STATE-SPONSORED VIOLENCE IN THE SOVIET UNION: SKELETAL TRAUMA AND BURIAL ORGANIZATION IN A POST-WORLD WAR II LITHUANIAN SAMPLE

By

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ABSTRACT

STATE-SPONSORED VIOLENCE IN THE SOVIET UNION:
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The Stalinist period represented one of the worst eras of human rights abuse in the Soviet Union. This dissertation investigates both the victims and perpetrators of violence in the Soviet Union during the Stalinist period through a site specific and regional evaluation of burial treatment and perimortem trauma. Specifically, it compares burial treatment and perimortem trauma in a sample (n = 155) of prisoners executed in the Lithuanian Soviet Socialist Republic (L.S.S.R.) by the Soviet security apparatus from 1944 to 1947, known as the Tuskulenai case. Skeletal and mortuary variables are compared both over time and between security personnel in the Tuskulenai case. However, the Tuskulenai case does not represent an isolated event. Numerous other sites of state-sponsored violence are well known. In order to understand the temporal and geographical distribution of Soviet violence, this study subsequently compares burial treatment and perimortem trauma observed in the Tuskulenai case to data published in site reports for three other cases of Soviet state-sponsored violence (Vinnytsia, Katyn, and Rainiai).

This dissertation discusses state-sponsored violence in the Soviet Union in the context of social and political theory advocated by Max Weber and within a principal-agent framework. Historical data characterizes the Soviet security apparatus as an efficient bureaucracy, which specialized in the identification, detention, and punishment of enemies throughout the Soviet Republics. In particular, Soviet authorities mandated that the only legitimate means of execution

was by fusillade, or gunshot to the back of the head. While historical data has largely focused on state officials who organized violence, less attention has been given to agents who actually performed violence in the name of the state. Evaluation of archaeological data and skeletal trauma permits researchers not only to study the death experiences of victims, but also to investigate the behavior and motivation of violence workers.

Results of mortuary analyses in the Tuskulenai case demonstrate that burial treatment did not significantly differ over time or between execution squads. However, comparison of skeletal variables reveals that the number of gunshot wounds decreased over time and between security personnel, while non-gunshot mechanisms increased and compliance with the state standard for execution decreased. Finally, comparison of mortuary variables among the four Soviet cases of violence reveals that burial treatment was relatively consistent across all cases, while perimortem injuries were consistent between the Vinnytsia and Katyn cases, but significantly varied at Tuskulenai and Rainiai. Furthermore, the Rainiai case demonstrated the greatest difference in perimortem wounds and compliance with state standards.

In conclusion, non-compliance with the state standard for execution (i.e. the improvisation of violence) in the Tuskulenai and Rainiai cases is attributed to a number of factors, including exogenous threats, the training of state agents, materialism, prisoner compliance, sadism, and desensitization to violence. This dissertation demonstrates that while violence may be ordered at the top by state leaders, the implementation of violence relies on the discretion of individual agents. As data from additional sites become available, it is hoped they can be included in both a regional and global index of state-sponsored violence during the twentieth century.

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CHAPTER 1: INTRODUCTION

STATE-SPONSORED VIOLENCE IN THE SOVIET UNION

The Union of Soviet Socialist Republics (USSR) represented a powerful, multi-national state ruled by the Communist Party from 1922 until 1991. In this political system, traditional roles of parliament and government were substituted as de facto instruments of the Party in order to enforce their ideology. Governing from Moscow, Soviet authorities implemented economic and political policies congruent with Marxist-Leninist ideology throughout their 15 Republics. From 1922 until 1953, Joseph Stalin retained the post of General Secretary of the Central Committee of the Communist Party of the Soviet Union. The Stalinist period represented a particularly tumultuous time in the Soviet Union, as the state attempted to implement drastic changes. These included nationalization of the means of production, abolition of the market, industrialization, and collectivization of agriculture. While the Soviet Union created a globally-competitive state, their developments were often made at the high cost of their own citizens. The state engaged in widespread terror, which included show trials, exiles, mass deportations, and executions of real and perceived enemies. Rummel (2008) estimates that approximately 61.9 million people were killed by the Soviet state from 1917 to 1987, with nearly 84% (51.8 million) of victims killed during the Stalinist period (1923-1953). This research investigates how state agents implemented violence in the Soviet Union during this period.

As dictator, Stalin officially interpreted ideology for both the Communist Party and the Soviet Union. Stalin envisioned a particular model of socialism, but understood that society would need to be absolutely transformed to reach this goal. Because undesirables and “enemies” did not conform to this ideal, Stalin implemented preventive measures to remove them from society. Whether or not individuals actually perpetrated crimes against the state was irrelevant;

their potential for such predilections (i.e. potential attitudes inferred from socio-economic characteristics, kinship, social origins, or ethnicity) was enough to qualify their guilt (Hollander 2008). Those deemed "enemies" were subject to mass arrest, deportation, exile, and execution. Most of the repressive activities occurred in secret, where individuals or entire families would "disappear" in the night. Similar to the *desaparecido* ("disappeared ones") in Guatemala and Argentina during the 1970s and 1980s, relatives and friends of the disappeared in the Soviet Union seldom knew the fate of their loved ones.

Mass terror operations, initiated by decrees from Stalin, were carefully orchestrated and executed by the state security apparatus. Historians have characterized this institution as highly bureaucratic, with proscribed rules for execution (Rudienė and Juozevičiūtė 2006; Stan 2009). While this repressive structure was established prior to Stalin's rise to power, this system was elaborated and intensified under Stalin's rule (Gregory 2009). Stalin organized, utilized, and motivated violence through his "punitive organs" and their agents in order to achieve his political, economic, and ideological goals. Cienciala et al. (2007) contend that between the late 1920s and early 1950s, approximately two million Soviet citizens were shot by state agents. Violence culminated in the mass terror campaigns of the 1930s and 40s, during which the Soviet security apparatus committed at least 30 episodes of mass violence. State-sponsored violence often occurred in border regions, such as in the Lithuanian Soviet Socialist Republic (L.S.S.R.). Campaigns of repression during the Stalinist period ebbed and flowed within a consistently despotic environment of terror.

Soviet authorities attempted to maintain the outward appearance of legality, especially following the Second World War. The Soviet Union was instrumental in the Nuremberg trials, punishing prominent Nazis who had organized war crimes during the war. Cognizant that the international community was actively developing resolutions to prosecute perpetrators of large-scale violence, the Soviet Union attempted to pass itself off as judicious. But their legal system was far different from that expected in a democratic state. Democracies generally encourage political participation, fair elections, freedom of press, freedom of association, universal suffrage, and judicial independence (Mitchell 2004). Leaders in democracies are also held accountable for their policies by their constituents (Mitchell 2004). These democratic principles were largely lacking in the Soviet Union.

Some may wonder why study the rationale of a totalitarian regime. By nature, these autocracies are often guided by capricious and imperious dictators who demand loyalty at any cost. However, it is specious to characterize all totalitarian systems the same way (Geyer and Fitzpatrick 2009). Every state has its own political and ideological goals guided by distinctive cultural and historical elements. Their internal dynamics are also influenced by the international climate in which they exist and the persona they attempt to project. The Soviet Union was a unique state. Its objectives and actions varied through new administrations, external and internal stimuli, and the will of strong personalities. Violence in these oppressive systems has also been known to fluctuate by individual violence workers, or those who implement policy on behalf of the state (Huggins et al. 2002). To not study these transformations would be amiss.

Cases of Soviet Violence

Inhabitants in border territories, such as Lithuania, were frequently subjected to campaigns of violence by the Soviet security apparatus. Situated on the Baltic Sea coast, Lithuania represents the geographical, cultural, and political intersection between Western Europe and Russia. Its strategic geopolitical position has served as a battle ground for various foreign groups for over a millennium. During the twentieth century, the Soviet Union occupied Lithuanian territory on two separate occasions: 1940-41 and 1944-1991. The beginning of the second occupation coincided with an organized offensive against both partisans and civilians in Lithuania.

From 1944 to 1947, Soviet authorities executed 767 prisoners in Vilnius, the capital of Lithuania, and subsequently buried their remains at the Tuskulenai Estate (Rudienė and Juozevičiūtė 2006). These remains were recovered following the re-instatement of independence in Lithuania during the early 1990s. Lithuanian researchers have diligently documented biological and archaeological data associated with the Tuskulenai case (Jankauskas et al. 2005). Even today, physical anthropologists continue the process of identification of executed prisoners (Jankauskas 2009). However, a systematic investigation of skeletal and archaeological data, which focuses on change through time or between execution squads, has not been performed.

The Tuskulenai case does not represent an isolated event. Other cases of Soviet state-sponsored violence toward "enemies" are well documented in the literature. It is important to view cases of Soviet violence during the 1930s and 1940s in a broader context in order to understand the breadth of these crimes. Three cases of Soviet violence are useful as comparisons to the Tuskulenai case, including mass graves of executed victims from Vinnytsia (Ukraine), Katyn (Russia), and Rainiai (Lithuania) (Figure 1). The *Vinnytsia case* involved civilians, executed during the Great Terror of 1937-1938. The *Katyn case* represents one episode of violence in a larger campaign of terror directed at Polish officers and soldiers during 1940. Finally, the *Rainiai case* consisted of victims executed as the German army approached Lithuania in 1941. Each case represents a distinct episode of violence committed by the Soviet security apparatus prior to and after the Second World War.

Figure 1: Distribution of Soviet Sites of Violence. For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation

RESEARCH GOALS

While historical data have largely focused on state officials who sanctioned and organized violence, less attention has been given to agents who actually performed violence in the name of the state and the manner in which the violence was carried out. Skeletal analyses of trauma provide researchers with the opportunity not only to study the death experiences of victims, but also to evaluate the behavior and motivation of violence workers. The primary goal of this study is to understand how state-sponsored violence was actually implemented on the ground by state agents. It also investigates how violence varied during the Stalinist period.

State-sponsored violence in the Soviet Union is discussed within the context of social and political theory advocated by Max Weber and within a principal-agent framework. Employing bioarchaeological and forensic approaches, this study assesses violence at a site specific and regional scale. While historical data document the presence of conflict, skeletal analysis of trauma represents direct evidence of violent interactions (Larsen 1997; Martin et al. 2012). Specifically, skeletal and archaeological data permit researchers to test the actual adherence to bureaucratic standards of violence established by state authorities. Ultimately, these data shed light on the relationship between state security forces and their agents, or the institutionalization of violence. Skeletal and archaeological variables are assessed in order to investigate the following research goals:

1. To understand how interment procedures and execution changed over time in the Tuskulenai case;

2. To evaluate how interment procedures and execution varied between two of the execution squads in the Tuskulenai case;

3. To investigate how interment procedures and execution varied amongst four Soviet cases of violence (i.e. Vinnytsia, Katyn, Rainiai, and Tuskulenai), as well as to explore potential reasons for this variation.

By comparing data from the Tuskulenai case to other examples of Soviet aggression, broader patterns of violence across the Soviet Union may be illuminated. Ultimately, this research can demonstrate how Soviet violence fits within broader narratives of state-sponsored violence during the twentieth century.

OUTLINE OF THE DISSERTATION

This dissertation attempts to understand how and why violence varied in the Soviet Union during the Stalinist period. Chapter Two provides the theoretical background employed to understand violence and the state. Specifically, this section discusses bioarchaeological and forensic anthropological approaches to violence. It also examines state institutions and agents responsible for organizing and executing violence.

Chapter Three discusses the historical background for this dissertation. This section examines the history of the state security apparatus, including its origin, transformation, and operational scheme. It also discusses the Soviet occupation of Lithuania, focusing on the restructuring of an autonomous Lithuanian state, the opposition that ensued, and the formation of the Tuskulenai case. Finally, this chapter provides background on the three other cases of state-sponsored violence in the Soviet Union.

Chapter Four outlines the research questions and hypotheses guiding this study. Chapter Five describes the materials and methods employed. Specifically, it discusses osteological variables (e.g. age, sex, perimortem trauma, etc.) as well mortuary variables (e.g. pit features, material culture, presence of concealment materials, etc.). This chapter also discusses the research materials and methods utilized in this dissertation.

Chapters Six through Eight present the results of mortuary and skeletal analyses. Chapter Six provides results associated with analysis of archaeological variables over time and between execution squads in the Tuskulenai case in order to address the research questions posed in this study. Chapter Seven discusses the demographic profiles of prisoners, as well as perimortem skeletal trauma and compliance with state guidelines in all burial samples in the Tuskulenai case. Subsequently, perimortem trauma and compliance is also discussed over time and between execution squads. Chapter Eight provides a regional comparison of violence, discussing trauma and interment procedures of individual cases as well as providing an integrated analysis of all four cases.

Chapter Nine proposes a typology of quadrilateral defects observed in the Tuskulenai case. Additionally, a historical case of violence is discussed in relation to the Tuskulenai sample, and a class of associated weaponry is explored in this chapter. Chapter Ten synthesizes the research questions, hypotheses, and results of this study. Using a principal-agent framework, this chapter also proposes several explanations for the improvisation of violence by Soviet violence workers demonstrated by varying frequencies of perimortem trauma and compliance. Finally, conclusions and future directions for research of Stalin-era crimes in the Soviet Union are discussed in Chapter Eleven.

CHAPTER 2: ANTHROPOLOGY, VIOLENCE, & THE STATE

Violence represents a biological and cultural phenomenon, pervasive in both past and present populations. Derived from the Latin *violentia*, the term 'violence' is associated with vehemence, impetuosity, and ferocity (Hinton 2002). Generally, violence refers to any type of physical, symbolic, structural, or psychological force of one agent against another (Hinton 2002). Violence may manifest at an interpersonal, intergroup, and intercommunity level, but it is intimately related to inequality, ideology, and power (Martin et al. 2012). State-sponsored violence represents a specific type of conflict, unique in its organizational structure, scale of application, and hierarchy of perpetrators. Anthropologists are uniquely suited to study violence committed by states because they connect social and political processes with biological outcomes (Martin et al. 2012). Due to the holistic nature of the field, anthropology acknowledges the complex interaction of biological, cultural, and environmental factors that shape human behavior. Specifically, their training in human variability can be employed to understand the causes, conditions, and consequences of violence (Otterbein 2000).

This chapter discusses the theoretical background of violence. It focuses on bioarchaeological and forensic approaches to studying violence, as well as skeletal indicators of trauma. This section also examines the role bureaucratic institutions play in initiating and maintaining state-sponsored violence, as well as the relationship of actors in these bureaucracies of violence.

ANTHROPOLOGICAL APPROACHES TO VIOLENCE

Anthropologists are suited to discuss the myriad dimensions of violence. These include the causes, circumstances (e.g. political, historical, socioeconomic, etc.), motivations, preventions, rituals, and relationship to social identities (Hinton 2002). This section discusses anthropological approaches to violence in bioarchaeology and forensic anthropology, as well as how researchers employ skeletal trauma to infer violent behavior.

Bioarchaeological Approaches to Violence

Bioarchaeology represents a multidisciplinary approach which assimilates principles of archaeology, cultural anthropology, and physical anthropology to create a powerful interpretive framework for skeletal data (Buikstra 2006). Bioarchaeologists study human remains at an assemblage level in order to understand patterns of behavior in past populations (Larsen 1997). Thus, it retains the potential to address broader anthropological issues, such as those related to physiological stress, paleodemography, activity patterns, division of labor, population movement, behavioral adaptation, and conflict (Buikstra 2006; Larsen 1997). This biocultural approach results in a powerful interpretive framework for assessing violence in past populations.

Human bodies are not merely biological entities, but are also mediums upon which social relations and cultural symbols are projected. The "politicization of the dead" paradigm contends that violence not only has pragmatic consequences (e.g. killing of victims), but that a cultural logic underlies violence (Pérez 2012). As such, violence to bodies should be viewed as cultural performances imbued with social meaning (Whitehead 2005). Bioarchaeologists strive to infer action, reconstruct behavior, and interpret the social meaning of violence through the identification and analysis of traumatic lesions (Martin and Frayer 1997). Traumatic lesions in skeletal remains represent direct evidence of injury related to conflict, accident, surgery, or disease (Walker 2001). Their frequency can be used to ascertain the lifestyle and behavior of past people (Lovell 1997). Lovell (1997) contends that bioarchaeologists who study conflict through analysis of skeletal trauma have three broad objectives: to interpret the causes of trauma (e.g. social, cultural, or environmental), to identify their relationship to biological variables that may hold cultural or social significance, and to understand their temporal or spatial variation.

The benefits of bioarchaeology lies in the ability of researchers to assemble examples of violence within larger contexts, such as temporal, spatial, depositional, and typological frameworks (Carman 1997b). Bioarchaeology also emphasizes a population approach, which interprets injuries in a broad frame of reference (Walker 2001). Injuries assessed at an assemblage level can more efficiently test viable hypotheses of veneration and violation of the deceased. As analyses become more contextualized with the accumulation of multiple lines of evidence, the actions and motivations of past people are illuminated. Martin and Frayer (1997) contend that skeletal data are useful for understanding violence and warfare, particularly when they are studied with regard to evolutionary patterns, environmental changes, subsistence or demographic stress, gender, weaponry, and political or ideological factors.

Bioarchaeologists have proposed a variety of theoretical models for violence. Most anthropologists avoid a strictly biological explanation, challenging the notion that violence is innate or inevitable. Rather, researchers tend to advocate models that explore the cultural and social dimensions of violence. Carman (1997a) recognizes two general paradigms for explaining the effects of violence: ecological models, which focus on the adaptive functions of violence, and sociological models, which focus on the symbolic attributes of violence. Other approaches study the *causes* of violence. Allen and Arkush (2006) identify three primary paradigms with this research goal, including the materialist, ideological, and political perspectives. The materialist approach evaluates the possible causes of warfare, such as the ecology or environment, which may have led to changes in the duration, frequency, and intensity of violence. This perspective views warfare as an expedient means of mitigating material need (Allen and Arkush 2006). The ideological approach evaluates how cultural, ideological, or social-structural factors influence the goals, tactics, and strategies of warfare. Advocates of this perspective argue that the tradition of warfare and its associated symbols legitimize military exploits (Allen and Arkush 2006). Finally, the political approach assesses the relationship between military victory and elite power by examining the political aims of elites, the development of chiefdoms and states, and the origin of sociopolitical complexity. Proponents of this paradigm focus on how warfare increased or inhibited the centralization of polities.

The causes of violence are most certainly complex. Walker (2001) recommends that researchers should avoid simplistic explanations based on human nature or models that focus solely on materialistic, ecological, or social motivations. Similarly, Allen and Arkush (2006) argue that anthropologists should not subscribe to a simplified model of conflict, but rather should acknowledge that violence can operate as both the cause and effect of social transformations. Conflict may result from population pressure, sedentism, statehood, and ideology, while acting as a cause of greater sociopolitical processes. Thus, Allen and Arkush contend that a broader approach will acknowledge the complexity of violence, which may be fundamentally modified by the same social transformation that it facilitates.

Violence can vary in a number of dimensions, including by level, scale, intensity, context, degree of symbolism, and legitimacy. Since violence manifests at a variety of levels, anthropologists can study violence from the state to the individual (e.g. war to homicide) (Carman 1997b). Subsequently, the scale and intensity that ensues can differ: scale refers to the size of combat, types of formation, and number of casualties, while intensity refers to the frequency with which people engage in violence (Bamforth 1994). Researchers may also study how violence relates to specific contexts, including the political, social, or ideological (Carman 1997b). However, not all violence is physical. Violence may be symbolic, manifesting in iconography or as violations to objects (e.g. monuments, graves, etc.) rather than people (Carman 1997b). Finally, researchers may also explore the legitimacy of violence. Carman (1997b) notes that the legitimacy of violence is dependent on the position of the one examining it: victims and eye-witnesses may deem violence as illegitimate, while perpetrators may consider violence as highly sanctioned, necessary, or even inevitable. The legitimacy of violence may be contentious and ultimately determined by culture, history, or law.

As with any scientific field, bioarchaeological research on violence has limitations. Some of these limitations include problems with interpreting skeletal injuries, defining violence, cultural contingency and archaeological data. Skeletal injuries may be difficult to assess or interpret for a number of reasons. The analysis of dry bone may be hindered by poorly preserved, fragmented, or incomplete remains which can obscure diagnoses (Steyn et al. 2009). Intrinsic factors (e.g. age and sex) and extrinsic factors (e.g. culture, environment, etc.) can also influence the location, prevalence, shape, appearance, multiplicity, sequence and severity of trauma (Steyn et al. 2009). Finally, the actual incidence of injury may be greatly underestimated because most assaults that cause soft-tissue injuries are not detected in skeletal material (Walker 2001).

Researchers face major problems regarding standardized terminology in the study of violence. There is no consensus as to what constitutes “violence” and researchers have advanced slightly different definitions. Walker (2001) contends that “violence” implies human behavior which causes personal harm or injury to another. In particular, he argues that researchers must distinguish between accidental and intentional injuries, because of the implication of human malevolence. Accidental injuries occur unexpectedly, while deliberate (or violent) injuries occur with human intentionality (Walker 2001). However, problems arise when discussing medical intervention, such as trephination, where intentional trauma is performed out of benevolence. Walker's definition is ambiguous enough to account for various degrees of intentionality. Similarly, Carman (1997a) defines "violence" as acts directed by humans at other humans with the intent of harm. Martin and Frayer (1997) separate the study of violence into the documentation of warfare versus non-war violence. Non-warfare violence is difficult to define since it encompasses an ambiguous class of human behavior that is found in different contexts and may be interpreted in various ways. These behaviors include homicide, ritualized combat, hand-to-hand fighting, scalping, sacrifice, cannibalism, and domestic abuse (Martin and Frayer 1997). Martin and Frayer (1997) argue that researchers should not attempt to provide a single definition of violence, particularly non-war violence. They also warn against interpreting these behaviors across spatially and temporally diverse groups. However, generally researchers tend to employ a binary of injuries as intentional or accidental. Walker (2001) suggests that "violence" in the study of past populations should refer to skeletal injuries that exhibit strong evidence of malevolent intent. However, he also contends that researchers should interpret the intent of injuries prudently, because while an injury's location is important for understanding its cause, accidental and intentional trauma can produce the same type of traumatic lesion.

Careful analysis of skeletal and archaeological data can reveal important patterning of conflict and violence. Lovell (1997) suggests that researchers should provide a quantifiable description of trauma using specific terminology that is supplemented by photographic and radiographic documentation for future interpretations. Researchers should also avoid simplistic interpretations. Multiple interpretations may be provided for any given archaeological pattern, and empirical evidence rather than plausible argumentation should be employed to interpret behavior (Bamforth 1994). A bioarchaeological approach emphasizes an explanatory model for violence, rather than merely a descriptive one. This paradigm investigates not only the victims of violent interactions, but attempts to identify the motivation of perpetrators.

Forensic Anthropological Approaches to Violence

Forensic anthropology is defined as the application of principles and methods of physical anthropology, including the knowledge of skeletal anatomy and human variation, to medico-legal issues (Komar and Buikstra 2008). Anthropologists can contribute significantly to medicolegal death investigations due to their training in a biocultural approach (Kimmerle and Baraybar 2008). The major goals of forensic anthropology include victim identification and interpretation of traumatic injuries (Komar and Buikstra 2008), although they may also be called upon to search, document, and recover human remains, to estimate the postmortem interval, and to develop biological profiles (Steadman and Haglund 2005). Increasingly, forensic anthropologists are also utilized to identify or assess living individuals based on morphological and metric characteristics (Cunha and Cattaneo 2006). Finally, forensic anthropologists are trained to work within the medico-legal field, and should be familiar with chain of custody, court testimony, confidentiality, and crime scene etiquette (Komar and Buikstra 2008). Forensic anthropologists perform these duties in a variety of contexts, including domestic casework, mass disasters, and human rights.

Forensic anthropologists have been instrumental in the investigation of human rights violations. In order for national and international courts to prosecute perpetrators for atrocities, they require objective collection and analysis of physical evidence by forensic scientists. Similar to their work in domestic cases and mass disaster, forensic anthropologists may be asked to excavate mass graves, process human remains, reconstruct fragmented remains, develop biological profiles, identify victims, and interpret skeletal trauma (Ferllini 2003). However, these objectives are complicated by the international setting. Forensic anthropologists working internationally must be cognizant of culture, context, and assorted judicial systems (Kimmerle and Baraybar 2008).

Researchers (Stover et al. 2003; Juhl and Olsen 2006; Jankauskas 2009) contend that mass grave investigations serve multiple goals, including aiding humanitarian efforts, determining legal accountability, and rectifying the historical record. Mass grave investigations serve humanitarian functions through the identification of victims and the repatriation of remains to family members. This process attempts to provide families with closure while allowing them to engage in proper burial rituals (Juhl and Olsen 2006). Thus, forensic investigations aid in the restoration of personal and social well-being, while reconfirming the rights of both the deceased and the living (Stover et al. 2003; Jankauskas 2009). Mass grave investigations also achieve legal objectives by quantifying victims and documenting human rights violations. Thus, these investigations establish accountability by providing evidence to national and international bodies in order to prosecute perpetrators (Stover et al. 2003). Finally, mass grave investigations serve historical purposes by determining factual truth, establishing historical records, and counteracting historical revisionism (Stover et al. 2003; Juhl and Olsen 2006). These investigations record details of abuse, including specific events, periods, sequences, and locations.

Stover et al. (2003) contend that exhumations should balance the legal need for criminal trials with the humanitarian needs of families and communities. Thus, violence should be understood in terms of individual and collective experiences. Stover et al. highlight a case in northern Iraq, where more than 4,000 Kurdish villages were destroyed during the 1980s. While individuals were killed, entire communities were also decimated. Thus, loss may be experienced not only by family members, but also by entire segments of a population. One way to help alleviate this loss is by including family and community members in the investigation process. After conflict, the search and identification of missing persons represents a strategy for restoring well-being in post-conflict areas. Stover et al. (2003) contend that successful forensic investigations are those that actively involve families and their organizations in processes to locate, exhume, identify, rebury, and memorialize the deceased. This involvement facilitates the mourning process and community unity associated with humanitarian goals.

While it is the responsibility of the medical examiner to determine the manner of death, forensic anthropologists may assist in this process by assessing skeletal pathology. Rodriguez-Martin (2006) contends that forensic anthropologists are adept at identifying lesions in dry bone, determining timing of injury, and interpreting its relationship to the victims' death. In turn, this process can help in the reconstruction of life events, aid in individualization, and reveal violations of human rights (Cunha and Pinheiro 2009). Forensic anthropologists also identify perimortem lesions that occur around the time of death. The identification of perimortem lesions, coupled with observations of burial features (e.g. body position, body orientation, and associated objects), can significantly contribute to the death investigation (Sauer and Simpson 1984). Similar to bioarchaeology, the intentionality of trauma in forensic contexts may be difficult to determine. Cunha and Pinheiro (2009) advocate four categories of traumatic injuries: accidental trauma (e.g. falls, etc.), intentional trauma (e.g. gunshot wounds, stab wounds, etc.), cultural trauma (e.g. foot-binding), and therapeutic trauma (i.e. surgical intervention). In their definition, intentional trauma is synonymous with "violence." However, due to the legal implications of their findings, forensic anthropologists' interpretations must be objective and well-supported.

Kimmerle and Baraybar (2008) advocate an epidemiological approach for the collection and analysis of skeletal trauma in forensic contexts. This framework permits the differential diagnosis of wounds, evaluation of the mechanisms of injuries, and determination of the nature of crimes. In particular, the authors stress six components for this model including: the *demography of victims* (i.e. age/sex distributions, vulnerability of victims, and wound to killed ratio), *context* (i.e. fatal environment), *intention of perpetrators, scientific protocols, weaponry*, and *estimation of cause and manner of death* (Kimmerle and Baraybar 2008). Synthesis of these data is meant to provide a robust interpretation of skeletal trauma for effective courtroom testimony.

Skeletal Indicators of Violence

Injuries sustained during or at the end of life frequently preserve in skeletal remains and may help in the reconstruction of traumatic events (Kimmerle and Baraybar 2008). Trauma is defined as any bodily injury or wound, and can be classified as fractures, dislocations, avulsions, amputations, disruptions in blood/nerve supply, or artificially-induced deformation (Roberts and Manchester 2007; Steyn et al. 2009). Fractures are defined as incomplete or complete breaks in the continuity of bone that result from repeated stress, underlying disease, or acute force (Lovell 1997). In order to analyze trauma, researchers must be familiar with normal skeletal development and be capable of differentiating traumatic lesions from epigenetic traits, abnormalities, and pathological conditions (Komar and Buikstra 2008).

Lovell (1997) contends that the interpretation of skeletal injuries represents a complicated decision-making process, reached through the combined analysis of fracture characteristics (e.g. type, location, distribution, etc.), mechanism of trauma, and timing of injury. Patterns of skeletal trauma should be documented in individual skeletons and throughout the population and subsequently compared with the burial context of the remains (Lovell 1997). The reconstruction of behavior also requires an examination of intrinsic biological variables (e.g. age and sex) and extrinsic factors (e.g. environmental and sociocultural) which may influence the presence or distribution of skeletal injuries (Lovell 1997; Walker 2001). Demographic profiles represent one means of revealing the population-level effects of conflict, such as the participation of young males in war or the capture of females by enemies (Lambert 2002). While the presence of injuries in an assemblage often reflects conflict, it alone does not represent intergroup aggression. Similarly, absence of injury does not necessarily indicate a lack of conflict; rather, it may reflect a dearth of skeletal material or lack of interest in this type of analysis (Lambert 2002). Lovell (1997) warns that interpretations must be made cautiously, as trauma caused by activity may be similar to that due to interpersonal violence. Assessing the ultimate cause of injury is best performed when done in concert with other forms of evidence.

It is also important to understand trauma patterns at the population level, which aids in the understanding of extra-legal conflicts, permits comparisons of violence with prior conflicts, and reveals information not discernible from individual examinations (Komar and Lathrop 2012). Thus, researchers should evaluate the number of injuries and their overall distribution by collecting data on specific elements fractured out of those elements observed, and number of individuals affected by fractures (Kimmerle and Baraybar 2008). Through the comparison of trauma patterns at a population level, researchers can identify the signatures of various forms of interpersonal conflict, such as genocide, conventional warfare, or crimes against humanity (Komar and Lathrop 2012).

While trauma analysis may serve as a powerful tool in the investigation of violence, there are limitations to the process. Cunha and Pinheiro (2009) warn that forensic anthropologists should be careful in their determination of intentionality based solely on the analysis of skeletal tissue. Furthermore, Sauer and Simpson (1984) contend that it is not the responsibility of the forensic anthropologist to determine the cause of death. Rather, forensic anthropologists merely contribute evidence for the determination of the manner of death (e.g. natural, accidental, suicide, homicide, or undetermined). However, the determination of the manner of death requires understanding the state of mind of the assailant, including their motive (personal justification), intent (mental resolution), and volition (free will) (Komar and Buikstra 2008). These elements may be particularly difficult to determine. Finally, Rodriguez-Martin (2006) argues that while different mechanisms of trauma often produce signature defects, many lesions lack specificity. The same method may produce various lesions and the same lesion may be produced by several methods. Despite these limitations, trauma analysis serves as an effective tool in the reconstruction of events.

Mechanism of Trauma

By definition, trauma subjects bone to some degree of force which may leave characteristic marks on bone. Anthropologists analyze fracture patterns in order to interpret the type of force applied, or mechanism of trauma. Three mechanisms of trauma are typically identified (blunt force, sharp force, and projectile trauma) and may be differentiated by their focus and load. However, these categories may overlap (Kimmerle and Baraybar 2008). This section particularly focuses on gunshot wound interpretation.

Blunt force trauma (BFT) consists of damage inflicted to a relatively large impact area by relatively low velocity impact (Galloway et al. 1999). Since blunt force injuries are produced from compression, bending, or shearing forces dynamically applied over bone, both simple and comminuted fractures may result (Kimmerle and Baraybar 2008). In long bones, complete fractures may manifest as transverse, oblique, spiral, or comminuted fractures (Galloway et al. 1999). Butterfly fractures in tubular bone may also form as a result of BFT. Butterfly fractures form when the bone bends around an insult, producing compression on the concave side and tension on the convex side. The bone fails on the tensile side first and then on the compression side, creating a triangular-shaped wedge of bone which can help establish the direction of force (Smith et al. 2003). In the cranial vault, fractures associated with BFT may manifest as radiating or concentric fractures. Since fractures follow paths of least resistance, blunt force to the face may produce LeFort fractures between buttressed areas and along suture lines (diastatic) (Berryman and Symes 1998). Instruments that commonly facilitate blunt force trauma include clubs, sticks, and fists, but injuries may also manifest as the result of falls, manual compaction of the body, and motor vehicle accidents (Galloway et al. 1999; Komar and Buikstra 2008). However, since fracture initiation and propagation are influenced by the magnitude, area, and duration of the blow, as well as the bone elasticity, plasticity, and density, fracture patterns may vary (Berryman and Symes 1998). Komar and Buikstra (2008) contend that analysis of blunt force trauma should document multiple variables, such as anatomical location (e.g. region and elements), description of fracture lines (e.g. transverse, oblique, spiral, etc.), fracture complexity (e.g. simple or comminuted), communication with external environment (e.g. simple or compound) biomechanical processes, and evidence of incomplete fractures.

Sharp force trauma (SFT) consists of dynamic compression forces applied to the surface of bone in a narrow and focused manner (Byers 2008). However, Smith et al. (2003) describe sharp force trauma as blunt force applied by a sharp object. Sharp force includes slashing, stabbing, chopping, or incising wounds made by any number of instruments, such as knives, machetes, hatchets, and axes (Komar and Buikstra 2008). The primary result is a discontinuity at the point of impact which takes various forms, such as punctures, incisions, or clefts, depending on the direction, focus, and energy of the causative force (Byers 2008). Secondary types of wounds may include radiating fractures, hinge fractures, striations, and wastage. Almost all of these features are visible macroscopically, although magnification is useful for identifying subtle details, such as tool marks (Byers 2008; Komar and Buikstra 2008). Injuries from machetes or axes (which have sharp edges) may also overlap with blunt force trauma, as blows from these heavy objects often produce cutting and crushing wounds (Kimmerle and Baraybar 2008). SFT has the capability of reflecting not only the class of weapon, but also its individual characteristics (Smith et al. 2003). Komar and Buikstra (2008) suggest that when analyzing sharp force trauma, physical anthropologists should collect data regarding features of the wound (e.g. number, shape, length, depth, etc.), anatomical position, and direction.

Projectile trauma consists of high-velocity compressive force which is initially narrowly-focused but gradually becomes wider as the projectile passes through bone (Byers 2008). Projectiles from firearms create gunshot wounds (GSWs), and the class of weapon (i.e. handgun, rifle, shotgun, etc.), velocity of the projectile (i.e. low, medium, or high), ammunition shape (i.e. shotgun pellets, hollow points, etc.), distance of fire, angle of trajectory, and presence of intermediate objects can differentially affect skeletal injuries (Kimmerle and Baraybar 2008). However, Kimmerle and Baraybar (2008) note that GSWs demonstrate more predictable associated fracture patterns due to the consistency in the morphology and construction of ammunition. Characteristics commonly discussed in association with GSWs to skeletal tissue include *range of fire, primary wound morphology, secondary/tertiary fractures, wound tract, direction of fire, number of injuries, sequence of injuries,* and *caliber estimation.*

Range of fire refers to the distance between the object and the weapon muzzle, which may consist of contact (full contact), near contact (within 10 mm), intermediate-range, and long-range (Di Maio 1999). However, in skeletal remains, the exact determination of the range of fire is difficult or impossible due to the lack of hallmark signs for differentiating categories (e.g. muzzle stamp, stippling, etc.) (Komar and Buikstra 2008). Kimmerle and Baraybar (2008) note that researchers may make broad generalizations regarding the range of fire (contact/near contact vs. intermediate/distant) based on the degree of fracturing, presence of secondary/tertiary fractures, wound morphology, and presence/absence of exit wounds.

Wound morphology is also an important characteristic as bullets from GSWs may enter an object and become lodged in it (penetrating wound) or the bullet may enter and exit the object (perforating wound) (Komar and Buikstra 2008). Projectiles that penetrate bone perpendicularly often produce plug formation and spall production. This is where bullets push (or punch) out the bone table, while spall produces a bevel or funnel-shaped wound (Berryman and Symes 1998; Komar and Buikstra 2008). The cone-shaped crater's largest diameter faces the direction in which the projectile is traveling. When a projectile strikes a bone with enough energy, it can create both an entry and an exit wound. Physical anthropologists recognize typical *entry* wounds in the cranium as circular, smooth holes with an internal bevel on the endocranial surface and *exit wounds* as those with external bevels on the ectocranial surface (Di Maio 1999; Rhine and Curran 1990; Smith et al. 2003). However, atypical entrance wounds may also occur, including gutter, keyhole, and irregular defects (Kimmerle and Baraybar 2008). Furthermore, differentiation of entry and exit wounds is more difficult in thin bones, such as those in the face or orbital plates (Di Maio 1999).

If a bullet impacts a skull with enough force, it may create *secondary* and *tertiary fractures* subsequent to the initial impact site. Secondary (radiating) fractures propagate from the bullet impact site in response to an increase of pressure within the skull. Radiating fractures continue to form until pressure subsides or it is halted by another structure such as a suture or a pre-existing fracture (Smith et al. 2003). Furthermore, fractures that radiate from entrance wounds can travel at a faster rate than the bullet itself, traversing the skull before the bullet exits (Berryman and Symes 1998; Smith et al. 2003). Tertiary (heaving concentric) fractures form subsequent to radiating fractures due to intracranial pressure still present. Concentric fractures surround the point of impact and appear as a series of independent arcs connecting radiating fracture lines (Smith et al. 1987). While radiating fractures form without the presence of heaving concentric fractures, the reverse is not true (Smith et al. 1987). Smith et al. (1987) note that entrance wounds often have long radial fractures and multiple generations of concentric heaving fractures, whereas exit wounds demonstrate shorter radial fractures (that may be arrested by pre-existing fractures) with fewer concentric heaving fractures. Characteristics of these secondary fractures permit researchers to identify entrance or exit wounds independent of wound beveling.

Wound track refers to the path of a bullet through the body, from entry to exit wound (Komar and Buikstra 2008). Researchers can determine the *direction of fire* by identifying entry and exit wounds, their wound track, and evidence of minute fragments of metal (or wipe) lodged in tissue (Komar and Buikstra 2008). This determination can lead to important information regarding the spatial relationship of the shooter to the victim, such as from the rear, front, or side (Komar and Buikstra 2008). Also, by analyzing wound tracks, researchers may then estimate the minimum *number of injuries* (Kimmerle and Baraybar 2008).

After identifying the wound track and number of injuries, the *sequence of injuries* may be assessed. This task requires investigators to identify the point of impact (primary fracture production), radiating fractures, and heaving concentric fractures. Since radiating fractures and concentric fractures are halted by pre-existing discontinuities, researchers can establish the order that injuries occurred by identifying which fracture lines terminate upon another (Rhine and Curran 1990). However, Kimmerle and Baraybar (2008) note that on occasion, radiating fractures from high-velocity rounds may cross pre-existing fracture lines.

It is debatable whether researchers can accurately *estimate caliber* from entrance and exit wounds. Evaluating the relationship between cranial entrance wound diameters and bullet caliber, Berryman et al. (1995) argue that specific bullet caliber cannot be reliably determined from wound size. This is due to the fact that wound size and morphology may be affected by intermediate targets (e.g. clothes), angle of trajectory (e.g. tangential impacts), bullet characteristics (e.g. diameter, shape, strength, etc.), previous discontinuities (e.g. existing fractures), loss of gyroscopic stability, distance, and victim age (Berryman et al. 1995; Komar and Buikstra 2008). Di Maio (1999) argues that while the specific caliber of bullet cannot be determined, researchers may use the size of an entrance hole to eliminate certain bullet calibers.

Although many GSWs are easily interpreted, trauma analysis can be problematic. Researchers commonly encounter atypical gunshot wounds, such as “keyhole” defects, hidden exits, and interposed wounds, which occur due to foreign objects and unusual positions of the body (Komar and Buikstra 2008). If a bullet strikes the cranium tangentially a keyhole defect may manifest, which is externally beveled along part of its margin (Berryman and Symes 1998). A type of gutter wound, the shape of keyhole defects can be highly variable (Kimmerle and Baraybar 2008). Hidden exits may also confound researchers. This phenomenon occurs when bullets exit through existing fractures, obscuring or preventing a plug or spall (Komar and Buikstra 2008). Careful examination of fragments and fracture patterns may reveal possible exit wounds. Finally, atypical wound morphology may be caused by bullets which are deformed by intermediate objects such as windows or doors. These interposed wounds may be laced with foreign trace evidence from intermediate objects, such as glass or wood (Di Maio 1999; Komar and Buikstra 2008).

While differentiation between mechanisms of trauma may be difficult, Berryman and Symes (1998) contend that key differences exist in fracture propagation between blunt force trauma and projectile trauma. Specifically, they note that since blunt force trauma involves a reduced loading rate, it subsequently causes bone to react with plastic deformation. The inner table experiences tensile force as it bends internally while the external table experiences compressive forces. Since bone fails first in tension, fractures initiate from the inner table and radiate from the impact site, often producing wedge-shaped plates. As tensile forces increase on the external surface, concentric fractures which are perpendicular to radiating fractures and circumscribe the impact site occur first on the outer table and propagate to the inner table. Thus, in blunt force trauma, concentric fractures are beveled internally (Berryman and Symes 1998). Conversely, due to the higher magnitude and rate of loading involved in projectile trauma, intracranial pressure is increased and bone responds as brittle material. Higher velocity weapons tend to produce little plastic deformation, unless a bullet loses enough energy before striking bone (Berryman and Symes 1998). In gunshot trauma, linear fractures also radiate from the bullet entry hole and produce plates of bone between the radiating fractures. However, in contrast to blunt force trauma, the ensuring concentric fractures initiate on the inner table (under tension) and move to the outer table. Thus, concentric fractures in gunshot trauma are beveled externally (Berryman and Symes 1998). However, Berryman and Symes (1998) warn that evidence of beveling may be obscured or difficult to interpret. Thus, fracture interpretation and assessment of mechanism of trauma should be performed cautiously.

Timing of Injury

Physical anthropologists are interested in when these mechanisms of trauma were applied to skeletal tissues with respect to death. Researchers generally partition the timing of injuries based on whether they occurred before death (antemortem), around the time of death (perimortem), or after death (postmortem). This section will review literature pertaining to each time period of injury.

Injuries that ***precede the death event*** are often (but not always) associated with evidence of an osteogenic reaction (Lovell 1997; Sauer 1998). Martin et al. (2004) divides fracture healing into three biological phases, including inflammatory, reparative, and remodeling phases. The *inflammatory phase* initiates immediately after trauma has occurred and is characterized by hematoma formation, vasodilation, serum exudation, and infiltration by inflammatory cells (Martin et al. 2004). This inflammatory stage functions to immobilize the fractured bone and activate the cells responsible for bone repair. It generally lasts three to seven days. The *reparative phase* of healing lasts about a month and is characterized the formation of periosteal and medullary calluses, which bridge the fractured bones internally and externally. Within 1 to 2 weeks, a provisional callus is formed when woven bone or cartilage accumulate substantial mineralization. When the cartilaginous and osseous matrices calcify a rigid, *bony callus* is formed. The reparative phase concludes once the bony callus can equal or exceed the rigidity of the intact bone, establishing a *bony union* (Martin et al. 2004). The *remodeling phase* of fracture healing gradually restores the fracture site to the original contour of the bone. This is characterized by the removal of medullary and periosteal calluses, where woven bone or calcified cartilage is replaced by secondary lamellar bone (Martin et al. 2004). Despite the fact that fracture sites are remodeled, radiographic evidence of fractures may persist for years. The length of time required for these stages varies depending on the element fractured, the type/position of the fracture, fracture severity, apposition of fragments, stability during healing, age of the individual, dietary/health status, and treatment availability (Galloway et al. 1999; Roberts and Manchester 2007). Roberts and Manchester (2007) also note that complications may occur that affect the rate of healing, including bone infection (e.g. osteomyelitis), limb shortening/misalignment, osteoarthritis, damage to blood vessels/nerves, and pseudoarthroses. Thus, while evidence for remodeling generally indicates that injury occurred at least one week before death (Sauer 1998), skeletal biologists must examine injuries with regard to these variables before cautiously estimating the period of healing. Using this information, investigators may make judgments about the length of time elapsed between an injury and when the victim died.

Injuries that occur ***around the time of death*** (perimortem) are often the most difficult category of injury to distinguish. Perimortem injuries are not associated with evidence of remodeling (Sauer 1998). Because living bone contains a high moisture and collagen content, osseous material retains some degree of elasticity at the time of injury and responds to force in a characteristic fashion (Maples 1986). However, since moisture content may persist in bone for some time after death, the determination of the perimortem period has more to do with the integrity of bone tissue rather the actual time of death (Galloway et al. 1999). Patterns of injuries associated with the perimortem period include concentric circles, radiating or stellate fracture lines, as well as the presence of greenstick fractures, incomplete fractures, spiral fractures, and depressed or comminuted fractures (Lovell 1997; Sauer 1998). These fractured edges are also more likely to manifest as oblique angles (Lovell 1997). Furthermore, perimortem injuries will likely exhibit uniform stains from water, soil, or vegetation on adjacent fracture edges because the internal bone surfaces are exposed at the same time of deposition (Maples 1986; Sauer 1998). Lambert (2002) notes perimortem defects which are commonly related to violence include depressed skull fractures, nasal fractures, tooth fractures, broken ribs, and parry fractures. However, perimortem damage may also occur as cutmarks, punctures, burning and may indicate trophy-taking (decapitation, scalping, and dismemberment), torture, corpse mutilation, or cannibalism (Lambert 2002). It is important to reiterate that the perimortem period in skeletal remains differs between forensic anthropology and forensic pathology. In forensic anthropology, this period includes portions of both the true antemortem and postmortem intervals (Galloway et al. 1999).

Skeletal tissues can also sustain injuries ***after the death event***. Taphonomic assessment is an essential component in the analysis of skeletal trauma. In physical anthropology, taphonomy refers to the processes that alter a body from the time of death until analysis (Ubelaker 2006). Ubelaker (2006) notes that researchers are responsible for identifying postmortem modifications on skeletal tissue and their causes, which can occur due to animal-related processes (e.g. trampling, chewing, gnawing, etc.), physical factors (e.g. water transport, weathering, movement, etc.), or human-induced trauma (e.g. dismemberment, thermal alteration, etc.). Many of these processes can be mistaken as pseudo-trauma, such as carnivore tooth marks mimicking sharp force trauma. However, taphonomic damage can also provide evidence of corpse exposure or lack of proper burial. Recognizing these processes can inform researchers regarding the postmortem interval, environmental reconstruction, and evidence of foul play (Ubelaker 2006).

Since these injuries may be difficult to distinguish from perimortem trauma, researchers are guided by distinct characteristics of fractures to help elucidate the timing of injury. At death or soon afterwards, bone begins to lose its water and collagen content. This process causes bone to become harder and stiffer, and significantly changes the manner in which they respond to force (Maples 1986). Consequently, fractures incurred after loss of moisture typically lack distinctive patterns due to the inclination of the brittle bone to shatter on impact, and these injuries often manifest as smaller fragments with squared-fracture edges (Lovell 1997). Radiating fractures and concentric heaving fractures are also rarely formed in dry bone (Galloway et al. 1999). However, Galloway et al. (1999) caution that in certain burial environments (e.g. mass graves with excessive body fluid) bones may retain their moisture content and elasticity. Researchers may rely on color to identify breakage after death. Recently fractured edges may exhibit a dramatic color difference from the surface of the bone since they are exposed to a different length of discoloration time during the post-depositional period (Sauer 1998).

The meticulous documentation of skeletal trauma, including identification of type and location of fractures, mechanism of trauma, and timing of injury can greatly assist anthropologists in investigating violent behavior.

STATE-SPONSORED VIOLENCE

One of the defining characteristics of the modern state is its monopoly on violence (Weber 1958a). However, states choose to differentially apply this violence: while some states maintain a relatively equitable and peaceful environment, others may zealously employ violence, thereby creating a "culture of terror." Sluka (2000:22) defines this repressive phenomenon as "…an institutionalized system of permanent intimidation of the masses or subordinated communities by the elite, characterized by the use of torture and disappearances and other forms of extrajudicial killings as standard practice." With this repressive framework in mind, this section discusses the structure and primary actors involved in the bureaucracies of violence. It also evaluates motivations of agents who act independently of their bureaucracy.

Bureaucracy of Violence

Researchers often explore how and why states employ violence, especially when human rights are violated. Sluka (2000) highlights two juxtaposed theories that have emerged to explain why states employ terror. The structural-functional argument contends that states attempt to maintain law and order to protect its citizens. Thus, terror is employed to temper popular resistance and to challenge elite control. In contrast, a power-conflict approach argues that state elites perpetuate terror to maintain their positions within a socially-stratified system of power. Thus, terror is conceived as a conscious strategy rather than a reaction to resistance. In particular, Sluka (2000) contends that the increasing power and wealth of the elite is directly correlated to the growth of state terror. While these paradigms explain why states (as a collective body of elites) choose to employ violence, they do not illustrate the mechanism through which power and violence is realized. Mitchell (2004) contends that researchers should consider human rights violations not only in terms of environment (e.g. war, development level, regime type), but also in terms of choice and decision-making of leaders and agents. Specifically, he advocates exploring the motives behind policies and behavior of individuals within bureaucratic structures: "Human rights violations are a policy- not the inhuman outcome of impersonal, slow-shifting economic, historical, international, or sociological substructures- and policies require policy makers" (Mitchell 2004: 18).

Weber's (1958b) paradigm of bureaucracy describes an organizational structure designed to manage procedures, coordinate labor, and implement policy in modern nation states. Bureaucracies have fixed and official roles, where incumbents can be replaced without major disruption to the office itself. Thus, bureaucrats operate as components in a larger mechanism, performing single yet integrated functions. Bureaucracies also have a hierarchy of authority, where action is mandated and supervised from above. Furthermore, official conduct is regulated by formal rules and written in official documents, producing standardized actions. Duties are performed in an objective manner, devoid of ethos, and represent functional specializations that necessitate expert training. Finally, bureaucracies often keep knowledge, actions, and intentions secret. The purpose of the formal, rule-bound nature of bureaucratic administrations is to function more effectively, based on speed, precision, continuity, obedience, and discretion (Weber 1958b). A bureaucracy of violence denotes a hierarchical structure which implements violence on behalf of the state.

One of the foundations of Stalinism was the development of bureaucracies. Through these organizational structures, Stalin enlisted bureaucrats who acted with blind obedience, executing orders with little regard for democratic decision making (Levytsky 1972). Bureaucratic structures were employed throughout all aspects of the state, including the

Communist Party, the economy, the army, and the police. This bureaucratic structure also extended to the security apparatus which implemented violence in the name of the state. In order to carry out the massive campaigns of repression during the 1930s and 40s, the state security apparatus required a highly efficient body. Massive operations were planned and carefully monitored, with quotas for the expected number of victims (Gregory 2009).

The Soviet security apparatus also represented a "nested dictatorship," denoting a system in which the supreme dictator had subordinates, but these subordinates represented dictators to subsequent subordinates and so forth (Gregory 2009). Thus, this hierarchical structure ensured that every subordinate answered to a higher administrator. Gregory (2009) contends that Stalin employed subordinates in the security apparatus who demonstrated loyalty, brutality, and obedience.

Codified laws serve multiple purposes, even in totalitarian regimes. Written criminal codes are employed as instruments of social engineering: when citizens are cognizant of actions that constitute crimes, most will try to avoid performing these actions (Gregory 2009). Codified laws also inform state agents on their expected behavior. Finally, written laws provide an "aura of legality," both nationally and internationally (Gregory 2009).

In the Soviet Union, Stalin ratified laws which provided him liberty to manage his subordinates and punish his "enemies," rather limit his own power. One example is Article 58 of the Russian Federation Criminal Code (1934), one of the codified laws under which "enemies" were convicted in the Soviet Union. Crimes related to "counter-revolutionary" activities included espionage, treason, armed uprisings, destruction of state property, undermining state production/trade, negligent fulfillment of state duties, and the distribution of religious or nationalistic materials (Gregory 2009). Between 1921 and 1938, approximately 69% of people arrested by the Soviet security apparatus (~3.3 million people) were charged with counterrevolutionary crimes (Gregory 2009). This article was purposely vague in order to offer wider latitude for Stalin to interpret various actions as "crimes against the state." Nonetheless, Soviet authorities were concerned about the image of the USSR in a global context and declared the state's adherence to international law (Kamenetsky 1989). The fact that Stalin and his security apparatus concealed their repressive actions attests to this fact.

Principals and Agents of State Violence

The Soviet security apparatus represented not only a bureaucracy of violence but a culture of power. Nader (1969) suggests that anthropologists should study this culture of power rather than the powerless, deemed "studying up." While researchers have focused on powerful individuals who organize violence, Sluka (2000) contends that anthropologists have shied away from studying the actual perpetrators of violence: "Very little fieldwork has been done with rank and file death squad members themselves" (Sluka 2000: 25). This section draws on the principal-agent paradigm, developed in sociology and political science, in order to examine key players in state bureaucracies, as well as evaluate expectations for behavior and circumstances in which these expectations are not met. This framework permits researchers to explore the agency of violence workers (i.e. the capacity of individuals to make choices of free will), conceptualizing agents as knowledgeable actors, with the capacity to improvise violence beyond expected roles within the state security apparatus.

The study of security apparatuses is often divided into three sets of actors: *principals* (individuals issuing orders), *agents* (those who fulfill orders), and *enemies* (those who threaten political or economic stability) (Gregory 2009). Gregory (2009) contends that each of these actors make cost-benefit calculations according to self-interest. *Principals* (political leaders) employ violence, often through systematic structures, in order to maintain power and support ideological programs (Mitchell 2004). In the case of the Soviet Union during the 1930s and 40s, Stalin and the Politburo represented the principal(s) who made key policy and personnel decisions for the state. Principals (particularly Stalin) instituted repression to maximize political power and economic goals (Gregory 2009). *Agents* included members of the security apparatus who acted on behalf of Stalin and Politburo. These actors differed from ordinary police or military members due their permitted use of brutal force and summary justice. Also, their responsibilities were broad, ranging from matters of culture, economics, and politics as well as targeting both foreign and domestic enemies (Gregory 2009). In the Soviet Union, a multilayer organization or "agency chain" existed, where the highest principals had subordinate agents, who in turn had subordinate agents and so forth (Gregory 2009).

Finally, the Soviet security apparatus identified *enemies* of the state. In a totalitarian regime, an enemy is anyone who the dictator names as one (Gregory 2009). Thus, "enemies" do not necessarily have to pose a tangible threat to be labeled as such. During the Stalinist period, those who constituted enemies evolved. Initially, Stalin targeted kulaks (wealthy peasants), independent thinkers, clergymen, members of banned parties, and "non-Soviet" specialists. However, in time, "enemies" gradually included "marginal elements" of society (i.e. homeless, minor criminals, unemployed, etc.) who did not conform to standards of the Soviet man, as well as communist elite who posed a threat (Gregory 2009). In essence, "enemies" were arrested for the social danger they posed, rather than for actual crimes committed. Belonging to a particular class, ethnicity, or political group determined guilt. This is why confessions of guilt proved more important than evidence of crimes.

In the Soviet Union, orders against "enemies" were issued by principals in Moscow and implemented on a local level by state agents. Thus, the security apparatus was organized by geographical administrations, including the republics, provinces, districts, or cities (Gregory 2009). Regional offices were *actually* responsible for executing orders of repression. However, in order to limit opportunism, the agency chain was shortened when possible. This meant that regional administrations directly received their orders from Moscow rather than through regional superiors (Gregory 2009). Furthermore, opportunism by agents was limited by the fact that sentences for enemies were primarily approved by either the Politburo or central state security office in Moscow. This structure provided principals with the ability to arrest and punish "enemies" quickly and efficiently, even in the most remote areas of the Soviet Union, while retaining control of their subordinates.

In state bureaucracies, principal-agent congruence is ideal. However, despite an organized bureaucratic structure, principal-agent problems may exist. This occurs when agents act outside the commands provided by their principals. Principals organize the bureaucratic hierarchy to deter actions which are contrary to their interests; however, agents may possess different, even conflicting objectives and behaviors than anticipated by their principals (Gregory 2009). Mitchell (2004) contends that repression in bureaucracies of violence is enhanced when agents conceal their interests and actions from the principal. Gregory (2009) also notes that principal-agent problems may occur when agents possess more information about local conditions than their principals. To minimize improvised behavior, principals may select agents who share similar goals or monitor agents to discourage opportunistic behavior. Principals can also deter agent improvisation by shortening the agency chain (Gregory 2009).

Principal-agent problems are important, especially in human rights contexts. The Hague Convention holds commanders responsible for atrocities committed by their subordinates, regardless if they were not active or not in the violation. This doctrine attempts to motivate principals to properly control their agents (Mitchell 2004). It stands to reason that in effective bureaucracies, principals at the top order their agents to behave in particular ways. When atrocities are committed by agents, two explanations are generally advanced: agents were given orders to commit the atrocities, or the bureaucracy of violence was ineffective as agents acted outside the purview of their principals. In order to deter criticism (and blame), principals often condemn agents as acting independently if human rights laws are violated. This approach minimizes systematic abuse (or complicity) within the bureaucratic apparatus by blaming "rogue" individuals.

However, due to the secretive nature of state security organizations, it is often difficult to judge whether agents are following protocols set forth by their principals or acting independently of them. In rare cases, abuse can come to light. One example is exemplified by the United States' military operation in Iraq in 2003. In this case, photographs surfaced of U.S. Army Military Police Corps personnel mistreating detainees at the Abu Ghraib security facility. These pictures served as powerful evidence of abuse of prisoners by state agents. Other mediums for documenting abuse include observation and victim/eyewitness testimony, as well as physical evidence of trauma. The global community reacted with outrage in the Abu Ghraib case. While many questioned the event as a bureaucratic failure, military principals were quick to identify the culprits as a few rogue agents who acted independently of the military bureaucratic order (Caton and Zacka 2010).

Researchers have advanced numerous motivations for the behavior of security agents. Gregory (2009) contends that the rational choice theory often drives state agents who perpetrate violence. In particular, behavior is primarily driven by cost-benefit calculations, which includes the assessment of rewards and punishments for following protocol. During the Stalinist period, the fact that Soviet security agents arrested so many innocent people, fabricated confessions, and exceeded execution quotas demonstrate that incentives for doing so were compelling (Gregory 2009). In this context, morality does not drive behavior. Rather, behavior is motivated by the optimization of objectives or goals, regardless of its ethical implications. In turn, principals may limit opportunism of their agents by monitoring behavior or instituting a reward system. Similarly, Mitchell (2004) contends that power, dogma, and selfish gratification frequently motivate agents to act beyond that expected by the bureaucracy.

Caton and Zacka (2010) suggest a different explanation. They agree that individuals who implement violence on behalf of the security apparatus may not adhere to bureaucratic guidelines as one closely as one would expect. However, this non-adherence to protocol does not represent fault on the part of the implementer, nor does it suggest failure of the system as a whole. Rather, non-adherence occurs when individual agents perceive a need to improvise in conditions of uncertain or unanticipated threats. Caton and Zacka (2010) propose that non-adherence to security apparatus guidelines for violence is likely underreported or unexamined.

Researchers should assess state terror with regard to the actors who perpetrate it. This project evaluates violence through the state's primary repressive institution, the Soviet security apparatus. Specifically, it investigates agents' (i.e. executioners) actual adherence to state guideline for violence in the Tuskulenai case and among four cases formed during the Stalinist period.

CHAPTER 3: THE SOVIET UNION DURING THE 20TH CENTURY

This section examines the history of the state security apparatus in the Soviet Union, from the 1930s to the end of the Stalinist period. It also discusses the intermittent occupations of Lithuania during the 1940s, as well as the social and political transformations that ensued and the resulting partisan war. Finally, this section concludes by briefly examining three other cases of state-sponsored violence in the Soviet Union, from the pre-Second World War period in Soviet-occupied territories.

THE SOVIET SECURITY APPARATUS

State security organizations in totalitarian regimes differ markedly from those in democracies. One of the primary objectives of law in a democracy is to protect individuals from arbitrary action by the state (Gregory 2009). Not only are democracies more likely to employ judicial or parliamentary oversight, but there are typically "administrative layers" between the chief executive and state security (Gregory 2009). In contrast, totalitarian regimes favor the state and society over individual rights. Furthermore, security organizations in totalitarian systems typically answer directly to dictators. Their broader definition of "crime" creates a greater number of enemies and fewer restraints on methods to deal with them (Gregory 2009). Thus, judicial review, rules of evidence, and implementation of torture and execution vary greatly between security organizations of a democracy versus a totalitarian regime (Gregory 2009).

The Soviet security apparatus during the Stalinist period was unique. In particular, the Communist Party possessed a monopoly on (state) power, at times employing both the regular police and security police to guarantee their centralized authority. Law served to reinforce state power, rather than grant rights to the individual (Shelley 1996). In order to retain authoritarian control, the USSR developed a centralized security apparatus that enforced ideological conformity, limited citizen autonomy, ensured social and political control, and punished transgressions (Shelley 1996). During the Stalinist period, the security apparatus developed into "a hierarchical, centralized police system [designed] to execute orders through a vast territory populated by numerous- and diverse- ethnic groups" (Shelley 1996:11). The centralized nature of state control was mirrored in the security apparatus: orders pertaining to state security originated in Moscow and were then disseminated down the bureaucratic hierarchy to be implemented at a local level. Those deemed as "enemies" of the state ranged from counter-revolutionaries to staunch Bolsheviks. No one was immune from arrest, deportation, exile, or execution. This section reviews the history of the vast bureaucracy of violence that Stalin developed from the 1930s to the 1950s, focusing on the organization and operation of the Soviet security apparatus. Additionally, this section also discusses the role of security agents in perpetrating repression during this period.

Transformation of the Security Apparatus (1934-1953)

During the Stalinist period, state security served one primary purpose: to manage "enemies" of the state. Stalin directly dictated quotas for arrest, deportations, and executions through his bureaucracy of violence and their regional administrations (Gregory 2009). The "agency chain" (i.e. number of links between the top officials and agents who execute orders) of the Soviet security apparatus was shortened during the Stalinist period. This provided Stalin with greater control over the behavior of agents and the outcome of repression (Gregory 2009).

State security in the Soviet Union began with the establishment of the Extraordinary Commission for Combating Counter-revolution and Sabotage or Cheka in December 1917. Modeled on the secret police agency (Okhrana) during Tsarist Russia, the Cheka retained unlimited authority to search, arrest, torture, exile, resettle, and execute individuals viewed as threats to state security or policies without the benefit of court proceedings (Butler 2006). From the 1920s until the 1950s, the security apparatus transformed immensely. Gregory (2009) identifies three basic organizational paradigms for state security, including the OGPU model, the NKVD model, and the separation of internal affairs and state security.

By February 1922, the Joint State Political Administration (OGPU) was established as the Soviet security apparatus. This organization managed the Civil War (1922-23) and the Solovetsky Camp of Special Designation (precursor to the Gulag). During the 1930s, the OGPU also played a key role in the enforcement of collectivization and grain requisitions, as well as the imprisonment, deportation, and execution of "kulaks" (Butler 2006). This organization gradually gained control over the civil (public) police, prisons, and special settlements (Gregory 2009).

In 1934, the OGPU was dissolved and replaced by the Commissar for Internal Affairs (NKVD), with Genrikh Yagoda as its new leader. This change was not merely in name; the new organization completely restructured the security apparatus. Specifically, the NKVD took control not only of the state security, but also incorporated the public police, border control, prison (GULAG) system, and interior ministry functions (i.e. citizen records, fire brigades, and civil affairs) into its fold (Levytsky 1972; Gregory 2009). Furthermore, a special section was created to ascertain the breadth of counter-revolutionary crimes (Butler 2006). The security apparatus was also granted broader powers, which allowed it to arrest, prosecute, deport, and execute "enemies" of the state on a massive scale (Applebaum 2003). Territorial divisions were also implemented to ensure managerial control (Gregory 2009). In sum, the NKVD became "an infinitely more effective instrument of repression, efficient and centralized" than its predecessors (Butler 2006). Gregory (2009:104) describes the NKVD as "a one-stop instrument of terror."

The NKVD played a primary role during the show trials of the 1930s, which targeted prominent party members and military leaders (particularly the Old Bolsheviks) in an effort to purge those disloyal to Stalin. Not even the head of the NKVD, Genrikh Yagoda, could escape persecution and was executed in 1936 at the behest of Stalin (Levytsky 1972). In his place stepped Nikolay Yezhov, who ushered in one of the bloodiest eras in the Soviet Union prior to the Second World War. Yezhov's first deed as the Commissar of the NKVD was to execute all of the higher agents, officers, judges of the NKVD who had been loyal to Yagoda (Levytsky 1972). From 1937 to 1938, he then set about a mass operation, known as the Great Terror.

Purges of the upper Soviet echelon were mirrored by purges of local peoples. By 1937 Stalin began ordering quotas of mass arrest and punishment (deportation or execution) of counter-revolutionaries and specific national contingents throughout the USSR (Applebaum 2003; Gregory 2009). Between 1934 and 1939, approximately 750,000 people were shot to death by the Soviet Security apparatus (Snyder 2010). During the most intense period of the purge, from 1937- 1938 under the direction of Nikolai Yezhov, approximately 385,000 people were executed by the NKVD under Order 00447, which targeted "Former Kulaks, Criminals, and Other Anti-Soviet Elements" (Snyder 2010). Other researchers (Gregory 2009:95) contend the number of executions from 1937-38 were closer to 700,000 people. Also during this period, punitive organs employed approximately 270,000 agents to implement their agenda (Gregory 2009). However, as danger of war increased and Stalin had completed his mission of fortifying his authoritative stature, the "Great Purge" waned (Levytsky 1972). And with it, Yezhov was deposed as head of the security apparatus and eventually executed. Yet, the purges of the 1930s created a new order. Specifically, the security apparatus became intimately linked to Stalin while at the same time, terror became institutionalized (Levytsky 1972). The NKVD blossomed into

Figure 2: Primary Leaders of the Security Apparatus during the 1930s and 40s

Genrikh Yagoda
Commissar of the
NKVD (1934-1936)

NikolayYezhev
Commissar of the
NKVD (1936-1938)

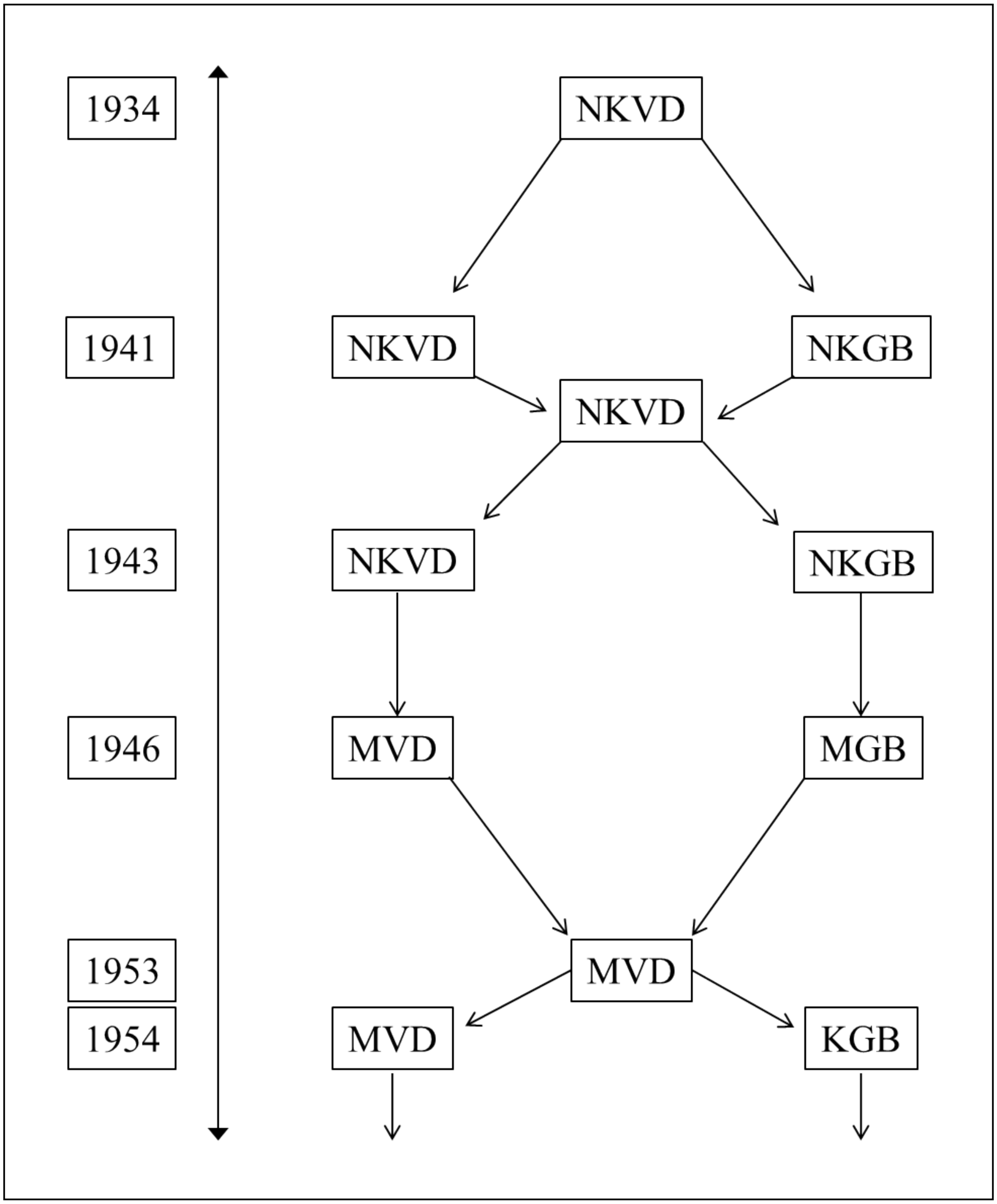
Lavrenti Beria
Head of the NKVD-MVD
(1938-1945, 1953)

a "system which, efficiently disciplined, was above all a comprehensive and boundless reign of terror" (Levytsky 1972: 129). This role in the state was developed by Yezhov's successor, Lavrenti Beria (Figure 2).

By December1938, Lavrenti Beria was instated as Commissar of the NKVD and quickly set about reforming the organization. Similar to his predecessor, upon appointment as head of the NKVD, Beria arrested and executed leading officers of the NKVD who had been loyal to Yezhov (Levytsky 1972). He then proceeded to transform the "terror machine" into a modern security apparatus. Specifically, Beria reduced the blind terror implemented during the Yagoda and Yezhov periods, while emphasizing anti-espionage and counter-intelligence (Levytsky 1972). Additionally, he institutionalized the "security" aspect of the organization by establishing a network of NKVD training schools with a unified curriculum throughout the Soviet Republics (Levytsky 1972). Professional preparation for security agents was supplemented through coursework and additional training opportunities. Also under Beria, central administrations (within the NKVD) were established for state security, the militia, frontier and internal control, fire protection, punishment camps, and family registration (Levytsky 1972). Although the great purges of the late 1930s were reduced, mass repression persisted throughout the Soviet Union. In particular, arrests, deportations, and executions of local peoples continued through the early 1940s. From 1941-1946, approximately 700,000 people were arrested, and 70,000 of those were executed (Gregory 2009).

The security apparatus experienced a number of tortuous splits and merges during the 1940s (Figure 3). With the promise of impending war, Soviet leaders believed it necessary to strengthen the security apparatus, which they believed could not be achieved within the structure of the NKVD. Thus, in February 1941, an independent ministry called the People's Commissariat for State Security (NKGB) emerged which became responsible state security (Butler 2006). Beria's former deputy, V.N. Merkulov, was appointed the chief of the NKGB. Levytsky (1972) characterizes the split between the NKVD and NKGB as a "bureaucratic separation," where Merkulov remained *de facto* under Beria's command and only Beria advised Stalin on matters of state security. However, with this division, the NKGB became responsible for essential departments, including: the Foreign Administration, which was responsible for supervising foreigners within the Soviet Union and abroad; the Secret Political Administration (SPU) which was responsible for suppressing illegal organizations, supervising nationalist movements in non-Russian peoples, supervising religious sects, and supervising cultural life (i.e. media); and the Defense Department, which identified foreign spies, conducted anti-espionage measures, and supervised Soviet agents (Levytsky 1972).

Figure 3: Development of the Security Apparatus from 1934-1954



Eventually the NKVD and NKGB were united in July 1941 in order to centralize supervision of the Soviet peoples during the Second World War, only to be divided again in April 1943. Again, Merkulov took control of the NKGB and the responsibilities of state security following the split, whereas the NKVD assumed responsibility for internal affairs, such as 'economic' organization, public order, transportation, army reinforcements and the functioning of the armaments industry (Levytsky 1972).

The Soviet security apparatus emerged stronger following the victory of the Soviet Union and its allies over Nazi Germany. Not only had the apparatus become more centralized during the war, but it now had well-trained agents at its disposal (Levytsky 1972). The NKGB also supported Stalin's role as an authoritative leader by answering directly to him, rather than to the Central Committee of the Communist Party (Levytsky 1972).

By 1946, both the NKVD and NKGB were transformed into ministries, including the Ministry of Internal Affairs (MVD) and the Soviet Ministry of State Security (MGB). Additionally, the leaders of these organizations also changed. Colonel-General Sergei Kruglov took Beria's place as the Minister of the MVD, while General V.S. Abakumov took Merkulov's place as the Minister of the MGB (Levytsky 1972). Driven by the post-War conditions, Abakumov reorganized the security apparatus by developing the Operations Department (responsible for the arrest of individuals and the suppression of partisan groups), the Espionage and Anti-Espionage Department (directing political and military anti-espionage and supervising the Soviet), and the Secret Political Office (supervised civilian life) (Levytsky 1972). Following the Second World War, the security apparatus focused its attention on civil unrest in the Baltic republics, Belorussia, and the Ukraine where anti-Soviet partisans strongly operated. MGB agents and troops employed a number of tactics to root out counter-insurgency, including engaging in open battles, infiltrating partisan groups, and punishing partisan supporters (Levytsky 1972). Additionally, at the behest of Stalin, the MGB was intimately involved in the mass arrests and executions of various groups, including: *Leningrad Affair* (1949) which purged Party leadership, the *Crimean Affair* (1950) which purged members of the Jewish intelligentsia, the *Mingrelian Affair* (1951) which purged party and state officials in Georgia, and the *Doctor's Conspiracy*, which accused Kremlin doctors of attempting to murder Stalin (Levytsky 1972). Eventually, in 1952, Abakumov was removed as Minister of the MGB and replaced by S.D. Ignatiev as part of Stalin's plan to re-staff and reorganize the secret police. However, with Stalin's death on 5 March 1953, the security apparatus was no longer subject to the whims of a dictator and was subsequently overhauled.

Following the death of Stalin in March 1953, the new Soviet leadership pursued a "collective" approach to power rather than one based on sole dictatorship. Simultaneously, they took steps to dismantle Stalin's terror apparatus, rehabilitate victims of Stalinism, and reform the criminal code of the USSR in the name "restoring legality" (Levytsky 1972). This transformation in the post-Stalin era began with the brief merging of the MVD and MGB in 1953 under the direction of Beria. However, due to Beria's ardent pursuit for dominance, the Politburo ensured that the state security organization would no longer retain unlimited powers and no long answer to a sole individual. Following the arrest (June) and execution (December) of Beria, the security apparatus split into the Ministry of Internal Affairs (MVD) and the Committee for State Security (KGB). The responsibilities of these organizations also shifted. In particular, the MVD retained control over internal security and the (public) police force. Meanwhile, the KGB controlled state security, the (secret) police, border patrols, and counter-intelligence (Butler 2006). Additionally, the Ministry of Justice inherited the responsibility of conducting summary trials and meting out sentences. While executions on a massive scale decreased following the reorganization of the security apparatus and the death of Stalin, the KGB (1954-1991) continued to perpetrate terror and repression both within and outside of the Soviet Union.

Operation of the Security Apparatus

Mass repression during the Stalinist period required a highly-organized state security. Terror campaigns, such as dekulakization (1930-1932), the Great Purge (1935-1938), the Great Terror (1937-1938), and the national operations (1937-1945), required the state to increase the number of core security agents it employed. In order to accommodate these spikes in terror, the number of agents increased from 22,000 under Yagoda, to 35,000 under Yezhov and more than 40,000 under Beria (Gregory 2009). Security agents were carefully vetted with coveted qualities of loyalty, discretion, and pursuit of (often gruesome) work. Operational agents had a number of responsibilities, including interrogating prisoners, serving on extrajudicial tribunals, and carrying out executions (Vaitiekus 2011).

Security agents played instrumental roles in extrajudicial tribunals, which were employed regularly to manage mass arrests and punishments. The use of normal courts to deal with high volumes of enemies presented a major dilemma: slowing down the process of repression. In order to retain the façade of legality while processing a high volume of "enemies," Stalin instituted simplified procedures for conviction in times of "national emergencies" (Gregory 2009). Specifically, the state security apparatus became responsible for the entire repression process, from investigation to punishment (Gregory 2009). During these periods, the civil rights of individuals were restricted by simplifying judicial proceedings and employing extraordinary tribunals (Gregory 2009). Troikas, or panels of three, were responsible for judging and sentencing prisoners for their “crimes” in secret, often without even the accused present (Applebaum 2003). These included a regional NKVD/NKGB chief, a regional party leader, and a regional prosecutor. Troikas answered exclusively to the Special Council of the NKVD, while the state security representative on the panel retained the most power (Snyder 2010). These proceedings ignored the requirements for fair trials, while acquiring evidence needed to convict dissidents by any means necessary (Hollander 2008; Stan 2009). The fact that an individual was *accused* of criminal or political misconduct bolstered his guilt (Snyder 2010). Described as a “repression conveyor,” troikas merely signed the recommendation of operational groups who arrested and interrogated prisoners (Gregory 2009). Between August 1937 and November 1938, approximately 1,500 death sentences were issued per day by troikas (Gregory 2009). Ultimately, the troikas permitted authorities to pass a greater number of sentences in a limited period of time without publicity or the guise of impartiality. Authorities also employed military (war) tribunals, especially during the post-War period. These boards also consisted of three members and were responsible for “investigating” and “judging” crimes. Chairmen of the war tribunals were also required to monitor executions performed by security agents (Vaitiekus 2011). Yet, even this façade of legality was not always upheld. Gregory (2009) notes that during dekulakization of the early 1930s, hundreds of thousands of families were summarily deported to remote regions of the Soviet Union without the benefit of sentences by judicial or extrajudicial courts.

Confessions were a powerful tool for confirming guilt and for implicating others. Evidence of crimes was not required when confessions were obtained. Additionally, confessions served as indicators of success during mass repression and state security agents were assessed on the basis of the number of confessions they elicited per day (Gregory 2009). Although physical abuse was not formally authorized by the Central Committee of the Communist Party until the purges of 1937-38, Pajaujis-Javis (1980) contends that torture was employed by the Soviet security apparatus since the Cheka. Strategies to elicit confessions included the "conveyor" method (uninterrupted questioning with sleep or food) and the "standing method" (suspects forced to stand for extended periods) (Snyder 2010). More abusive tactics employed during interrogations included beatings to the face, head, stomach, and spine with pistols, steel rods, rubber hoses, or other blunt objects; inserting needles under fingernails, called "manicures"; binding genitalia with cords until loss of consciousness; and electrical shocks (Pajaujis-Javis 1980). According to an account by the former NKVD Commissar Yezhov, Stalin ordered agents to "beat in the faces" of the accused to obtain confessions (Gregory 2009:208). Confessions acquired during interrogation were subsequently used for sentencing by troikas, military tribunals, or show trials.

Soviet security agents were expected to carry out executions ordered by the state. The Supreme Degree of Punishment or Vysshaya Mera Nakazaniya (VMN) represented capital punishment. Specifically, the penal code of the Russian Soviet Federative Socialist Republic (R.S.F.S.R.), which was applied throughout the Soviet republics, mandated that the only legitimate means of performing executions was by fusillade, or firearm to the back of the head (Vaitiekus 2006). However, the degree to which agents followed the state guideline for execution is not well known. While agents within the Soviet security apparatus were required to maintain abundant documentation on prisoners and even sign their death warrants, they were not obliged to verify the mode of execution. Furthermore, Gregory (2009) contends that security agents often became inebriated to shoot people and vodka was readily available during episodes of mass execution. Additionally, when there was a shortage of manpower, non-state security personnel (i.e. from the militia, army, etc.) were often summoned to head operational groups and perform executions (Gregory 2009). Given the presence of alcohol and non-state security personnel during some of the mass execution episodes, it is possible that executions did not always conform to state guidelines for violence.

Agents who perpetrated violence in the name of the state walked a fine line. When security agents abided by orders, they reaped both material rewards and prestige. Specifically, Stalin rewarded agents of the security apparatus with economic privileges. Performance-based bonuses included excessive pay, luxurious housing, free vacations, access to medicine, and chauffeurs (Gregory 2009). These privileges were meant to motivate agents to perform their work diligently. For instance, in July 1937, Stalin and Yezhov raised the salaries of operational workers responsible for executing 17,000 victims during the Great Terror (Gregory 2009). Furthermore, in July 1939, the Politburo permitted NKVD agents to retain the apartments of those deemed as "enemies" (Gregory 2009). In return, the principals received a relatively consistent "product," such as arrests, deportations, and executions which were easily monitored (Gregory 2009). However, perpetrators of repression could easily become victims of it. Agents risked not only falling from grace by being removed from their post, but they and their families could also face execution (Gregory 2009).

Gregory (2009) characterizes this predicament as the "repressor's dilemma." Those who carried out mass repressions were expected to meet quotas for arrests, but if they did not exceed those quotas (especially in relation to other regional administrators) the repressors could in turn become victims. In one municipal administration, the deputy head arrested all of the NKVD agents in the district because of their lackluster in battling "counter-revolutionaries" (Gregory 2009). Furthermore, security agents had to navigate ambiguous instructions for violence, which were often purposely vague so that misinterpretations could be attributed to agents, rather than principals. While Stalin and the Politburo dictated policy, they did not assume responsibility for mistakes. Instead, those implementing the policy were required to take the blame. Thus, while the party condemned torture and fabrications of guilt in public, they simultaneously compelled their agents to employ these tactics to obtain confessions through force to fulfill quotas (Gregory 2009). This proved especially true during the Great Terror, in which NKVD agents were characterized as rogue operators (despite Stalin's signature on thousands of execution orders) when the Party and public complained. Gregory (2009:212) contends that, "Just about any active participant in mass operations was a candidate for blame." Following the end of the Great Terror, regional party secretaries and justice officials targeted NKVD agents on the basis of unlawful torture. Additionally, NKVD officials were arrested on the basis that they did not follow "proper procedures" during the repression process. As the ranks of the NKVD became decimated, Stalin was eventually forced to concede that torture was permitted in "rare cases" to root out enemies, and demanded local prosecutors to stop targeting security agents (Gregory 2009). Still, many state security agents were punished for their use of torture during interrogation. Thus, agents faced the possibility of being repressed for not meeting their organizational targets *and* being punished if they did.

Following the removal of Yagoda, Yezhov, and Abakumov during the 1930s and 40s, massive purges in the security apparatus ensued. Approximately 40% of the top NKVD leadership was executed in 1935 (Gregory 2009). Furthermore, 50% of the top NKVD officers in 1936 were executed before 1940, while 80-85% of the regional NKVD personnel were executed during this period (Gregory 2009). In Stalin's words, security agents had one of two paths, "advancement or prison" (Gregory 2009: 267). Gregory's (2009) "repressor's dilemma" model demonstrates that there was no systematic way to determine survivorship: many agents within the state security apparatus perished and those who survived likely did so out of luck.

Nonetheless, agents who perpetrated violence at the behest of the state had a reasonable expectation to adhere to state guidelines. By examining the remains of executed prisoners, researchers not only study the life and death experiences of victims but can also indirectly study the perpetrators of violence through analysis of their conduct.

OCCUPIED LITHUANIA (1940-1991)

Although Lithuania was formally recognized as an independent state following the First World War, its sovereignty lasted less than 20 years. By 1940, Lithuanian autonomy was challenged by foreign nations who intermittently occupied their territory. This section focuses on the first and second Soviet occupations of Lithuania, and the resistance movement during the mid to late 1940s. This period not only corresponds to the beginning of the second occupation of Lithuania by Soviet Union, but also to violence and terror directed at citizens by the Soviet state.

Loss of Lithuania's independence during the 20th century began in 1939 with the Non-Aggression Treaty between the USSR and Nazi Germany. Signed by Nazi Germany's Foreign Minister Joachim von Ribbentrop and the Soviet Union's Foreign Affairs Commissar Vyacheslav Molotov, this pact served as a prelude to conquest and ultimately partitioned Poland and the Baltic states amongst the Nazis and the Soviets (Damusis 1998). Under severe duress, Lithuanian authorities signed the Treaty of Mutual Assistance in October 1939 which permitted the Soviet Union to establish military bases and Red Army troops on Lithuanian soil in exchange for protection against Germany. This treaty and three subsequent protocols eliminated Lithuanian sovereignty by providing the Soviet Union enduring justification for military occupation of Lithuanian territory not only during the first occupation, but also during the second one (Pajaujis-Javis 1980). By June 1940, all three Baltic States had been annexed by the USSR and assimilated as Soviet states (Damusis 1998).

The first Soviet occupation of Lithuania, from June 1940 to June 1941, was marked by unprecedented repression. With help from local collaborators, Soviet authorities dismantled the Republic of Lithuania by restructuring the state administration and implementing communist ideology (Rudienė and Juozevičiūtė 2006). Along with these political changes, Soviet authorities reorganized economic, cultural, educational, and spiritual life of local people according to Communist ideology, known as 'sovietization' (Rudienė and Juozevičiūtė 2006; Smith et al. 2002). The policy of Sovietization was implemented as a means of integrating Lithuania into the Soviet Union, denationalizing Lithuanian identity, introducing a command economy, collectivizing the means of production, distribution, and exchange, imposing totalitarianism, and eliminating civil society (Lane 2001). Leading Lithuanian statesmen were arrested and deported. At first, the Soviet leadership attempted to maintain the façade of legal legitimacy, despite their blatant attempts to decisively control the political process (Misiunas and Taagepera 1993). They staged elections, installed cabinet members, and promoted Communist leaders. Once the Soviet-style elections had been completed (with the unanimous victory of a single slate of candidates), Lithuanian territory was formally incorporated into the U.S.S.R. as the Lithuanian Soviet Socialist Republic (L.S.S.R.) (Misiunas and Taagepera 1993). The local political structures acted primarily as legitimizing bodies to implement legislation and policies, such as collectivization and industrialization, from Moscow (Misiunas and Taagepera 1993; Smith et al. 2002). Since Lithuania was predominantly an agrarian society, the Communist movement was not well-developed. After the integration of Lithuania into the U.S.S.R., there was a great influx of Communist Party members into the republic that corresponded with the reorganization and expansion of the Party in this region (Smith et al. 2002). Soviet takeover also included the rearrangement of economic structures, specifically the expropriation of industrial, banking, commercial, and housing institutions (Kiaupa 2005; Misiunas and Taagepera 1993). All non-Communist controlled public activity was proscribed: the press was severely limited, specific literature was banned, and theological institutions were destroyed. Administrative restructuring included a massive overhaul of leading officers and police commanders. The Lithuanian police force was disbanded and replaced with special militias (Misiunas and Taagepera 1993).

The role of national security ideology was paramount during this transformation. Since the Soviet state had twenty years of experience dealing with border nations, they did not hesitate to engage in mass arrests and deportations in Lithuania. Communist dogma allowed authorities to shape the resistance they were encountering into a war against internal subversion, where 'pro-Independence' equated to "enemies of the state." Thus, ideology substantiated the extraordinary measures of Soviet authorities against internal enemies. Under the guise of directive No. 001223, issued in October 1939, all "counterrevolutionary elements" were subject to accounting, regardless of their anti-Soviet activities (Pajaujis-Javis 1980). This decree served as the basis for arrests, deportations, and execution of the Baltic people.

Beginning in July 1940, purges of anti-Soviet elements in Lithuania by the NKVD commenced. The reasons for mass arrests in the Baltic States during the early 1940s were haphazard and nonsensical, yet their course was highly ritualized and predictable (Applebaum 2003). By the beginning of the 1940s, the methods of arrest, interrogation, transportation, and execution were firmly established (Applebaum 2003). More than 11,000 people were arrested between 1940 and 1941, consisting mostly of public figures, politicians, soldiers, farmers, and members of other parties and organizations (Pajaujis-Javis 1980; Rudienė and Juozevičiūtė 2006). Prisoners were documented, photographed, fingerprinted, searched, and deprived of personal effects (Applebaum 2003). However, during the early 1940s, the façade of legality could not be upheld due to the mass scale of arrests. Thus, many individuals during the first Soviet occupation of Lithuania became subject to "administrative deportation," without the benefit of arrest, trial, or sentencing (Applebaum 2003). During this period 96,000 prisoners were arrested and 160,000 were deported to exile villages from the Baltic States (Applebaum 2003). Applebaum (2003) also argues that Stalin engaged in mass deportations rather than mass executions (during the first occupation) because his intent was to eliminate culture, rather than actual people.

This first Soviet occupation ended at the beginning of the Second World War, when Nazi German forces invaded Lithuania and drove Soviet authorities east. However, as the Germans invaded the Baltic States, the security apparatus feared leaving political prisoners in the hands of the Nazis. Thus, as security agents and Red Army soldiers retreated, they killed approximately 10,000 prisoners in Polish and Baltic towns and villages (Applebaum 2003: 416). The Nazi German occupation of Lithuanian territory (1941-1944) was received with both relief and apprehension. While many Christian Lithuanians welcomed the German army after the brutal occupation of the Soviets, specific segments of the population suffered enormously under the Nazis. In particular, Nazi propaganda exploited the anti-communist and anti-Semitic climate in Lithuania (Bubnys 2005). The most devastating effect was the enslavement and near eradication of the Lithuanian Jewish population. An estimated 95% of Lithuanian Jews were methodically killed by Nazis and their supporters (Bubnys 2005). Thus, Nazi German forces contributed to the homogenization of Lithuanian territory. With the conclusion of World War II in Europe, Soviet forces once again re-occupied Lithuanian territory.

From July 1944 until 1990, the Soviet Union governed in Lithuania and continued the policies from the first period. Once more, Soviet leadership controlled the appointment of state and public positions, maintained a monopoly over policy production, censored media and cultural organizations, and restricted human rights (Stan 2009). Specifically, the regime within Lithuania attempted to weaken pro-democratic political organizations, silence civil society, and rally citizens in support of the communist leadership (Stan 2009). During the post-WWII period, Soviet authorities increased mass arrests and deportations (Applebaum 2003). Ethnic minorities, particularly those located in borderlands (e.g. Poles, Germans, Lithuanians, Latvians, etc.) were targeted for repression in greater numbers due to their perceived alliances with foreign enemies and strong sense of nationalism (Gregory 2009). However, subjugation during this second occupation was met with strong opposition and a long partisan war ensued from 1944 to 1953 (Kiaupa 2005). The anti-Soviet resistance movement attracted partisans from a variety of social backgrounds, drawn together with the common purpose of rejecting Soviet policies and re-establishing Lithuanian independence. Although partisans waged a well-organized campaign from the forests of Lithuania, Soviet authorities effectively quelled explicit opposition within the first decade of their second occupation. Both partisans and noncombatants (civilians) were targeted regarding counter-revolutionary activities (Poncius 2006). Between 1944 and 1949, approximately 350,000 Lithuanians were subject to deportation (Lane 2001).

The Republic of Lithuania was eventually re-established in March 1990. However, unanswered questions persist regarding perpetrators' actions and victims' experiences during this conflict. Similar to other Baltic countries, Lithuania is undergoing a process of democratization and transitional justice. Transitional justice in post-Soviet states refers to a wide range of inter-related processes aimed at reconciling past abuses, rehabilitating society, prosecuting perpetrators, and exposing mechanisms of trauma (Stan 2009). As historians begin to unravel tightly bound renditions of the post-World War II period, new accounts of violence have come to light. In the interest of historical pluralism, researchers should now investigate the extent to which state-sponsored abuse and execution was systematic within the Soviet security apparatus.

Tuskulenai Case

The Tuskulenai case represents a post-War campaign of repression (1944 to 1947) involving the highly reformed state security apparatus. Not only is the historical context of its formation unique, but there is an abundance of historical documentation to complement skeletal and archaeological data.

Following the end of the war in the Baltic States, the Soviet Union re-occupied Lithuanian territory. However, by this time the state security apparatus had changed from the NKVD to the NKGB (1943), and later to the MGB (1946). Not only did the organizational structure responsible for state security transform, but the targets of repression also shifted. In particular, Soviet authorities targeted ethnic minorities in borderlands, such as in the Baltic States. Initially, security forces pursued those in Lithuania who had *supposedly* collaborated with German forces during World War II. But as time passed, authorities began targeting those who supported nationalism and partisan organizations.

Despite their alliance in 1939, the Soviet Union and Nazi Germany soon became enemies during the Second World War. In Soviet-occupied territories, Germans (as well as German-sympathizers) were targeted as “enemies.” In 1943, the Supreme Soviet Presidium passed the ordinance “Regarding the means to punish the German fascist villains guilty for torturing and massacring the Soviet civilians and war prisoners from the Red Army, as well as the Soviet people and the collaborators who had acted as spies and betrayed the homeland” (Vaitiekus 2011). Under this ordinance, “collaboration” was defined as any form of contact with Germans or “passive treason” (Levytsky 1972).

Capital punishment was the accepted sentence for this crime. This repression played out in Lithuania immediately following the war. Between 1944 and 1947, war tribunals investigated cases of “German fascists and their collaborators,” passing 132 death sentences in the Tuskulenai case under this ordinance (Vaitiekus 2011). These individuals were charged with participating in the Lithuanian security service (which was previously under German control), collaborating with Nazis, working in prison or concentration camps, and participating in crimes of Jewish genocide (Vaitiekus 2011). While there were certainly local collaborators who aided Nazis in their persecution of Jews and other “enemies,” the actual degree to which prisoners in the Tuskulenai case did so is not known. This is because Soviet authorities often trumped up charges, through fabrications and confessions coerced under torture.

While Soviet purges following World War II initially targeted Nazi collaborators and sympathizers, communist leadership within Lithuania promptly identified new groups as “enemies of the state.” These included anti-Soviet resistance fighters and individuals critical of communist ideology, policy, or leaders (Stan 2009). Meanwhile, Soviet authorities cast the anti-Soviet resistance movement as a “civil war” among the Lithuanians. Ultimately, this propaganda campaign masked resistance to Soviet occupation within a legitimizing framework to the international community (Pajaujis-Javis 1980). In the Tuskulenai case, individuals were sentenced to death for supporting the anti-Soviet resistance, as well as for their participation in the Polish army, religious organizations, Lithuanian police, and rebellion of June 1941 (Vaitiekus 2011).

Following the end of the Second World War, extrajudicial courts operated in Lithuania. Those arrested were first imprisoned in local NKGB-MGB jails. They were then interrogated regarding their “crimes” and mostly convicted by NKGB-MGB war tribunals (rather than troikas) of Kaunas and Vilnius. According to historical records approximately 767 people were sentenced to death between 28 September 1944 and 16 April 1947, mostly under Article 58 (regarding counter-revolutionary activity) (Vaitiekus 2011). Following their convictions, prisoners were transported to the Lukiškės prison (Vilnius) and then to the NKGB-MGB basement prison (Vilnius) (Figure 5). Here, they were further interrogated regarding counter-revolutionary activities, sentenced for their “crimes,” and either executed or deported to Gulag prisons throughout the Soviet Union (Rudienė and Juozevičiūtė 2006). The entire judicial process, from arrest to execution or deportation could take up to one year (Rudienė and Juozevičiūtė 2006).

Based on eyewitness accounts and historical records, individuals at the NKGB-MGB prison were subjected to poor conditions. Prisoners were kept in overcrowded, unfurnished, cement cells where lights were kept on day and night (Rudienė and Juozevičiūtė 2006). Inmates were also poorly nourished and isolated from relatives (Pajaujis-Javis 1980). Additionally, individuals were subjected to several types of disciplinary and interrogation techniques during imprisonment. Rudienė and Juozevičiūtė (2006) document various types of solitary confinement procedures used at the NKGB-MGB prison. These included the use of standing chambers or

Figure 4: Map Indicating the Location of Vilnius, Lithuania

"boxes," which consisted of placing prisoners in a 0.6 square meter room for hours without room for sitting. Individuals who defied prison authorities were also forced to wear straitjackets and placed in padded, soundproof cells. Additionally, some solitary confinement rooms were also equipped to retain water. In these cells, prisoners were forced to stand in ice-cold water or balance on small platforms amid cold water for extended periods (Rudienė and Juozevičiūtė 2006).

Executions were performed in the NKGB-MGB basement execution chamber predominantly around midnight. Based on eyewitness accounts, the protocol for managing condemned prisoners appears fairly standardized. Condemned prisoners were transported from prison cells to a room adjacent to the execution chamber. Here, they confirmed their biographical information to security agents and their death warrants were signed. Then they were led, unknowingly, into the execution chamber where the door would close. According to Vaitiekus (2011), prisoners were often distracted or hit on the head with a heavy object to lose orientation, before being shot in the head.

Execution of prisoners in the U.S.S.R. and L.S.S.R. were carried out by commanders of the NKGB-MGB Department “A” (Department for Registration and Archives) and the NKGB-MGB interior prison. Between 1944 and 1947 in Lithuania, this department was headed by Lieutenant-Colonel Stepan Kharchenka (September 1944-January 1946) and then by Lieutenant-Colonel Pavel Grishin (January 1946-April 1947) who *organized* executions (Vaitiekus 2011). The *actual* executions were performed by special execution squads. Executions squads consisted of NKGB-MGB commanders, responsible for performing fusillades, and warders who assisted them by transporting condemned prisoners to the execution chamber, taking part in executions, and disposing of bodies (Vaitiekus 2011). According to procedure, a representative of the procurator’s office (war tribunal) supervised these executions in Lithuania (Vaitiekus 2011). By a decree from Stalin, executions in the Soviet Union ceased in 1947 and were replaced by a 25 year sentence to the Gulag, until capital punishment was reinstated in 1950 (Rudienė and Juozevičiūtė 2006).

In the Tuskulenai case, three execution squads operated, including those led by Jegor Kuznetsov, Vasilij Dolgirev, and Boris Prikazchikov (Table 1). L.S.S.R. NKGB Commandant Kuznetsov participated in only the first two episodes of executions, killing a total of 18 people on September 28 and October 11, 1944 (Vaitiekus 2011). The second executioner, Lieutenant-Colonel Dolgirev, became the warden of the L.S.S.R. NKGB-MGB interior prison after

Kuznetsov. Operating from November 17, 1944 until October 18, 1947, Dolgirev executed a total of 650 prisoners (Vaitiekus 2011). Finally, Security Captain Prikazchikov became L.S.S.R. MGB prison warden, executing a total of 99 people from November 18, 1946 until April 1947 (Vaitiekus 2011). This study focuses on pits from two of these execution squads: those of Dolgirev and Prikazchikov.

Table 1: Execution Squads in the Tuskulenai Case

Execution Squads	Start Date	End Date	Executed Prisoners (n)	Execution Episodes (n)
Jegor Kuznetsov	September 1944	October 1944	18	2
Vasilij Dolgirev	November 1944	October 1946	650	41
Boris Prikazchikov	November 1946	April 1947	99	11

After executions, the bodies of prisoners were transported on trucks to the Tuskulenai Estate and were interred in clandestine mass graves. This estate was chosen for as the primary prisoner disposal site due to its location outside of Vilnius, its proximity to the Soviet Army garrison, its spacious grounds, and the discretion provided by high walls (Vaitiekus 2011). Secrecy was paramount during the trials, executions, and interments of prisoners and these activities were concealed until the end of the Soviet occupation in Lithuania. However, with the discovery of state security documents in 1994, the Lithuanian President established a working group of archaeologists, anthropologists, and forensic experts to investigate these activities (Jankauskas 2009). Due to the immense secrecy under Soviet administration, the national revival in Lithuania during the 1990s focused on the establishment of truth and historical justice concerning the occupation period (Vaitiekus 2011). This included the search, recovery, and identification of prisoner remains at the Tuskulenai Estate.

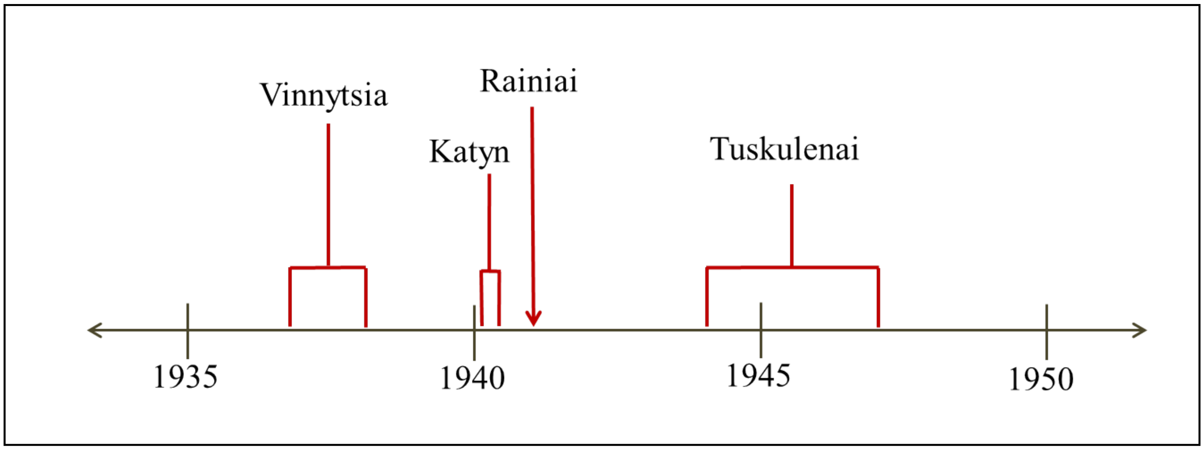
While the Tuskulenai mass graves were discovered shortly after the re-establishment of the Republic of Lithuania, the skeletal remains continue to be generally unexamined. Jankauskas et al. (2005) provide the most comprehensive record of archaeological and skeletal data. Archaeological excavations undertaken at the Tuskulenai Estate in 1994, 1995, and 2003 revealed a series of 45 pits containing a total of 724 individuals. Remains were discovered in two general locations: inside a former garage and north of the garage. Jankauskas et al. (2005) note the presence of 720 males and 4 females, aged 19 to 66 years at death. Jankauskas et al. report that 97% of skulls in the Tuskulenai case exhibit perimortem trauma, with 95% of the collection demonstrating single and multiple gunshot wounds. However, skeletal remains in this case also display evidence of sharp and blunt force trauma. Researchers argue that groups of prisoners were likely executed during one night and subsequently buried in one pit together (Jankauskas et al. 2005). Thus, each pit represents one discrete night of executions. Jankauskas and colleagues have chronologically sequenced at least twenty-five pits based on identification of skeletal remains which correspond to specific individuals named in state security documents. Furthermore, Jankauskas et al. positively identified approximately 55 individuals with missing persons and returned 7 of these individuals to families for reburial. The skeletal remains now reside in an accessible columbarium at the Tuskulenai Memorial Complex in Vilnius.

Following Gorbachev’s policy of *glasnost* or openness, other mass atrocities committed by Soviet security forces have come to light. Until this time, the Soviets had maintained an official policy of denial, cover-ups, and silence (Kamenetsky 1989). A number of cases of Soviet state-sponsored violence toward “enemies” are now documented in the literature. It is important to view cases of state security violence during the 1930s and 1940s in a broader context in order to understand the breadth of these crimes (Kamenetsky 1989). Three cases in particular are useful as comparisons to the Tuskulenai case, including those from Vinnytsia, Katyn, and Rainiai.

OTHER CASES OF STATE-SPONSORED VIOLENCE IN THE SOVIET UNION

This section reviews the historical background of three other cases of Soviet violence, including Vinnytsia, Katyn, and Rainiai. These sites represent a range of geographical and temporal examples of state-sponsored violence in the Soviet Union during the Stalinist period (Figure 4). While the remains of prisoners in the Tuskulenai case were excavated and analyzed following the restoration of Lithuanian independence, the three other cases (Vinnytsia, Katyn, and Rainiai) of Soviet violence were formed, discovered and analyzed under different circumstances. In particular, prisoners in these cases were executed prior to the Second World War. Since the burial sites were located in areas occupied by the German army during the war, their remains were analyzed by German-led international forensic commissions. While the Nazis committed their own massive terror and repression, these forensic commissions made a concerted effort to document the Soviet mass burials in order to garner local and international support. Because the remains of victims were re-interred after analysis, this study employs the skeletal and archaeological data from Vinnytsia, Katyn, and Rainiai generated by their respective investigative commissions.

Figure 5: Timeline of Cases of Soviet Violence



Vinnytsia Case, Ukraine

During the 1930s, Ukraine represented a borderland territory and a danger to Soviet rule for a number of reasons. Similar to Lithuania, Ukraine was perceived as particularly vulnerable to foreign interests and nationalism. Not only did it share a common border with foreign nations (e.g. Poland and Romania), but its predominantly Slav population also possessed its own history, language and national culture (Gregory 2009). During the collectivization campaign and grain requisitions of the early 1930s, massive famines ensued, which claimed approximately 5 million people in Ukraine alone (Valentino 2004). Additionally, Ukrainians were also subject to intense purges during the Great Terror (1936-1939). Between 1937 and 1938, 700,000 people were executed and 27% of all convictions occurred in Ukraine, which exceeded its share of the population in the Soviet Union (Gregory 2009).

One episode of violence during the Great Terror occurred in the Ukrainian town of Vinnytsia (Figure 6). This city became a target during the Great Terror for several reasons, including its strong sense of nationalism, its high level of public resentment to Soviet policies, and its close proximity to the Polish and Romanian borders (Kamenetsky 1989). Vinnytsia acted as a central point for the mass arrest and execution of approximately 9,500 common citizens by the NKVD between 1937 and 1938 (Kamenetsky 1989). Victims' professions included peasants, trade workers, office workers, specialists/professionals, military personnel, and clergy (Kamenetsky 1989). Reasons for their arrest varied greatly, including opposition to collectivization, refusal to renounce religion, and changing their place of employment without permission (Kamenetsky 1989). Furthermore, when victims' family members inquired about the location of their relatives, the NKVD told them that prisoners had merely been exiled to Siberia for numerous years and correspondence was not permitted (Kamenetsky 1989).

Figure 6: Map Indicating the Location of Vinnytsia, Ukraine

Similar to the Tuskulenai case, prisoners arrested outside of the city were eventually transported to the state security headquarters in Vinnytsia. Based on eyewitness accounts, prisoners endured severe abuse during interrogation, including the sexual assault of young and middle aged females (Kamenetsky 1989). Before executions, prisoners were stripped of any excess clothing, which was subsequently buried on top of bodies during interment. Executions occurred at night, either in a discrete portion of a courtyard (where truck engines were left running to conceal gunshot noises) or in a room in the Vinnytsia NKVD headquarters. Prisoner remains were then transferred to one of three burial sites throughout the city: an orchard, an Orthodox Cemetery, and the Gorky Park of Culture and Rest (a public park). Great efforts were taken to guard or conceal these sites until the German invasion.

Following the German invasion of Ukraine in the summer of 1941, local Ukrainians led German authorities to suspected locations of mass graves. However, graves associated with this repressive campaign were not excavated until spring of 1943. An international commission, managed by the occupying German forces, was composed primarily of Ukrainian and German physicians and forensic investigators who analyzed the Vinnytsia remains. A total of 9,432 adults were recovered from 91 burial pits. However, only the orchard was thoroughly investigated, while the park and cemetery were only partially excavated (Kamenetsky 1989). Most individuals were killed with one or two gunshot wounds to the back of the head, likely with small caliber (.22) ammunition. Based on the trajectory of gunshot wounds, investigators believe that experienced executioners operated in the Vinnytsia case (Kamenetsky 1989). Additionally, individuals demonstrated blunt force trauma to the head, possibly to ensure death when gunshot force was inadequate (Kamenetsky 1989). Based on growth rings of overlying trees, documents found among the victims, eyewitness testimony, and forensic medicine findings, the executions and interments were believed to have occurred from 1937 to 1938.

The official German report is not without its falsifications. Part of the objective of the investigation included the identification of victims and their biographical information. While the Vinnytsia remains included individuals of various nationalities, German authorities prohibited the mentioning of certain nationalities (e.g. Russians, Jews, Gypsies, and Poles) in the official report. Furthermore, German officials also identified Soviet Jews as responsible for the Vinnytsia massacre (Kamenetsky1989). These reductions and assertions have proven inaccurate, as they were blatantly utilized for Nazi propaganda. However, due to the inclusion of an international body of forensic experts, as well as the broad publicity during excavation and analysis, the skeletal and archaeological results of the investigative commission are considered valid.

Katyn Case, Russia

Ukrainians were not the only nationality to be targeted as an "enemy nation" during the Stalinist period. Poles were also suspect. Soviet authorities were particularly wary of Poles who resided under Soviet jurisdiction, especially in the border regions. This culminated in a mass offensive against Polish prisoners of war (POWs) during spring 1940, where approximately 22,000 individuals were executed throughout the Soviet Union. One of these sites of execution and interment was in the Katyn Forest.

The mass repression of Poles began in September 1939, when the Red Army crossed the Polish-Soviet border with the reported intentions of protection (Kamenetsky 1989). However, Soviet authorities quickly arrested approximately 200,000 Polish military personnel (Levytsky 1972). Although formally they were POWs, these soldiers were managed as prisoners of the

NKVD (Levytsky 1972). Eventually most Polish soldiers were released from the POW camps. However, on March 5, 1940, the Politburo ordered the mass execution of the remaining Polish POWs held throughout the Soviet Union. These included roughly 14,500 prisoners in three special camps (Ostashkov, Starobelsk, and Kozelsk) in the R.S.F.S.R. Additionally, approximately 7,300 Poles jailed in western Belorussia and Western Ukraine were also targeted for elimination. A synchronized offensive was also launched against the families of those executed. Cienciala et al. (2007) estimate that approximately 25,000 families were deported to collective and state farms in Kazakhstan on 13 April 1940.

Although the exact motivation for the mass execution is unknown, three possible motives are accepted by Katyn historians. These include: 1) Soviet authorities viewed the remaining prisoners as "enemies;" 2) the remaining prisoners were elites which, once removed, could be replaced by pro-Soviet leaders; and 3) prisoners could not be persuaded to assume a pro-Soviet attitude (Cienciala et al. 2007; Zawodny 1972). The decision to execute prisoners was likely multifactorial: Stalin likely wished to eliminate the Polish elite, who were unsupportive of Soviet domination and could potentially become Poland's future leaders (Cienciala et al. 2007).

Mass executions of the three POW prisoner camps occurred from April to May 1940 (Table 2). Prisoners at these camps were tried by troikas, executed and then interred clandestinely in forested areas. Approximately 6,300 prisoners at the Ostashkov Camp, who were primarily composed of police and gendarmes, were executed at the NKVD prison in Kalinin (Tver) before being interred at Mednoe. However, eyewitness accounts note that some prisoners may have been executed at the burial site (Cienciala et al. 2007). Similarly, approximately 3,800 prisoners at the Starobelsk Camp were executed at the NKVD prison in Kharkov and then buried in the Kharkov Park. Again, some of the victims may have been executed at the burial site. Most prisoners in the Starobelsk camp were Polish Army officers and gendarmes (Cienciala et al. 2007). Finally, approximately 4,400 prisoners at the Kozelsk Camp were transported through Smolensk to the outskirts of the town of Katyn, where they were executed and interred (Figure 7).

Table 2: Execution Sites Associated with the Offensive against Polish POWs

Prisoner Camp	Execution Site	Interment Site	Executed Individuals (n)
Ostashkov Camp	Kalinin	Mednoe	6,300
Starobelsk Camp	Kharkov	Kharkov Park	3,800
Kozelsk Camp	Katyn Forest	Katyn Forest	4,400

Figure 7: Map Indicating the Location of Katyn, Russia

The exact location and details of prisoner execution in the Katyn case is unknown. Initially, researchers believed that prisoners were killed at or near the Katyn burial site. However, because few bullets casings were recovered at the site and most prisoners were not bound, researchers now believe that executions occurred elsewhere and remains were then transported to the Katyn forest. Cienciala et al. (2007) suggest prisoners could have been executed in the cellar of a villa near the Dnieper River or in a special room of the NKVD dacha. Both of these structures eventually burned down and are no longer available for analysis. Prisoners were likely killed individually (led one by one into the execution chamber) by NKVD agents (Cienciala et al. 2007). In October 1940, Beria rewarded these executioners for their participation by providing 800 rubles to each NKVD agent involved in the massacres (Cienciala et al. 2007). Victims of the Katyn massacre were not recovered until years after their deposition. Remains were initially were discovered in summer 1942 (with the unearthing of bones and Polish military insignia) and again in early spring 1943 (by accounts from local witnesses) (Cienciala et al. 2007). However, the Katyn remains were not fully investigated until late spring 1943 when the ground unfroze.

Three independent commissions investigated the Katyn massacre from April to July 1943. The International Commission represented one of the teams, which consisted of 13 forensic medicine specialists (with no overt evidence of pro-Nazi dispositions) from 12 countries. The Polish Red Cross Technical Commision also investigated at Katyn. This team consisted of 12 forensic specialists from German-wary Poland. Finally, a German Special Medical-Judiciary Commission also operated at Katyn at the behest of the Nazi government, who decided to exploit the anti-Soviet sentiments generated by the massacre (Cienciala et al. 2007). These three investigative commissions produced separate reports, but their findings generally coincided. Investigators exhumed a total of 8 mass graves containing 4,132 individuals. All individuals demonstrated major trauma and were in an active to advanced state of decomposition. Investigations were suspended on July 7, 1943 due to extreme heat and the approaching Red Army (Sanford 2005).

Responsibility for the Katyn massacre has been extensively contested. Soviet authorities adamantly rejected their involvement in the Katyn massacre, despite the independent findings of the three investigative commissions of 1943. Instead, in January 1944 they launched their own investigation of the massacre, the Burdenko Commission. Members of this special commission included forensic scientists and members of the intelligence services (Cienciala et al. 2007). Based on their own inquiries, such as review of documents, discussions with local eyewitnesses, and excavation of remains, the Burdenko Commission report concluded that the Germans were responsible for the Katyn massacre. This controversy played out during the Nuremberg Trials of 1946, when the Soviets accused Germany of the crime. Although the International Military Tribunal did not list the Katyn case in their final verdict against German leaders, they also neglected to entertain the notion of Soviet guilt. In the 1950s, the Madden Committee hearings in the U.S. Congress did find the Soviet security apparatus responsible for the Katyn massacre. However, this investigation failed to initiate another international trial, in part because of the United States' role in suppressing information on the Katyn massacre following World War II and the need for Soviet-U.S. cooperation in North Korea (Cienciala et al. 2007). Thus, for over 40 years, Soviet authorities officially denied responsibility for the Katyn killings. However, on 13 April 1990, Soviet authorities finally admitted guilt for the atrocity. In particular, they revealed that the Burdenko Commission had forged documents, intimidated witnesses, and planted evidence on corpses to implicate the Germans for the Katyn massacre (Cienciala et al.

2007). Regardless of this admission, the Katyn massacre (and the greater offensive against Polish POWs in 1940) remains a controversial issue for Polish-Russian reconciliation.

Figure 8: Map Indicating the Location of Rainiai, Lithuania

Rainiai Case, Lithuania

Although the Soviet Union and Nazi Germany had co-signed the Non-Aggression Treaty in 1939, Hitler violated the pact by invading Soviet-occupied territory beginning in June 1941. Stalin and Beria reacted by ordering the immediate liquidation of anyone *suspected* of espionage (Levytsky 1972). These events primarily played out in concentration camps and prisons in the Baltic Soviet republics, Belorussia, and Western Ukraine. Levytsky (1972) notes that in these areas, the unanticipated invasion by German forces created chaos. As the German army approached Lithuanian territory in July 1941, members of the Soviet security apparatus and the Red Army attempted to quickly manage prisoners held throughout Lithuania. However, given such short notice of evacuation, the security forces were not capable of safely withdrawing their own employees and records, let alone evacuating prisoners. Thus, while some prisoners were forced to retreat with Soviet forces, others were killed without the benefit of a trial or conviction (Šiušaitė and Landsbergis 2007).

One such episode occurred in the Rainiai forest in Lithuania (Figure 8). Based on eyewitness statements and historical documents, NKGB agents and members of the Red Army transported 76 inmates from the Telšiai prison to the Rainiai forest on the night of June 24-25, 1941. During this episode, prisoners were massacred and then interred in mass graves. None of the prisoners had been tried or convicted of crimes and most of the victims were Boy Scouts and high school students (Pajaujis-Javis 1980; Šiušaitė and Landsbergis 2007). Days later, a local farmer discovered the mass graves in the Rainiai forest and alerted German officials.

On June 28, 1941, a special commission of medical experts investigated these remains, identifying the prisoners and documenting trauma (Šiušaitė and Landsbergis 2007). The remains of 73 individuals in four mass graves were discovered. Due to the short interval between interment and discovery, victims were found in a fresh state of decomposition. All individuals were male and most exhibited evidence of perimortem trauma. After analysis, remains were subsequently reburied near the original interment site. Although known since 1941, the Rainiai case has received limited exposure in the history of Soviet crimes compared to Katyn and Vinnytsia.

SUMMARY

The state security apparatus transformed enormously from 1920 to 1950, as Stalin worked to maximize his power and increase the loyalty of his subordinates. Under the direction of Yagoda, Yezhov, and Beria, the Soviet security apparatus developed into a centralized, highly efficient instrument of state repression. This violence was meted out through operational agents, responsible for interrogating, convicting, and punishing transgressors.

Those in border territories and member of "enemy nations" bore the brunt of this repression during the Stalinist period. Cases from Vinnytsia, Katyn, and Rainiai demonstrate a range of state-sponsored violence implemented during the post-1936 period until the Second World War. However, there is not a clear understanding of the implementation of violence following World War II. An analysis, which compares the Tuskulenai case with these three cases, can address the gap in knowledge, permitting a broader understanding how violence committed by the Soviet security apparatus changed from the 1930s until the mid-1940s.

CHAPTER 4: RESEARCH QUESTIONS & EXPECTATIONS

The previous chapters examined the historical context of Soviet violence, as well as the structure of the security apparatus and expectations of agents. Specifically, within state bureaucracies, agents are expected to adhere to internal rules, such as those related to violence. However, the degree to which agents follow rules or improvise violence is not always explored. This dissertation employs forensic and bioarchaeological methods to evaluate how and why state-sponsored violence in the Soviet Union varies in space and time. This chapter outlines the primary research questions and expectations investigated in this study.

RESEARCH QUESTIONS

Chapter three discussed the social upheaval in Soviet-occupied Lithuania following the Second World War. Particularly, the second Soviet occupation was met with fierce opposition by locals, who engaged in a covert, extensive, and highly organized guerilla resistance movement from 1944 until the early 1950s. While historical data characterizes the Soviet security apparatus, which handled not only the Tuskulenai case but also those at Vinnytsia, Katyn, and Rainiai, as an efficient bureaucracy, skeletal and archaeological evidence permits researchers to assess variation with regard to violence and interment procedures. My basic assumption is that if this violence was in fact implemented methodically, then we will likely see relatively standardized treatment of prisoners at the time of death. If sufficiently severe, such violence will be visible in the recovered skeletal remains of the Tuskulenai sample. A high degree of standardization in violent death should result in strong patterning of trauma at a population level.

This dissertation investigates two primary research questions:

1. Do skeletal samples in the Tuskulenai case exhibit systematic variation in perimortem trauma or burial treatment?

a. Do perimortem injuries or burial treatment vary *over time*?

b. Do perimortem injuries or burial treatment vary *between security personnel*?

2. Do perimortem injuries or burial treatment vary among cases of Soviet state-sponsored violence during the Stalinist period?

The next section advances testable hypotheses associated with each of these research questions.

RESEARCH HYPOTHESES AND EXPECTATIONS

Hypothesis 1a: Skeletal samples in the Tuskulenai case will exhibit increasing variation of perimortem trauma over time, but burial treatment will remain consistent.

While historical data characterizes the Soviet political force as highly organized, the standardized implementation of violence by the Soviet security apparatus across time may be falsely assumed. Caton and Zacka (2010) argue that security apparatuses can deviate from guidelines while handling uncertain conditions and ongoing threats, such as those from enemy combatants. From 1944 to 1947, the Soviet security apparatus encountered different types of threats in the LSSR. Additionally, the personal attitudes of security personnel may have affected the improvisation of violence over time.

During the Second World War, the Nazis occupied Lithuanian territory. However, toward the end of the war, the Soviet Army pushed the Nazis west. As they did so, the Soviet Union re-occupied Lithuania and continued the policies from the first period, including arresting and executing “enemies” of the state. Beginning in 1944, the NKGB targeted individuals they suspected of Nazi collaboration during the German occupation (Vaitiekus 2011). This category of prisoner would have applied to many individuals detained in the early part of the Tuskulenai case. Since the German army was effectively expelled from Lithuania in September 1944 and likely did not pose an imminent threat, the Soviet security apparatus may have acted in a punishment capacity. In turn, prisoners who collaborated with the Nazis may have been conceptualized as less threatening and provided agents with fewer incentives to improvise violence.

As time progressed, the partisan war in the LSSR intensified. Specifically, the security apparatus began identifying new groups as “enemies,” including anti-Soviet resistance fighters and nationalists (Vaitiekus 2011). Subsequently, NKGB-MGB agents may have conceptualized prisoners in the latter part of the Tuskulenai case as an ongoing and uncertain threat and adjusted their actions (i.e. improvised violence) according to exigent circumstances rather than following state guidelines. While a clear demarcation between these periods is not known, the evaluation of biological and archaeological variables related to violence may help discern temporal patterns.

If the security apparatus did indeed perceive a greater threat later in the Tuskulenai case, it is anticipated that prisoner treatment during execution became increasingly varied through time. The state guideline for execution was fusillade (firearm) to the back of the head (Vaitiekus 2011). This mandate can be evaluated in skeletal tissues with regard to three variables: 1) mechanism of trauma, 2) anatomical location of trauma and 3) direction of force. In order to assess differences over time, variables are evaluated per burial pit, which have been sequenced according to their individual date of formation (e.g. Burial Pit 39 represents Time 1, etc.) It is hypothesized that over time, the number of individuals affected by gunshot wounds will decrease while the number of individuals affected by non-gunshot mechanisms (i.e. blunt force, sharp force, and quadrilateral defects) will increase. Also, the anatomical location of trauma is expected to shift from cranial to postcranial elements. Furthermore, the direction of force is expected to change from the posterior to include non-posterior directions. Finally, it is anticipated that the frequency of prisoners who exhibit full compliance (execution according to the state standard) will decrease over time, as the frequency of partial compliance or non-compliance increases.

Unlike the stated guideline for execution, there are no (known) state standards for burial treatment of prisoners. The number of individuals, arrangement of bodies, presence of concealment materials, presence of bindings and artifact type will be evaluated for patterns, but no *a priori* expectations for interment procedures exist. Thus, no change over time in burial treatment of prisoners is anticipated.

Hypothesis 1b: Skeletal samples in the Tuskulenai case will exhibit increasing variation in perimortem trauma between security personnel, but burial treatment will remain consistent.

This study seeks to identify conditions under which perimortem trauma and burial treatment changed in the Tuskulenai case. Thus, biological and archaeological variables are also assessed according to security personnel, or execution squad. Two execution squads are examined in the Tuskulenai case. The first was led by Vasilij Dolgirev, w4ho operated from November 1944 to October 1946. The second squad was led by Boris Prikazchikov, who operated from November 1946 to April 1947. These two execution squads did not overlap in time, thus their tenure as executioners also represent time (since they operated consecutively, not concurrently). Nonetheless, analysis of execution samples may help answer questions regarding the agency of state violence workers. In particular, we can evaluate whether changes in archaeological and biological variables are a product of time alone, or time and personnel.

If security agents did indeed perceive a greater threat later in time, then it is expected that prisoners in the Tuskulenai case will exhibit increasing variation of perimortem trauma between execution samples. Again, three main variables are assessed, including 1) mechanism of trauma, 2) anatomical location of trauma, and 3) direction of force. It is hypothesized that the number of individuals affected by gunshot wounds will decrease while the number of individuals affected by non-gunshot mechanisms (e.g. blunt force, sharp force, and quadrilateral defects) will increase between execution samples. The anatomical location of trauma is expected to change from cranial elements in Dolgirev's sample to postcranial elements in Prikazchikov's sample. Furthermore, the direction of force is expected to change from the posterior in Dolgirev's sample to include non-posterior directions in Prikazchikov's sample. Finally, it is anticipated that the frequency of prisoners who exhibit full compliance and partial compliance (execution according to the state standard) will decrease from Dolgirev to Prikazchikov's sample, as the frequency of non-compliance increases.

Again, because codified state standards for the burial treatment of prisoners is unknown, interment procedures are expected to remain consistent between execution squads. The number of individuals, arrangement of bodies, presence of concealment materials, presence of bindings and artifact type will be evaluated for patterns, but no *a priori* changes between execution squads are expected. Thus, no change in burial treatment of prisoners between security personnel is anticipated.

Hypothesis 2: The frequency of perimortem injuries in prisoners will be consistent in the Vinnytsia and Katyn cases, but vary in the Rainiai and Tuskulenai cases. Burial treatment will be consistent across all four sites.

Previous research has demonstrated that state-sponsored violence during the Stalinist period was not isolated to the Tuskulenai case. Other instances of Soviet violence are known, including those at Vinnytsia, Katyn, and Rainiai. Each of these cases represents a discrete temporal and geographical episode of state violence prior to and following the Second World War.

In the cases of Vinnytsia and Katyn, the state security apparatus waged an organized campaign against select groups. The Vinnytsia case formed as a result of the Great Terror (1937-1938) in borderland republics, while the Katyn case occurred as part of an offensive against Polish POWs (1940). In both of these episodes, Soviet security forces had sufficient time to carefully plan and execute procedures according to bureaucratic standards. In the Katyn case, the security apparatus even mitigated the potential of prisoner uprisings by vaccinating prisoners against typhoid in order to placate them into believing they were not in danger (Zawodny 1972). The expenditure of time and resources indicates a well thought out approach to the management of prisoners. Furthermore, there is no indication that security agents in either case were operating in conditions of uncertain threats. Victims at both Vinnytsia and Katyn were targeted due to their perceived threat to Stalin, rather than their actual threat to society; in order to fulfill quotas provided by Stalin, security agents arrested individuals guilty of relatively non-egregious crimes (e.g. owning land). Since victims likely did not create uncertain or unanticipated threats for agents on the ground, agents may not have improvised violence. As such, it is expected that executions in both cases were performed according to the state guideline which resulted in similar patterns of perimortem trauma. Specifically, the mechanism of trauma, direction of force, and anatomical location of trauma will not vary significantly between the Vinnytsia and Katyn cases.

However, the Rainiai case differs drastically from Vinnytsia and Katyn. Specifically, the decision to execute prisoners was sudden, spurred by the impending German invasion. This likely required state agents to proceed more quickly and perhaps improvise violence. Additionally, due to the chaotic environment, members of the Red Army were enlisted to assist security agents in the execution of prisoners (Šiušaitė and Landsbergis 2007). Thus, not only was there an environment of uncertain threat, but not all violence workers were formally incorporated into the security bureaucracy or trained to adhere to the state standard for execution. As such, it is expected that patterns of perimortem trauma (i.e. mechanism of trauma, direction of force, and anatomical location) in the Rainiai case will vary significantly from the Vinnytsia and Katyn cases.

The Tuskulenai case is also unique due to the fact that it formed over a three year period. Between 1944 and 1947, security agents faced both low level threats (e.g. punishing Nazi collaborators) and uncertain threats (e.g. managing anti-Soviet resistance fighters). Since the Tuskulenai samples are combined in this analysis, it is anticipated that frequencies of perimortem trauma (e.g. mechanism of trauma, direction of force, and anatomical location) in the Tuskulenai case will be more varied than Vinnytsia and Katyn, but less varied than Rainiai.

Since there is no *a priori* expectation for interment procedures, no change in burial treatment of prisoners between sites is anticipated. However, the number of individuals, arrangement of bodies, presence of concealment materials, presence of bindings and artifact type will be evaluated for significant patterns.

SUMMARY

A primary objective of this study is to evaluate how state-sponsored violence varied during the Stalinist period. This variation is explored through two research questions. The first question evaluates how perimortem trauma and burial treatment of prisoners changed in the Tuskulenai case. Since unanticipated threats may have increased from 1944 to 1947, it is hypothesized that perimortem became more varied over time (i.e. by pit and execution squad). This will manifest as an improvisation to the state guideline for execution (i.e. fusillade to the back of the head), visible in the mechanism of trauma, direction of force, and anatomical location of trauma. However, no difference is expected in interment procedures over time or between execution squads.

The second research question evaluates how perimortem trauma and burial treatment of prisoners vary between different sites of state-sponsored violence in the Soviet Union. It is anticipated that security forces had sufficient time to carefully plan and execute procedures according to bureaucratic standards in Vinnytsia and Katyn cases. Additionally, since Stalin's quotas drove the number of arrests and executions (rather than being based on actual crimes committed), state agents may not have encountered uncertain or unanticipated threats. Thus, it is hypothesized that agents did not improvise violence and perimortem trauma is consistent in the Vinnytsia and Katyn cases. However, in the case of Rainiai, impending threat of German invasion, limited preparation time, and the inclusion of non-security personnel likely created an environment of non-adherence to bureaucratic standards. Thus, it is expected that perimortem trauma in the Rainiai case varies significantly from the Vinnytsia and Katyn cases. Since the Tuskulenai case represents a mixture of both anticipated and unanticipated threats, perimortem trauma is expected to be more varied than Vinnytsia and Katyn, but less varied than Rainiai. However, no difference is expected in interment procedures between the sites.

CHAPTER 5: RESEARCH MATERIALS & METHODS

This chapter introduces the research materials and methods employed in this study. It provides an overview of the materials in the Tuskulenai case, highlighting the sampling strategy for burial pits and skeletal remains. Furthermore, it discusses the sources of data for the regional comparison of Soviet state-sponsored violence. This chapter also examines methods employed in the collection and analysis of biological data (e.g. age, sex, perimortem trauma, and additional variables) and archaeological data (e.g. pit features, concealment materials, bindings/gags, and material culture), as well as description of statistical analyses utilized.

RESEARCH MATERIALS

Tuskulenai Case

Following the restoration of independence in 1991, Lithuania ushered in an era of democratization and the pursuit of transitional justice. In post-Communist states, transitional justice refers to a wide range of inter-related processes aimed at reconciling abuses committed under past authorities (Stan 2009). These processes serve multiple purposes, including the assessment of past authoritarian regimes, the rehabilitation of victims, the prosecution of perpetrators, and the exposure of the mechanisms of trauma (Stan 2009). In Lithuania, authorities pursued historical accountability by forming a working group of forensic medicine professionals, archaeologists, and anthropologists to investigate atrocities committed during the Stalinist period. Historical documents discovered in the KGB headquarters in Vilnius led investigators to believe prominent members of the Catholic Church and anti-Soviet resistance, executed during the 1940s, were buried at the Tuskulenai Estate (Jankauskas et al. 2005).

Excavations at the Estate in 1994, 1995, and 2003 yielded a total of 724 individuals in 45 mass graves. Burial pits were discovered in two general locations: within and outside of a former garage (Figures 9 and 10). Eight burial pits, located approximately 55 meters northeast of the garage, included 113 individuals executed and interred during the summer of 1945 (Jankauskas et al. 2005). The former garage, represented by a foundation and stone floor, was approximately 10 x 40 meters in size. Excavations in the former garage revealed 37 square or rectangular burials pits containing a total of 611 individuals, likely interred during the fall, winter, and spring of 1944-45, 1945-46, and 1946-47 (Jankauskas et al. 2005). The remains of prisoners executed during the summer of 1946 have yet to be discovered. As of today, 25 pits have been associated with dates of execution and interment in the Tuskulenai case.

Figure 9: Plan Map of Burial Pits Located North of the Garage at the Tuskulenai Estate

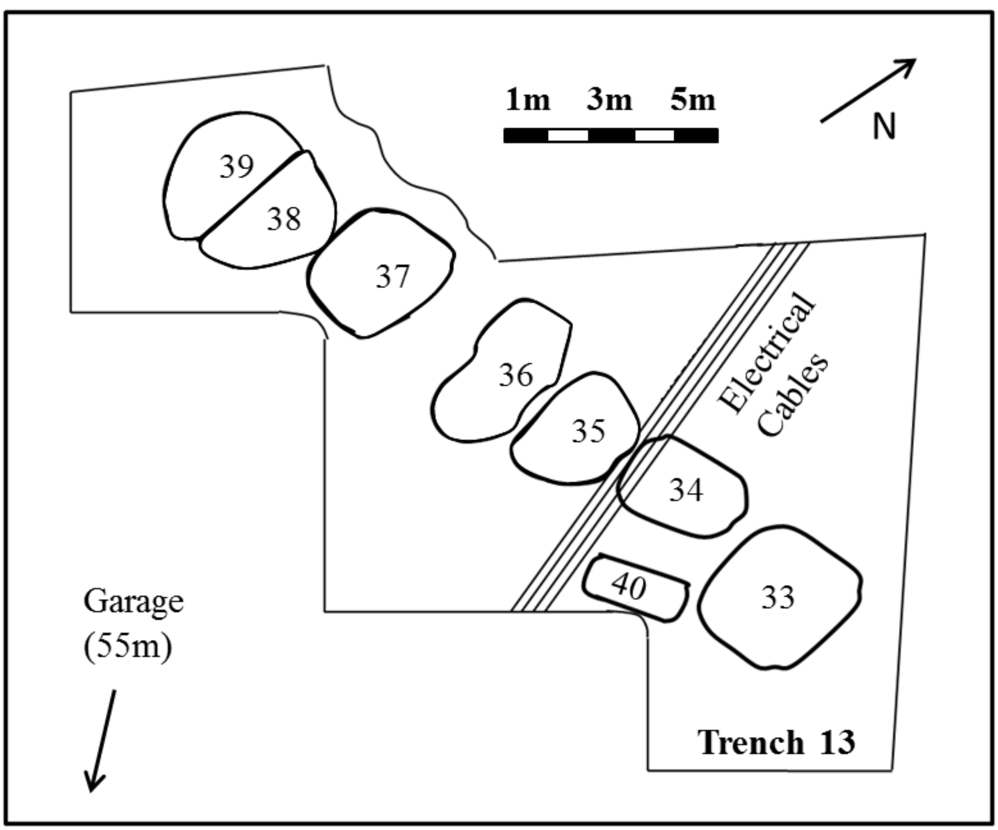
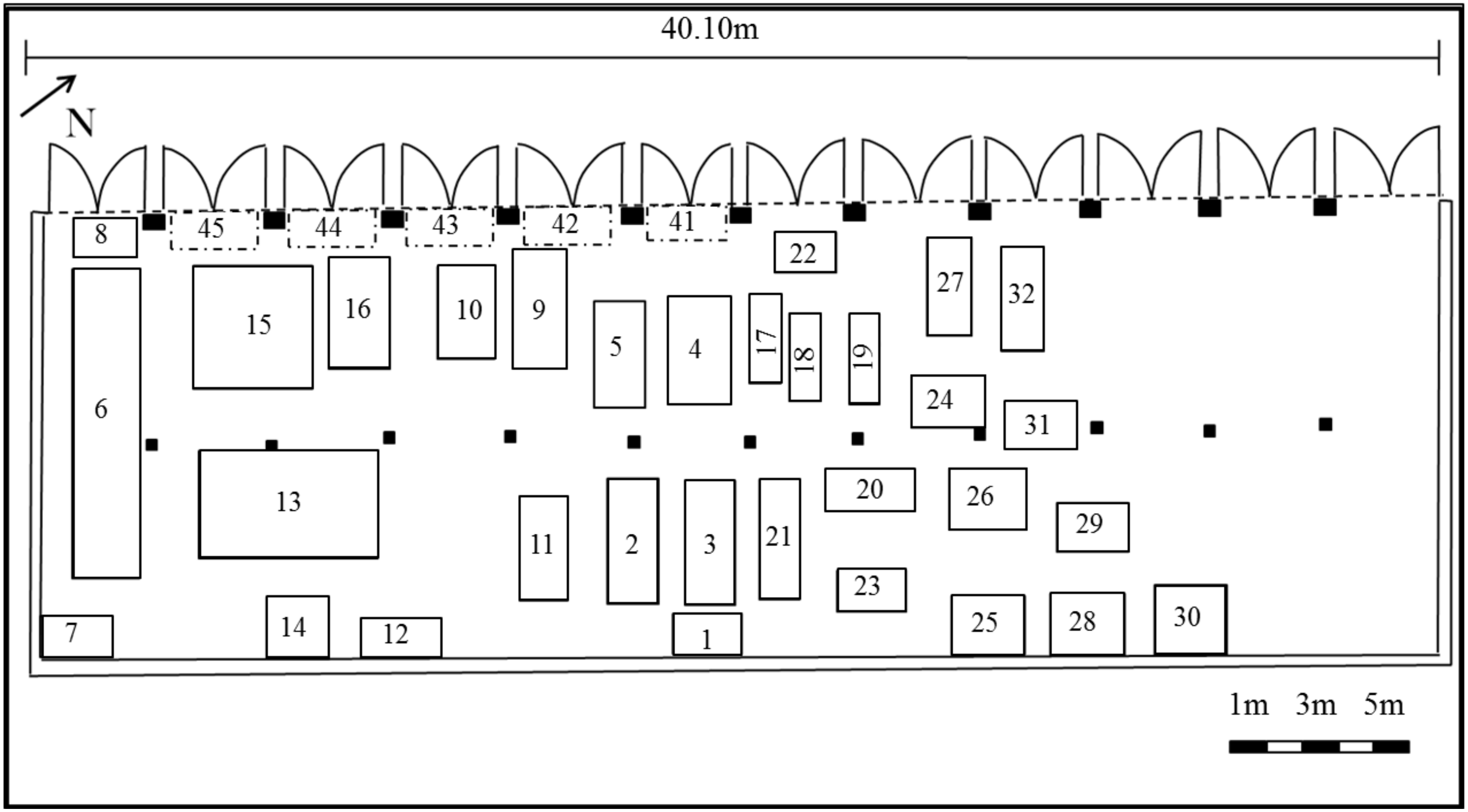


Figure 10: Plan Map of Burial Pits within the Garage at the Tuskulenai Estate



Since this project evaluates change over time in the Tuskulenai case, only pits with definitive dates of execution and interment were sampled. Dated pits were randomly selected and (when possible) 100% of individuals in each of the selected burial pits were analyzed. However, in some cases not all individuals were available for analysis because they were identified and repatriated for burial upon request of relatives or the Catholic Church. Thus, the skeletal remains of 155 individuals from 12 burial pits were analyzed in the Tuskulenai case. Sampled burial pits range in date from July 1945 until January 1947 and include prisoners executed by both Dolgirev and Prikazchikov's squads (Table 3 and Figure 11). Samples from Dolgirev's squad include 110 individuals in 8 burial pits, interred both within and outside the garage from July 1945 until August 1946. Samples from Prikazchikov's squad include 45 individuals in 4 burial pits, interred within the garage during the last six months of the Tuskulenai case. Plan maps of the sampled burial pits from the two execution squads are shown in Figures 12 and 13.

Table 3: Sampled Burial Pits with Dates of Execution & Execution Squad

Pit Number	Time	Date of Execution & Interment	Execution Squad
35	1	14 July 1945	V. Dolgirev
36	2	31 July 1945	V. Dolgirev
37	3	17 August 1945	V. Dolgirev
38	4	27 August 1945	V. Dolgirev
39	5	25 September 1945	V. Dolgirev
2	6	30 December 1945	V. Dolgirev
5	7	23 January 1946	V. Dolgirev
23	8	26 August 1946	V. Dolgirev
26	9	18 November 1946	B. Prikazchikov
24	10	26 November 1946	B. Prikazchikov
27	11	25 December 1946	B. Prikazchikov
31	12	21 January 1947	B. Prikazchikov

Figure 11: Timeline of Sampled Burial Pits in the Tuskulenai Case

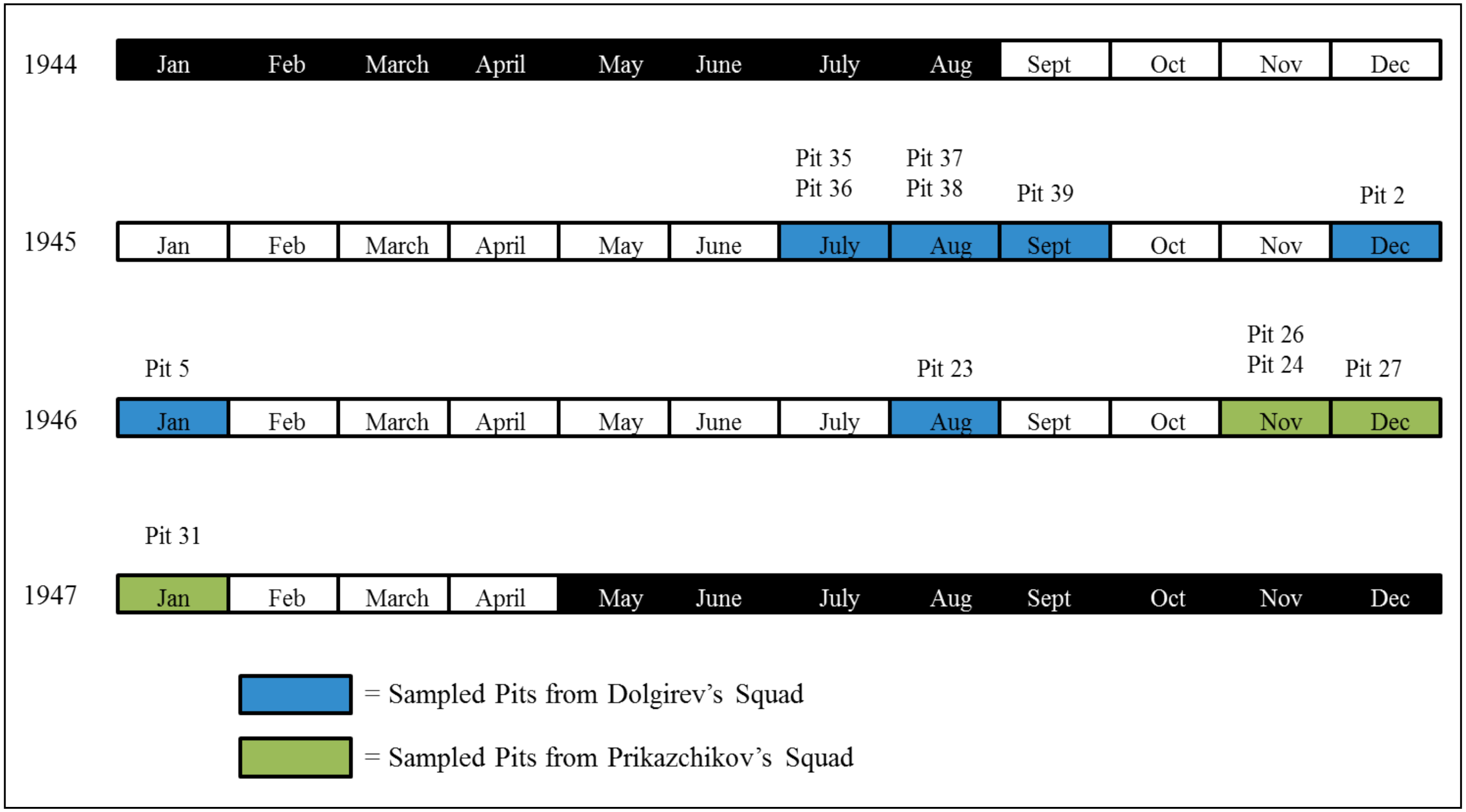


Figure 12: Sampled Burial Pits by Executioner Squad Located North of the Garage

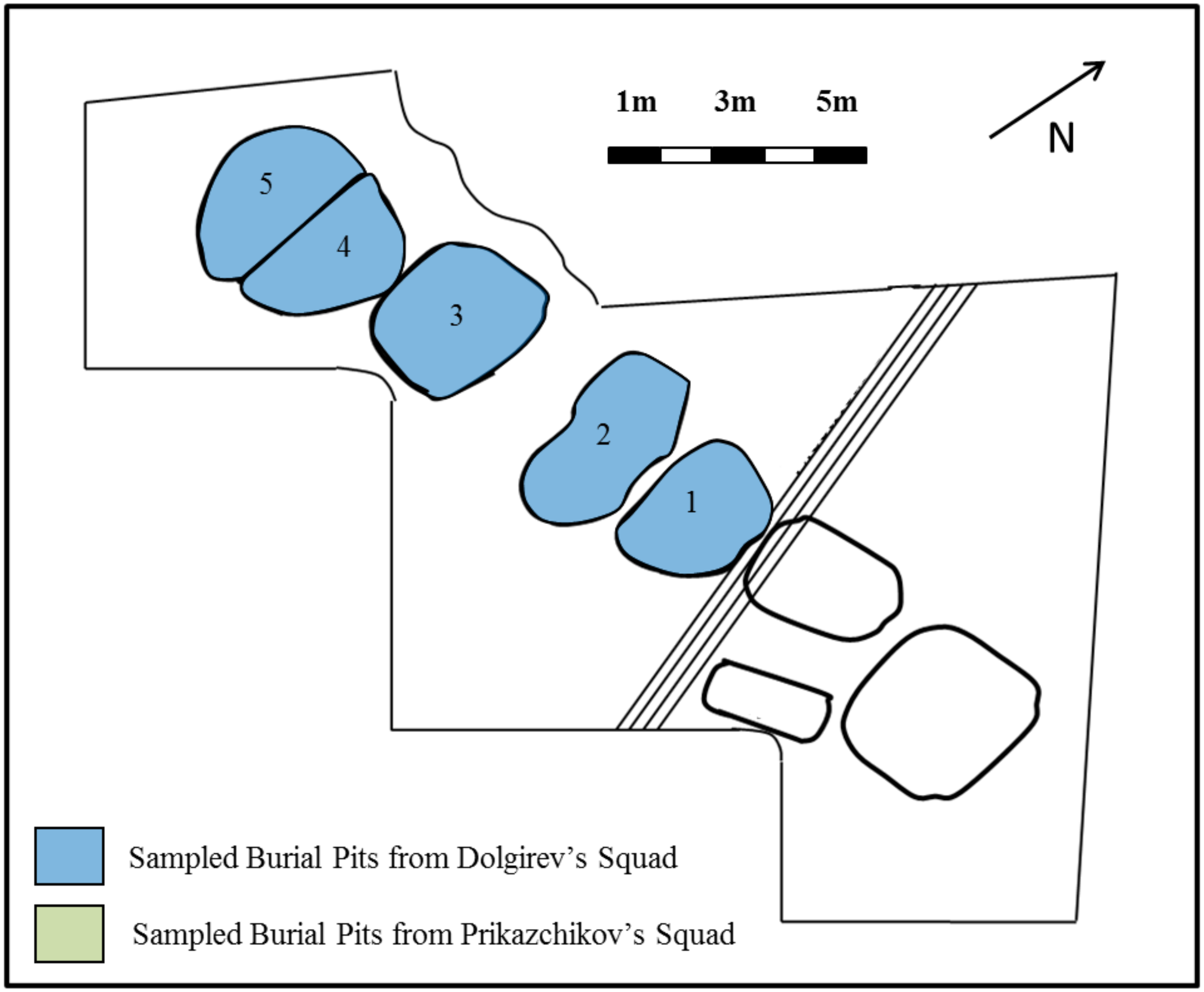
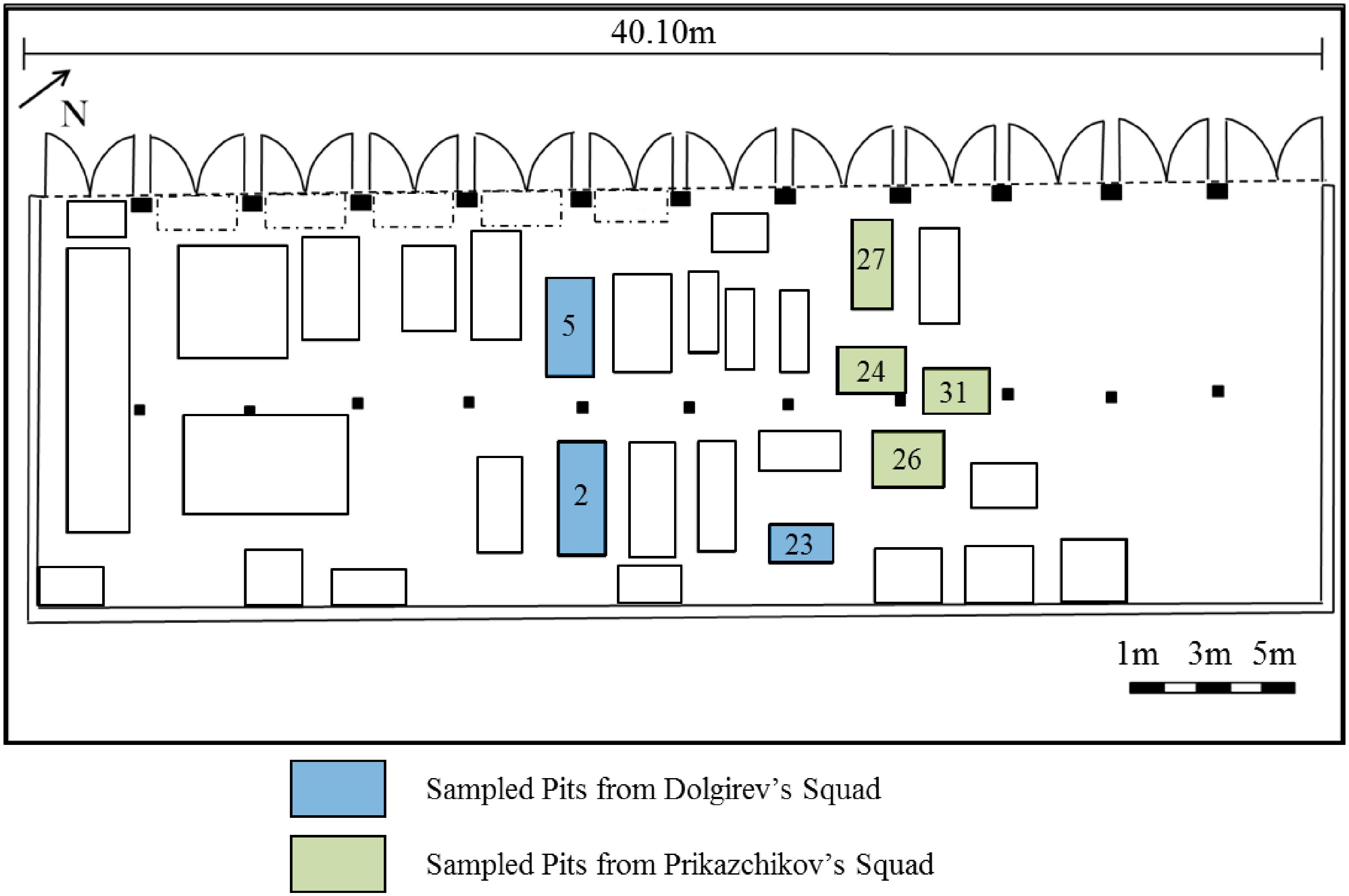


Figure 13: Sampled Burial Pits by Execution Squad Located within the Garage



Other Cases of Soviet Violence

This project compares trauma patterns and burial organization from Tuskulenai with data from other episodes of Soviet violence during the Stalinist period, including the Vinnytsia, Katyn, and Rainiai cases. However, prisoner remains in these three other cases were reinterred immediately following analysis during the 1940s. Thus, this study relies on published literature that documents the skeletal and archaeological data in each case. The suspected number of executions and actual number of remains analyzed varies due to the unique circumstances of investigation (Table 4). In the Vinnytsia case, approximately 9,450 individuals were executed and 9,432 individuals were analyzed (Kamenetsky 1989). In the Katyn case, approximately 4,400 individuals were executed, while 4, 143 individuals were analyzed (Cienciala et al. 2007; Sanford 2005; Zawodny 1972). At Rainiai, 76 individuals were executed and 73 individuals were analyzed (Šiušaitė and Landsbergis 2007). Finally, in the Tuskulenai case, 767 individuals were executed, while 155 of those individuals were analyzed in this study.

Table 4: Cases of Soviet Violence

Case	Date(s) of Execution	Date(s) of Analysis	Number Executed	Number Analyzed	Source(s)
Vinnytsia	1937-1938	Spring 1943	~9,450	9, 432	Kamenetsky (1989)
Katyn	Spring 1940	Spring 1943	~22,000	4,143	Cienciala et al. (2007); Sanford (2005); Zawodny (1972)
Rainiai	June 1941	June 1941	76	73	Šiušaitė and Landsbergis (2007)
Tuskulenai	1944-1947	2012	767	155	Bird (2013)

RESEARCH METHODS

Skeletal Analyses

In order to facilitate cross cultural comparisons of trauma patterns, a number of biological variables were considered. These included age and sex estimation, perimortem trauma, and additional variables. In the Tuskulenai case, skeletal variables were evaluated based on standards suggested by Buikstra and Ubelaker (1994), as well as methods suggested in forensic literature. Skeletal data from Vinnytsia, Katyn, and Rainiai are based on methods employed by forensic personnel during the 1940s. Thus, data were not always collected comparably to that at Tuskulenai in the present study. Data from these sites were compared when possible.

Age and Sex Estimation

Analysis and interpretation of trauma in skeletal remains should consider not only the extrinsic social, cultural, or environmental factors related to injury, but also their relationship to intrinsic biological variables (Lovell 1997). The evaluation of victim demographics (e.g. age and sex) is important for demonstrating specific attributes of victims and reasons for their selection (Komar and Lathrop 2012). Thus, age and sex were evaluated in this study.

Age-at-death was assessed using morphological features of the pelvis and thorax, according to standard data collection procedures (Buikstra and Ubelaker 1994). Preservation of remains dictated the element and method employed. To estimate age, this study focused on features of the pubic symphysis (Brooks and Suchey 1990; Suchey and Katz 1986, 1998), auricular surface (Lovejoy et al. 1985; Meindl and Lovejoy 1989), and sternal rib ends (İşcan et al. 1984, 1985). Subadult age was estimated using epiphyseal appearance and union (Scheuer and Black 2000), as well as dental eruption (Ubelaker 1989). Subsequently, the sample was divided into age categories outlined by Buikstra and Ubelaker (1994), including subadult (<20 years), young adult (20-35 years), middle adult (35-50 years), and older adult (50+ years) (Table 5). When poor preservation obstructed the age estimation in adults, individuals were placed in a general "adult" category.

While subadults are typically divided into additional age categories (i.e. fetal, infant, child, and adolescent), this categorization was not undertaken in this study. Based on historical data, only adolescents were expected in the samples of executed prisoners. Thus, "subadults" in this study refers to individuals aged 16 to 20 years at death. It is important to note that the category of "subadult" may be misleading in a human rights context. According to standard data collection procedures (Buikstra and Ubelaker 1994), individuals are differentiated into "subadult" or "adult" categories based on growth and development. While this categorization can be useful for skeletal biologists, it does not necessarily reflect a society's actual conception of "adulthood." The fact that individuals younger than 20 years old were executed seems to reflect the state's conception of them as credible threats.

Table 5: Age Groups and Associated Summary Age Ranges

Age Group	Age Range
Subadult	< 20 years
Young Adult	20-35 years
Middle Adult	> 35 – 50 years
Older Adult	Over 50 years
Adult	+20 years

Sex was determined for all adults based on morphological features of the skull and pelvis when elements were present and scorable (Buikstra and Ubelaker 1994). Sex was also determined for subadults, since the sample consisted of older adolescents who had likely experienced puberty and developed secondary sexual characteristics. Assessment of sex from the pelvis was based on aspects of the pubic bones (Phenice 1969), as well as the width of the greater sciatic notch (Buikstra and Ubelaker 1994). Sex was also assessed based on the expression of features in the skull, including the nuchal crest, mastoid process, supraorbital margin, glabella, and mental eminence (Buikstra and Ubelaker 1994). Extensive robusticity was noted when present. While pelvic and cranial features were employed, features of the pelvis were preferred when ambiguity was present. Individuals were placed into one of five categories, including female, probable female, undetermined, probable male, and male (Buikstra and Ubelaker 1994). However, the final analysis only includes the categories of "female," "male" and "indeterminate" sex. Based on historical data, females were not expected to be well represented in any of the prisoner samples.

Skeletal Trauma

Skeletal analysis of trauma typically evaluates the timing of injuries and the mechanism of trauma. While traumatic injuries which demonstrated an osteogenic reaction were noted, they were not a focus of this study. Instead, injuries related to the death event (perimortem) were assessed in order to understand the experiences of victims and behavior of perpetrators during executions.

Perimortem injuries are the most difficult category to distinguish, but unique fracture patterns (e.g. concentric fractures, obliquely angled fractures, etc.) guide researchers in this assessment (Maples 1986; Lovell 1997). Furthermore, perimortem injuries often exhibit uniform stains from water, soil, or vegetation on adjacent fracture edges because the internal bone surfaces are exposed at the same time of deposition (Maples 1986; Sauer 1998).

This study identified macroscopic signs of unhealed fractures relating to the perimortem period. Wound descriptions included number of individuals affected, number of episodes per individual, anatomical location, and direction of force. Injuries were also documented with regard to entry vs. exit wound, size, shape, associated fractures, and presence of beveling. However, only variables pertinent to answering specific research questions are analyzed in the results section.

Three mechanisms of trauma are typically identified, including blunt force trauma, sharp force trauma, and projectile trauma. Skeletal injuries were evaluated for unique characteristics associated with each mechanism of trauma. **Blunt force trauma** (BFT) consists of damage inflicted to a relatively large impact area by low velocity instruments and are produced from compression, bending, or shearing forces dynamically applied over bone (Galloway 1999). Suspected blunt force injuries were described with regard to fracture type (e.g. butterfly fractures, spiral fractures, Lefort fractures, depression fractures, etc.), anatomical location, direction of force, size of affected area, and number of injuries.

Sharp force trauma (SFT) consists of dynamic compression forces applied to the surface of bone in a narrow and focused manner, which result in a discontinuity at the point of impact (e.g. punctures, incisions, clefts, etc.) (Byers 2008). Suspected sharp force injuries were described with regard to wound type (e.g. incised, puncture, etc.), anatomical location, direction of force, size of affected area, and number (and sequence) of injuries.

Projectile trauma or **gunshot wounds** (GSWs) consists of high-velocity compressive force which is initially narrowly-focused but gradually becomes wider as the projectile passes through bone (Byers 2008). Bullets from firearms are the most common instruments that cause projectile trauma, and their construction, caliber, and velocity can differentially affect skeletal injuries (Kimmerle and Baraybar 2008). Suspected gunshot injuries were described with regard to wound type (i.e. entry, exit, or keyhole), anatomical location, direction of force, size of affected area, and number (and sequence) of injuries. Primary (impact) fractures, secondary (radiating) fractures, and tertiary (heaving concentric) fractures were assessed with regard to beveling patterns in order to distinguish between blunt force trauma and gunshot trauma (Berryman and Symes 1998).

This project utilized two additional mechanisms of trauma, including quadrilateral defects and undetermined defects. **Quadrilateral defects** (QD) represent a site-specific (Tuskulenai case) mechanism of trauma, which produces square or rectangular-shaped wounds. These patterned injuries likely consist of a combination of blunt and sharp forces, and may include both entry and exit wounds. Entry wounds demonstrate beveling on internal and external surfaces, while QD exit wounds primarily exhibit beveling on external surfaces. Both entry and exit wounds are associated with radiating fractures. Quadrilateral defects are likely caused by objects that are long and pointed, square in cross section, taper from base to tip, and have sufficient mass to penetrate bone (e.g. ice axes, bayonets, etc.). Finally, **undetermined defects** (UD) were identified when the mechanism of trauma was ambiguous or difficult to discern.

These mechanisms of trauma were evaluated not only by number of individuals affected and number of episodes observed per individual, but also with regard to anatomical location and direction of force. When possible, trauma on individual bones was observed (e.g. occipital).

However, due to the interconnectedness of cranial bones and the diffuse nature of some mechanisms of trauma (e.g. blunt force), a general distinction of cranial versus postcranial trauma was used to test specific hypotheses. Since perpetrators likely did not differentiate between lower cranial elements and cervical vertebrae, trauma to the neck was included under cranial elements. Finally, the direction of force of specific mechanisms of trauma was recorded as posterior, front, left side, right side, superior, inferior, or unknown.

Additional Variables

In order to facilitate cross-cultural comparison of violence on a population level, a number of additional variables were collected. These include decompositional stage, percentage of body recovered, and the degree of trauma.

Decompositional stage was documented for each sample according to Komar and Lathrop (2012), including fresh or bloated, active or advanced, and skeletal. The fresh or bloated stage indicates the period from death until the development of a maggot mass, and includes features such as a bloated appearance, gas accumulation in the body cavities, marbling of the skin, and strong odor (Komar and Buikstra 2008). The active or advanced decay stages is characterized by the appearance (and subsequent disappearance) of a sizeable maggot mass, strong odor, marked decrease in body mass, collapse of the thorax, and the initial desiccation of soft tissues (Komar and Buikstra 2008). The skeletal stage is characterized by the presence of bone, cartilage, or desiccated soft tissue, lack of odor, and disappearance of insect activity (Komar and Buikstra 2008).

Percentage of body recovered was recorded according to Komar and Potter (2007), and included the categories of complete, partial or skull only. Complete remains included those in which 75% or more of elements were recovered. Partial remains were those in which fewer than 75% of elements were recovered, while skull-only indicates that only the skull was recovered. The percentage of elements recovered was calculated according to the weighting system based on element size as outlined by Grisbaum and Ubelaker (2001:6).

Degree of trauma was recorded according to categories proposed by Komar and Lathrop (2012), including absent, minor, or major. These classifications were adapted from classes originally defined by Komar et al. (2008). The absence of trauma indicates no perimortem traumatic defects were observed. Minor trauma indicates the presence of non-lethal trauma which likely did not directly contribute to death (Komar et al. 2008). Finally, major trauma indicates the presence of lethal or potentially lethal defects incompatible with life (Komar et al. 2008).

Compliance to Standards

In order to assess whether state agents implemented violence according to the bureaucratic standard of the security apparatus, overall compliance was evaluated per individual. The state guideline for execution in the Soviet Union during the 1930s and 40s mandated fusillade (firearm) to the back of the head (Vaitiekus 2011). Fulfillment of this directive required that a specific mechanism of trauma (gunshot wound), direction of force (rear), and region of injury (cranium/neck) be employed. Thus, this study defines three categories of compliance (with the state guideline for execution) per individual: full compliance, partial compliance, and non-compliance (Table 6). **Full compliance** is achieved when an individual demonstrates all three requirements (e.g. gunshot wound(s) to the back of the head). **Partial compliance** is identified when gunshot wounds are present on crania, but they are administered from a direction other than posterior. This category takes into account that security personnel (executioners) may have been acting in good faith with the state guideline, but prisoners could have turned their heads or body positions at the time of execution. Finally, **non-compliance** is determined when any additional mechanism of force is present (e.g. quadrilateral defects), even when gunshot wounds are also present. However, since partial compliance ultimately constitutes non-compliance, statistical tests are performed with individuals executed in partial compliance added to the non-compliance category.

Table 6: Categories of Compliance

Category	Description
Full Compliance	Gunshot trauma to the back of the head
Partial Compliance	Gunshot trauma to the head from a non-rear direction
Non-Compliance	Presence of non-gunshot mechanisms of trauma

Time versus Security Personnel

This study investigates how compliance changed over time and between security personnel. However, time and security personnel are intimately related since execution squads operated consecutively, rather than concurrently. In order to evaluate the influence of time and security personnel, compliance is evaluated over time separately for each of the execution samples. For these analyses, individuals executed in partial compliance are collapsed into the non-compliance category.

Mortuary Analyses

A number of contextual variables related to interment procedures were analyzed in the Tuskulenai, Vinnytsia, Katyn, and Rainiai cases. When possible, features of each pit discovered during the archaeological excavation were assessed, including pit dimensions, number of individuals per pit, and the arrangement of bodies in the pit. Furthermore, this study noted the presence of concealment materials, as well as the presence of bindings or gags. Finally, material culture recovered at each site was analyzed, including the number and types of artifacts. Archaeological variables were compared based on information stated in the site reports of each case. This section presents a detailed description of these mortuary variables.

Pit Features

When available from the site report, pit dimensions were analyzed in each case. This included the *length* and *width of pits*, as well as the *depth* at which remains were first encountered (starting depth) and ceased (ending depth). The thickness of pits (based on starting and ending depths) was also evaluated.

The *number of individuals per pit* was assessed for each case of Soviet violence. This category is straightforward for most of the cases. However, in the Tuskulenai case, the number of individuals discovered in pits did not correspond to the number of remains analyzed. This was due to the fact that some individuals were not available at the time of skeletal analysis.

Finally, the *arrangement of bodies* in each pit was assessed through two primary means: head orientation and body position. Head orientation indicates the location of the head within the pit (e.g. north, south, east, west, etc.). Subsequently general directionality of bodies can be assessed since remains often lie in a linear fashion (e.g. north-south, east-west, etc.). Body position refers to the burial of decedents in a supine position (on the back), prone position (on the stomach), left side, or right side. Pits were classified as organized, semi-organized, or disorganized based on patterns of head orientation and body placement. Pits were organized when the head orientation and body placements were consistent in individuals throughout the pit. Pits were semi-organized when either the head orientation or body placement was consistent in individuals throughout the pit. Finally, disorganized pits refer to those in which neither the head orientation nor body placement was consistent in individuals throughout the pit.

Material Culture

Material culture discovered within the graves during excavation was analyzed in this study. Specifically, the *number of artifacts* as well as *artifact type* was examined. In order to compare material culture across sites, artifacts were separated into one of four categories: clothing, personal effects, weaponry, historical documents, and other items (Table 7). Clothing included non-specific items that were constructed and worn, such as textiles, shoes, and buttons. Personal effects included objects that were often personalized or used by specific individuals, such as medallions, pipes, wallets, and brushes. Items related to weaponry were noted and included bullet fragments and bullet cartridge cases. Historical documents refer to paper items related to victims or perpetrators, which were buried with decedent remains. Finally, non-specific artifacts were classified as “other” when they did not clearly fit into one the previous categories (e.g. ceramics) or had limited descriptions in the archaeological site reports.

Table 7: Description of Artifact Types

Artifact Type	**Description**
Clothing	Non-specific, worn items
Personal Effects	Personalized items
Weaponry	Items related to violence
Historical Documents	Paper items interred with decedent remains
Other	Additional items not related to clothing, personal effects, weaponry, or historical documents

Presence of Concealment Materials

A number of materials were interred with the remains of prisoners, presumably as tools of concealment (e.g. accelerating decomposition, masking decompositional odors, etc.). These included both corrosive and non-corrosive items, such as lime, carbon (tar) paper, and layers of organic material (e.g. possible clothing). In the Tuskulenai case, concealment materials interred with remains were documented through two approaches: archaeological and skeletal analyses. If tar paper, lime, or organic materials were recorded in the archaeological site report, or observed during the analysis of remains, then concealment materials were considered present.

Presence of Bindings or Gags

The presence of bindings and gags was also assessed. When discernible from site reports, the location (e.g. wrist, elbow, feet, etc.) and position of bindings (e.g. behind the back) were evaluated. Additionally, the presence of knotted material around the neck and face was also noted as evidence of gagging. At Tuskulenai, the presence of bindings and gags is particularly difficult to ascertain due to the postmortem interval. However, based on the position of remains within the burial pits, researchers may speculate whether or not prisoners were interred bound.

When individuals were discovered *in situ* with both arms bent behind their backs, this study infers that their arms were bound behind them during life.

Descriptive and Statistical Analyses

Both descriptive and statistical analyses were performed on skeletal and archaeological data. Specifically, data related to mortuary and demographic variables, as well as skeletal trauma (i.e. mechanism of trauma, anatomical location, and direction of force) were compared in the Tuskulenai case using prevalence rates. Prevalence in this study refers to the number of individual affected divided by the total number of individuals in the sample (e.g. per burial pit or execution sample). In some cases, the total number of individuals varied according to the specific analysis. For example, when assessing the prevalence of perimortem trauma in a sample, individuals whose skeletal remains were extensively damaged due to taphonomy were deemed "unobservable" and excluded from the analysis. Prevalence rates were also assessed based on the number of skeletal elements present (e.g. number of left fibulae affected by trauma divided by the number of left fibulae observed). Additionally, two-tailed *t*-tests were performed to compare the means of independent samples (e.g. executioner samples).

Non-parametric statistics were performed in order to measure the relationship between variables. The prevalence rates were compared between execution samples using Pearson's chi-square test or two-tailed Fisher's exact probability tests. The application of a specific statistical test depended on the expected frequencies in contingency tables (Field 2009). Fisher's exact test was employed in 2 x 2 contingency tables when any expected frequency was lower than 5 or less than 20% of the total number. In larger contingency tables, categories were combined if any cells had an expected frequency of less than 1 or more than 20 percent of cells.

In order to evaluate the association between archaeological or skeletal variables and time, both Spearman's correlation coefficient (or Spearman's rho) and linear regression analyses were used. Spearman's rho ranks the data and provides a correlation coefficient (*r*) that indicates directionality of association: a negative coefficient indicates an inverse association, while a positive coefficient indicates a positive association (Field 2009). When linear regression analyses were used, lines of best fit and coefficients (*b*) were calculated to assess the strength and direction of associations (Field 2009). For all statistical tests, the significance level was established when *p* values were less than 0.05, and marginal significance was established when p values were less than 0.01. Values lower than 0.05 indicate that the null hypothesis (i.e. variables were not related) should be rejected.

SUMMARY

This study randomly sampled 155 individuals from 12 burial pits in the Tuskulenai case. These individuals represent prisoners executed and interred by Soviet security forces in Lithuania between July 1945 and January 1947. Data related to age and sex was collected using anthropological standards recommended by Buikstra and Ubelaker (1994). Perimortem trauma data was collected based on methodological approaches from forensic anthropological literature. Variables related to demography and skeletal trauma were analyzed using prevalence rates, chi-square tests, Fisher's exact tests, Spearman's rho, or linear regressions. Descriptive and statistical tests were performed to examine patterns of violence within the Tuskulenai case, as well as to compare the four cases of Soviet violence. The following chapter presents the results of the mortuary analysis in the Tuskulenai sample, evaluating archaeological variables over time and between execution squads to address the first research question.

CHAPTER 6: TUSKULENAI MORTUARY RESULTS

This chapter examines the mortuary features of burial pits in the Tuskulenai sample. Specifically, it analyzes archaeological variables related to the pit, such as the number of individuals per pit and pit dimensions. It also assesses body arrangement of prisoners (e.g. head orientation and body position), material culture (e.g. artifact number and type), the inclusion of concealment materials, and the presence of bindings on individuals. Mortuary variables assessed in this study are printed in the Tuskulenai archaeological site report, which was translated with the help of Justina Kozakaite. As mentioned previously, the sample size between the mortuary analysis and osteological analysis does not directly correspond. A total of 159 individuals were discovered in the 12 sampled burial pits during excavation. However, because not all individuals were accessible for examination during the course of this study, only 155 of those individuals were included in the osteological analysis.

The chapter begins with a discussion of mortuary variables in all sampled pits combined in the Tuskulenai case. The next section explores mortuary variables with regard to time, followed by analysis by execution squad. Descriptions of mortuary features of individual pits can be found in Appendix A. Data reported in this chapter are used to address the first research question outlined in Chapter Four: Does burial treatment vary over time or between security personnel in the Tuskulenai case? The first and second hypotheses expect burial treatment to remain consistent over time and between security personnel.

MORTUARY RESULTS IN THE TUSKULENAI CASE

A total of 159 individuals were recovered from the 12 sampled pits in the Tuskulenai case. The number of individuals per pit ranged from 6 to 19 individuals, with a mean of 13.25 individuals per pit. For all burial pits combined, pit sizes ranged from 0.90 meters to 2.80 meters. The mean starting depth for all pits was 152 cm with a mean ending depth of 236 cm. The thickness of all pits ranged from 40 to 130 cm, with a mean thickness of 84 cm.

The arrangement of bodies was evaluated by the orientation of the head and position of the body of individuals in burial pits. Individuals were discovered with varying head orientations throughout the Tuskulenai sample. Heads were located more commonly in the western (38%) and eastern (33%) ends of pits, followed by the north (18%), south (9%), northeast (1%), southeast (1%), and southwest (1%) (Table 8 and Figure 14). The body positions of individuals in all sampled pits were relatively evenly distributed between supine (49%) and prone (43%) positions (Table 9 and Figure 15). Fewer individuals were interred on the left side (4%) and right side (4%). One individual's body position was not discernible from the site report.

Table 8: Head Orientation for All Tuskulenai Samples

	Head Orientation	
	n	**%**
East	52	32.7
West	60	37.7
North	28	17.6
South	14	8.8
Northeast	1	0.6
Southeast	2	1.3
Southwest	2	1.3

Figure 14: Head Orientation for all Tuskulenai Samples

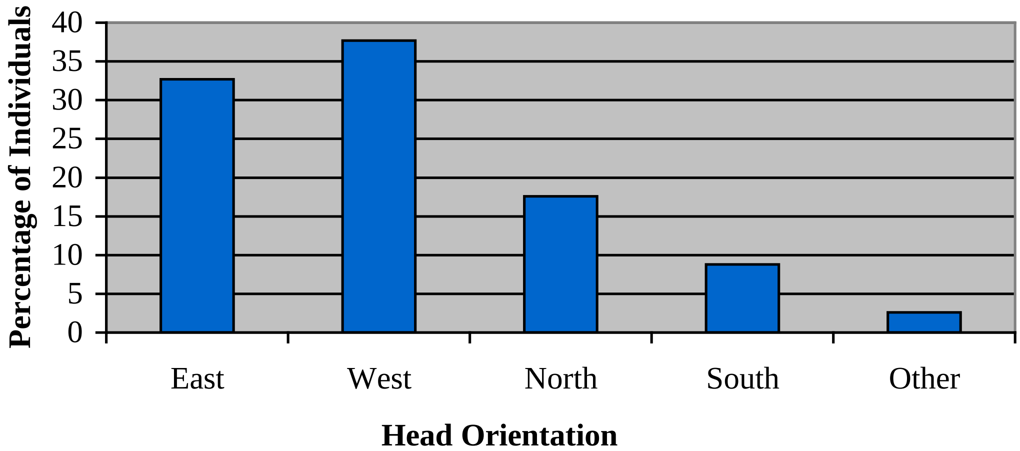
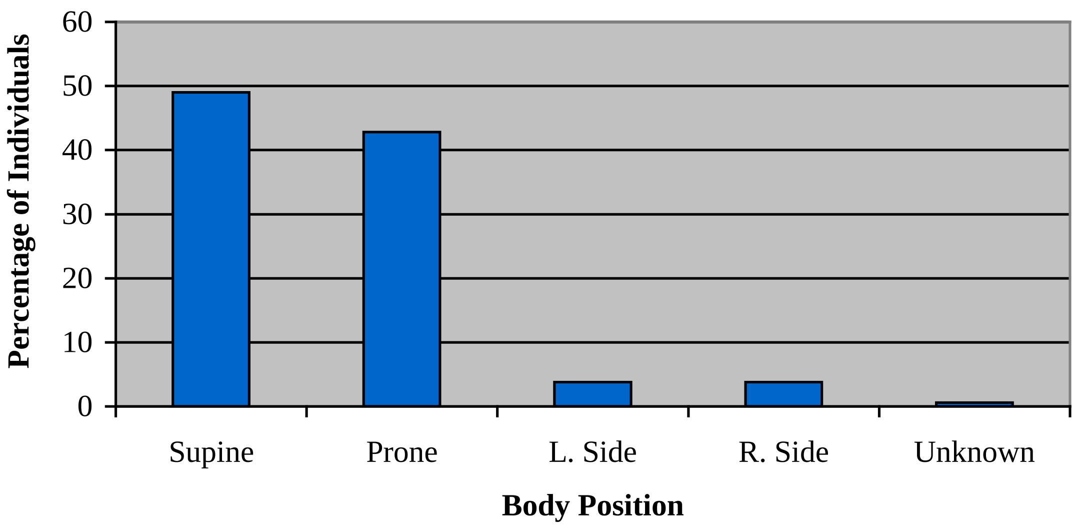


Table 9: Body Position of Individuals in all Tuskulenai Samples

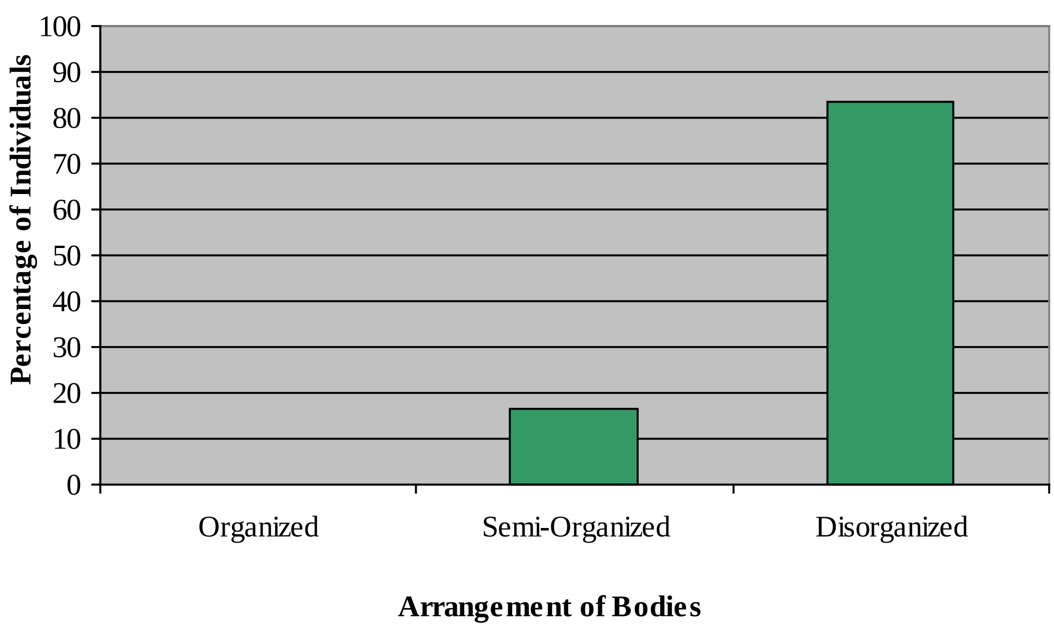
	Body Position	
	n	**%**
Supine	78	49.0
Prone	68	42.8
L. Side	6	3.8
R. Side	6	3.8
Unknown	1	0.6

Figure 15: Body Position in all Tuskulenai Samples



While a general east-west head orientation exists, approximately 29% of the Tuskulenai sample demonstrates other (e.g. north, south, etc.) head orientations. The lack of a single preferred head orientation or body position suggests that perpetrators did not bury prisoners with a standard, mortuary norm in mind. Instead, the placement of prisoners may have been haphazard or a product of functional requirements of the pit (e.g. pit dug in an east to west orientation based on space available in the former garage). This inference is confirmed when head orientation and body position are analyzed together. Approximately 83% of the sampled pits demonstrated a disorganized arrangement of bodies (neither the head orientation nor the body position was consistent throughout all individuals in a pit). Only 17% (n = 2) of pits demonstrated a semi-organized arrangement, as the head orientation of all individuals in both of those pits were consistently located in the north (although body positions varied). None of the burial pits demonstrated an organized arrangement of bodies (Figure 16).

Figure 16: Arrangement of Bodies in all Tuskulenai Samples



The sampled pits contained a total of 196 artifacts, most of which were clothing items (85%) followed by personal effects (9%), weapons (3%) and other items (3%) (Table 10 and Figure 17). Since the majority of clothing items represented individual buttons (95%), and multiple buttons were likely included on single articles of clothing, it is probable that the clothing category is artificially inflated compared to the other artifact types. Personal effects recovered included items such as hairbrushes, tin plates, medallions, and spoons, as well as a wallet, stamp, toothbrush, cigarette holder, perfume bottle, and smoking pipe. Weaponry included bullet fragments and cartridge cases, while other items included chalk, metal pipes, and ceramics. Historical documents were not discovered in any of the Tuskulenai sampled pits.

Table 10: Number and Artifact Type for all Tuskulenai Samples

	Total # of Artifacts	**Clothing**		**Personal Effects**		**Weapons**		**Other**	
	n	n	**%**	n	**%**	n	**%**	n	**%**
Total	196	166	84.7	18	9.2	6	3.1	6	3.1

Figure 17: Percentage of Artifacts by Type for all Tuskulenai Samples

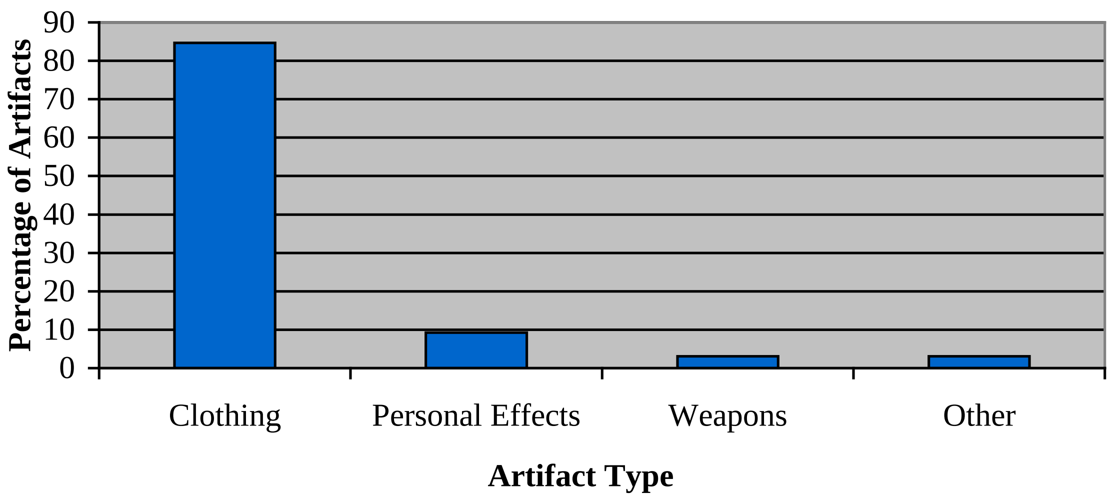
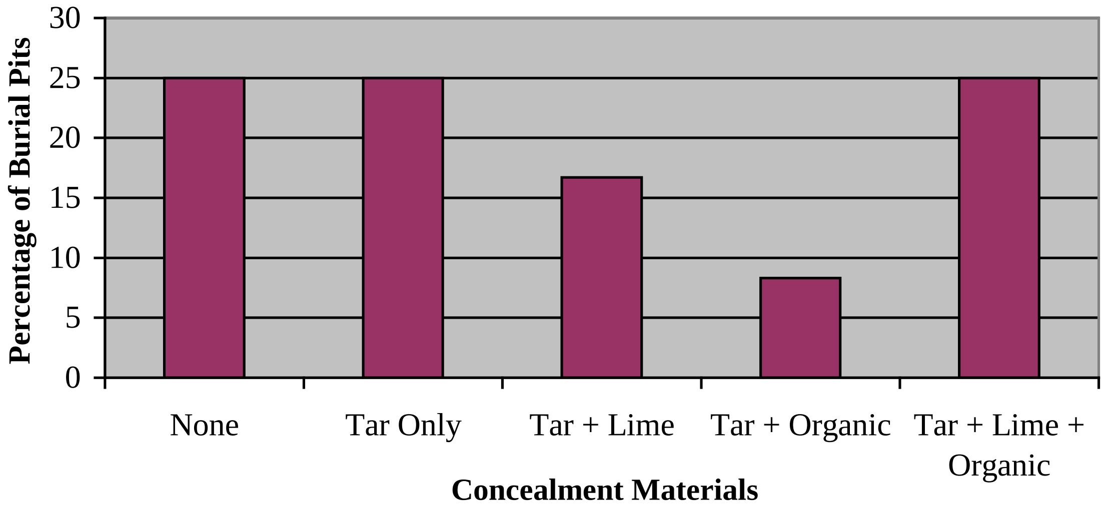


Figure 18: Percentage of Concealment Materials for all Tuskulenai Samples



Various combinations of concealment materials were discovered in burial pits at Tuskulenai (Figure 18). Burial pits equally demonstrated tar paper only (25%) and combined tar paper, lime, and organic materials (25%). Fewer burial pits contained lime and tar paper (16.7%) or tar and organic material (8.3%). Concealment materials were absent in three burial pits (25%).

Finally, the presence of bindings was assessed cautiously from the position of remains within burial pits. Approximately 17% of individuals (n = 27) in the Tuskulenai sample were discovered *in situ* with both arms bent behind their backs, indicating that they may have been bound at the time of execution and interment.

MORTUARY RESULTS OVER TIME

In order to compare archaeological variables over time, burial pits were sequenced according to date of formation and given a time designation (e.g. Burial Pit 35 = Time 1) as shown in Table 11. Prisoners were interred in two locations on the Tuskulenai Estate: within the former garage and north of the garage. When the 12 burial pits sampled in this study are color-coded by time, a clear spatial pattern emerges (Figure 19). The earliest pits sampled (Time 1-5) are located north of the garage and interred in a sequential east to west pattern. These pits contained prisoners executed during the late summer/early fall of 1945. The remaining burial pits sampled (Time 6-12) are located within the former garage and are interred in a general west to east pattern. These pits contained prisoners executed during winter 1945/46, fall 1946, and winter 1946/47. The spatial layout supports Jankauskas et al.'s (2005) findings that perpetrators were burying prisoners' remains within the garage during colder months and outside of the garage in warmer months. Furthermore, the orderly layout of burial pits by time indicates that perpetrators systematically planned for the disposal of prisoner remains in future episodes of mass violence.

Table 11: Burial Pit and Time Sequence in the Tuskulenai Case

Burial Pit	Time	# of Individuals
35	1	12
36	2	12
37	3	17
38	4	10
39	5	15
2	6	14
5	7	19
23	8	11
26	9	13
24	10	6
27	11	18
31	12	12

Figure 19: Burial Pits Color-Coded over Time in the Tuskulenai Case

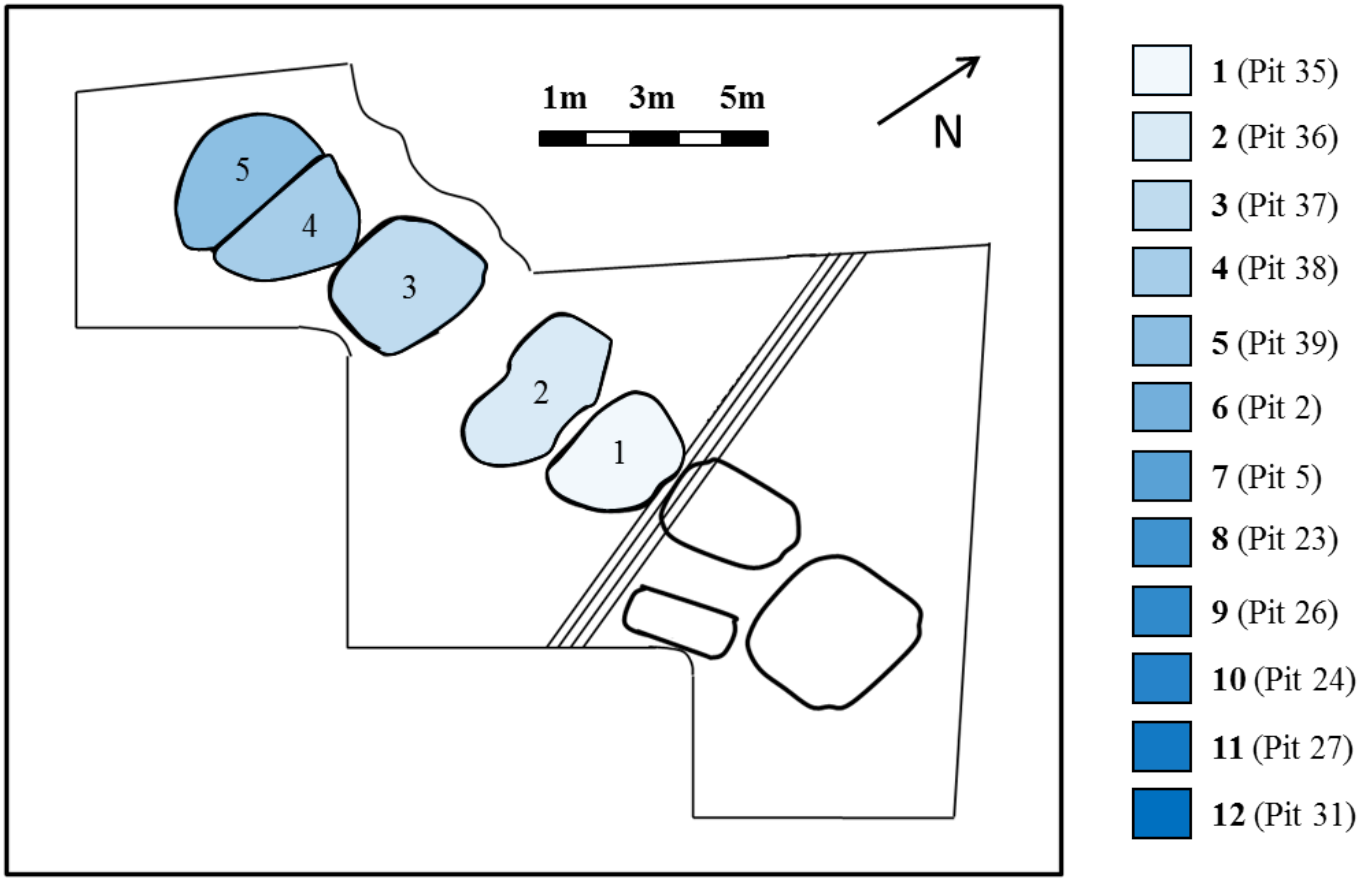


Figure 19 (cont'd): Burial Pits Color-Coded over Time in the Tuskulenai Case

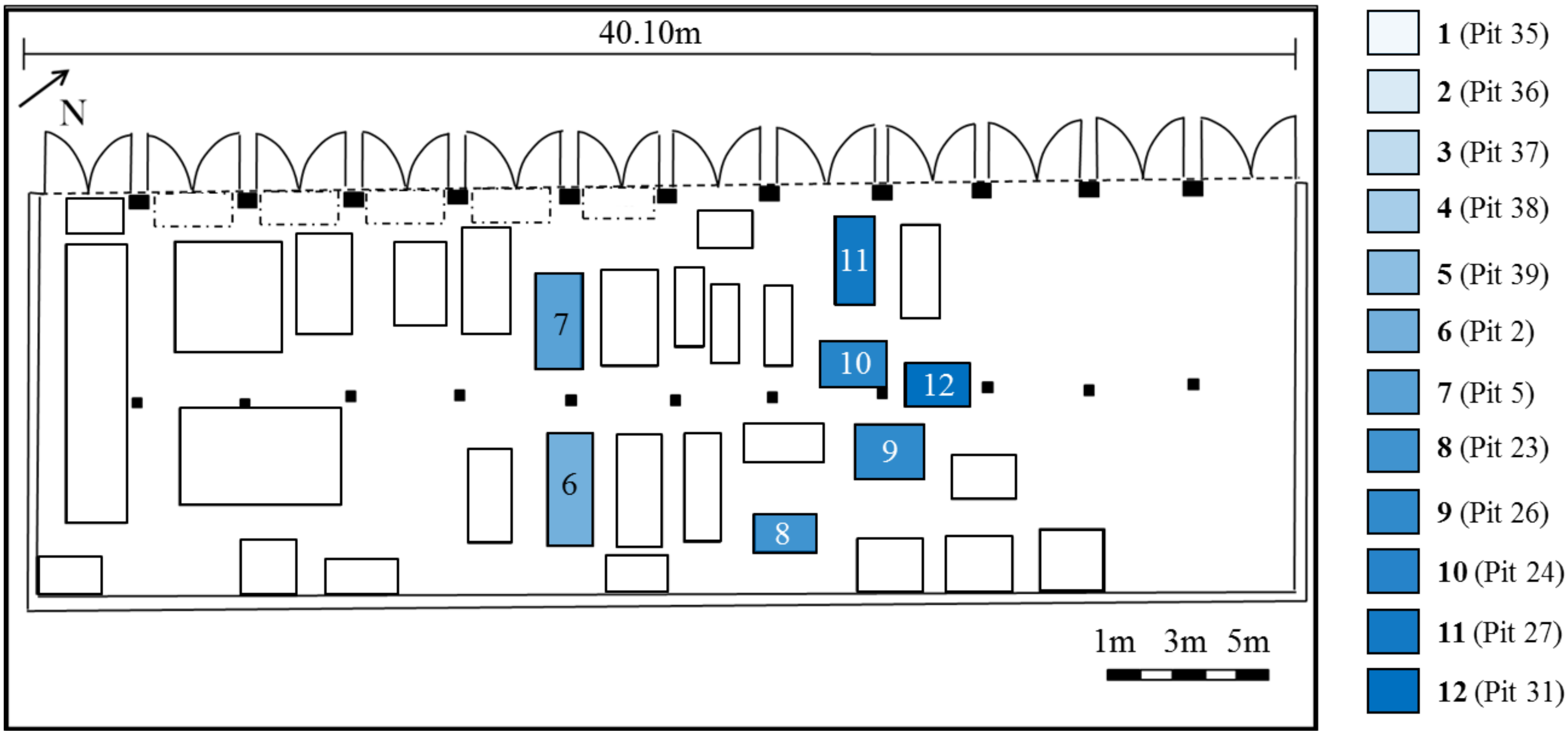
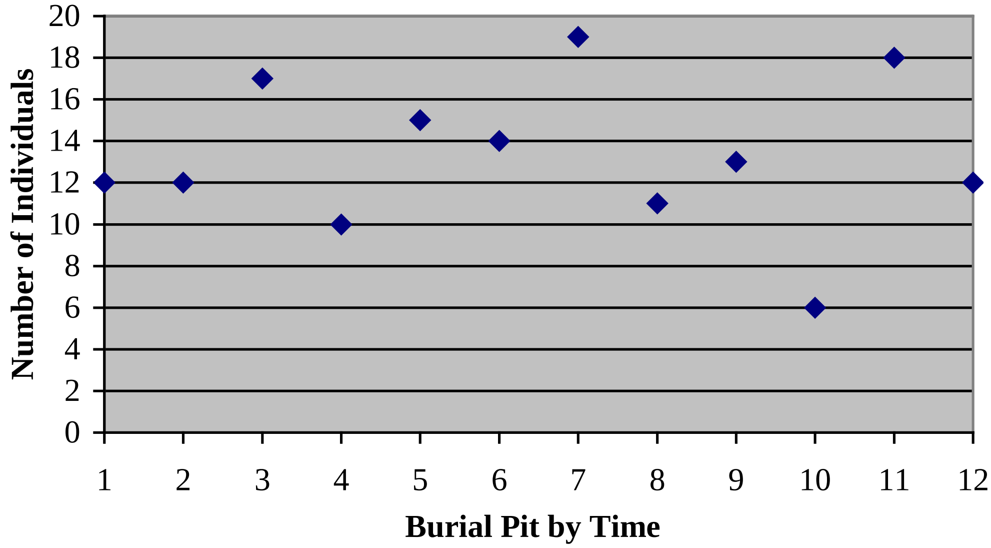


Figure 20: Number of Individuals per Burial Pit over Time



In order to assess change in the number of individuals over, a linear regression was run with the number of individuals as the dependent variable and pit time as the independent variable. Time was not a significant predictor of the number of individuals per pit ($b = -.052$, $p = .873$) as shown in Figure 20. Similarly, comparison of pit thickness, width, and length demonstrated limited variation. Generally, pit thickness increases over time, but results of linear regression analysis demonstrate that the change is not statistically significant ($b = 0.059$, $p = 0.059$) (Figure 21). Generally, pit length and width decrease over time, but results of linear regression analysis demonstrate that the change in length ($b = -0.042$, $p = 0.207$) and width ($b = -0.067$, $p = 0.052$) are not statistically significant (Figure 22). Thus, the number of individuals per pit and pit length, width, and thickness does not significantly vary over time.

Figure 21: Comparison of Pit Thickness over Time

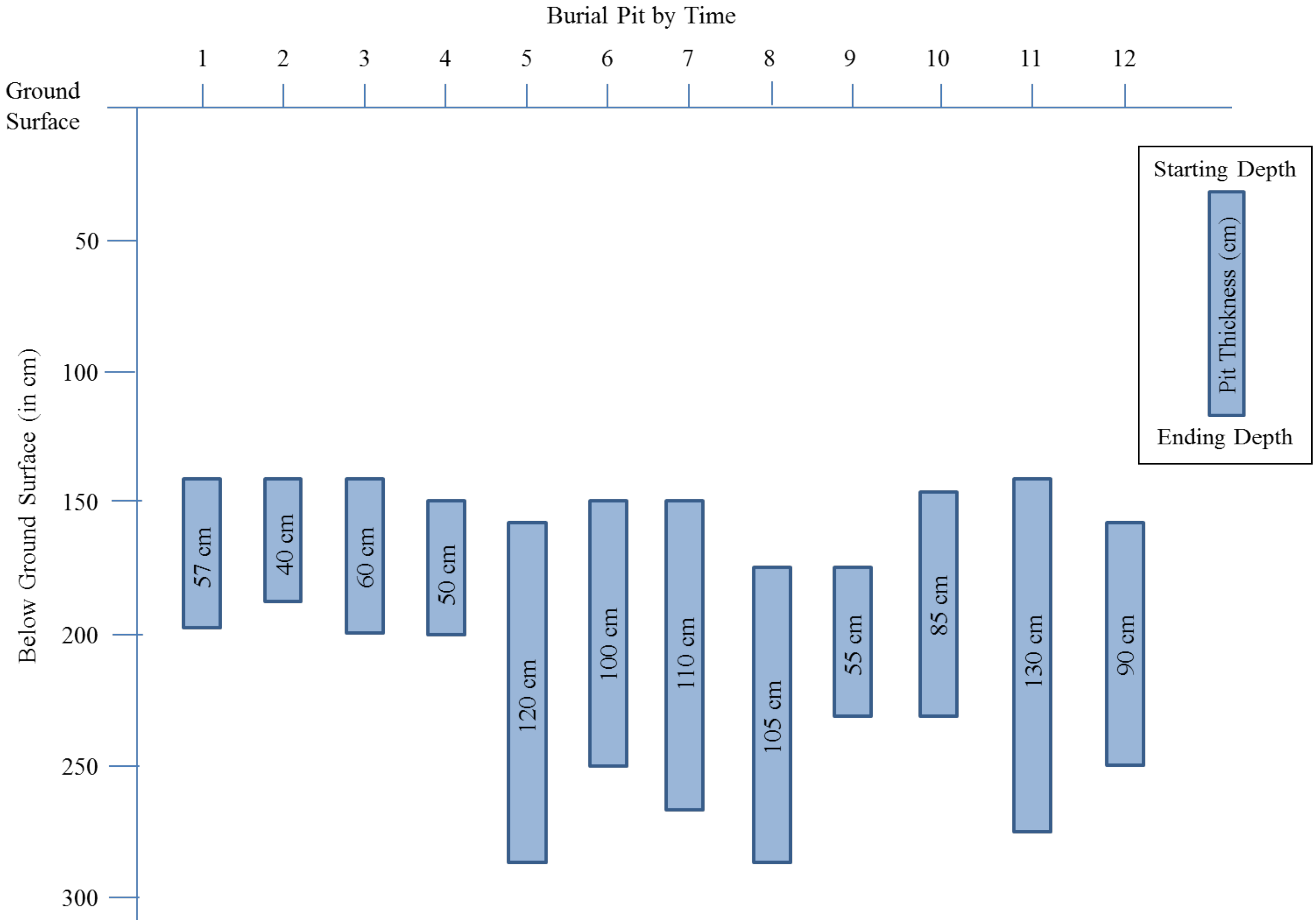
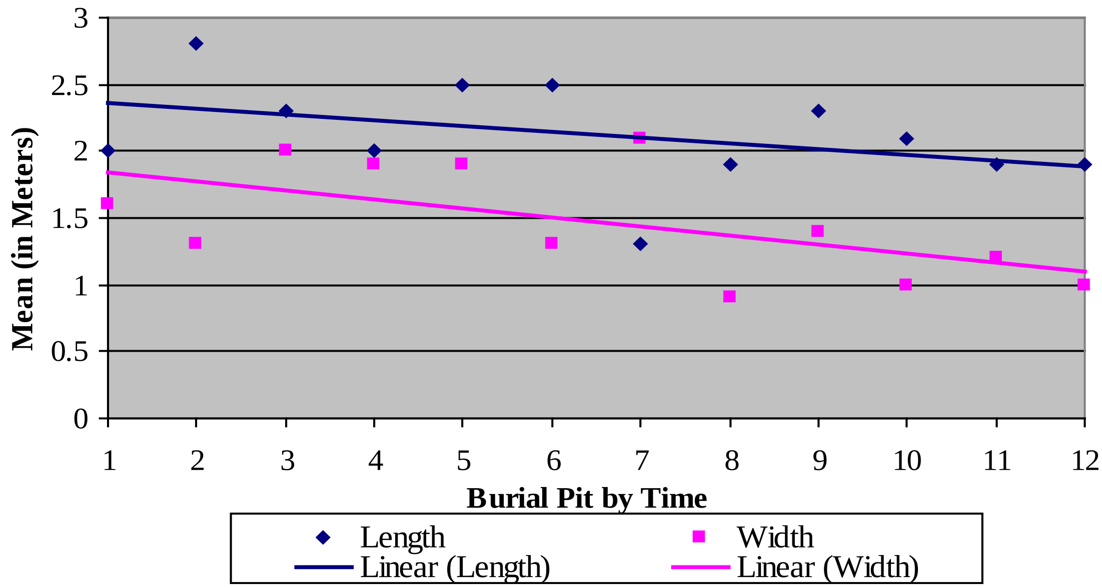


Figure 22: Comparison of Burial Pit Width and Length over Time



Comparison of head orientation over time demonstrates that individuals were interred with their heads in the east or west throughout the sampled time (Figure 23). However, individuals were only interred with their heads in the north or south later in time (Time 8-10, 12). Furthermore, burial pit 24 (Time 10) and pit 31 (Time 12), both of which contained individuals whose heads were all located in the north represent two of these later pits. Comparison of body position demonstrates a relatively equal representation of prone and supine positions over time (Figure 24). While fewer individuals were discovered on the right and left sides, both of these body positions are present throughout the sampled pits. Evaluation of the organization of bodies reveals a generally disorganized pattern across time. However, individuals in two late dated pits (Time 10 and 12) demonstrate a semi-organized pattern. None of the sampled burial pits exhibit an organized pattern of interment. While head orientation appears to be influenced to some degree by time, the small sample size and low level of variability does not permit statistical confirmation.

Figure 23: Comparison of Head Orientations over Time

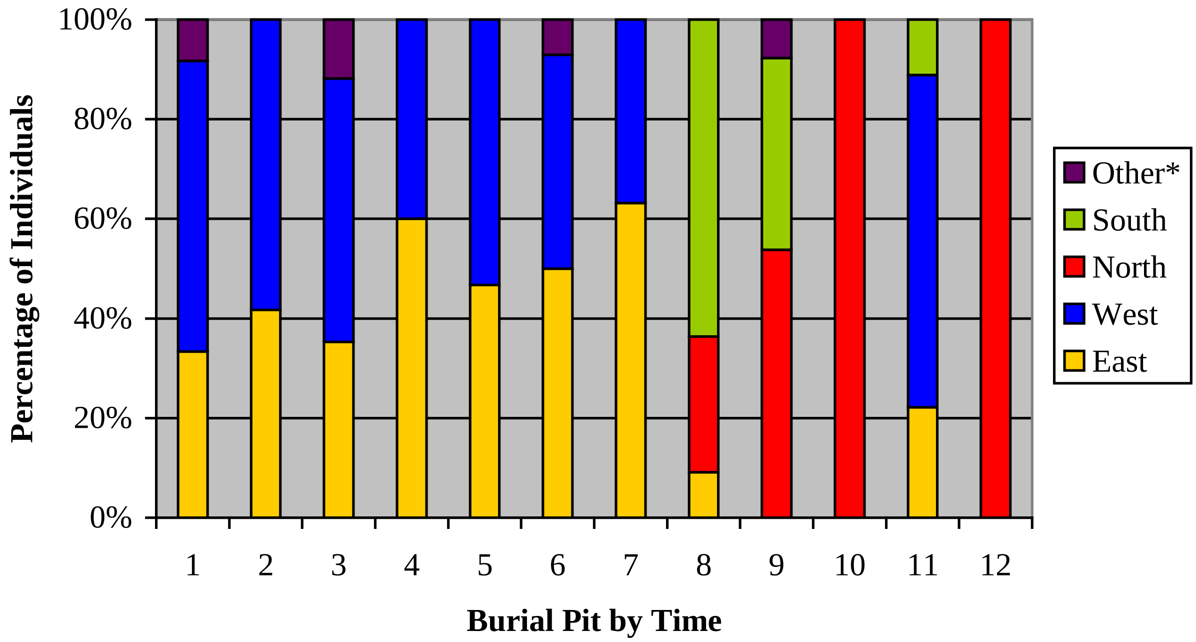
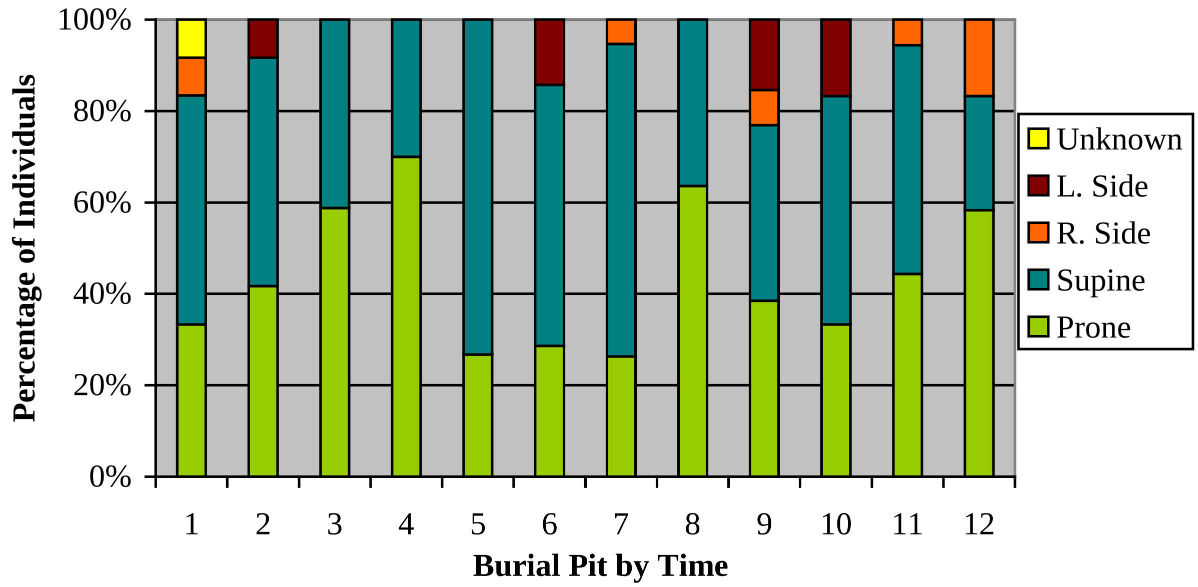


Figure 24: Comparison of Body Position over Time



The number of artifacts varied over time, but no clear pattern is evident (Figure 25). Specifically, no material culture was recovered in two early-dated burial pits (Time 2 and 4). While burial pit 39 yielded the greatest number of artifacts (n = 62), approximately 85% of items recovered in this pit pertained to clothing (i.e. buttons). Furthermore, personal effects, weapons, and other items were present throughout sampled pits.

Figure 25: Number and Type of Material Culture over Time

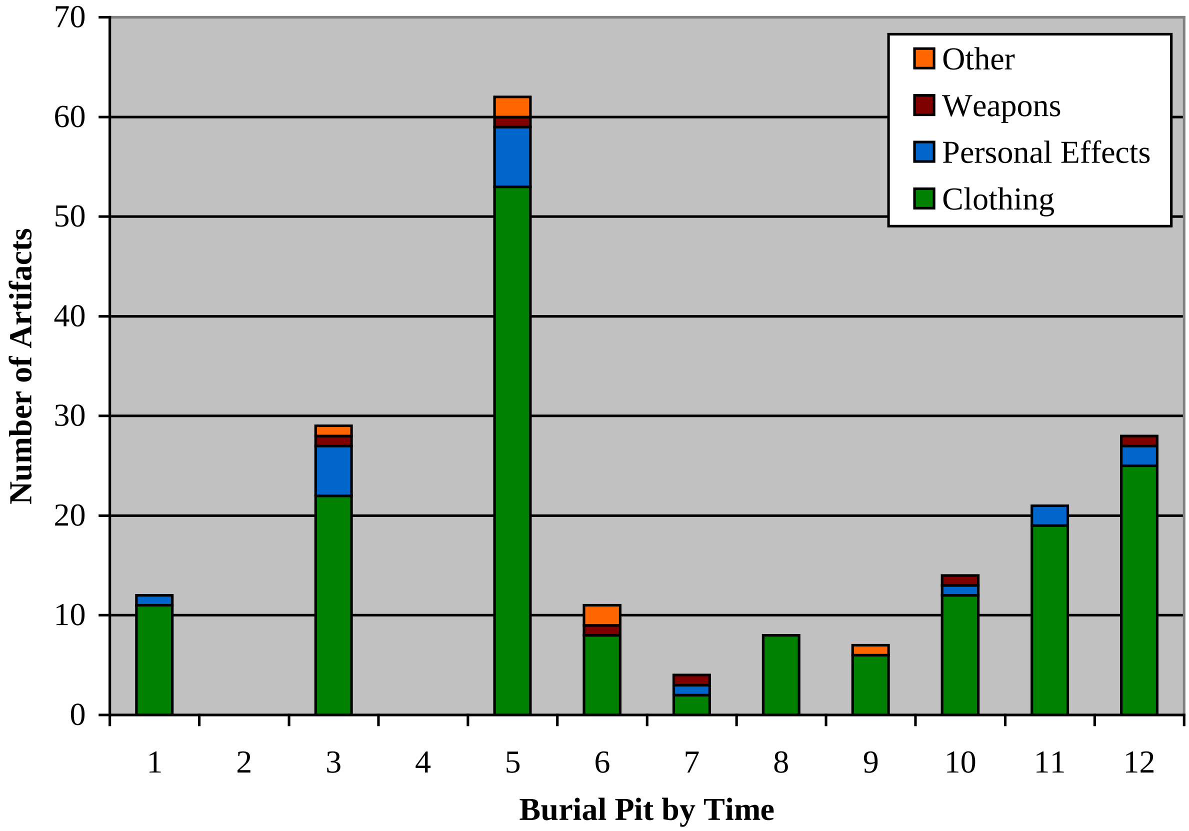
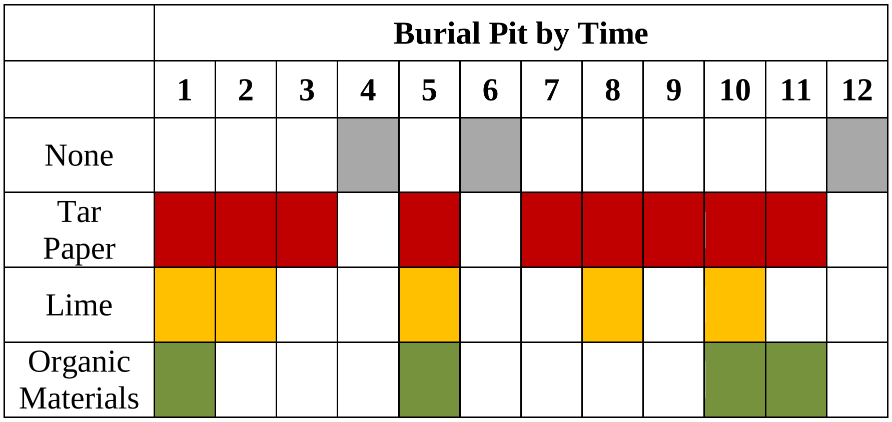


Figure 26: Comparison of Concealment Materials over Time

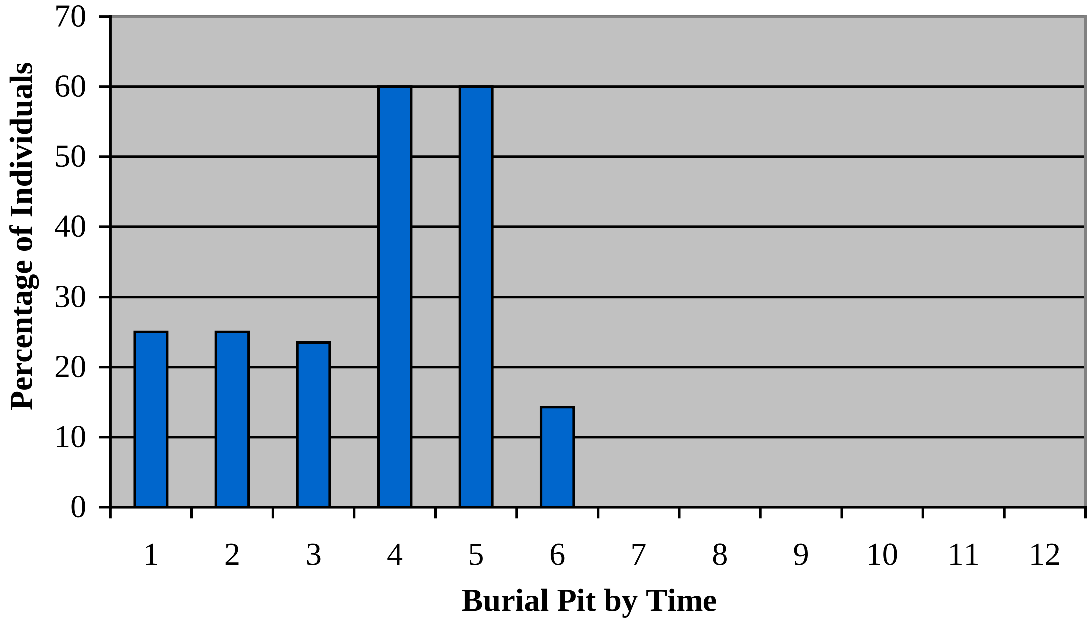


*Colored square denotes presence of material in pit

A comparison of concealment materials in pits over time demonstrates that tar paper, lime, and organic materials were used relatively frequently from the earlier to the later pits in the sample (Figure 26). Tar paper was observed in eight pits (Time 1-3, 5, 7-11). Lime was observed in five pits (Time 1-2, 5, 8, and 10). Finally, organic materials were observed in four pits (Time 1, 5, 10, 11). Due to the distribution of tar paper, lime, and organic materials throughout sampled pits, time is not believed to be a reliable predictor of the presence of concealment materials.

Finally, the presence of binding of prisoners was compared over time. Figure 27 demonstrates that bound individuals were only discovered in pits dated to the early to mid-part of the sample, including pits 35, 36, 37, 38, 39, and 2 (Time 1-6). These pits correspond to executions performed from July to December 1945. The percentage of individuals bound in these six pits range from 14-60%, with significantly higher frequencies of bindings in burial pits 38 (Time 4) and 39 (Time 5). No individuals were bound in the latter part of the sample. When these early burial pits are evaluated using Pearson's chi-square, results demonstrate the number of individuals bound varies over during the early to mid-part of the sample ($\chi2 = 17.893$, df = 5, p = 0.003).

Figure 27: Percentage of Prisoners Bound over Time



Summary of Mortuary Variables over Time

This section compared mortuary variables of burial pits over time. Two burial locations are noted in the Tuskulenai sample, including within a former garage and north of the garage. When evaluated spatially, early dated burial pits (Time 1-5) are exclusively located north of the garage and interred in a sequential east to west pattern. The mid and later dated burial pits (Time 6-12) are located within the former garage and interred in a general west to east pattern. The spatial layout of these pits is likely the result of both weather (e.g. prisoners interred within the garage during colder months) and the systematic planning for future episodes of mass violence and prisoner disposal.

While the number of individuals per burial pit, and the width, length, and thickness of pits varies, change in these pit features is not significant over time. Evaluation of body position of prisoners demonstrates a relatively even distribution between prone and supine positions through time. Evaluation of the arrangement of bodies in burial pits revealed a generally disorganized pattern across time. While prisoners were interred with their heads in the east or west throughout time, north or south head orientations were only discovered later in time (Time 8-10, 12). Thus, time may be exerting some influence on head orientation. However, this pattern is likely related to constraints placed on execution squads (rather than a conscious mortuary norm in mind) as space within the garage became limited later in time.

Evaluation of artifacts (e.g. number and type) and concealment materials in burial pits revealed no clear pattern of variation over time. However, the presence of bindings did vary significantly over time. Specifically, binding of prisoners was only observed in early to mid-dated pits (Time 1-6), which correspond to executions performed from July to December 1945. Furthermore, the number of individuals bound in these pits significantly varies over time.

MORTUARY RESULTS BETWEEN EXECUTION SQUADS

Pits from Dolgirev's sample were discovered both north of the garage and within the garage, while Prikazchikov's sample was exclusively located within the garage. Comparison of pit features between execution squads indicates minor differences in burial treatment of prisoners. In Dolgirev's sample, the number of individuals per pit ranged from 10 to 19 individuals, with a mean of 13.75 individuals per pit. Similarly, in Prikazchikov's samples, the number of individuals per pit ranged from 6 to 18 individuals, with a mean of 12.25 individuals per pit. Comparison of pit dimensions also reveals minor variation (Table 12). Results of t-tests demonstrate that the mean number of individuals (t = .654, p = .528), mean pit thickness (t = -0.509, p = 0.622), mean pit length (t = 0.455, p = 0.659) and mean pit width (t = 2.099, p = 0.062) do not significantly differ between execution squads.

Table 12: Archaeological Features of Burial Pits (Means) between Execution Squads

Features	Dolgirev	Prikazchikov
Number of Individuals	13.75	12.25
Pit Thickness	0.80 m	0.90 m
Pit Length	2.17 m	2.05 m
Pit Thickness	1.63 m	1.15 m

The head orientation of prisoners significantly varied between execution samples. Prisoner remains associated with Dolgirev's squad were oriented predominantly with their heads in the west (43.5%) and east (43.5%) (Table 13 and Figure 28). Conversely, in Prikazchikov's sample, individuals were oriented with their heads in the north (51%), followed by the west (25%), and south (14%). Results of Pearson's chi-square and Fisher's exact tests demonstrate that the difference in the head orientation of prisoners is significantly different between execution squads for east, west, and north directions. Dolgirev's squad is associated with east and west head orientations, while Prikazchikov's squad is associated with north head orientations.

While the body position of prisoners varied between execution samples, the difference is not significant. In Dolgirev's sample, most individuals were discovered in supine (53%) or prone (42%) positions, followed by the left side (3%) and right side (2%), and unknown (1%) (Table 14 and Figure 29). In Prikazchikov's sample, most individuals were discovered in prone (45%) or supine (41%) positions, followed by the right side (8%) and left side (6%). Results of Pearson's chi-square and Fisher's exact tests demonstrate that the difference in the body position of prisoners is not significantly different between execution squads.

Table 13: Head Orientation of Individuals by Execution Squad

	Dolgirev		Prikazchikov					
	n	**%**	**n**	**%**	$\chi 2$	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
East	48	43.6	4	8.2		1	< 0.0001	**YES**
West	48	43.6	12	24.5	4.506	1	0.0338	**YES**
North	3	2.7	25	51.0		1	< 0.0001	**YES**
South	7	6.4	7	14.3	1.755	1	0.1853	No
Southeast	2	1.8	0	0	-	-	-	-
Southwest	2	1.8	0	0	-	-	-	-
Northeast	0	0	1	2.0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Figure 28: Head Orientation between Execution Squads

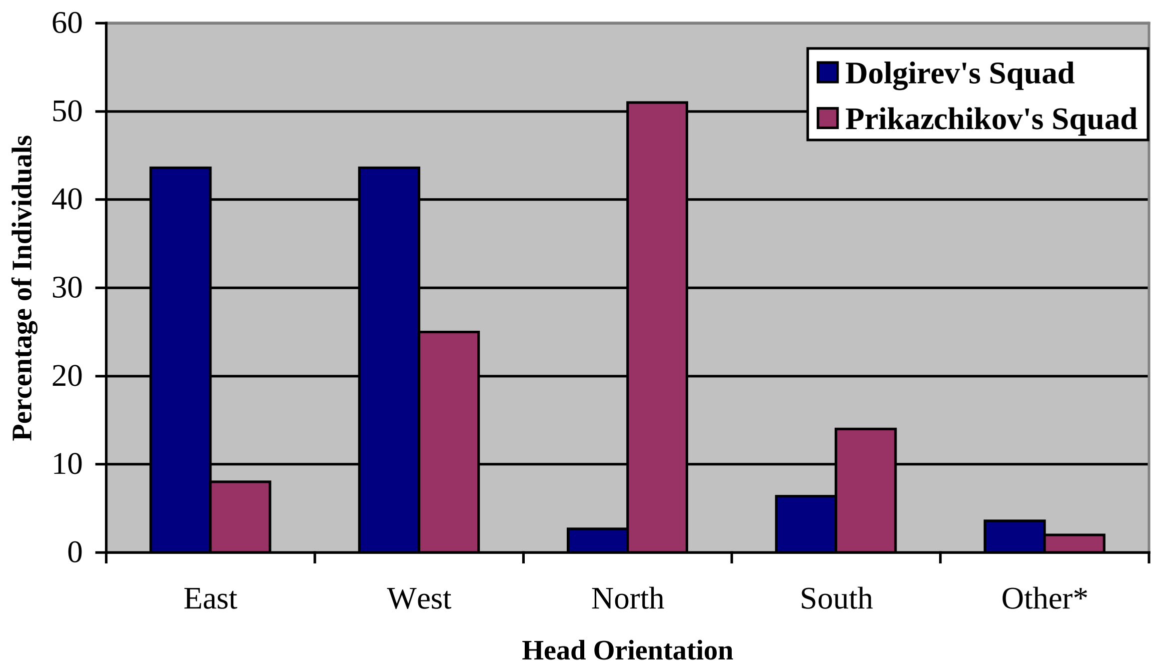
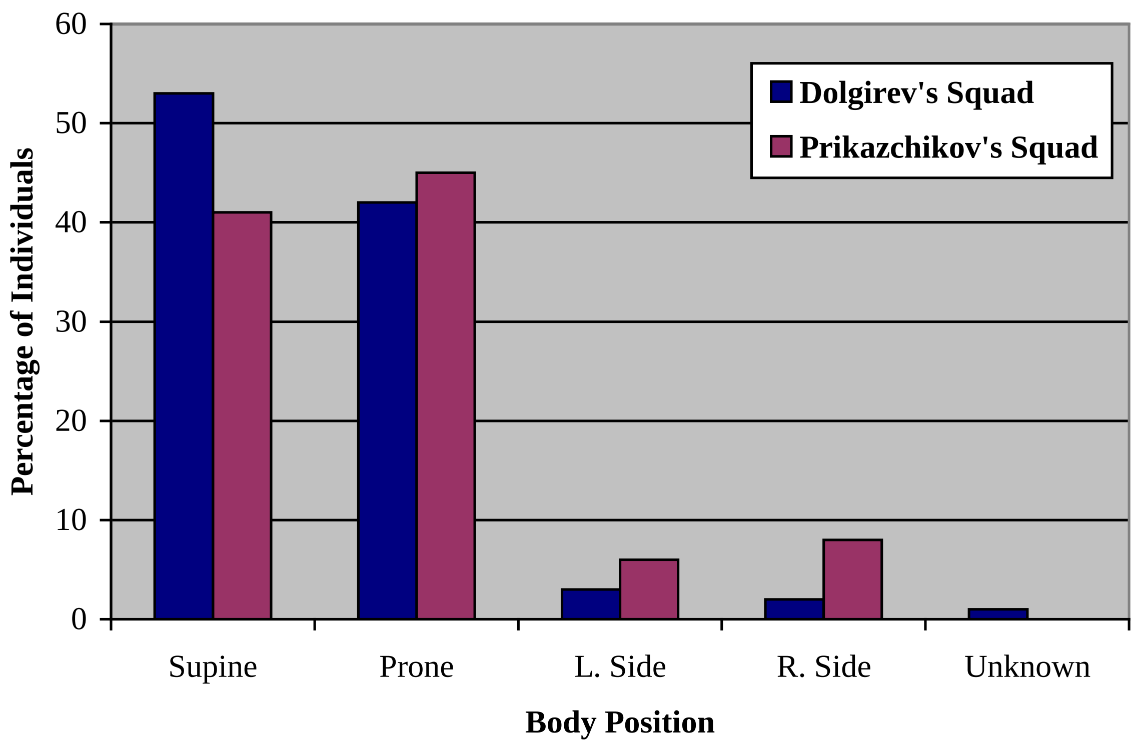


Table 14: Body Position of Individuals by Execution Squad

	Dolgirev		Prikazchikov					
	n	**%**	**n**	**%**	$\chi 2$	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
Supine	58	52.7	20	40.8	1.477	1	0.2242	No
Prone	46	41.8	22	44.9	0.036	1	0.8502	No
L. Side	3	2.7	3	6.1		1	0.3732	No
R. Side	2	1.8	4	8.2		1	0.0732	No
Unknown	1	0.9	0	0.0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Figure 29: Body Position between Execution Squads



The arrangement of bodies was compared between execution squads. In Dolgirev's samples, 100% of pits (n = 8) were considered disorganized, while 50% of Prikazchikov's pits (n = 2) were semi-organized and 50% (n = 2) were disorganized. Due to the small sample size and low variability, statistical tests were not performed.

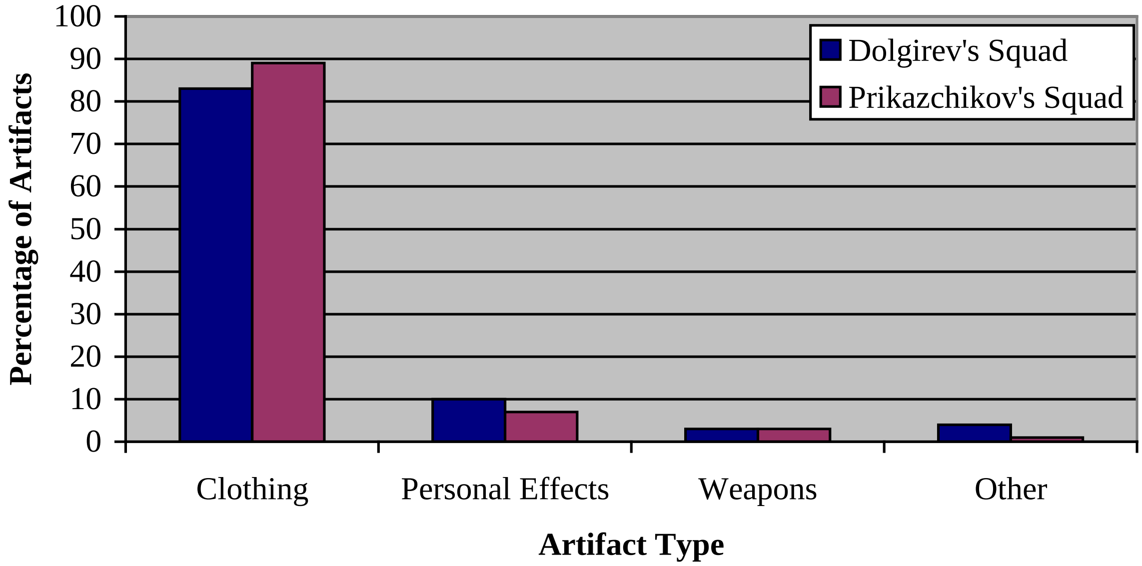
Analysis of material culture revealed a total of 126 artifacts in Dolgirev's pits (Table 15 and Figure 30). However, artifacts were not recovered in two of the eight burial pits (Pits 36 and 38) from Dolgirev's sample. Clothing represented 83% of the artifacts recovered (92% of which were individual buttons), followed by personal effects (10%), weapons (3%), and other items (4%). Prikazchikov's pits contained a total of 70 artifacts. Similar to Dolgirev's pits, clothing represented 89% of artifacts (95% of which were individual buttons), followed by personal effects (7%), weapons (3%), and other items (1%). Results of Pearson's chi-square and Fisher's exact tests reveal no significant difference in artifact type between execution squads.

Table 15: Number and Artifact Type between Execution Squads

	Dolgirev		Prikazchikov					
Artifact Type	**n**	**%**	**n**	**%**	$\chi 2$	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
Clothing	104	82.5	62	88.6	0.840	1	0.3593	No
Personal Effects	13	10.3	5	7.1	0.230	1	0.6317	No
Weaponry	4	3.2	2	2.9		1	1.000	No
Other	5	4.0	1	1.4		1	0.4239	No

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Figure 30: Percentage of Artifacts by Execution Squad



While the presence of concealment materials in burial pits varied between executioners, the difference is not significant (Table 16). Tar paper, lime, and organic materials, as well as combinations of those materials, were observed in both Dolgirev's and Prikazchikov's samples. Results of Fisher's exact tests demonstrate that the difference in the presence of concealment materials is not significantly different between execution squads.

Table 16: Presence of Concealment Materials between Execution Squads

	Dolgirev		**Prikazchikov**					
	n	**%**	**n**	**%**	$\chi 2$	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
None	2	25.0	1	25.0		1	1.000	No
Tar Only	2	25.0	1	25.0		1	1.000	No
Tar + Lime	2	25.0	0	0.0	-	-	-	-
Tar + Organic	0	0.0	1	25.0	-	-	-	-
Tar + Lime + Organic	2	25.0	1	25.0		1	1.000	No

Evaluation of bindings between execution squads revealed that only individuals in Dolgirev's pits were discovered *in situ* with both hands behind their backs (Table 17). Specifically, 75% (n = 6) of Dolgirev's pits contained bound individuals and approximately 25% of all of individuals in Dolgirev's sample were bound. In contrast, no individuals in Prikazchikov's sample demonstrated evidence of binding. Statistical tests were not performed with regard to bindings between execution squads given its complete absence in Prikazchikov's sample.

Table 17: Presence of Binding between Execution Squads

Execution Squad	**Total # of Individuals**	**Presence of Binding**	
		n	**%**
Dolgirev	110	27	24.5
Prikazchikov	49	0	0.0

Summary of Mortuary Variables between Execution Squads

This section compared mortuary variables of burial pits between execution squads. Burial pits from Dolgirev's sample were discovered both north of the garage and within the garage, while Prikazchikov's sample was exclusively located within the garage. Comparison of pit features (e.g. number of individuals per pit, and pit length, width, and thickness) revealed no significant difference between execution squads. While the head orientation of prisoners significantly varied for east, west, and north directions, the body position of prisoners did not significantly vary. Additionally, two burial pits in Prikazchikov's sample exhibited semi-organization, while all of Dolgirev's pits were disorganized.

Evaluation of material culture between execution squads revealed no significant difference in artifact number or type. Similarly, no differences were observed in the presence of concealment materials. However, the presence of bindings did vary significantly between execution squads. Specifically, binding of prisoners was only observed in Dolgirev's pits.

SUMMARY

This research presents mortuary data on 159 individuals from 12 burial pits sampled in the Tuskulenai case. Mortuary variables related to pit features (i.e. length, width, depth, number of individuals per pit), as well as head orientation, body position, arrangement of bodies, material culture, concealment materials, and bindings were analyzed. Descriptive analyses compared variables over time and by execution squad. Additionally, variables were assessed for all Tuskulenai samples combined. When appropriate, chi-square tests or Fisher's exact tests were employed to assess statistical significance.

Comparison of mortuary variables *over time* revealed that while pit features varied, they were not significantly different. The body position of prisoners was relatively evenly distributed between prone and supine positions through time. While prisoners were interred with their heads in the east or west throughout time, north or south head orientations were only discovered later in time. Generally, a disorganized pattern of burial was observed across all burial pits, and little difference was observed in material culture and concealment materials. However, the presence of bindings significantly varied over time, as bindings were only observed in early to mid-dated pits. Thus, hypothesis 1 (i.e. burial treatment will remain consistent *over time*) is generally supported, except for head orientation and the presence of bindings (Table 18).

Comparison of mortuary variables *between execution squads* revealed no significant differences in pit features (e.g. number of individuals per pit, and pit length, width, and thickness), body position, material culture, and concealment materials. However, significant differences were observed in the head orientation and binding of prisoners between Dolgirev's and Prikazchikov's samples. Similar to the evaluation of mortuary variables over time, hypothesis 1 (i.e. burial treatment will remain consistent *between security personnel*) is generally supported, except for head orientation and the presence of bindings (Table 18).

Table 18: Evaluation of Mortuary Variables and Hypotheses

Mortuary Variables	**Over Time**	**Between Executioners**
Pit Features	**Supported**	**Supported**
Head Orientation	Rejected	Rejected
Body Position	**Supported**	**Supported**
Arrangement of Bodies	**Supported**	**Supported**
Material Culture	**Supported**	**Supported**
Concealment Materials	**Supported**	**Supported**
Bindings	Rejected	Rejected

The following chapter discusses results of the osteological analysis of the Tuskulenai samples, focusing on age, sex, and patterns of perimortem trauma.

CHAPTER 7: TUSKULENAI OSTEOLOGY RESULTS

This chapter discusses the results of the demographic and perimortem analyses of skeletal samples in the Tuskulenai case. This chapter is broadly divided into three sections. The first section combines individuals from all pits, analyzing the remains as one sample in order to compare to patterns of trauma in the Tuskulenai case to those at Vinnytsia, Katyn, and Rainiai (Chapter Eight). The second section examines skeletal trauma over time, comparing burial pits independently. Finally, the third section evaluates trauma data with regard to security personnel, including Dolgirev's and Prikazchikov's execution squads.

In the first section, skeletal variables assessed include the sex and age at death of prisoners, as well as the perimortem trauma. Skeletal samples are analyzed with regard to standard categories of sex and age according to Buikstra and Ubelaker (1994). Samples are also evaluated with regard to skeletal trauma, including the mechanism of trauma, anatomical location, and direction of trauma. Age-specific cohorts are also investigated in tandem with trauma data. Finally, additional variables are analyzed, including the degree of trauma, percentage of body recovered, and decompositional stage.

The second two sections address the research question: Do perimortem injuries vary over time or between security personnel in the Tuskulenai case? The first hypothesis predicts skeletal samples to exhibit increasing variation over time. The second hypothesis predicts skeletal samples to exhibit increasing variation between security personnel. As mentioned in Chapter Four, it may be difficult to determine if variation in perimortem trauma is related to change in time or difference in security personnel, since they are intimately related in the Tuskulenai case. Nonetheless, an attempt is made to explore these patterns in the discussion section of this chapter.

SKELETAL RESULTS IN THE TUSKULENAI CASE

A total of 155 individuals were assessed in 12 dated burial pits. All of the sampled pits represent mass graves created from 14 July 1945 to 21 January 1947. All remains were skeletonized and demonstrated various degrees of preservation: some individuals exhibited intact, well-preserved bones while others were highly fragmented, with missing portions and erosion on cortical surfaces. However, due to the immediate interment of prisoner remains following execution, none of the skeletal elements demonstrated evidence of surface weathering (e.g. sun bleaching). It is speculated that destruction of skeletal elements was caused, in part, by the inclusion of concealment materials (e.g. lime) by perpetrators during disposal. In highly fragmented or poorly preserved remains, perimortem trauma was scored as unobservable. Additionally, perimortem trauma was distinguished from postmortem cranial autopsy sections and drilled holes (where cranial fragments were rearticulated with copper wiring) created by forensic analysts during postmortem examinations in the 1990s.

Approximately 88% of individuals in the Tuskulenai sample (n = 136) were considered complete (over 75% of remains recovered), while 12% of individuals were partial (less than 75% complete) (Table 19). Of those partial individuals, seven individuals were considered very partial, with between 10% and 50% of the body recovered. All of the very partial remains also demonstrated poor preservation and all occurred in burial pit 39, north of the garage. These preservation issues likely resulted from the presence of tar paper and lime (both present in Pit 39), as well as additional taphonomic factors.

Table 19: Percentage of Body Recovered and Degree of Trauma

		Total	%
Percentage of Body Recovered	Complete	136	87.7
	Partial	19	12.3
	Skull only	0	0
Degree of Trauma	Major	147	94.8
	Minor	0	0
	Absent	4	2.6
	Unknown	4	2.6

Approximately 95% of remains in the Tuskulenai sample demonstrated major trauma, which is expected given that the sample represents executed prisoners (Table 19). However, perimortem trauma was absent in four individuals, all of whom demonstrated excellent preservation and completeness. While not anticipated, this absence may be due to the possibility that some prisoners died of natural causes (e.g. heart attack) during imprisonment or interrogation, or prisoners may have been killed by methods which did not affect skeletal tissue. Additionally, the degree of trauma was unobservable in four individual due to extensive fragmentation and poor preservation.

Demography

As discussed in Chapter Five, skeletal samples were analyzed with regard to age at death in both adults and subadults. Adult age was primarily assessed using morphological changes of pelvic joints, including the pubic symphysis (Brooks and Suchey 1990; Suchey and Katz 1986, 1998) and auricular surface (Lovejoy et al. 1985; Meindl and Lovejoy 1989). Additionally, sternal rib ends (İşcan et al. 1984, 1985) were evaluated when possible. Subadult age was estimated using epiphyseal appearance and union (Scheuer and Black 2000), as well as dental eruption (Ubelaker 1989). Individuals were placed in standard categories of age (Buikstra and

Ubelaker 1994), including subadult (<20 years), young adult (20-35 years), middle adult (35-50 years), and older adult (+50 years). Individuals who could only be assessed as over the age of 20 years were placed in a non-specific "adult" category. Analysis of age of individuals revealed that subadults accounted for 7% of the sample, while adults accounted for 93% (Table 20 and Figure 31). Within the adult category, young adults (41%) and middle adults (39%) were most prevalent, followed by older adults (10%) and non-specific adults (3%).

Table 20: Proportion of Individuals by Age Category in the Tuskulenai Sample

	Age	**Number (n)**		**%**	
Subadult	Subadult	11	11	7.1	7.1
Adult	Young	144	64	92.9	41.3
	Middle		61		39.3
	Old		15		9.7
	Adult (>20)		4		2.6

Figure 31: Percentage of Individuals by Age Category

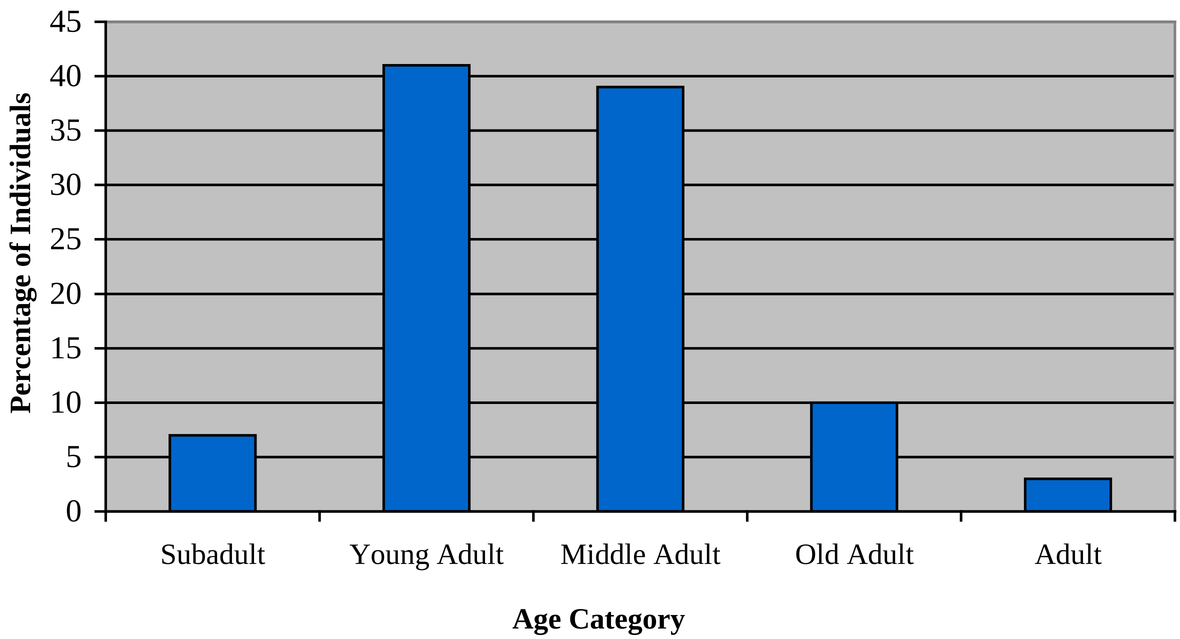


Table 21: Distribution of Sex in the Tuskulenai Sample

Sex	Number (*n*)	%
Male	146	94.2
Female	3	1.9
Indeterminate	6	3.9

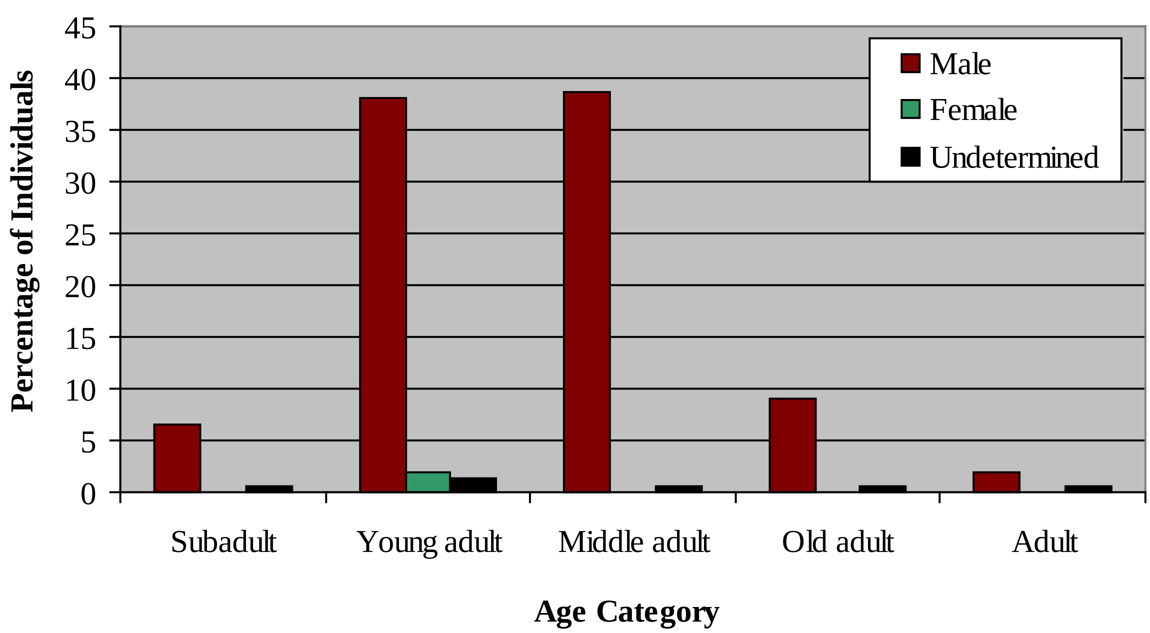
Estimation of sex was based on morphological features of the skull and pelvis (Buikstra and Ubelaker 1994). When possible, this study relied on features of the pelvis, specifically those outlined by Phenice (1969) for the os pubis. The degree of robusticity was also taken into account when assessing sex. The final analysis of sex included standard categories of "male," "female" and "indeterminate" (Buikstra and Ubelaker 1994). Since historical documents confirm that subadults in the Tuskulenai case were older adolescents, most likely in their late teens, sex was estimated for subadults. As was expected from previous research (Jankauskas et al. 2005; Vaitiekus 2011), an overwhelming percentage (94%) of individuals were estimated as male, followed by females (2%) (Table 21). Approximately 4% of the sample was categorized as indeterminate, but these individuals likely represent males as well.

Table 22 and Figure 32 summarize the demographic structure of individuals in the Tuskulenai sample. Young and middle adult males dominate the Tuskulenai sample, which likely reflects a perception of young and middle-aged males as the greatest threats to state power. However, given the bureaucratic nature of the state security apparatus, direct perpetrators of violence (e.g. execution squads) were likely not responsible for the arrest of these individuals. Thus, the demography of executed prisoners is not interpreted as a reflection of the executioner's selection of age or sex-specific victims.

Table 22: Age and Sex Demographics in the Tuskulenai Sample

	Age	Number (n)		%	
Male	Subadult	146	10	94.2	6.5
	Young		59		38.1
	Middle		60		38.7
	Old		14		9.0
	Adult (>20)		3		1.9
Female	Subadult	3	0	1.9	0.0
	Young		3		1.9
	Middle		0		0.0
	Old		0		0.0
	Adult (>20)		0		0.0
Undetermined	Subadult	6	1	3.9	0.65
	Young		2		1.3
	Middle		1		0.65
	Old		1		0.65
	Adult (>20)		1		0.65

Figure 32: Age and Sex Distribution in the Tuskulenai Sample



Perimortem Trauma

Perimortem trauma in the Tuskulenai sample is discussed according to mechanism of trauma, including gunshot wounds, blunt force trauma, sharp force trauma, quadrilateral defects, and undetermined defects. Within each of these sections, the number of individuals affected, number of traumatic episodes, anatomical location, and direction of force are reported. However, since perimortem trauma was unobservable in four individuals in the sample due to extensive postmortem damage, these individuals are excluded from the following analyses. Thus, the sample size in this section is 151 individuals.

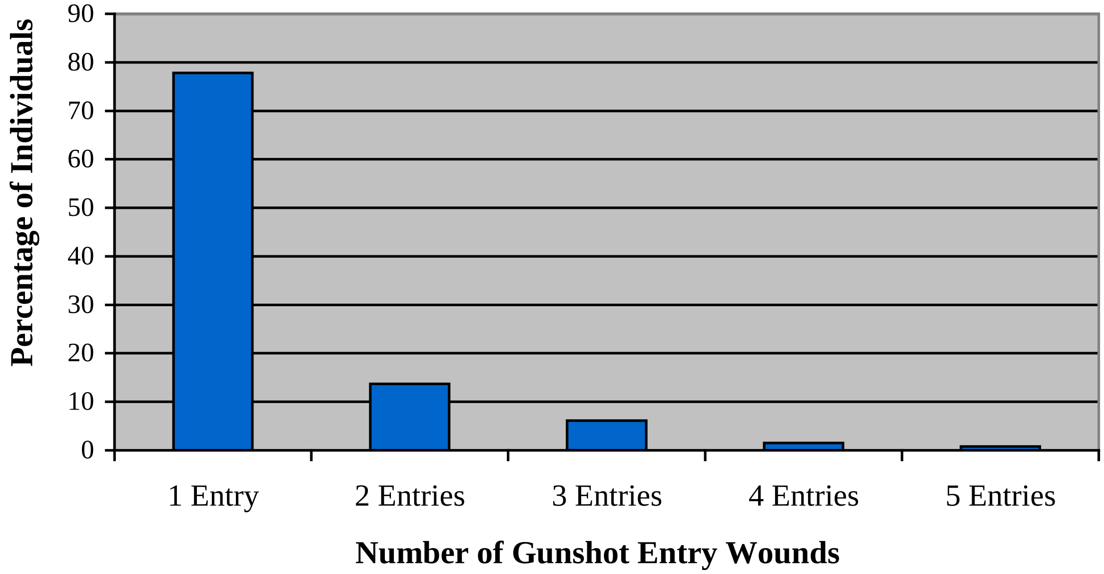
Gunshot wounds

Approximately 87% of the Tuskulenai sample (n = 131) exhibited a total of 175 gunshot wounds. This included 171 gunshot *entry* wounds and 103 *exit* wounds. The number of gunshot entry wounds varied from one to five, with single entry wounds (78%) being the most frequent followed by two entries (14%), three entries (6%), and four entries (2%) (Table 23 and Figure 33). Only one individual demonstrated five gunshot entry wounds.

Table 23: Number of Individuals with Multiple GSWs in the Tuskulenai Sample

	Total	**%**
1 Entry	102	77.8
2 Entries	18	13.7
3 Entries	8	6.1
4 Entries	2	1.5
5 Entries	1	0.8

Figure 33: Individuals with Multiple GSWs in the Tuskulenai Sample



All gunshot wounds were observed in head or neck elements (Table 24). A total of 151 crania were present, with gunshot wounds observed in approximately 87% (n = 131) of those. Gunshot wounds were most frequently observed on the occipital (70%), followed by the left parietal (9%) and right parietal (7%). Approximately 14% of gunshot wounds were observed on additional cranial or neck elements (7%).

Table 24: Bone of Gunshot Wound in the Tuskulenai Sample

	Total	**%**
Occipital	122	69.7
L. Parietal	16	9.1
R. Parietal	13	7.4
L. Temporal	9	5.1
R .Temporal	3	1.7
Frontal	2	1.1
R. Orbit	1	0.6
R. Pterion	2	1.1
Sagittal Suture	1	0.6
Lambda	1	0.6
Neck	1	0.6
Unknown	4	2.3

Table 25: Direction of Force of Gunshot Wounds in the Tuskulenai Sample

	Total	%
Rear	143	81.7
Left Side	13	7.4
Right Side	13	7.4
Front	2	1.1
Superior	0	0
Inferior	0	0
Unknown	4	2.3

The direction of force of gunshot wounds generally corresponded to the bone of entry (e.g. gunshot wound to the right temporal indicated the direction of force was from the right side). However, given the possibility that prisoners may have turned their heads to some degree during execution, this study employs a “rear inclusive” approach. If gunshot wounds were observed in close proximity to the occipital bone, the direction of force was considered from the rear. Analysis of the direction of force indicates that gunshot wounds most frequently arose from the posterior of victims (82%), followed by the left side (7%), the right side (7%), and the front (1%) (Table 25).

In summary, gunshot wounds were observed in 87% of the sample. Most gunshot wounds represented single entries, although up to five entry wounds were discovered. All gunshot wounds were observed in crania, predominantly on the occipital bone, followed by the left parietal, or right parietal. Finally, 84% of gunshot wounds arose from a posterior direction of force. Figures 34-36 represent a series of photographs documenting the location and direction of force of a single gunshot wound observed on Skeleton 19. Note that the gunshot entry wound is located low on the occipital bone, with a corresponding exit wound on the frontal bone.

Figure 34: GSW Entry (a) and Corresponding Exit Wound (b) on Skeleton 19

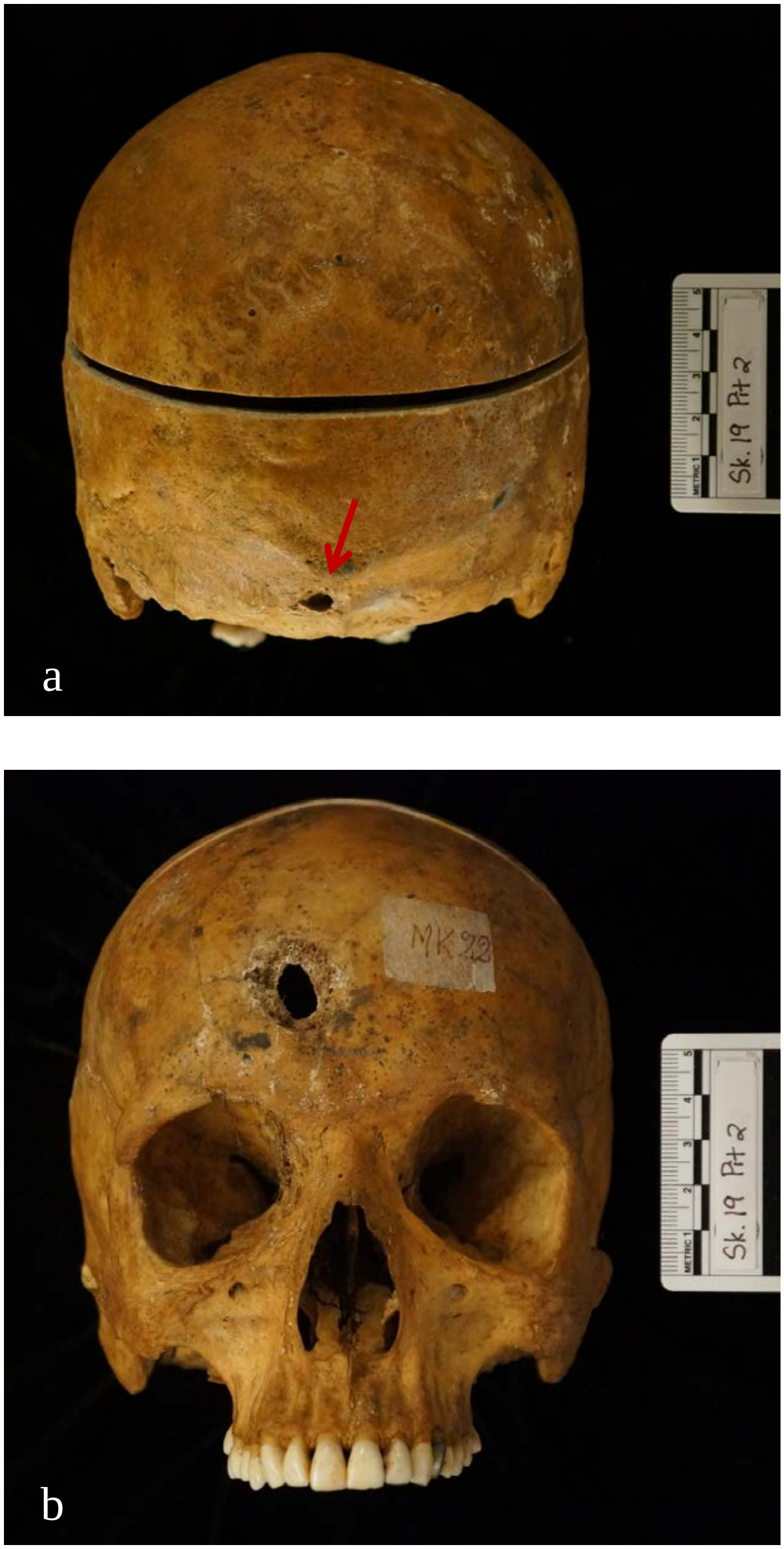
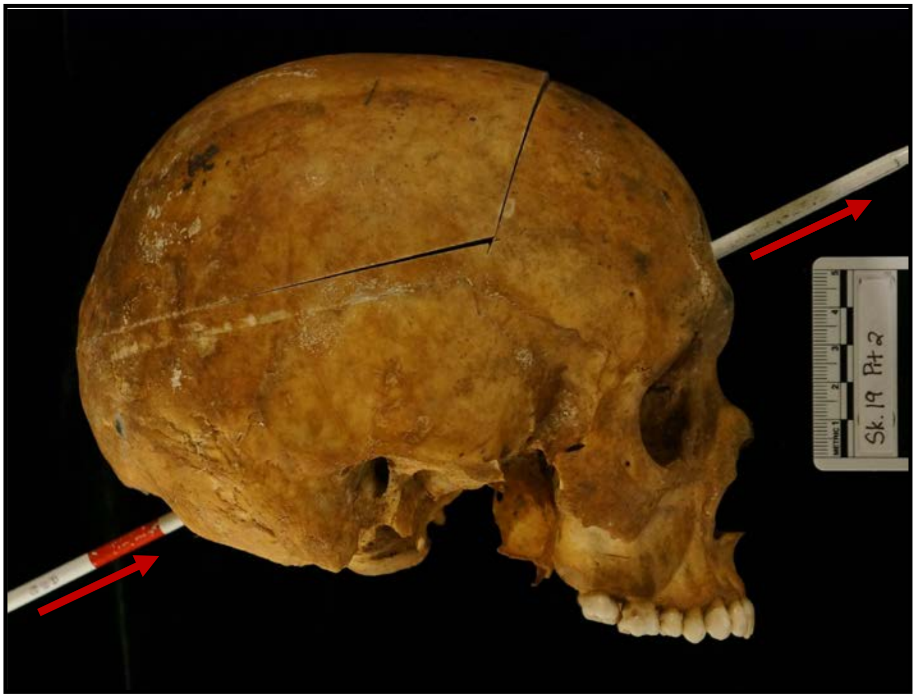


Figure 35: Close up of the Gunshot Entry (a) and Exit (b) Wound on Skeleton 19

Figure 36: Angle of Trajectory of a Single Gunshot Wound on Skeleton 19



Blunt force trauma

This study took a modest approach to the evaluation of blunt force trauma in the Tuskulenai sample, evaluating the minimum amount of trauma. Both the number of individuals affected and number of blunt force episodes were recorded. However, if ambiguity existed regarding the number of blunt force episodes per individual, the minimum number was preferred. Approximately 40% of the Tuskulenai sample (n = 60) exhibited a total of 85 episodes of blunt force trauma (Table 26). The number of blunt force episodes varied from one to four, with single episodes (70%) being the most frequent followed by two episodes (20%), three episodes (8%), and four episodes (2%).

Table 26: Number of BFT Episodes in the Tuskulenai Sample

	Total	%
1 Episode	42	70.0
2 Episode	12	20.0
3 Episode	5	8.3
4 Episode	1	1.7

Blunt force trauma was observed in both cranial and postcranial remains (Table 27). The majority of blunt force trauma was observed only in the crania (93%) of individuals, followed by postcranial-only trauma (3%) and combined cranial and postcranial trauma (3%). Analysis of blunt force trauma by individual bone in crania was not performed because many episodes of blunt force were diffuse, affecting two or more bones. However, evaluation of postcranial trauma by element reveals one episode of blunt force trauma on each of the following bones: left fibula, right humerus, right clavicle, and left scapula. Table 28 demonstrates the prevalence of blunt force trauma by skeletal element.

Table 27: Anatomical Location of BFT per Individual in the Tuskulenai Sample

	n	%
Cranial	56	93.3
Postcranial	2	3.3
Cranial and Postcranial	2	3.3

Table 28: Evaluation of BFT by Element in the Tuskulenai Sample

Element	No. of Elements Present	No. Affected	%
Cranium	151	58	38.4
L. Scapula	144	1	0.7
R. Clavicle	143	1	0.7
R. Humerus	149	1	0.7
L. Fibula	138	1	0.7

The direction of force of blunt force trauma varied in the Tuskulenai sample (Table 29). Most blunt force trauma was observed from a rear (and inferior) direction (49%) followed by the front (24%), right side (14%), left side (6%), and superior (5%). The direction of force was not discernible in two individuals. Trauma from the front mainly affected bones of the face, creating various configurations of Lefort fractures to the maxilla as seen in Figure 37.

Table 29: Direction of Force of BFT in the Tuskulenai Sample

	Total	%
Rear	42	49.4
Left Side	5	5.9
Right Side	12	14.1
Front	20	23.5
Superior	4	4.7
Unknown	2	2.4

Figure 37: Blunt Force Trauma to the Face on Skeleton 574

Trauma from the rear/inferior largely affected bones of the cranial base, especially the occipital, and manifested as a high degree of fragmentation. Figures 38 and 39 demonstrate the location and appearance of this blunt force trauma. Ta'ala et al.'s (2006) analysis of trauma in skeletal remains from the Cambodian killing fields may be particularly informative to the interpretation of this fracture pattern in the Tuskulenai sample. These researchers note the presence of extensive fragmentation of the cranial base in 12% of their sample. While these fracture patterns resembled basilar or ring fractures, the presence of internal beveling around fracture margins (rather than external bevels) made them distinct. Thus, researchers suggested that fractures of the cranial base in their sample likely resulted from blows to the back of the head by a blunt object rather than falls from a height. This method of execution by Khmer Rouge violence workers in Cambodia is supported by eyewitness accounts and historical data. In the Tuskulenai sample, the location and appearance of comparable patterns of perimortem trauma suggests a similar method of execution may have been employed, where Soviet violence workers were striking prisoners low on the occipital or high on the neck with a blunt object. Examination of cervical vertebrae might shed light on this mechanism of trauma; unfortunately, at the time of analysis, most cervical vertebrae in the Tuskulenai sample were not available. While these fracture patterns are interpreted as blunt force trauma to the back of the head, this study does not attempt to infer a specific weapon which caused the defects.

In summary, blunt force trauma was observed in 40% of the Tuskulenai sample. Most defects represent single episodes, although up to four episodes were observed. Most blunt force defects were observed in crania, although postcranial trauma was also present. Finally, approximately 49% of traumatic episodes occurred as a result of blunt force to the rear of the head while 24% occurred as a result of blunt force to the face (front).

Figure 38: (a) Posterior and (b) Postero-Lateral View of BFT on Skeleton 574

Figure 39: (a) Inferior and (b) Infero-Lateral View of BFT on Skeleton 570

Sharp Force Trauma

The frequency of sharp force trauma was low in the Tuskulenai case. Approximately 3% of individuals (n = 4) exhibited a total of 5 sharp force wounds. The number of sharp force wounds varied from one to two, with single entries (75%) being the most frequent. Only one individual demonstrated two sharp force wounds. All sharp force defects were observed on crania. Two wounds were observed on occipital bones, while one sharp force wound (respectively) was observed on a right temporal, left parietal, and frontal bone. The direction of force of these wounds corresponds to the bone of entry: two wounds occurred from a rear direction, while single wounds occurred from right, left, and front directions. Figures 40 and 41 demonstrate episodes of sharp force trauma to the occipital on two separate individuals.

Figure 40: Sharp Force Wound on the Occipital of Skeleton 576

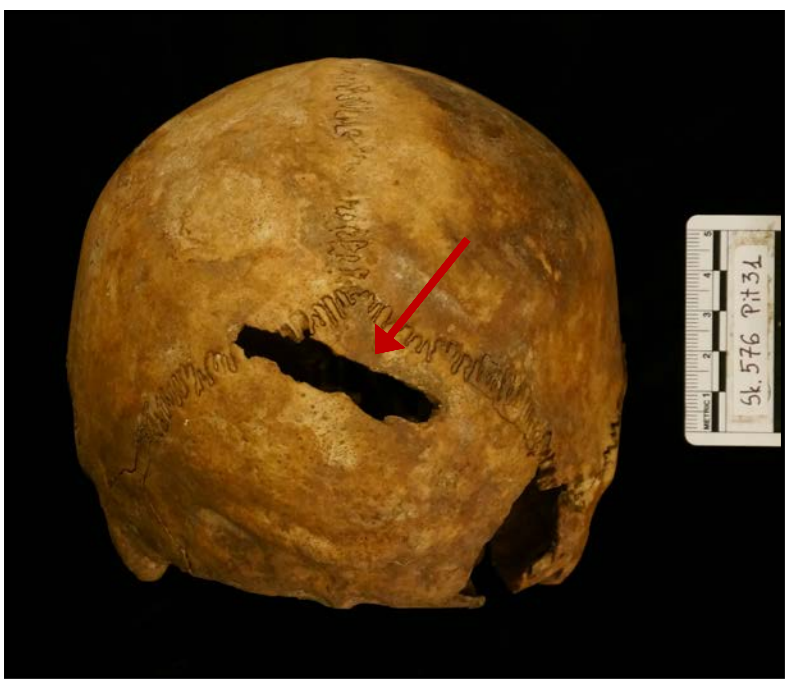
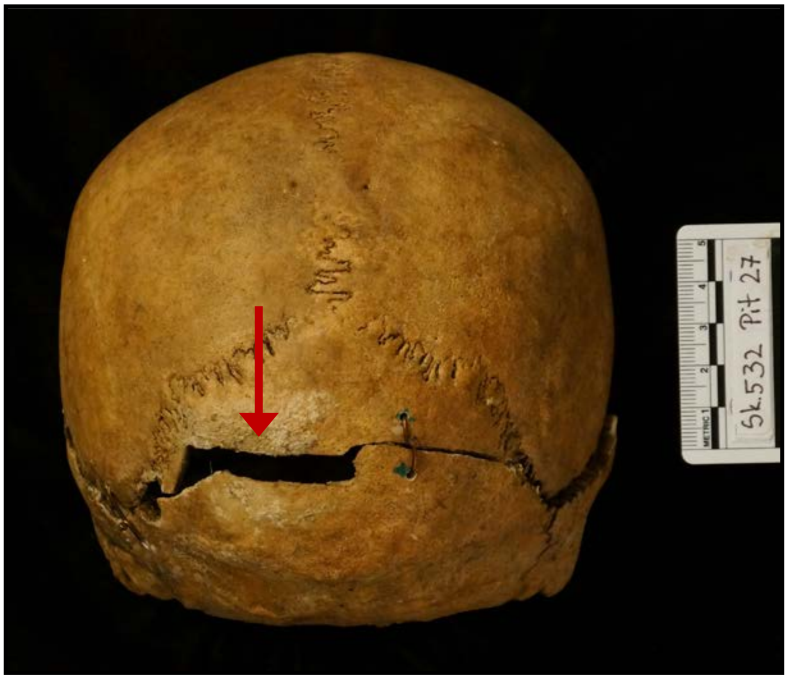


Figure 41: Sharp Force Wound on the Occipital of Skeleton 532



Quadrilateral defects

Approximately 15% of the Tuskulenai sample (n = 22) exhibited a total of 30 quadrilateral defects. This included 30 quadrilateral *entry* wounds and 7 possible *exit* wounds. The number of quadrilateral entry wounds varied from one to three, with single entry wounds (68%) being the most frequent (Table 30). Only one individual demonstrated three quadrilateral entry wounds.

Table 30: Number of Quadrilateral Defects in the Tuskulenai Sample

	Total	**%**
1 Entry	15	68.2
2 Entries	6	27.3
3 Entries	1	4.5

Table 31: Bone of Entry for Quadrilateral Defects in the Tuskulenai Sample

	Total (n = 30)	**%**
Occipital	5	16.7
L. Parietal	5	16.7
R. Parietal	6	20.0
L. Temporal	3	10.0
R .Temporal	4	13.3
Frontal	2	6.7
L. Pterion	1	3.3
R. Coronal Suture	2	6.7
R. Squamosal Suture	2	6.7

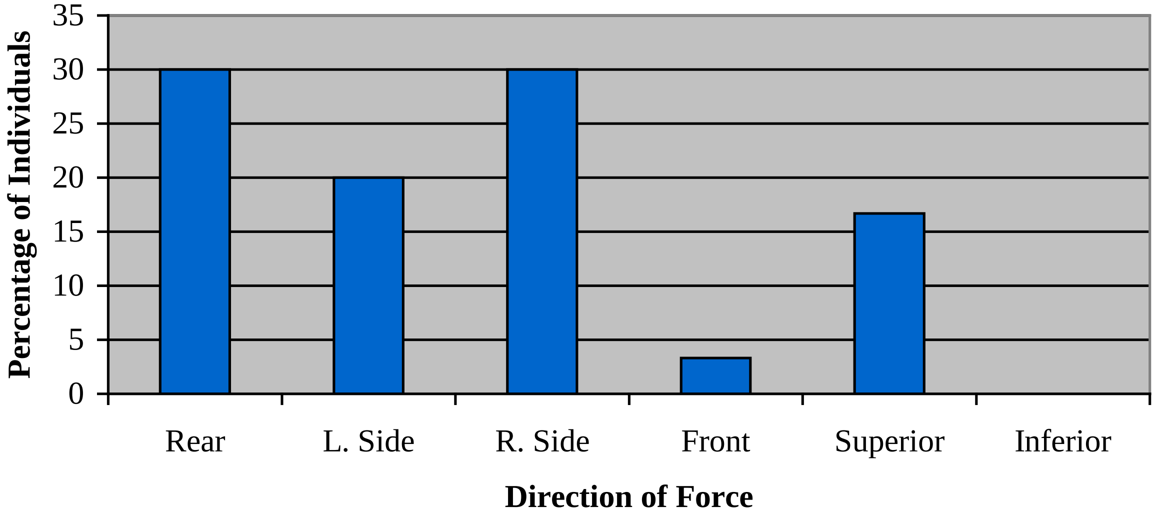
All quadrilateral defects were observed in cranial elements (Table 31). Quadrilateral defects were more frequently observed on the right parietal (20%), left parietal (17%), and occipital (17%). Approximately 46% of the remaining quadrilateral defects were located on other cranial elements.

The direction of force of quadrilateral defects varied (Table 32 and Figure 42). Defects were most frequently observed from the rear (30%) and right side (30%), followed by the left side (20%) and superior (17%) directions. No quadrilateral defects were observed from an inferior direction, which may be expected given the type of instrument used to create the wounds.

Table 32: Direction of Force of Quadrilateral Defects in the Tuskulenai Sample

	Total (n = 30)	**%**
Rear	9	30.0
Left Side	6	20.0
Right Side	9	30.0
Front	1	3.3
Superior	5	16.7
Inferior	0	0

Figure 42: Direction of Force of Quadrilateral Defects in the Tuskulenai Sample



In summary, quadrilateral defects were observed in 15% of the Tuskulenai sample. Most defects represented single entries, although up to three entry wounds were discovered. All quadrilateral defects were observed in crania, predominantly on the right parietal, left parietal, and occipital. Finally, the direction of force varied between the rear, right side, and left side, but was also present on the superior and front of crania. Figures 43 and 44 depict examples of quadrilateral defects in the Tuskulenai case. However, a more detailed examination of quadrilateral defects will be presented in Chapter Nine.

Figure 43: Quadrilateral Defect in Skeleton 481, a) Superior View and b) Close Up

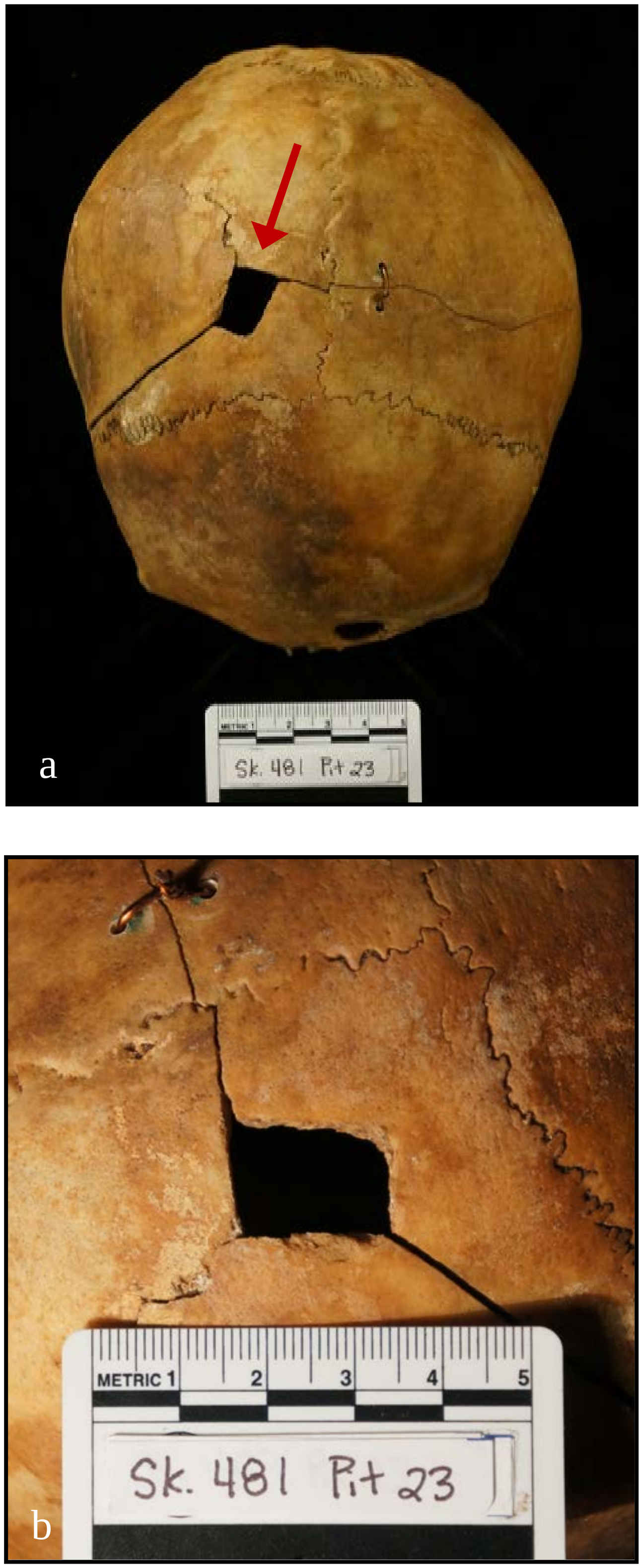
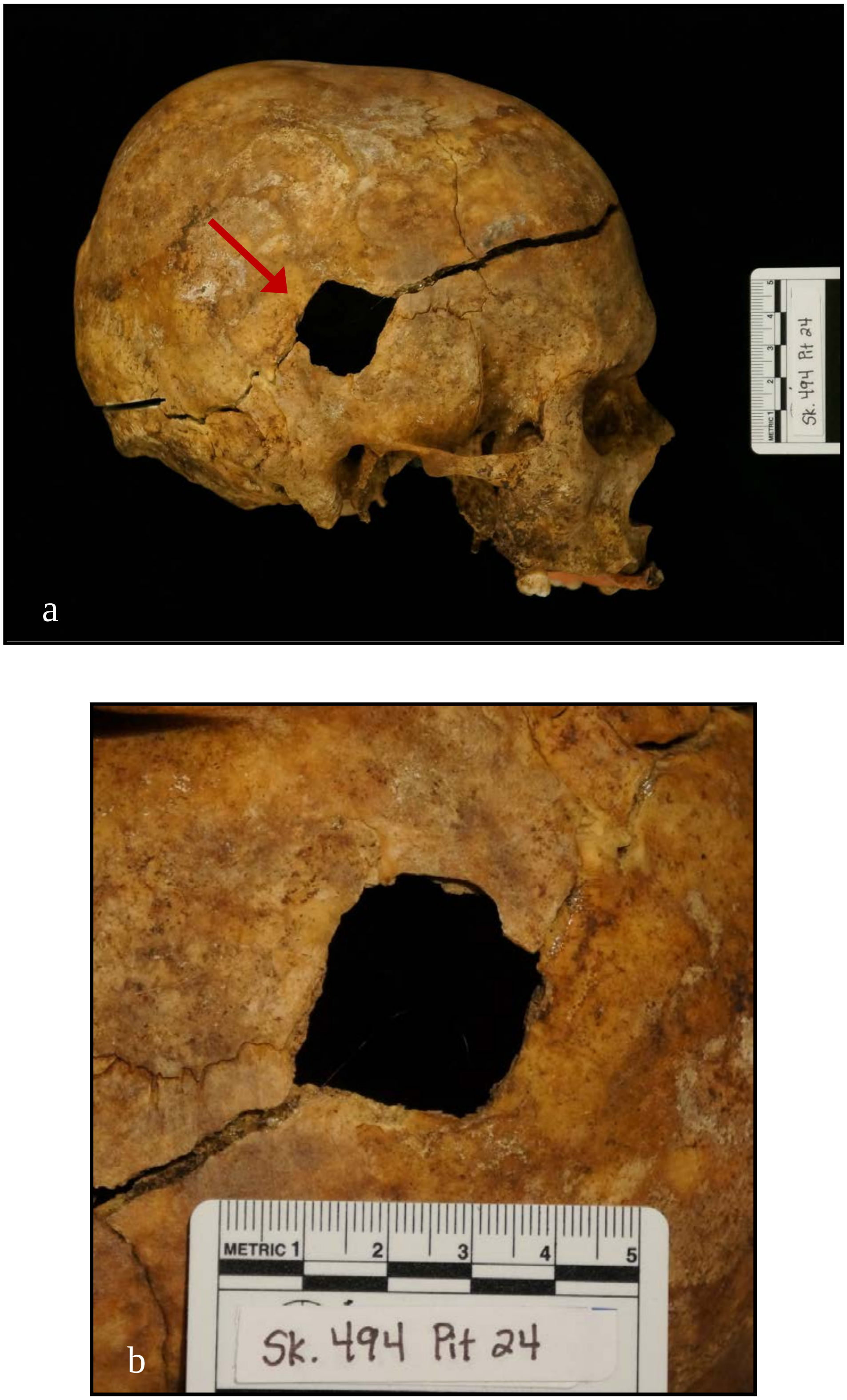


Figure 44: Quadrilateral Defect in Skeleton 494, a) Lateral View and b) Close Up



Undetermined Defects

In the Tuskulenai sample, some traumatic perimortem defects were ambiguous or difficult to discern. Ambiguity arose from the inability to distinguish between various mechanisms of trauma (e.g. blunt force vs. gunshot wounds) due to lack of or obscuration of associated beveling patterns. Also, a high degree of fragmentation, coupled with postmortem damage and missing elements made complete trauma reconstruction difficult (Figure 45). In these cases, defects were observed as "undetermined." That said, all individuals who demonstrated undetermined defects also exhibited at least one recognizable mechanism of trauma (e.g. gunshot wound) in conjunction with these defects.

Figure 45: High Degree of Fragmentation in the Cranium of Skeleton 642

Approximately 13% of the Tuskulenai sample (n = 19) demonstrated a total of 24 undetermined defects (Table 33). All defects were observed in cranial elements, including the cranial base (29%), face (21%), occipital (17%), right temporal (13%), left temporal (8%), left parietal (8%) and right parietal (4.2%). The direction of undetermined defects was relatively divided between the rear (21%), front (21%), right side (21%), and left side (12%) (Table 34). However, trauma analysis was particularly problematic when fractures extended across multiple regions of the cranium (e.g. cranial base to the face). Thus, the direction of force could not be determined in 25% of these cases. While important to note their presence, undetermined defects were not considered in analysis of perimortem trauma over time and between execution squads.

Table 33: Region Affected by Undetermined Defects in the Tuskulenai Sample

Bone Affected	**n**	**%**
Cranial base	7	29.2
Occipital	4	16.7
L. Parietal	2	8.3
R. Parietal	1	4.2
L. Temporal	2	8.3
R. Temporal	3	12.5
Face	5	20.8

Table 34: Direction of Force of Undetermined Defects in the Tuskulenai Sample

Direction of Force	**n**	**%**
Rear	5	20.8
Left Side	3	12.5
Right Side	5	20.8
Front	5	20.8
Unknown	6	25.0

Perimortem Trauma and Age Category

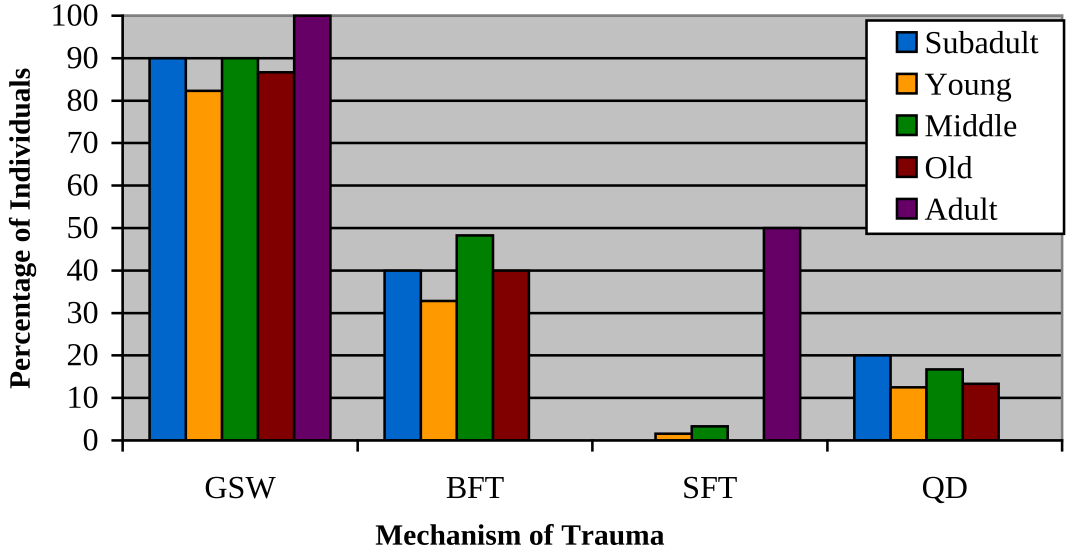
Finally, mechanism of trauma was evaluated by age category. In this analysis, mechanisms of trauma were not mutually exclusive as individuals could demonstrate multiple types of injury (e.g. gunshot trauma and blunt force). Results of this analysis demonstrate similar frequencies of mechanisms of trauma for all age categories except the non-age specific "adult" category (Table 35 and Figure 46). However, as only two individuals are present in the adult group, this category may be skewing the results. Thus, the following descriptions of frequencies of trauma are presented with the adult category removed.

Table 35: Mechanism of Trauma by Age Category in the Tuskulenai Sample

Age Category	**GSW**		**BFT**		**SFT**		**QD**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Subadult (n = 10)	9	90.0	4	40.0	0	0.0	2	20.0
Young Adult (n = 64)	53	82.3	21	32.8	1	1.6	8	12.5
Middle Adult (n = 60)	54	90.0	29	48.3	2	3.3	10	16.7
Older Adult (n = 15)	13	86.7	6	40.0	0	0.0	2	13.3
Adult (n = 2)	2	100.0	0	0.0	1	50.0	0	0.0
Total (n = 151)	**131**	**86.8**	**60**	**39.7**	**4**	**2.7**	**22**	**14.6**

The frequency of gunshot trauma ranged from 82% to 90% across the age categories, with the highest frequencies in the middle adult (90%) and subadult (90%) groups. The frequency of blunt force trauma ranged from 33% to 48%, with the highest frequencies in the middle adult (48%), older adult (40%), and subadult (40%) groups. The frequency of sharp force trauma ranged from 0% to 3%, with frequencies of 2% in young adults and 3% in middle adults. No sharp force trauma was observed in subadults or older adults. Finally, frequencies of quadrilateral defects in the Tuskulenai sample ranged from 13% to 20%, with the highest frequencies in subadults (20%), followed by middle adults (17%), older adults (13%), and young adults (13%). Thus, the mechanism of trauma does not appear to vary by age category.

Figure 46: Mechanism of Trauma by Age Category



Summary of Demography & Trauma in the Tuskulenai Case

A total of 155 individuals were examined in the Tuskulenai sample. All remains were skeletonized, demonstrating various degrees of preservation. Approximately 88% of individuals were complete and 12% were partial. While 95% of individuals demonstrated major trauma, trauma was absent or unobservable in 5% of the sample. Analysis of demographic profiles of individuals revealed a high frequency of males (94%). Furthermore, young (41%) and middle adults (39%) dominate the Tuskulenai sample, with fewer old adults (10%) and subadults (7%). Evaluation of mechanism of trauma by age category reveals that the application of perimortem trauma did not vary by age group.

Table 36: Mechanism of Trauma per Individual in the Tuskulenai Sample

Mechanism of Trauma	**n**	**%**
GSW	131	86.8
BFT	60	39.7
SFT	4	2.6
QD	22	14.6

Perimortem trauma was evaluated in 151 individuals in the Tuskulenai sample. Gunshot trauma (87%) was most prevalent in prisoners, followed by blunt force (40%), quadrilateral defects (15%), and sharp force (3%) (Table 36). Most gunshot wounds represented single entries, although up to five entry wounds were observed. All gunshot wounds were observed in crania, predominantly on the occipital bone, followed by the left parietal or right parietal. Approximately 84% of gunshot wounds arose from a posterior direction of force. Similarly, single episodes of blunt force trauma were most common, although up to four episodes were observed. Most blunt force defects were observed in crania, although four episodes of postcranial trauma were noted. Finally, approximately 49% of traumatic episodes occurred as a result of blunt force to the posterior of the head while 24% occurred as a result of blunt force to the face. Few individuals exhibited sharp force trauma. The number of sharp force wounds varied from one to two, with single entries (75%) being the most frequent. All sharp force defects were observed on crania and the direction of force of these wounds varied considerably. Furthermore, most quadrilateral defects represented single entries, although up to three entry wounds were discovered. All quadrilateral defects were observed in crania, predominantly on the right parietal, left parietal, and occipital and the direction of force varied mainly between the rear, right side, and left side.

Finally, evaluation of perimortem trauma with regard to state standards for execution reveals that 40% of individuals in the Tuskulenai sample were executed in full compliance (Table 37). This means that 40% of individuals demonstrated gunshot trauma exclusively to the rear of crania. Approximately 5% of individuals were considered executed in partial compliance, demonstrating non-rear gunshot wounds to the head with no other mechanism of trauma present (e.g. blunt force). Finally, non-compliance was observed in 54% of individuals, all of whom demonstrated non-gunshot trauma (e.g. quadrilateral defects). Compliance was not evaluated in eight individuals, four of whom demonstrated no perimortem trauma and four whose remains were too damaged to assess trauma.

Table 37: Compliance with the State Guideline in the Tuskulenai Sample

Compliance	**n**	**%**
Full Compliance	59	40.1
Partial Compliance	8	5.4
Non-Compliance	80	54.4

SKELETAL RESULTS OVER TIME

This section discusses the skeletal results of demographic variables and perimortem trauma with regard to time by comparing individually dated burial pits. Burial pits were sequenced according to date of formation and given a time designation (e.g. Burial Pit 35 = Time 1) as visible in Table 38. Since four individuals from Burial 39 (Time 5) were excluded due to extensive postmortem damage, a total of 151 individuals were analyzed in this section.

Table 38: Burial Pit, Time Sequence, and Number of Individuals

Burial Pit	**Time**	**n**
35	1	12
36	2	12
37	3	17
38	4	10
39	5	11
2	6	14
5	7	19
23	8	11
26	9	10
24	10	6
27	11	18
31	12	11

Gunshot Wounds

The percentage of individuals exhibiting gunshot wounds ranged from 10% to 100% over time (Table 39 and Figure 47). Four burial pits (35, 36, 38, and 23) demonstrated 100% frequency and were discovered within the first eight dated pits (Time 1, 2, 4, and 8). None of the pits dated after pit 23 (Time 8) demonstrated 100% frequency of gunshot wounds. Results of Pearson's chi-square test demonstrates that the number of individuals affected by gunshot wounds significantly changed over time ($\chi 2 = 65.787$, df = 11, $p < 0.00$). Furthermore, results of Spearman's rank correlation coefficient ($\rho = -.293$, $p < 0.000$) indicates an inverse association between time and the percentage of individuals affected by gunshot wounds.

The total number of gunshot wounds per pit ranged from 1 to 26, while the number of gunshot wounds per individual ranged from 1 to 5 (Table 39 and Figure 48). While fewer total gunshot wounds are found on individuals in later dated pits, the total number of gunshot wounds should be evaluated with regard to number of individuals per pit, or mean. Visual evaluation of the mean number of shots per individual by burial pit reveals that the number of shots used per individual steadily decreased over time and then leveled out in the last four dated pits (Figure 49). These last four pits are associated with Prikazchikov's execution squad. Results of Spearman's rank correlation coefficient ($\rho = -.369$, $p < 0.05$) indicates an inverse association between time and the mean number of gunshot wounds; thus, an increase in time is associated with a decrease in the mean number of gunshot wounds.

Table 39: Total, Frequency, Mean and Range of Gunshot Wounds over Time

Pit	Time	# of Individuals with GSWs		Total Number of GSWs	Mean # of Shots per Individual	Range of GSWs per Individual
		n	%			
35	1	12	100.0	24	2	1 to 5
36	2	12	100.0	12	1	1
37	3	16	94.1	26	1.63	1 to 4
38	4	10	100.0	15	1.4	1 to 3
39	5	10	90.9	15	1.5	1 to 4
2	6	13	92.9	17	1.31	1 to 3
5	7	17	89.5	23	1.35	1 to 3
23	8	11	100.0	12	1.09	1 to 2
26	9	1	10.0	1	1	1
24	10	5	83.3	5	1	1
27	11	17	94.4	18	1.06	1 to 2
31	12	7	63.6	7	1	1

Figure 47: Percentage of Individuals Exhibiting Gunshot Wounds over Time

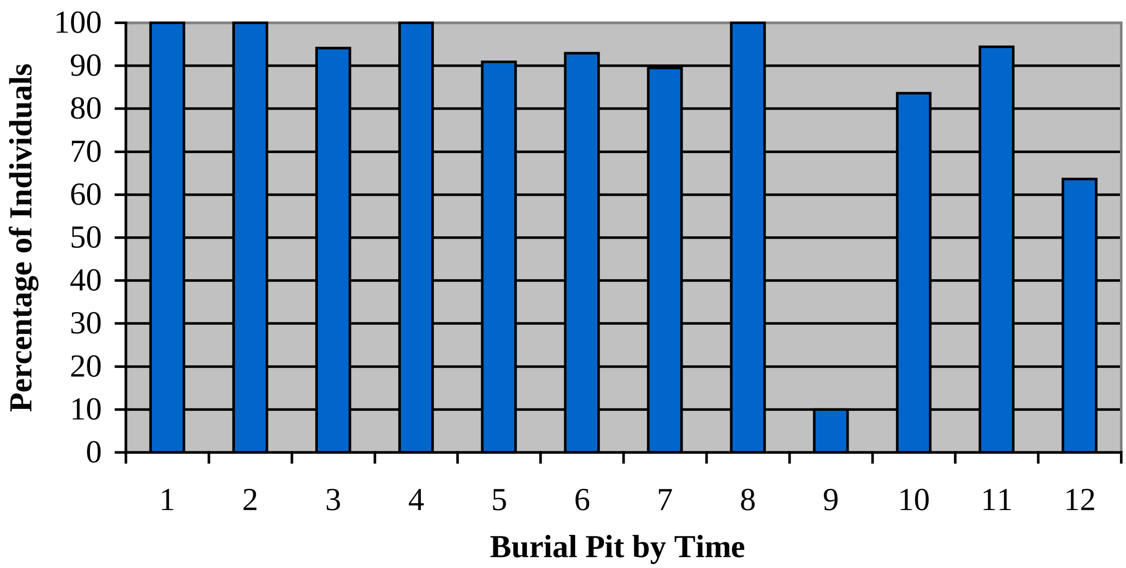


Figure 48: Total Number of Gunshot Wounds over Time

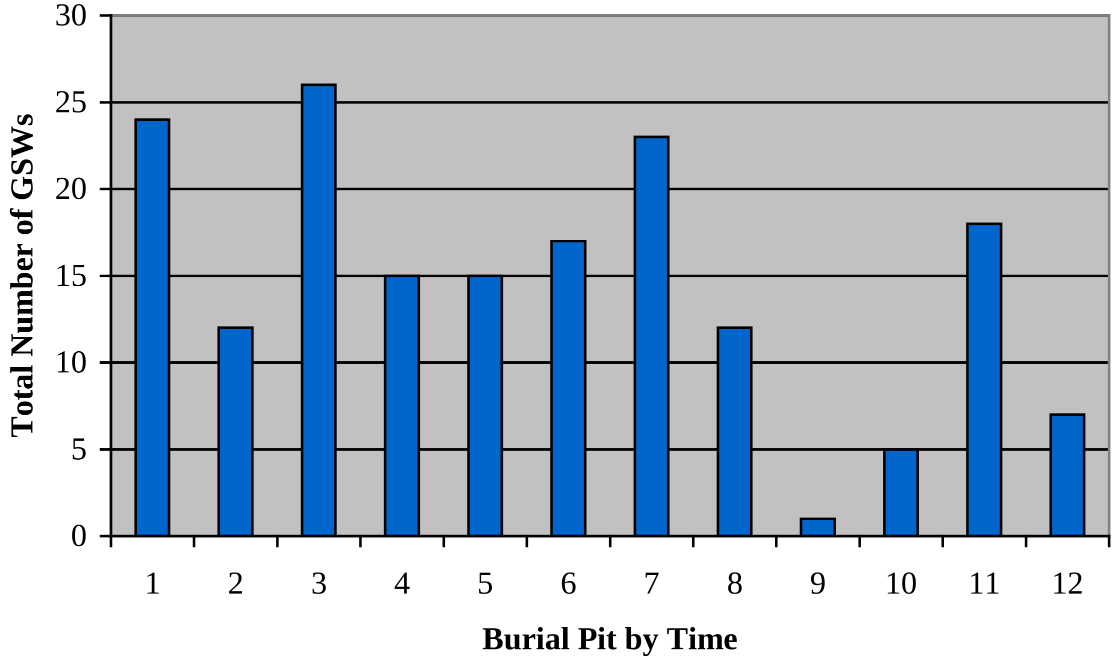


Figure 49: Mean Number of Gunshot Wounds per Burial Pit over Time

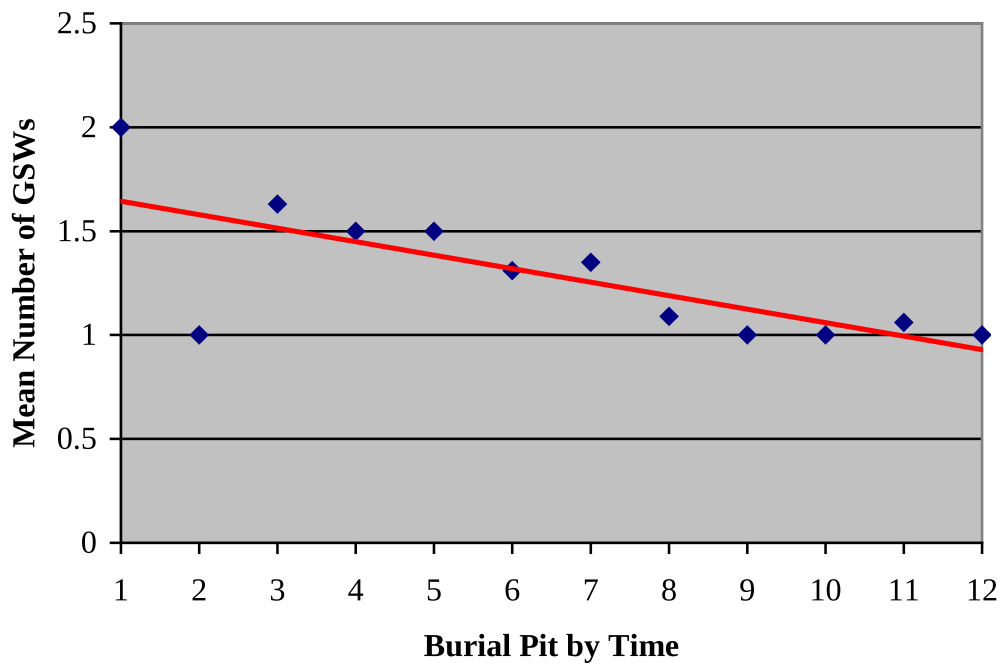
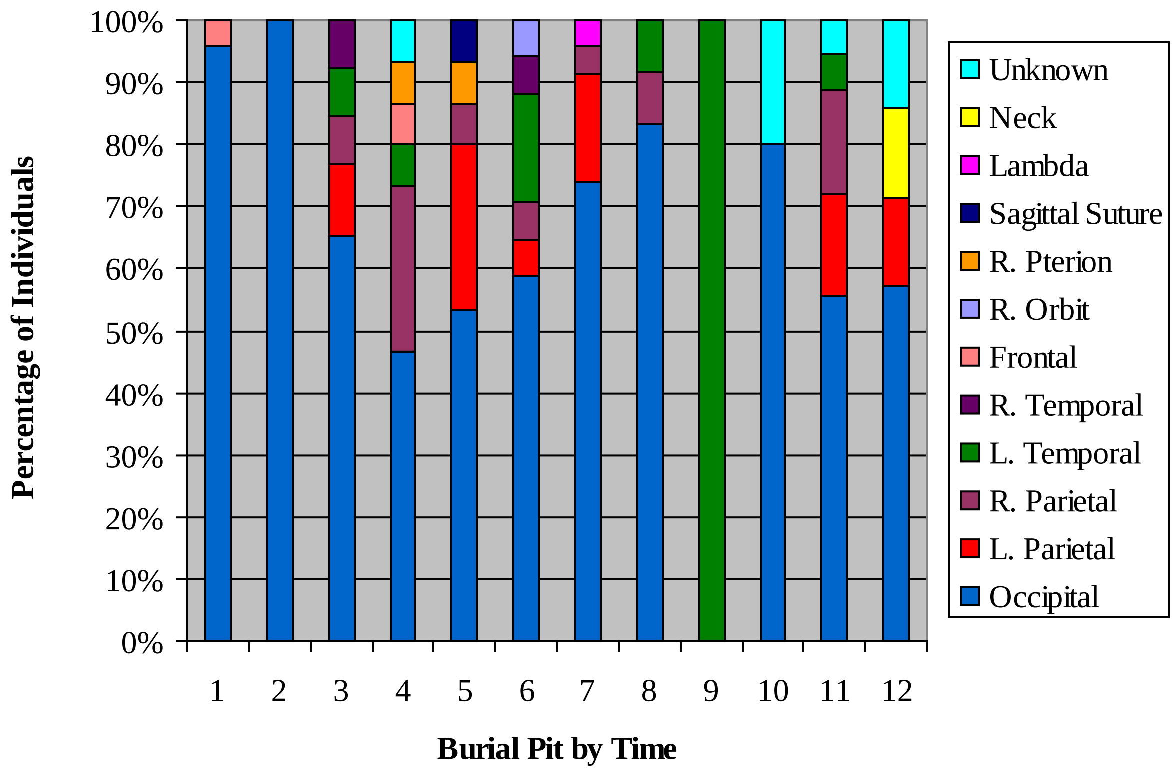


Figure 50: Evaluation of Gunshot Wounds by Bone of Entry over Time



All gunshot wounds were observed in crania (Figure 50 and Table 40). While the bone of entry varied over time, the majority of gunshot wounds are located on occipital bones, followed by left and right parietals. Evaluation of Pit 26 (Time 9) is slightly misleading from Figure 50, as only one gunshot wound was present and it was located on the left temporal of skeleton 513.

Evaluation of direction of force over time demonstrates a high frequency (96-100%) of gunshot wounds from the rear of prisoners (Table 41 and Figure 51). However, the direction of force does varies, including a decline of rear shots in burial pits 37, 38, 39, 2 and 5 (Time 3-7) and again in burial pits 24 and 27 (Time 10-11). Pearson's chi-square test demonstrates that the direction of gunshot wounds significantly fluctuated over time ($\chi 2 = 27.416$, df = 11, $p = 0.04$). However, linear regression analysis reveals that the change is not predicted by time ($b = 0.728$, $p = 0.619$) as seen in Figure 52.

Table 40: Count of Gunshot Wounds by Bone of Entry over Time

Bone of Entry	**Burial Pits by Time**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Occipital	23	12	17	7	8	10	17	10	0	4	10	4
L. Parietal	0	0	3	0	4	1	4	0	0	0	3	1
R. Parietal	0	0	2	4	1	1	1	1	0	0	3	0
L. Temporal	0	0	2	1	0	3	0	1	1	0	1	0
R. Temporal	0	0	2	0	0	1	0	0	0	0	0	0
Frontal	1	0	0	1	0	0	0	0	0	0	0	0
R. Orbit	0	0	0	0	0	1	0	0	0	0	0	0
R. Pterion	0	0	0	1	1	0	0	0	0	0	0	0
Sagittal Suture	0	0	0	0	1	0	0	0	0	0	0	0
Lambda	0	0	0	0	0	0	1	0	0	0	0	0
Neck	0	0	0	0	0	0	0	0	0	0	0	1
Unknown	0	0	0	1	0	0	0	0	0	1	1	1

Table 41: Direction of Gunshot Trauma (by Count) over Time

Direction of Force	**Burial Pits by Time**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Posterior-Anterior	23	12	22	7	12	11	19	12	1	4	15	7
Left-Right	0	0	2	2	1	4	3	0	0	0	1	0
Right-Left	0	0	2	5	2	1	1	0	0	0	2	0
Anterior-Posterior	1	0	0	0	0	1	0	0	0	0	0	0
Unknown	0	0	0	1	0	0	0	0	0	1	0	0

Figure 51: Overall Evaluation of Direction of Force of Gunshot Wounds over Time

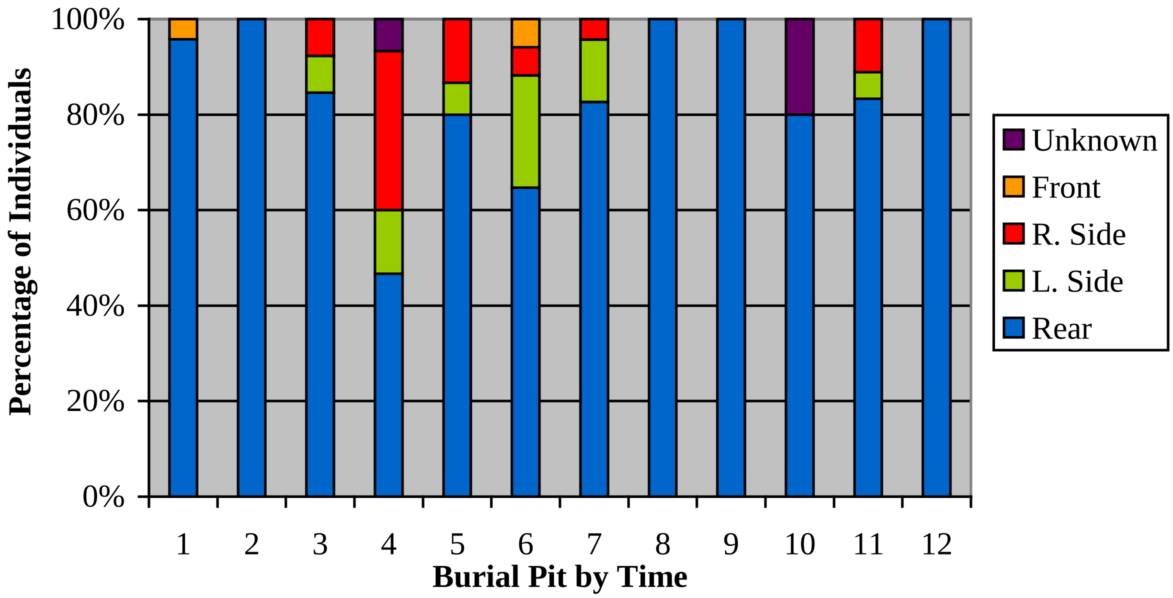
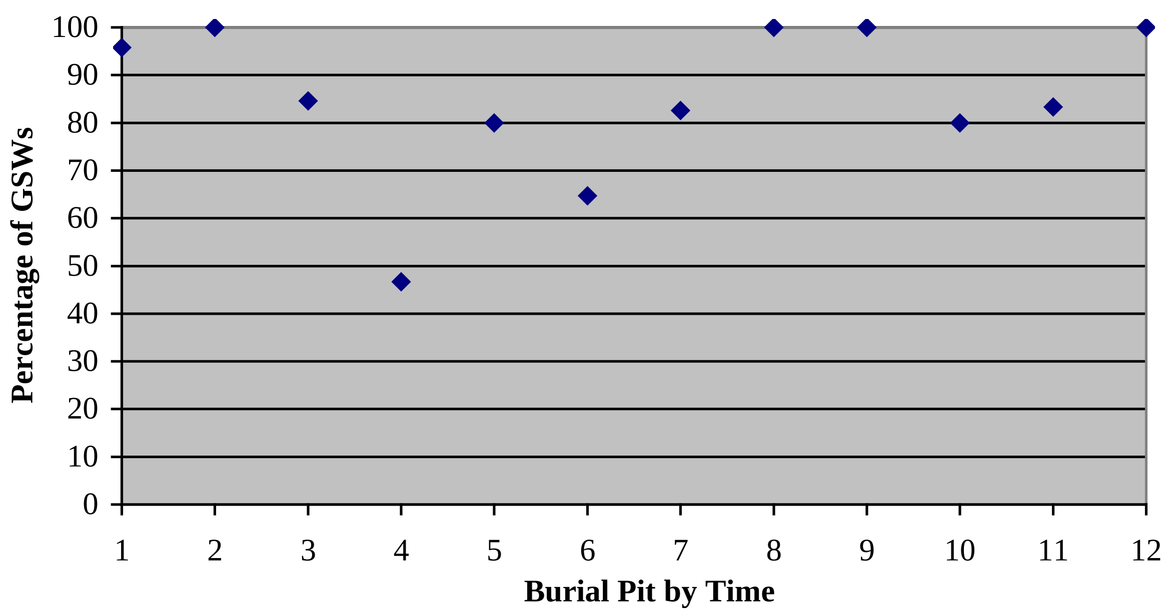


Figure 52: Evaluation of Rear Gunshot Wounds over Time



Blunt Force Trauma

The percentage of individuals exhibiting blunt force trauma ranged from 9% to 82% over time (Table 42 and Figure 53). Frequencies of blunt force varied, particularly in early to mid-dated pits. However, in the later dated pits, from Pit 23 to 31 (Time 8-12) the number of individuals exhibiting blunt force steadily increased. Results of Pearson's chi-square test demonstrates that the percentage of individuals affected by blunt force significantly changed over time ($\chi 2 = 25.176$, df = 11, $p = 0.009$). Results of Spearman's rank correlation coefficient indicate a positive association between time and the percentage of individuals affected by blunt force trauma ($\rho = .253$, $p = 0.001$).

The total number of blunt force episodes per pit ranged from 2 to 18, while the number of blunt force episodes per individual ranged from 1 to 4 (Table 42). Evaluation of the total number of blunt force episodes per pit shows considerable variation, especially in the mid to late dated pits (Figure 54). Similarly, the mean number of blunt force episodes varied over time with the greatest means seen in mid to late dated pits (Time 7, 8, and 10) (Figure 55). Results of Spearman's rank correlation coefficient indicate a positive association between time and the mean number of blunt force episodes ($\rho = .271$, $p = 0.01$); an increase in time is associated with an increase in the mean number of blunt force episodes.

Table 42: Total, Frequency, Mean and Range of Blunt Force Trauma over Time

Pit	Time	# of Individuals with BFT		Total # of BFT Episodes	Mean # of Episodes per Individual	Range of Episodes per Individual
		n	%			
35	1	2	16.7	2	1	1
36	2	5	41.7	6	1.2	1 to 2
37	3	5	29.4	6	1.2	1 to 2
38	4	4	40.0	6	1.5	1 to 3
39	5	3	27.3	3	1	1
2	6	5	35.7	5	1	1
5	7	8	42.1	16	2	1 to 4
23	8	1	9.1	2	2	2
26	9	3	30.0	3	1	1
24	10	2	33.3	5	2.5	2 to 3
27	11	13	72.2	18	1.39	1 to 3
31	12	9	81.8	13	1.44	1

Figure 53: Percentage of Individuals Exhibiting Blunt Force Trauma over Time

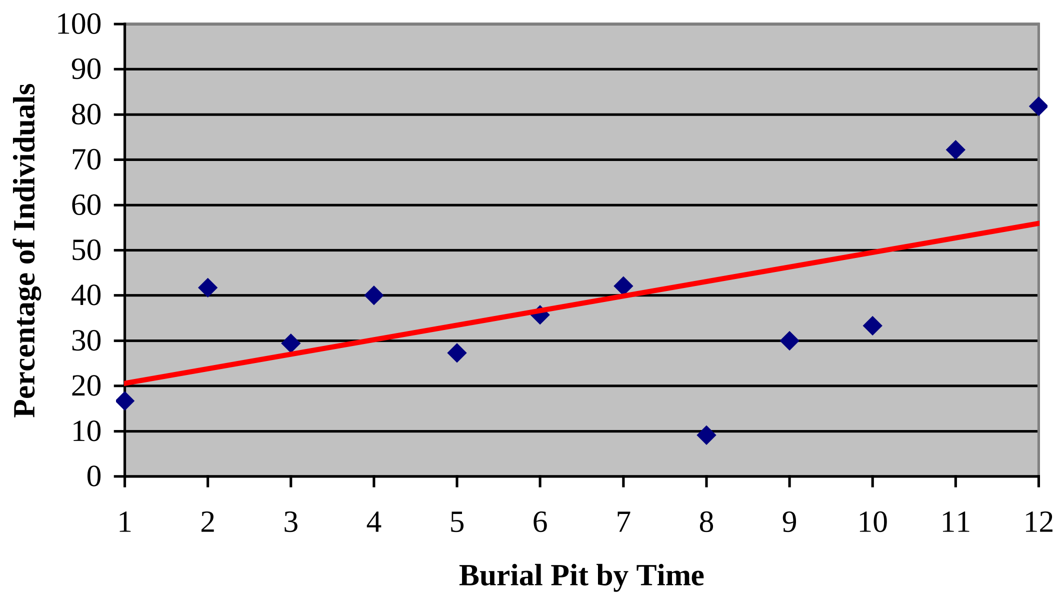


Figure 54: Total Number of Blunt Force Defects over Time

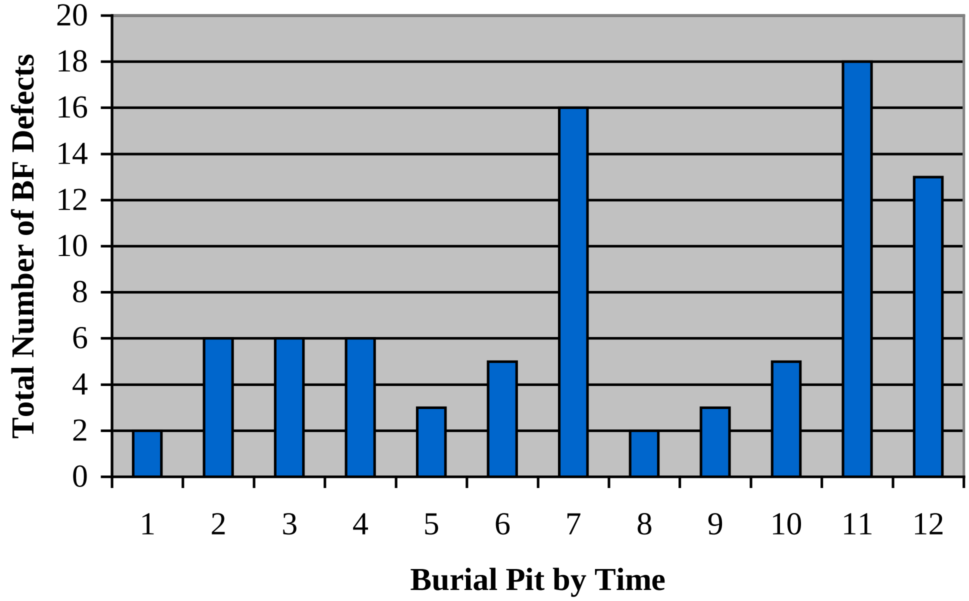
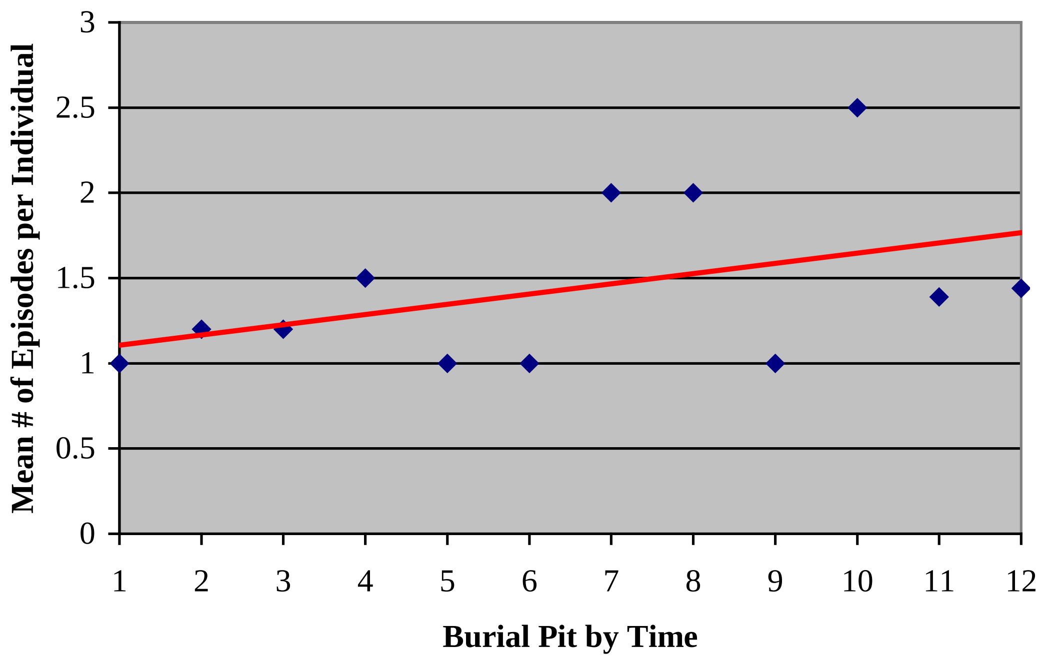


Figure 55: Mean Number of Blunt Force Episodes over Time



While blunt force trauma was observed in both cranial and postcranial remains, the majority of blunt force over time was noted in crania (Table 43). Two individuals in Pit 36 (Time 2) demonstrated blunt force trauma to upper limb elements, while blunt force was observed in both cranial and postcranial remains in one individual (upper limb) in Pit 5 (Time 7) and one individual (lower limb) in Pit 24 (Time 10). Given the small sample size of postcranial trauma, the anatomical location of blunt force trauma does not appear to vary over time; blunt force is consistently present in crania of prisoners. Due to the diffuse nature of blunt force in crania, which often affects multiple bones, individual cranial bones were not compared with regard to blunt force over time.

Table 43: Anatomical Location of Blunt Force Trauma over Time

Pit	**Time**	**Cranial**		**Postcranial**		**Cranial + Postcranial**	
		n	**%**	**n**	**%**	**n**	**%**
35	1	2	100	0	0	0	0
36	2	3	60	2	40	0	0
37	3	5	100	0	0	0	0
38	4	4	100	0	0	0	0
39	5	3	100	0	0	0	0
2	6	5	100	0	0	0	0
5	7	7	87.5	0	0	1	12.5
23	8	1	100	0	0	0	0
26	9	3	100	0	0	0	0
24	10	1	50	0	0	1	50
27	11	13	100	0	0	0	0
31	12	9	100	0	0	0	0

Table 44: Direction of Blunt Force Trauma (by Count) over Time

Direction of Force	**Burial Pits by Time**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Posterior-Anterior	0	2	2	3	2	3	6	0	0	2	12	10
Left-Right	0	0	0	1	0	0	2	0	0	1	1	0
Right-Left	1	0	1	1	0	0	3	2	1	0	2	1
Anterior-Posterior	1	1	0	1	1	2	5	0	2	2	3	2
Superior-Inferior	0	3	1	0	0	0	0	0	0	0	0	0
Unknown	0	0	2	0	0	0	0	0	0	0	0	0

Evaluation of the direction of force indicates that blunt force trauma was frequently applied from a rear and front direction, but other directions (e.g. superior, right side and left side) are common throughout time (Table 44 and Figure 56). Evaluation of blunt force from rear versus non-rear directions over time indicates that blunt force was applied from a rear direction from the early to middle dated pits (Time 2-7) and the last three dated pits (Time 10-12) (Figure 57). However, results of Pearson's chi-square test demonstrate that the direction of blunt force trauma does not statistically vary over time ($\chi 2 = 15.826$, df = 11, $p = 0.148$).

Figure 56: Direction of Blunt Force Trauma over Time

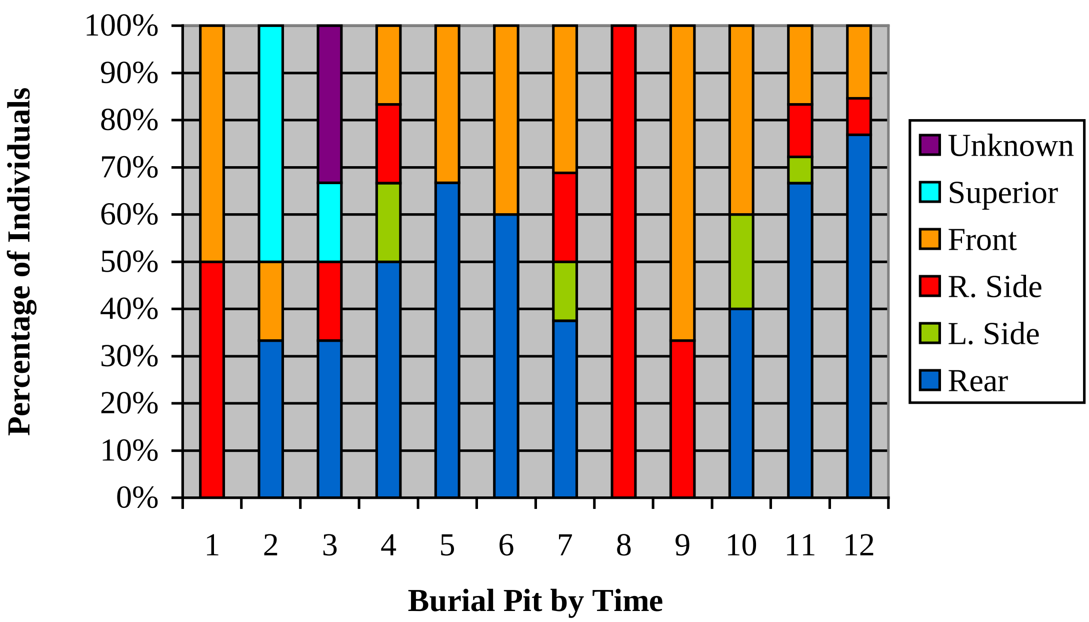
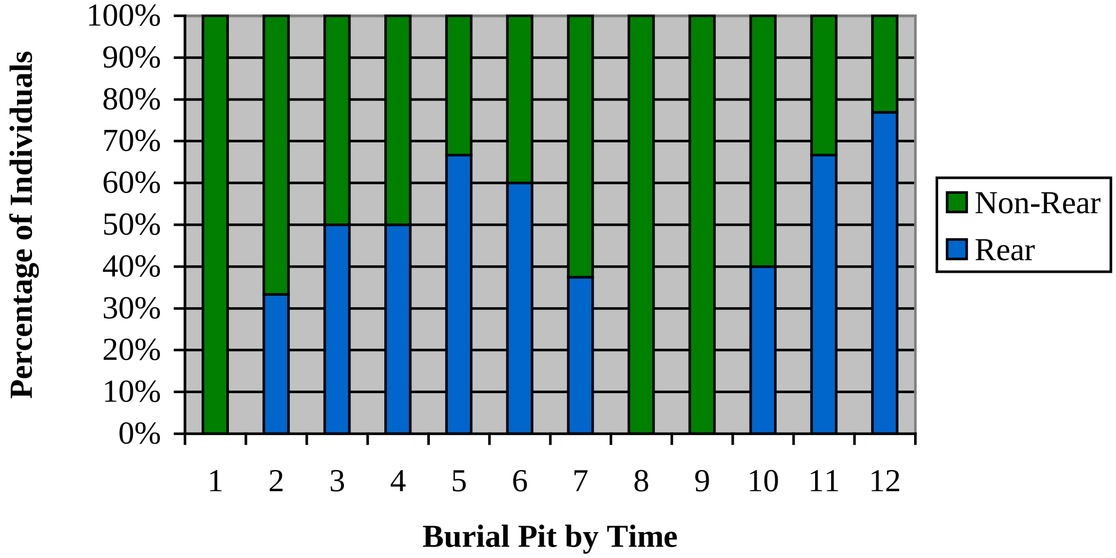


Figure 57: Rear vs. Non-Rear Directions of Blunt Force Trauma over Time



Sharp Force Trauma

Five episodes of sharp force trauma were observed on the crania of four individuals in the Tuskulenai sample. When evaluated by time, sharp force defects are located in mid to late dated pits (Table 45). Each burial pit contained only one individual exhibiting sharp force trauma, although Skeleton 507 in Pit 26 (Time 9) exhibited two episodes of sharp force. The direction of sharp force also varied considerably. Due to the small sample size, Pearson's chi-square tests, Fisher's exact tests, and Spearman's correlation coefficients were not performed. Thus, while sharp force defects appear in mid to late dated pits, statistical significance of its presence, anatomical location, and direction of force over time is not evaluated.

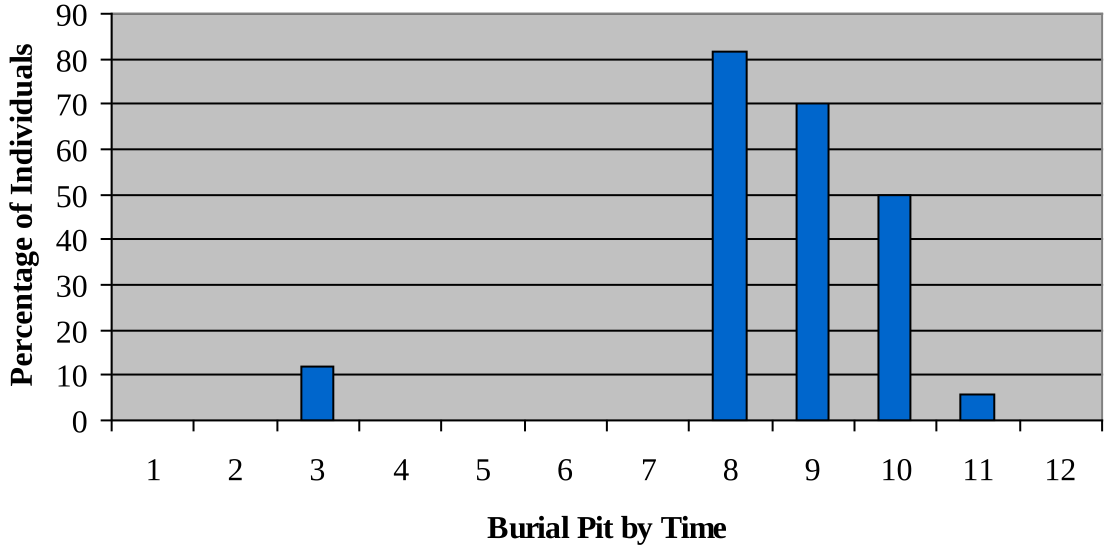
Table 45: Presence of Sharp Force Trauma over Time

	Burial Pit by Time											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
SFT Present (Red Squares)					■				■		■	■
Number of Individuals Exhibiting SFT					1				1		1	1
Number of SFT Episodes					1				2		1	1
Bone of Entry					R. Temporal				L. Parietal Frontal		Occipital	Occipital
Direction of Force					R. Side				L. Side Front		Rear	Rear

Quadrilateral Defects

Quadrilateral defects were observed in five burial pits in the Tuskulenai sample (Figure 58). While quadrilateral defects initially appear early (Time 3) at 12% in Pit 37, they are not observed again until the mid to late dated pits, including Pits 23, 26, 24, and 27 (Time 8-11). In this later grouping, the number of individuals demonstrating quadrilateral defects spikes at 82% in Pit 23, then gradually decreases to 70% in Pit 26, 50% in Pit 24, and 6% in Pit 27. Thus, it appears that quadrilateral defects generally appear later in time, but then gradually decrease. However, due to the absence of quadrilateral defects in seven of the burial pits, Pearson's chi-square and Fisher's exact tests were not performed.

Figure 58: Percentage of Individuals Demonstrating Quadrilateral Defects over Time



The total number of quadrilateral defects per pit ranged from 1 to 12, while the number of quadrilateral episodes per individual ranged from 1 to 3 (Table 46 and Figure 59). Evaluation of the mean number of quadrilateral defects per individual ranged from 1 to 1.57, with the greatest number of defects occurring in Pit 26 (Time 9) (Figure 60).

Table 46: Total Number, Mean, and Range of Quadrilateral Defects over Time

Pit	Time	Total Number of QDs	Mean number of QDs per Individual	Range of QDs per Individual
35	1	0	0	0
36	2	0	0	0
37	3	2	1	1
38	4	0	0	0
39	5	0	0	0
2	6	0	0	0
5	7	0	0	0
23	8	12	1.33	1 to 3
26	9	11	1.57	1 to 3
24	10	4	1.33	1 to 2
27	11	1	1	1
31	12	0	0	0

Figure 59: Total Number of Quadrilateral Defects over Time

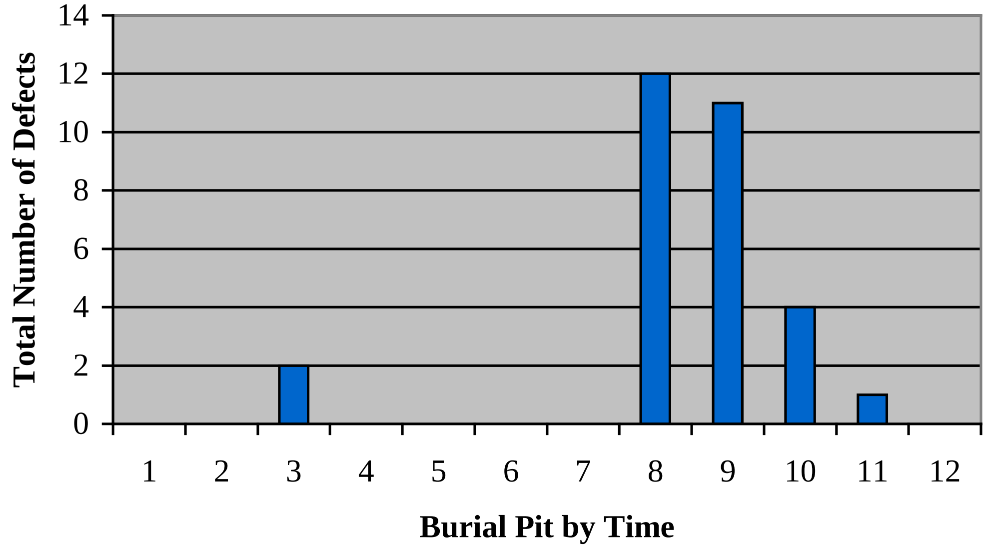
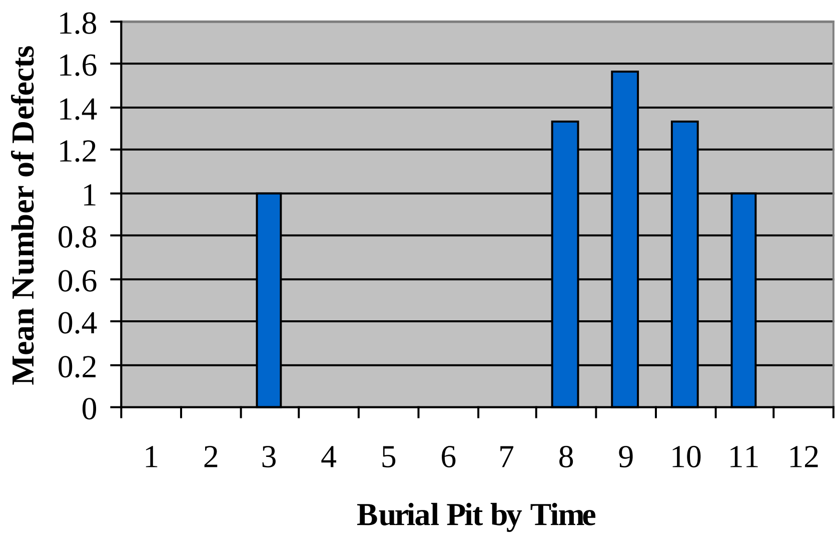


Figure 60: Mean Number of Quadrilateral Defects per Burial Pit over Time



All quadrilateral defects were observed in crania, yet the bone of entry varied over time (Table 47 and Figure 61). No single bone was preferred over others. Evaluation of Pit 27 (Time 11) is slightly misleading from Figure 61, as only one quadrilateral defect was present and it was located on the right pterion of skeleton 535.

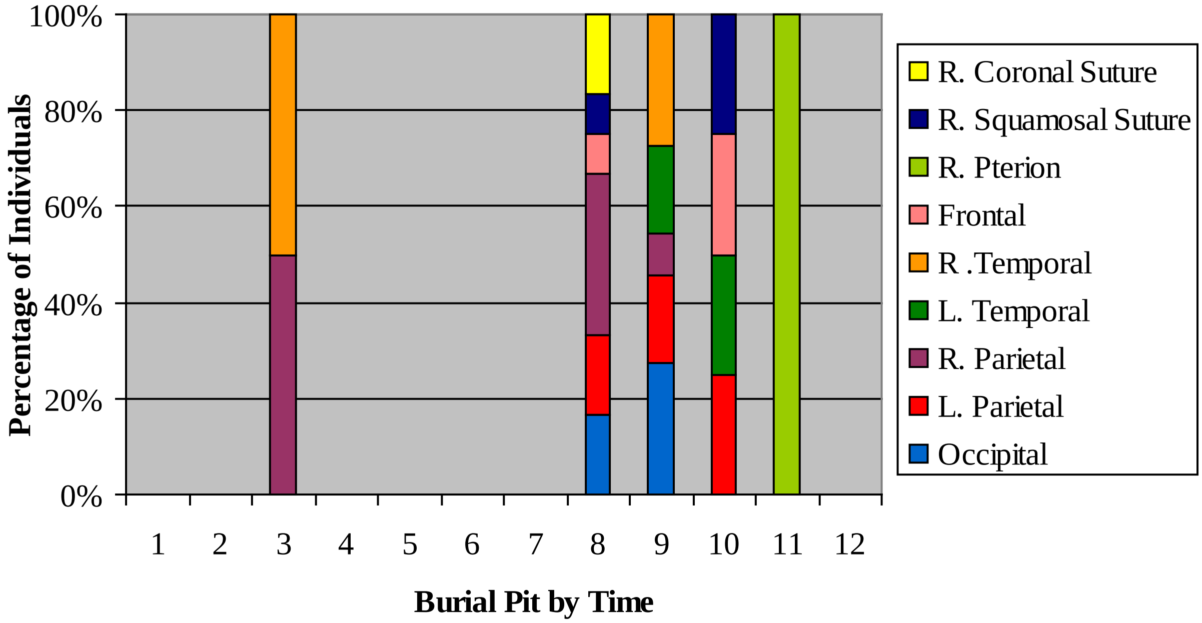
Table 47: Count of Quadrilateral Defects by Bone of Entry over Time

Bone of Entry	**Burial Pits by Time**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Occipital	0	0	0	0	0	0	0	2	3	0	0	0
L. Parietal	0	0	0	0	0	0	0	2	2	1	0	0
R. Parietal	0	0	1	0	0	0	0	4	1	0	0	0
L. Temporal	0	0	0	0	0	0	0	0	2	1	0	0
R. Temporal	0	0	1	0	0	0	0	0	3	0	0	0
Frontal	0	0	0	0	0	0	0	1	0	1	0	0
R. Pterion	0	0	0	0	0	0	0	0	0	0	1	0
R. Squamosal suture	0	0	0	0	0	0	0	1	0	1	0	0
R. Coronal Suture	0	0	0	0	0	0	0	2	0	0	0	0

Table 48: Direction of Quadrilateral Defects (by Count) over Time

Direction of Force	**Burial Pits by Time**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Posterior-Anterior	0	0	0	0	0	0	0	5	4	0	0	0
Left-Right	0	0	0	0	0	0	0	0	3	2	1	0
Right-Left	0	0	1	0	0	0	0	3	4	1	0	0
Anterior-Posterior	0	0	0	0	0	0	0	1	0	0	0	0
Superior-Inferior	0	0	1	0	0	0	0	3	0	1	0	0

Figure 61: Evaluation of Quadrilateral Defects by Bone of Entry over Time



Evaluation of the direction of force of quadrilateral defects by burial pit indicates a continuous, high frequency of non-rear directions throughout time (Table 48 and Figure 62). Quadrilateral defects from rear directions were only present in Pits 23 and 26 (Time 8 and 9), but both were at frequencies below 50% (Figure 63).

Figure 62: Direction of Quadrilateral Defects over Time

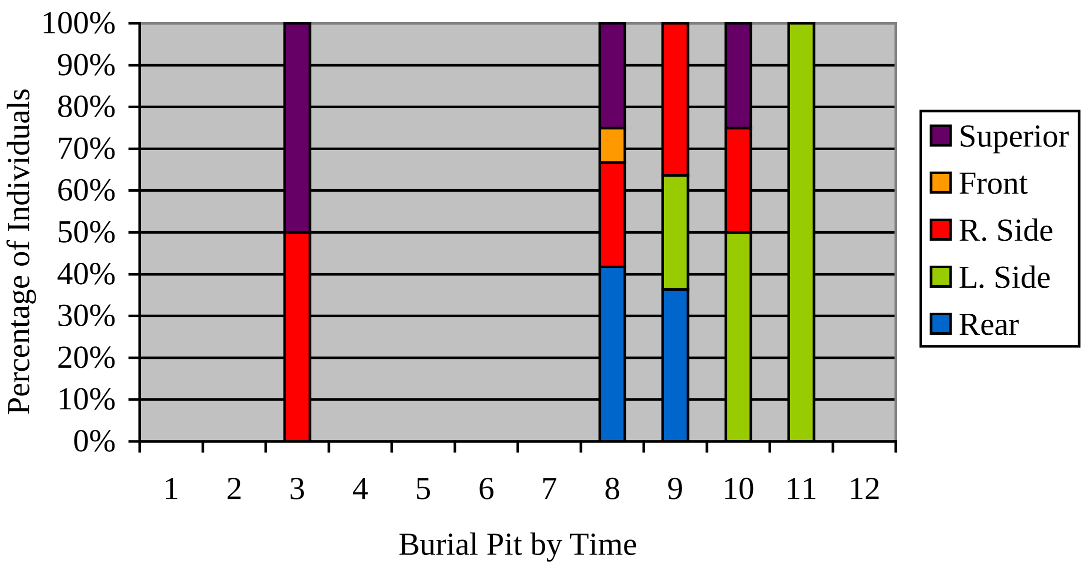
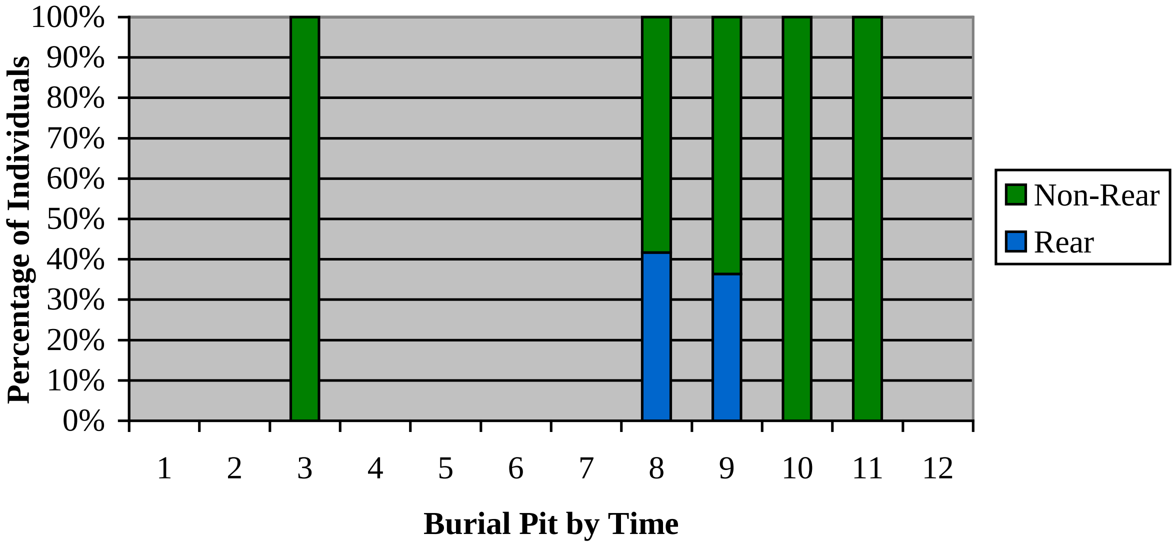


Figure 63: Rear vs. Non-Rear Directions of Quadrilateral Defects over Time



Summary of Perimortem Trauma over Time

The purpose of this section is to evaluate how the mechanism of trauma, direction of force, and anatomical location of trauma varies *over time* in the Tuskulenai case. The mechanism of trauma was expected to change from gunshot wounds to include non-gunshot mechanisms. Results demonstrate that the percentage of individuals exhibiting gunshot trauma decreased over time (Figure 64 and Table 49). Furthermore, the number of episodes of gunshot wounds (shots) per individual also decreases over time. At the same time, evaluation of other mechanisms of trauma demonstrates that the percentage of individuals exhibiting non-gunshot mechanisms increases over time (Figure 65). Thus, the *number of individuals* being shot and the *number of times* prisoners were shot decreased. At the same time, the number of individuals exhibiting non-gunshot mechanisms increased.

Figure 64: Percentage of Individuals Demonstrating Gunshot Trauma over Time

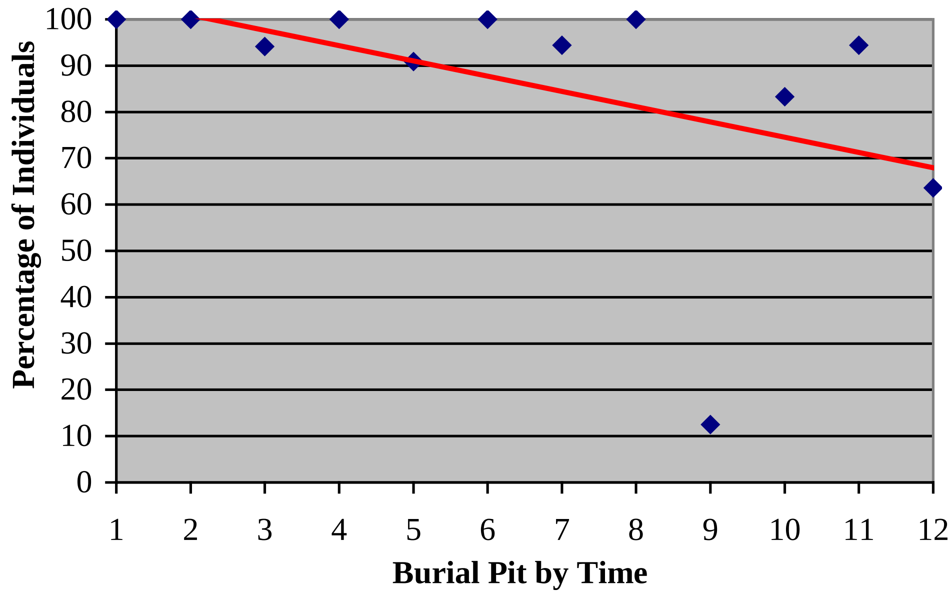


Figure 65: Percentage of Individuals Demonstrating Non-Gunshot Trauma over Time

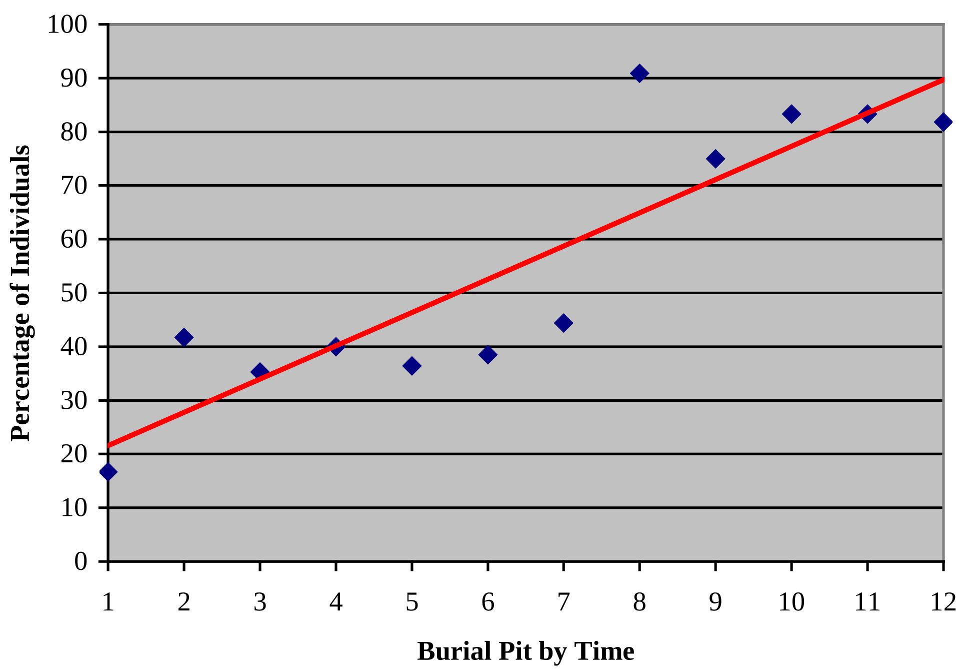


Table 49: Percentage of Individuals Exhibiting Mechanisms of Trauma over Time

Pit	Time	n	GSW		BFT		SFT		QD	
			n	%	n	%	n	%	n	%
35	1	12	12	100.0	2	16.7	0	0	0	0
36	2	12	12	100.0	5	41.7	0	0	0	0
37	3	17	16	94.1	5	29.4	0	0	2	11.8
38	4	10	10	100.0	4	40.0	0	0	0	0
39	5	11	10	90.9	3	27.3	1	9.1	0	0
2	6	14	13	92.9	5	35.7	0	0	0	0
5	7	19	17	89.5	8	42.1	0	0	0	0
23	8	11	11	100.0	1	9.1	0	0	9	81.8
26	9	10	1	10.0	3	30.0	1	10.0	7	70
24	10	6	5	83.3	2	33.3	0	0	3	50.0
27	11	18	17	94.4	13	72.2	1	5.6	1	5.6
31	12	11	7	63.6	9	81.8	1	9.1	0	0.0

The anatomical location of trauma was expected to shift from cranial to postcranial locations. Gunshot trauma, sharp force trauma, and quadrilateral defects were all observed in cranial elements and did not significantly vary over time. While blunt force trauma was observed in postcranial elements, given the small sample size, the anatomical location of blunt force trauma does not appear to vary over time; blunt force is consistently present in crania of prisoners.

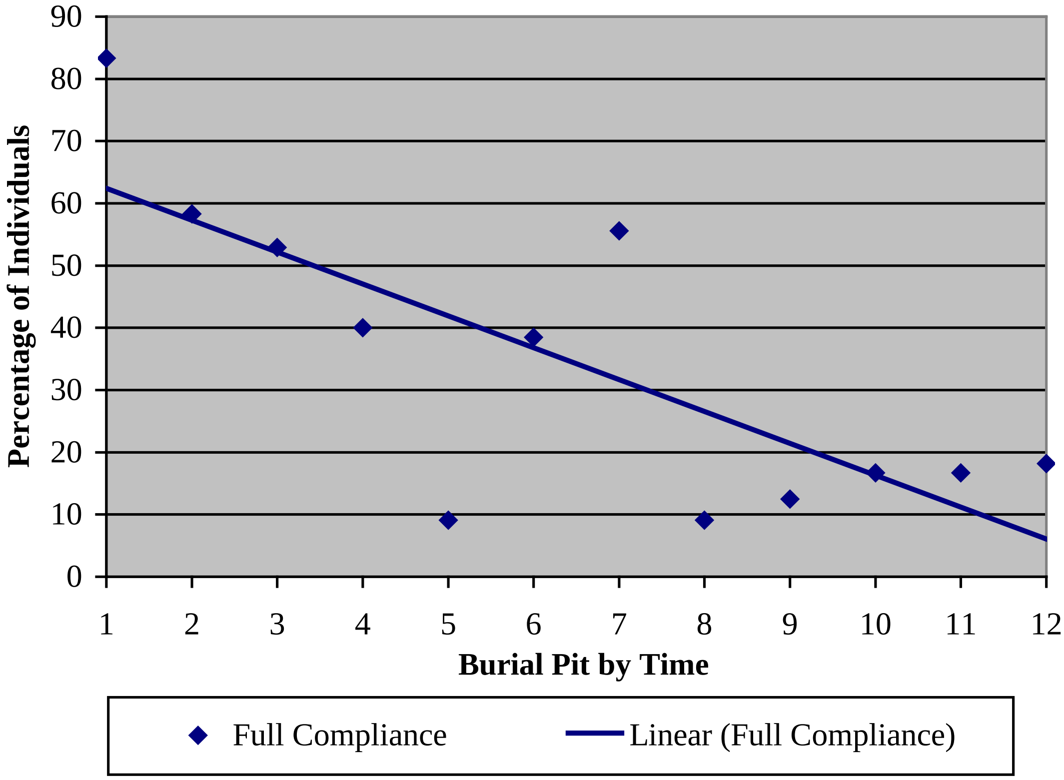
Furthermore, the direction of force was expected to change over time from the rear to include non-rear directions. Results demonstrate that there is a high frequency of rear-directed gunshot wounds consistently throughout time, but a low frequency of non-rear directions of other mechanisms of trauma. Thus, the direction of force did not change from a rear to non-rear direction over time.

Evaluation of compliance over time reveals that full compliance is highest in the early to mid-dated pits (Time: 1-7), except in Pit 39 (Time: 5) which shows a low frequency of full compliance (Table 50). Since partial compliance ultimately constitutes non-compliance, Spearman's rho was performed with individuals executed in partial compliance added to the non-compliance category (Figure 66). Results demonstrate a significant decrease in compliance over time (ρ = -.383, p = 0.00). From these results, hypothesis 1A (i.e. skeletal samples in the Tuskulenai case will exhibit increasing variation of perimortem trauma over time) is partially supported.

Table 50: Compliance with the State Guideline over Time

Pit	**Time**	**n**	**Full Compliance**		**Partial Compliance**		**Non-Compliance**	
			n	**%**	**n**	**%**	**n**	**%**
35	1	12	10	83.3	0	0	2	16.7
36	2	12	7	58.3	0	0	5	41.7
37	3	17	9	52.9	2	11.8	6	35.3
38	4	10	4	40.0	2	20.0	4	40.0
39	5	11	1	9.1	6	54.5	4	36.4
2	6	13	5	38.5	3	23.0	5	38.5
5	7	18	10	55.6	0	0	8	44.4
23	8	11	1	9.1	0	0	10	90.9
26	9	8	1	12.5	0	0	7	87.5
24	10	6	1	16.7	0	0	5	83.3
27	11	18	3	16.7	0	0	15	83.3
31	12	11	2	18.2	0	0	9	81.8

Figure 66: Compliance with the State Guideline over Time



SKELETAL RESULTS BETWEEN EXECUTION SQUADS

The sample size associated with each execution squad varies (Table 51). While 110 individuals from 8 burial pits were evaluated in Dolgirev's sample, only 106 of those individuals are included in this analysis (due to the presence of extensive taphonomic damage in 4 individuals). In Prikazchikov's sample, 45 individuals from 4 burial pits were analyzed.

Table 51: Sampled Pits by Execution Squad

Dolgirev			**Prikazchikov**		
Burial Pit	**Time**	**n**	**Burial Pit**	**Time**	**n**
2	1	12	24	9	10
5	2	12	26	10	6
23	3	17	27	11	18
35	4	10	31	12	11
36	5	11			
37	6	14			
38	7	19			
39	8	11			

Gunshot Wounds

This section compares gunshot wounds between execution squads. In Dolgirev's sample, 95% of individuals (n =101) exhibited a total of 144 gunshot wounds. This included 143 *entry* wounds and 78 *exit* wounds. In Prikazchikov's sample, 67% of individuals (n = 30) exhibited a total of 31 gunshot wounds, which included 28 *entry* wounds and 25 *exit* wounds. Results of Pearson's chi-square test shows that the number of individuals affected by gunshot wounds is significantly different between executioners ($\chi2$ = 20.091, *df* = 1, $p < 0.0001$). However, one burial pit (Pit 26) in Prikazchikov's sample demonstrates an extraordinarily low frequency of gunshot trauma (10%). In order to test if the low frequency of gunshot trauma in this pit is exerting a significant influence on the overall assessment between executioner samples, tests were re-run with Pit 26 excluded. Results of Pearson's chi-square test shows that even when Pit 26 is excluded, the number of individuals affected by gunshot wounds is still significantly different between executioners ($\chi2$ = 4.053, *df* = 1, $p = 0.0441$).

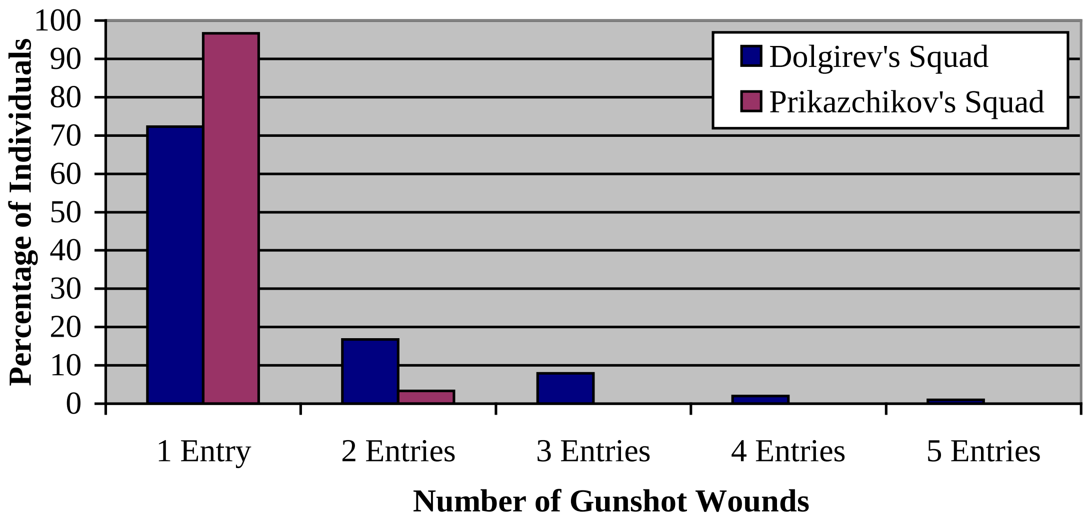
The number of gunshot entry wounds (episodes) per individual differed between execution squads (Table 52 and Figure 67). In Dolgirev's sample, the number of entry wounds varied from one to five shots. While single entry wounds were most common (72%), two entry wounds (17%) and three entry wounds (8%) were fairly common. In comparison, individuals in Prikazchikov's sample overwhelmingly exhibited one gunshot wound (97%). Only one individual demonstrated two gunshot wounds and no individuals exhibited more than two gunshot wounds. Results of Fisher's exact tests demonstrate that the difference in the presence of single gunshot entry wounds is statistically significant between executioners (p = 0.0047), but the difference between two entry wounds is not. From this, it is inferred that Prikazchikov's squad employed single gunshot wounds significantly more than Dolgirev's squad. In turn, Dolgirev's squad employed more shots, between two and five, to execute prisoners.

Table 52: Number of Individuals with Multiple GSWs between Execution Squads

	Dolgirev		**Prikazchikov**		**χ2**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
1 Entry	73	72.3	29	96.7		1	0.0047	**YES**
2 Entries	17	16.8	1	3.3		1	0.0719	No
3 Entries	8	7.9	0	0	-	-	-	-
4 Entries	2	2	0	0	-	-	-	-
5 Entries	1	1	0	0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Figure 67: Percentage of Individuals with Multiple GSWs between Execution Squads



All gunshot wounds were observed in crania. While the bone of gunshot wound entry differed between executioners, results of Pearson's chi-square and Fisher's exact tests indicate that none of these differences are statistically significant (Table 53). In Dolgirev's sample, 73% of gunshot entry wounds occurred on the occipital, followed by the left parietal (8%), right parietal (7%), and left temporal (5%). Remaining gunshot wounds (7%) were distributed throughout cranial elements. In Prikazchikov's sample, 64% of gunshot entry wounds occurred on the occipital, followed by the left parietal (14%), right parietal (11%), left temporal (7%), and neck (4%)

Table 53: Bone of Gunshot Entry between Execution Squads

	Dolgirev		**Prikazchikov**		**χ2**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Occipital	104	72.7	18	64.3	0.455	1	0.4997	No
L. Parietal	12	8.4	4	14.3		1	0.3028	No
R. Parietal	10	7.0	3	10.7		1	0.4492	No
L. Temporal	7	4.9	2	7.1		1	0.6423	No
R .Temporal	3	2.1	0	0.0	-	-	-	-
Frontal	2	1.4	0	0.0	-	-	-	-
R. Orbit	1	0.7	0	0.0	-	-	-	-
R. Pterion	2	1.4	0	0.0	-	-	-	-
Sagittal Suture	1	0.7	0	0.0	-	-	-	-
Lambda	1	0.7	0	0.0	-	-	-	-
Neck	0	0.0	1	3.6	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

While the execution samples exhibited different frequencies in the direction of force of gunshot wounds, these differences were not statistically significant (Table 54 and Figure 68). In Dolgirev's sample, gunshot wounds predominantly occurred from the rear (83%), followed by the left side (8%), right side (8%), and front (1%). In Prikazchikov's sample, gunshot wounds also primarily occurred from the rear (89%), followed by the right side (7%) and left side (4%).

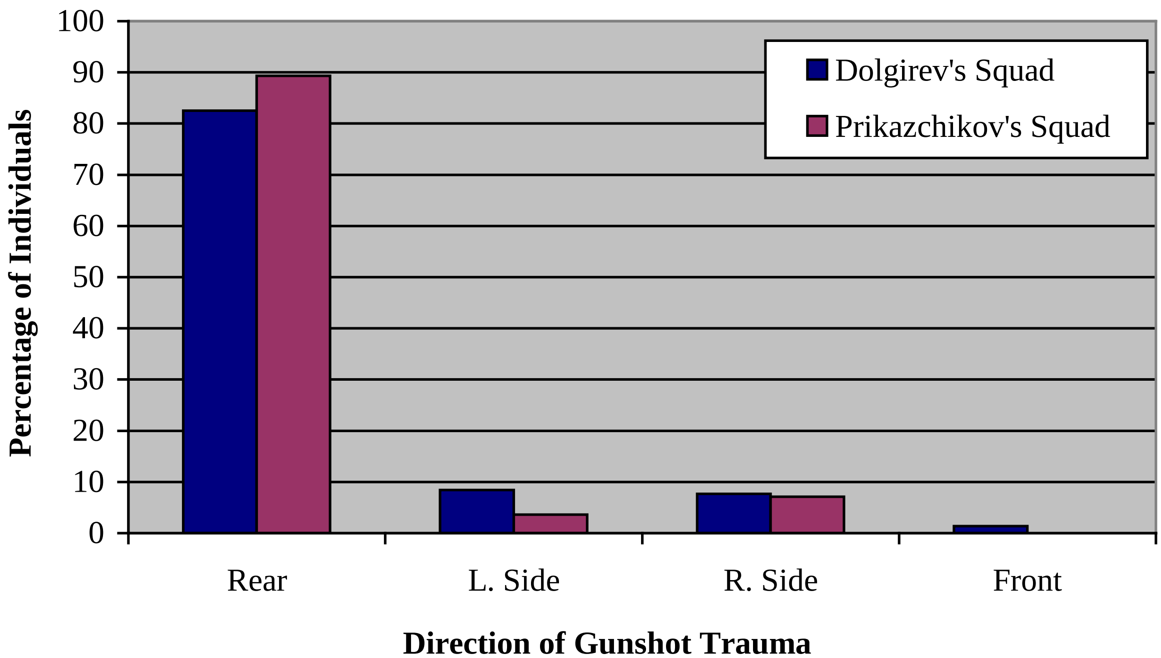
Results of Pearson's chi-square and Fisher's exact tests indicate that the direction of force of gunshot wounds did not significantly differ between execution squads.

Table 54: Direction of Gunshot Trauma between Execution Squads

	Dolgirev		**Prikazchikov**		**$\chi 2$**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Rear	118	82.5	25	89.3	0.367	1	0.5446	No
L. Side	12	8.4	1	3.6		1	0.6965	No
R. Side	11	7.7	2	7.1		1	1.000	No
Front	2	1.4	0	0.0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Figure 68: Direction of Gunshot Trauma between Execution Squads



Blunt Force Trauma

This section compares blunt force trauma between execution squads. In Dolgirev's sample, 31% of individuals (n = 33) exhibited blunt force trauma. In Prikazchikov's sample, 60% of individuals (n = 27) exhibited blunt force trauma. Results of Pearson's chi-square test show that the number of individuals affected by blunt force trauma is significantly different between executioners ($\chi 2 = 9.821$, $df = 1$, $p = 0.0017$).

In Dolgirev's squad, 33 individuals exhibited a total of 46 blunt force episodes (Table 55). While the number of episodes in Dolgirev's sample ranged from one to four, approximately 73% of individuals demonstrated a single episode. Similarly, 27 individuals in Prikazchikov's sample exhibited a total of 39 episodes of blunt force episodes. The number of episodes ranged from one to three, but most individuals exhibited one (67%) or two (22%) episodes of blunt force. Results of Pearson's chi-square and Fisher's exact test indicate that there is not a statistically significant difference in the number of blunt force episodes between executioners.

Table 55: Comparison of the Number of BFT Episodes between Execution Squads

	Dolgirev		Prikazchikov		χ2	df	Two-tail *p*-value	*p* < 0.05 Yes/No
	n	**%**	**n**	**%**				
1 Episode	24	72.7	18	66.7	0.051	1	0.8208	No
2 Episodes	6	18.2	6	22.2	0.004	1	0.9483	No
3 Episodes	2	6.1	3	11.1		1	0.6494	No
4 Episodes	1	3.0	0	0.0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Table 56: Anatomical Location of BFT per Individual between Execution Squads

	Dolgirev		**Prikazchikov**		**χ2**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Cranial	31	93.9	25	92.6		1	1.000	No
Postcranial	2	6.1	0	0.0	-	-	-	-
Cranial & Postcranial	0	0.0	2	7.4	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

The execution samples exhibited similar frequencies in the anatomical location of blunt force (Table 56). Blunt force solely to crania was prevalent in both Dolgirev's sample (94%) and Prikazchikov's sample (93%). Two individuals in Dolgirev's sample exhibited blunt force to postcranial-only elements, while two individuals in Prikazchikov's sample exhibited blunt force to cranial and postcranial elements. However, results of Fisher's exact tests indicate that the anatomical location of blunt force trauma did not significantly differ between execution squads.

Table 57: Direction of Blunt Force Trauma between Execution Squads

	Dolgirev		**Prikazchikov**		**χ2**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Rear	18	39.1	24	61.5	3.391	1	0.0656	No
Left Side	3	6.5	2	5.1		1	1.000	No
Right Side	8	17.4	4	10.3		1	0.5335	No
Front	11	23.9	9	23.1	0.008	1	0.9278	No
Superior	4	8.7	0	0.0	-	-	-	-
Unknown	2	4.4	0	0.0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

While the execution samples exhibited different frequencies in the direction of blunt force trauma, these differences were not statistically significant (Table 57). In Dolgirev's sample, blunt force mainly occurred from the rear (39%), front (24%), and right side (17%). In Prikazchikov's sample, more blunt force defects were discovered from a rear direction (62%), followed by the front (23%) and right side (10%). No blunt force defects were observed from a superior direction in Prikazchikov's sample. Results of Pearson's chi-square and Fisher's exact tests indicate that the direction of blunt force trauma did not significantly differ between execution squads.

Sharp Force Trauma

A comparison of sharp force trauma between execution squads reveals that one individual in Dolgirev's sample and three individuals in Prikazchikov's sample demonstrated sharp force defects. While Prikazchikov's squad employed sharp force more frequently than Dolgirev's squad, Fisher's exact test shows that the difference is not statistically significant ($p = 0.0794$). All defects were observed in crania, so no difference exists in the anatomical location of sharp force trauma between executioners. While the bone of entry differed between execution squads, tests of statistical significance in bone of entry is not possible due to the small sample size and low variability (Table 58).

Table 58: Bone of Entry for Sharp Force Defects between Execution Squads

	Dolgirev		**Prikazchikov**		$\chi 2$	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Occipital	0	0.0	2	50.0	-	-	-	-
L. Parietal	0	0.0	1	25.0	-	-	-	-
R .Temporal	1	100	0	0.0	-	-	-	-
Frontal	0	0.0	1	25.0	-	-	-	-

Finally, evaluation of the direction of force reveals that Dolgirev's squad employed one episode of sharp force trauma from a non-rear direction, while Prikazchikov's squad employed two episodes of sharp force from the rear and two episodes from a non-rear direction. Again, while the direction of force differed between execution squads, tests of statistical significance in direction of force is not possible due to the small sample size and low variability.

Quadrilateral Defects

This section compares quadrilateral defects between the execution squads. Each execution sample demonstrated an equal number of individuals with quadrilateral defects (n = 11). Results of Pearson's chi-square test shows that the difference in the number of individuals affected by quadrilateral defects is significant between executioners ($\chi 2 = 3.956$, $df = 1$, $p = 0.0467$).

In Dolgirev's sample, 11 individuals exhibited a total of 14 quadrilateral defects (Table 59). While the number of quadrilateral defect entry wounds in Dolgirev's sample ranged from one to three entries, approximately 82% of individuals demonstrated a single entry wound. Similarly, the 11 individuals in Prikazchikov's sample exhibited a total of 16 quadrilateral defects. The number of defect entry wounds in Prikazchikov's sample was relatively divided between one entry (55%) and two entries (45%). No individuals in this sample demonstrated three quadrilateral entry wounds. However, results of Fisher's exact test indicate that there is not a statistically significant difference in the number of episodes of quadrilateral wounds between executioners.

Table 59: Number of Quadrilateral Defects between Execution Squads

	Dolgirev		**Prikazchikov**		**χ2**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
1 Entry	9	81.8	6	54.5		1	0.3615	No
2 Entries	1	9.1	5	45.5		1	0.1586	No
3 Entries	1	9.1	0	0.0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

All quadrilateral defects were observed in crania. While the bone of entry of quadrilateral defects differed between executioners, results of Fisher's exact tests indicate that none of these differences are statistically significant (Table 60). In Dolgirev's sample, more quadrilateral entry wounds occurred on the right parietal (36%), followed by the right coronal suture (14%), the left parietal (14%), and the occipital (14%). In Prikazchikov's sample, quadrilateral entry wounds were distributed on the occipital (19%), left parietal (19%), left temporal (19%), and right temporal (19%).

Table 60: Bone of Entry for Quadrilateral Defects between Execution Squads

	Dolgirev		**Prikazchikov**		$\chi 2$	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Occipital	2	14.3	3	18.8		1	1.000	No
L. Parietal	2	14.3	3	18.8		1	1.000	No
R. Parietal	5	35.7	1	6.2		1	0.0725	No
L. Temporal	0	0.0	3	18.8	-	-	-	-
R .Temporal	1	7.1	3	18.8		1	0.6015	No
Frontal	1	7.1	1	6.2		1	1.000	No
L. Pterion	0	0.0	1	6.2	-	-	-	-
R. Coronal Suture	2	14.3	0	0.0	-	-	-	-
R. Squamosal Suture	1	7.1	1	6.2		1	1.000	No

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

A comparison of the direction of force of quadrilateral defects revealed differences between execution squads. However, results of Fisher's exact tests indicate that none of these differences are statistically significant (Table 61). In Dolgirev's sample, quadrilateral defects occurred from rear (36%), right side (29%), and superior (29%) directions. In Prikazchikov's sample, quadrilateral defects occurred from the left side (31%), right side (31%), and rear (25%).

Table 61: Direction of Force of Quadrilateral Defects between Execution Squads

	Dolgirev		**Prikazchikov**		**χ2**	**df**	**Two-tail *p*-value**	***p* < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Rear	5	35.7	4	25.0		1	0.6944	No
Left Side	0	0.0	6	37.5	-	-	-	-
Right Side	4	28.6	5	31.25		1	1.000	No
Front	1	7.1	0	0.0	-	-	-	-
Superior	4	28.6	1	6.25		1	0.1571	No
Inferior	0	0.0	0	0	-	-	-	-

Summary of Perimortem Trauma between Execution Squads

The purpose of this section is to evaluate how the mechanism of trauma, direction of force, and anatomical location of trauma varies *between execution squads* in the Tuskulenai case. With regard to the mechanism of trauma, gunshot wounds were expected to decrease and non-gunshot mechanisms were expected to increase between executioners. Analysis of gunshot trauma demonstrates that both the *number of individuals* shot and the *number of times* prisoners were shot were greater in Dolgirev's sample than Prikazchikov's sample (Table 62). Thus, not only was Prikazchikov's squad shooting fewer people than Dolgirev's squad, but they were using fewer bullets as well. At the same time, results indicate that the number of individuals affected by blunt force and quadrilateral defects increased from Dolgirev's sample to Prikazchikov's sample. However, the number of individual affected by sharp force did not change between execution squads. Interestingly, while the *number of individuals* affected by blunt force and quadrilateral defects significantly differed between execution squads, the frequency with which these mechanisms were applied (*number of episodes*) did not differ.

Table 62: Comparison of Mechanisms of Trauma between Execution Squads

Mechanism of Trauma	Dolgirev			Prikazchikov						
	Pr (n)	**Ab (n)**	**%**	**Pr (n)**	**Ab (n)**	**%**	**$\chi 2$**	**df**	**Two-tail p-value**	**p < 0.05 Yes/No**
GSW	101	5	95.3	30	15	66.7	20.091	1	< 0.0001	**YES**
BFT	33	73	31.1	27	18	60.0	9.821	1	0.0017	**YES**
SFT	1	105	0.9	3	42	6.7		1	0.0794	No
QD	11	95	10.4	11	34	24.4	3.956	1	0.0467	**YES**

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

The anatomical location of trauma was expected to shift from cranial to postcranial locations. Gunshot trauma, sharp force trauma, and quadrilateral defects were all observed in cranial elements and did not change between executioners. While blunt force trauma was observed in postcranial elements, given the small sample size, the anatomical location of blunt force trauma does not appear to vary between execution squads; blunt force is consistently present in crania of all prisoners. Furthermore, the direction of force was expected to change from the rear to include non-rear directions between execution squads. Results demonstrate that the direction of force for each mechanism of trauma is not significantly different between executioners.

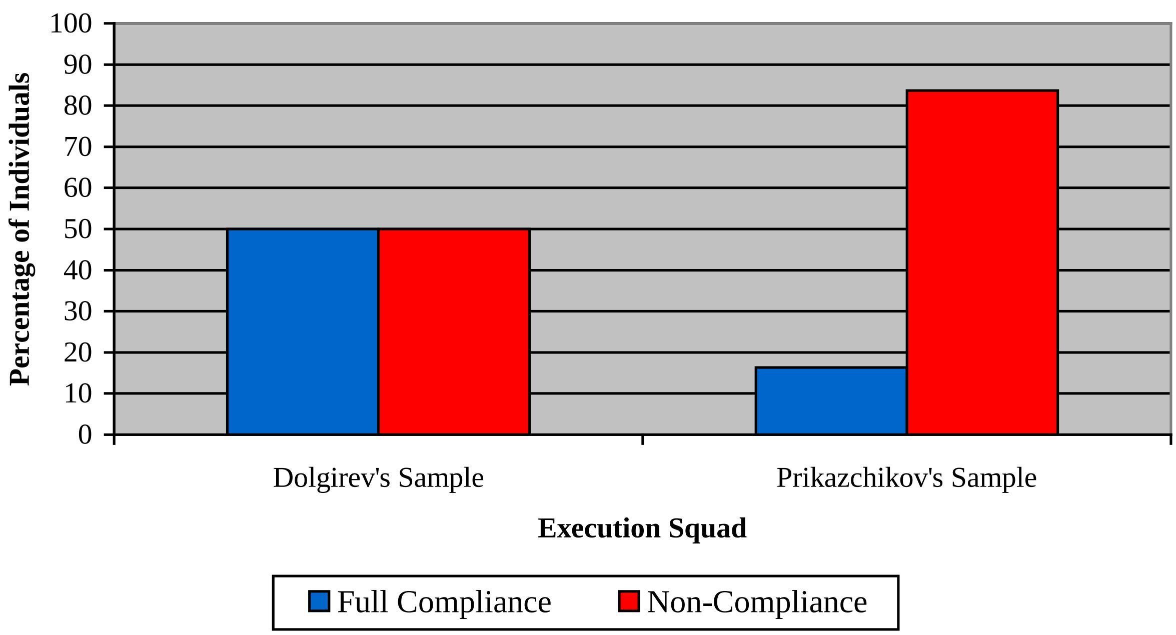
Comparison of compliance reveals significant differences between execution squads (Table 63). In Dolgirev's sample, 50% of prisoners were executed in full compliance with the state guideline whereas only 16% of prisoners in Prikazchikov's sample were executed in full compliance. Conversely, 84% of Prikazchikov's sample demonstrated non-compliance, whereas Dolgirev's sample demonstrated 42%. Approximately 8% of Dolgirev's sample exhibited partial compliance, and no individuals in Prikazchikov's sample demonstrated partial compliance. Results of Pearson's chi-square tests shows that the difference in the number of individuals executed in compliance and non-compliance is significantly different between executioners.

Since partial compliance ultimately constitutes non-compliance, Pearson's chi-square tests were run with individuals executed in partial compliance added to the non-compliance category (Figure 69). Even when these individuals are considered non-compliant, results of chi-square indicate that the difference in the number of individuals executed in compliance and non-compliance is significantly different between executioners ($\chi 2 = 14.397$, df = 1, $p < 0.00$).

Table 63: Compliance with the State Guideline between Execution Squads

Compliance	Dolgirev (n = 104)		Prikazchikov (n = 43)		χ2	df	Two-tail p-value	p < 0.05 Yes/No
	n	%	n	%				
Full Compliance	52	50.0	7	16.3	13.028	1	0.0003	**YES**
Partial Compliance	8	7.7	0	0.0	-	-	-	-
Non-Compliance	44	42.3	36	83.7	19.398	1	<0.0001	**YES**

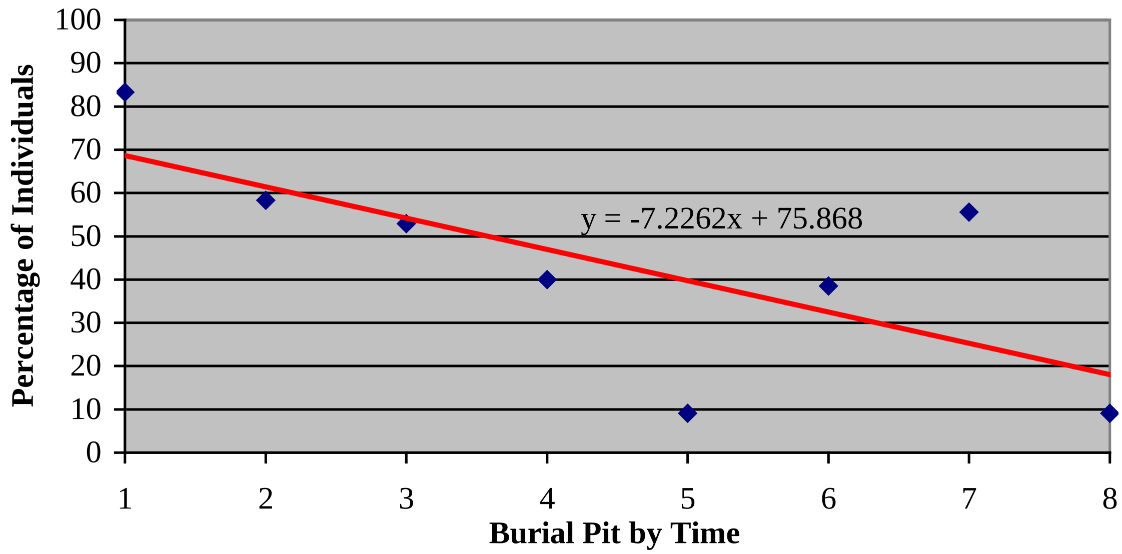
Figure 69: Compliance with the State Guideline between Execution Squads



COMPARISON OF TIME VERSUS EXECUTION SQUAD

Execution squads and time are intimately related since execution squads operated consecutively, rather than concurrently. Thus, it is difficult to completely separate the two variables. However, evaluation of compliance over time within each execution squad can help elucidate the complex interaction of these variables. For the following analyses, individuals executed in partial compliance are collapsed into the non-compliance category.

Figure 70: Compliance with the State Guideline over Time in Dolgirev's Sample

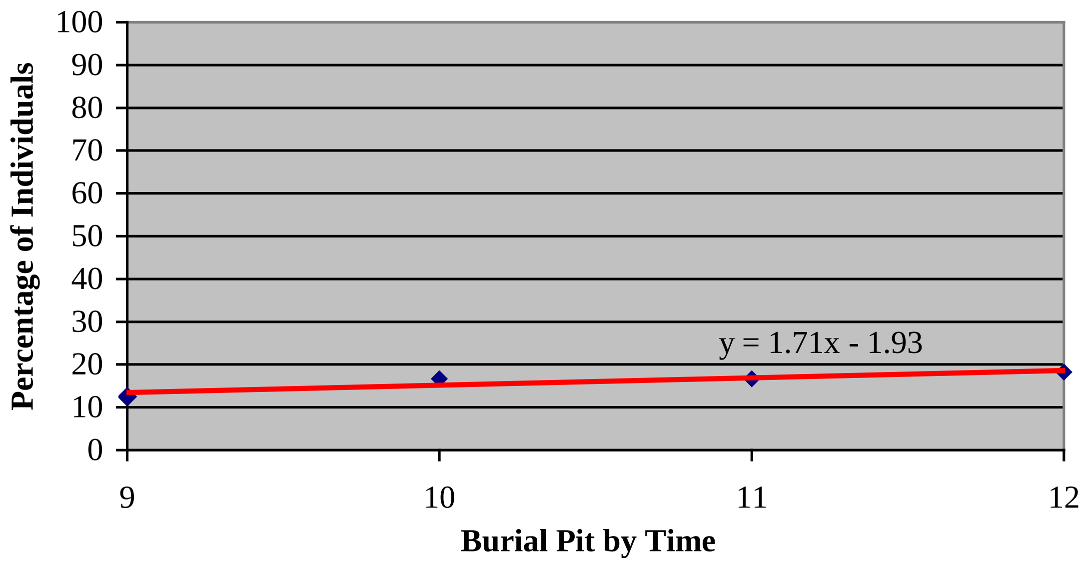


Dolgirev's sample encompasses the first eight dated burial pits. Based on descriptive analyses, compliance in these eight pits is variable over time. Specifically, compliance gradually decreases from the first dated burial pit to the fifth, then increases until the seventh dated pit before declining in the eighth pit (Figure 70). Results of Pearson's chi-square test indicates that the number of individuals executed in compliance with state standards significantly changes over time in Dolgirev's sample ($\chi2 = 14.495$, df = 7, p = 0.043). However, results of linear regression analysis demonstrate that the change in compliance is not predicted by time (*b* = -7.226, *p* =

0.052) (although the *p* value is marginally significant). Thus, while a general decrease in compliance in Dolgirev's sample is observed from the first to last dated burial pits, compliance appears to fluctuate considerably over time.

Prikazchikov's sample encompasses the last four dated burial pits. Based on descriptive analyses, compliance in these pits remains relatively low, but stable over time (Figure 71). Results of Pearson's chi-square test indicates that the number of individuals executed in compliance with state standards does not significantly change over time in Prikazchikov's sample ($\chi 2 = 0.116$, df = 3, p = 0.990). This is confirmed with the results of linear regression analysis ($b = 1.710$, $p = 0.100$).

Figure 71: Compliance with the State Guideline over Time in Prikazchikov's Sample



Thus, time appears to exert more influence on Dolgirev's sample, where compliance with state standards for execution ranged from 9% to 83%. In contrast, time appears to exert less influence on compliance in Prikazchikov's sample, which remains consistently low at 13% to 18%.

SUMMARY

This chapter presents the results of analysis of demography and skeletal trauma in the Tuskulenai sample. Data regarding 155 individuals from 12 burial pits were evaluated as a complete sample, as well as by individual burial pit over time and by execution sample. In these analyses, three main variables were assessed, including the mechanism of trauma, anatomical location, and direction of force, as well as compliance with the state standard for execution.

Two specific research hypotheses were tested in this chapter to answer the first research question. Hypothesis 1a, which anticipated that skeletal samples in the Tuskulenai case would exhibit increasing variation of perimortem trauma over time, was partially supported (Table 64). While the number of individuals affected by gunshot wounds decreased over time, the number of individuals affected by non-gunshot mechanisms increased over time. However, the anatomical location of trauma and direction of force did not significantly change over time. Furthermore, compliance with state standards generally decreased from the early to later dated pits.

Hypothesis 1b, which anticipated that skeletal samples in the Tuskulenai case would exhibit increasing variation of perimortem trauma between security personnel, is also partially supported (Table 64). Statistically significant differences were found in the mechanism of trauma employed between execution squads. Specifically, Dolgirev’s squad was consistently shooting prisoners more than Prikazchikov’s squad, while employing less blunt force and fewer quadrilateral defects. However, no difference was observed in the use of sharp force, or the anatomical location or direction of force of trauma between executioners. Comparison of compliance reveals that Dolgirev’s squad executed prisoners in compliance with state standards significantly more than Prikazchikov’s squad.

Table 64: Evaluation of Research Variables and Hypotheses

Research Variables	Over Time	Between Executioners
Mechanism of Trauma	**Partially supported**	**Partially supported**
Direction of Force	Rejected	Rejected
Anatomical Location	Rejected	Rejected
Compliance	**Supported**	**Supported**

Evaluation of compliance with regard to time and execution squad revealed that compliance tended to decline over time in Dolgirev's samples. In contrast, compliance remained consistently low throughout Prikazchikov's sample. Thus, time may be exerting a greater influence on Dolgirev's sample than Prikazchikov's. The following chapter discusses mortuary features and skeletal patterns of trauma across four sites of Soviet violence.

CHAPTER 8: COMPARISON OF CASES OF SOVIET VIOLENCE

The Tuskulenai case does not represent an isolated event. Gorbachev's policy of *glasnost* or openness allowed atrocities committed by Soviet security forces to come to light. Until this time, the Soviets had maintained an official policy of denial, cover-ups, and silence regarding Stalinist crimes (Kamenetsky 1989). Other cases of Soviet state-sponsored violence toward "enemies of the state" are now well documented in the literature. It is important to view cases of state violence during the 1930s and 1940s in a broader context in order to understand the breadth of these crimes. Three cases in particular are useful as comparisons to the Tuskulenai case, including those from Vinnytsia (Ukraine), Katyn (Russia), and Rainiai (Lithuania).

This chapter begins by discussing mortuary and skeletal variables in the Vinnytsia, Katyn, and Rainiai cases. While the Tuskulenai sample was observed directly, remains associated with Vinnytsia, Katyn, and Rainiai were interred soon after discovery. Thus, this study relies on data published in forensic site reports to assess burial conditions and perimortem trauma in each case. The second section compares variables across these four Soviet sites in an integrated analysis in order to address the second research question: Do perimortem injuries and burial treatment vary among cases of Soviet state-sponsored violence during the Stalinist period? The second hypothesis expects that the frequency of perimortem injuries in prisoners will be consistent in the Vinnytsia and Katyn cases, but vary in the Rainiai and Tuskulenai cases. However, burial treatment is expected to be consistent across all four sites.

VINNYTSIA CASE

During the winter of 1937-1938, approximately 9,500 prisoners were executed at the NKVD prison in Vinnytsia, Ukraine and buried nearby. Their remains were not discovered until the Nazi German invasion during the Second World War. In June 1943, the German Society for Forensic Medicine and Criminal Investigation excavated 93 mass graves containing a total of 9,432 individuals across three sites (Figures 72 and 73). Their investigation was twofold: not only did they attempt to identify executed prisoners, but they also aimed to document the burial conditions, demographics, and trauma associated with the Vinnytsia remains. Kamenetsky (1989) provides a translation of the forensic and archaeological data in the Vinnytsia case.

Figure 72: Forensic Examination of Remains in the Vinnytsia Case (Kamenetsky 1989)

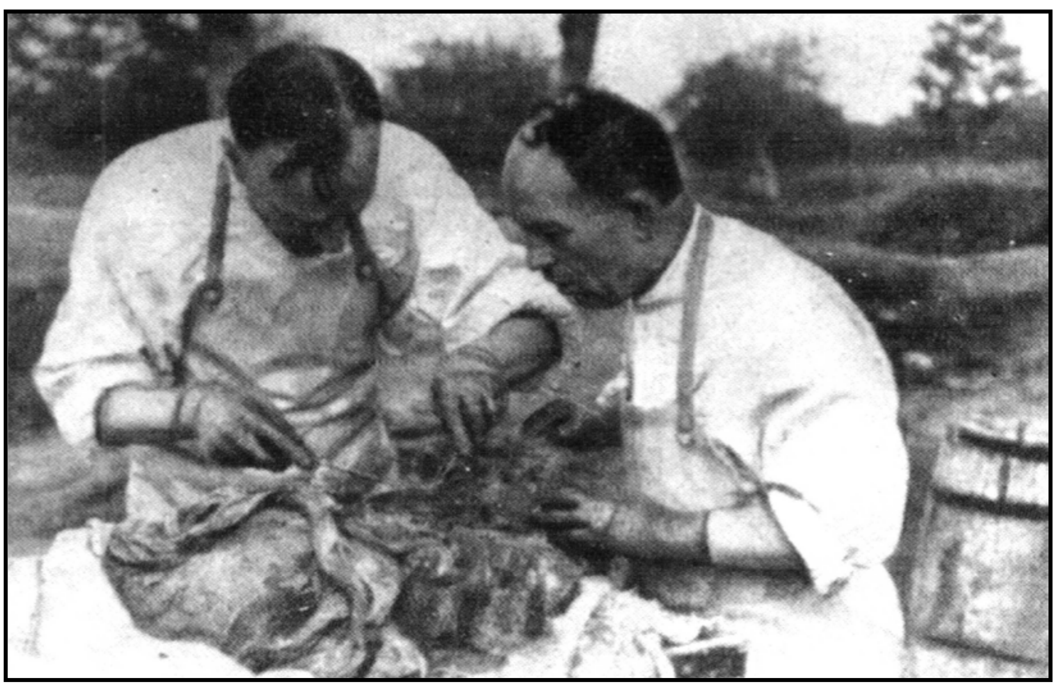


Figure 73: The Bodies of Executed Prisoners in the Vinnytsia Case (Kamenetsky 1989)

Interment Sites and Mortuary Variables

Under the direction of German physicians, Ukrainian and Polish prisoners of war were employed to disinter human remains from three sites, including an orchard, an Orthodox cemetery, and a public park. Approximately 60% of individuals in the Vinnytsia case were discovered in the orchard, followed by 25% in the cemetery and 15% in the public park (Table 65).

Table 65: Number of Burial Pits and Individuals at Three Sites in the Vinnytsia Case

Sites	**Number of Burial Pits**	**n**	**%**
Orchard	38	5,644	59.8
Cemetery	42	2,405	25.5
Public Park	13	1,383	14.7
Total	93	9,432	100

The orchard site was located on the western outskirts of the city, and until 1943 this area was used for military purposes. Upon investigation, researchers discovered 41 pits at the orchard site. However, not all pits at this site yielded human remains: three pits contained only shoes, only clothes, or only historical documents (e.g. letters, arrest warrants, etc.). A total of 5,644 individuals were recovered from 38 rectangular-shaped burial pits. Pits ranged in length and width, from 2 to 5 meters, while depths ranged from 3 to 3.8 meters. Clothing was discovered in layers (30-40 cm deep) above decedents in each pit. In larger pits, intermittent layers of clothing and human remains were observed (Kamenetsky 1989).

The cemetery site was located closer to the city center. A total of 2,405 individuals were recovered from 42 rectangular-shaped burial pits. Graves from the Orthodox cemetery were distinguished from mass graves associated with the Vinnytsia case by the presence of gravestones and single interments. Mass graves were smaller in size than the orchard or public park sites, ranging from 1 to 4.5 meters in length and width, and 2 to 3.5 meters in depth. Again, clothing was also discovered in burial pits above decedent remains (Kamenetsky 1989).

The public park site was located just north of the cemetery site and bordered the former NKVD prison. A total of 1,383 individuals were recovered from 13 rectangular and square-shaped burial pits. Since this site was still used for public events, thick shrubbery had been planted above the graves to conceal them. The size of pits varied from 2 to 3 meters in length and width, and 3 meters in depth. Once again, clothing was discovered above human remains in burial pits (Kamenetsky 1989).

The number of individuals per burial pit varied for each site (Table 66). Burial pits at the orchard site contained between 2 and 284 individuals, with a mean of 149 individuals. Burial pits at the cemetery site contained between 3 and 147 individuals, with a mean of 57 individuals.

Finally, burial pits at the public park site contained between 33 and 153 individuals, with a mean of 106 individuals. Thus, while the cemetery site contained more burial pits than the orchard or park there were fewer individuals interred in each of those burial pits.

Table 66: Number of Individuals per Burial Pit in the Vinnytsia Case

Site	# of Burial Pits	# of Individuals	Range		Mean
			Lower Limit	Upper Limit	
Orchard	38	5, 644	2	284	149
Cemetery	42	2, 405	3	147	57
Park	13	1, 383	33	153	106

Head orientation and body position of prisoners is not discernible from the site report. However, the arrangements of bodies in pits were overwhelmingly deemed “disorganized.” Described as the “complete disarray” of remains, corpses were stacked haphazardly in all but one pit. Pit number 24 at the Orchard Site was the only grave which contained an orderly layering of the bodies (Kamenetsky 1989).

Corrosive materials were discovered in pits at the orchard and park, but not at the cemetery site. Specifically, chlorinated lime was dispensed over the top of decedents in multiple (but not all) pits, presumably to prevent odor associated with decomposition (Kamenetsky 1989).

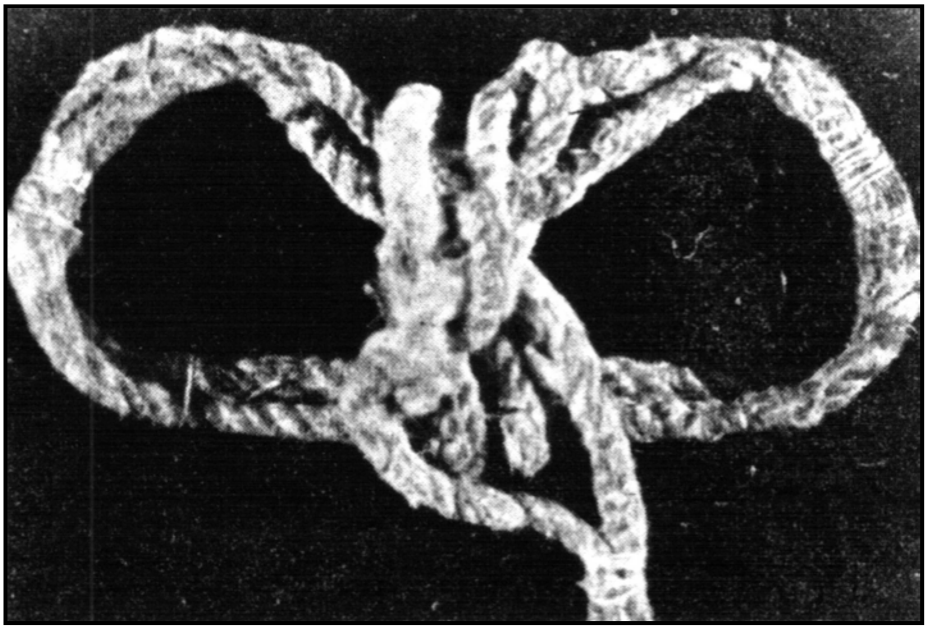
Material Culture

Material culture discovered at all three sites included clothing, personal effects, historical documents, and weaponry. Clothing items unassociated with particular individuals included jackets, pants, shoes, underwear, and winter apparel (e.g. fur coats, fur caps, felt boots, and lined jackets). In addition to unassociated articles of clothing, all male decedents were also discovered wearing clothes. However, 29% of females were discovered completely naked. Investigators believe that NKVD agents were likely sexually abusing younger female prisoners, since all of the young and middle-aged females were recovered nude, while the older adult females were discovered fully clothed (Kamenetsky 1989). At the orchard site, a large number of historical documents and personal effects were recovered. Documents were found loose or in the pockets of decedents, and included photographs, letters, books, and NKVD warrants of arrest. Personal effects were often discovered between layers of clothing, and included family keepsakes, suitcases, pillows, blankets, toilet utensils, tobacco, and food items. Finally, items related to weaponry were recovered from all three sites, including bullets, bullet fragments, intact cartridges, and cartridge cases (Kamenetsky 1989).

Bindings and Gags

Bindings were abundantly applied in the Vinnytsia case. All males (except one) were discovered bound at the wrists, with their arms behind their backs. Seven males were also bound at the elbows or upper arms often in conjunction with wrist bindings. This included one (amputee) individual from the orchard, four individuals from the cemetery, and two individuals from the Park. Furthermore, a total of 24 individuals were bound at the feet, including 8 from the orchard, 14 from the cemetery, and 2 from the park. Researchers noted the regularity of the binding method and material in thousands of examinations. Specifically, an industrial-grade twine rope (1.2-1.3 meters long) was consistently tied in one-half double loops around each hand of prisoners (Figure 74). A consistent technique was also employed in binding the upper arms and the feet. In comparison to males, an unspecified number of females (e.g. “most”) were discovered unbound.

Figure 74: Binding Employed in the Vinnytsia Case (Kamenetsky 1989)



Various modes of gags were also observed. Specifically, two males from the cemetery site were discovered with twine nooses around their necks. However, because these individuals also exhibited gunshot wounds to the back of the neck, researchers speculate that these were used as choking devices, (e.g. to stifle screams) rather than as means of execution. Additionally, three individuals demonstrated gags (e.g. twisted cloth) that had been shoved into their mouths and throats. Again, these victims also exhibited gunshot wounds to the neck and thus the gags were likely used only to manage prisoners, not execute them. Researchers also speculate that more victims at the Vinnytsia sites likely endured gagging, but due to time constraints, extensive examinations could not be conducted on all bodies (Kamenetsky 1989).

Skeletal Variables

The decompositional stage of remains varied throughout the three Vinnytsia sites. While mummification and minor skeletonization was observed in the upper layers of graves, most individuals exhibited active to advanced stages of decomposition (mainly in the middle and deeper layers of burial pits). Due to the presence of soft tissue, the percentage of bodies recovered throughout the Vinnytsia sample neared 100%. Additionally, approximately 100% of individuals demonstrated major trauma, which is expected given the context of the case (Kamenetsky 1989). Mechanisms of trauma observed included gunshot wounds, blunt force, and additional mechanisms; however, sharp force trauma and quadrilateral defects were not noted in the site report presumably because they were not observed on individuals.

Demographic Variables

The age and sex of Vinnytsia victims were evaluated by German forensic medical professionals. Sex of individuals was determined based on physical characteristics visible in soft tissue as well as decedent clothing. The vast majority of victims (98%) were male (n = 9, 263), ranging from 97-99% at the three sites. However, a considerable number of females (n = 169) were also present in the Vinnytsia sample (Table 67).

Table 67: Sex of Victims in the Vinnytsia Case

	Males		**Females**	
	n	%	n	%
Orchard	5591	99.1	53	0.9
Cemetery	2320	96.5	85	3.5
Park	1352	97.8	31	2.2
Total	9263	98.2	169	1.8

Age was assessed based on dental attrition, suture closure, ossification of the larynx and costal cartilage, and the presence of atherosclerotic deposits (Kamenetsky 1989). However, it is important to note that age categories used at Vinnytsia differ from those employed in the previous evaluation of the Tuskulenai sample and thus are not directly comparable. Forensic investigators used categories of young adult (20-30 years), middle adult (30-40 years), older adult (+40 years), and a non-age specific category of adult (+20 years) as demonstrated in Table 68. No individuals under 20 years of age were recovered in the Vinnytsia case. Results of age estimation reveal that middle adults were well represented at all three sites (63%), followed by older adults (15%), and young adults (7%) (Table 69 and Figure 75). Approximately 15% of individuals at Vinnytsia could not be aged more specifically than adults.

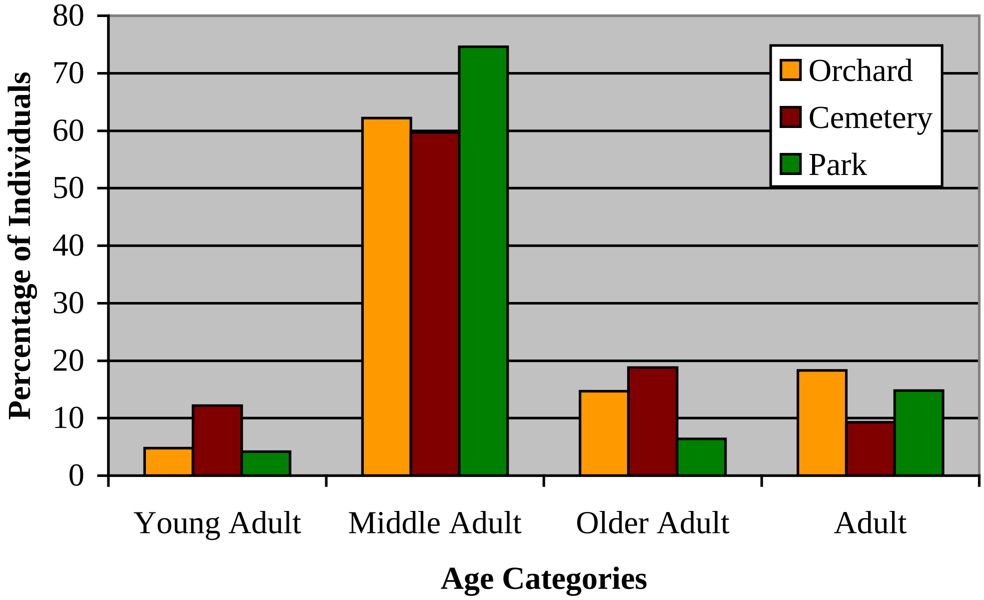
Table 68: Age Categories used in the Vinnytsia Case

Age Category	**Years**
Young adult	20-30 years
Middle adult	30-40 years
Older adult	40+ years
Adult	Over 20 years

Table 69: Age Distribution between Three Sites in the Vinnytsia Case

Site	**20-30 years**		**30-40 years**		**40+ years**		**Adult**	
	n	%	n	%	n	%	n	%
Orchard	274	4.8	3,508	62.2	827	14.7	1035	18.3
Cemetery	294	12.2	1,436	59.7	451	18.8	224	9.3
Park	58	4.2	1,032	74.6	88	6.4	205	14.8
Total	626	6.6	5976	63.4	1366	14.5	1464	15.5

Figure 75: Percentage of Individuals by Age Category from the Vinnytsia Sites



Gunshot Wounds

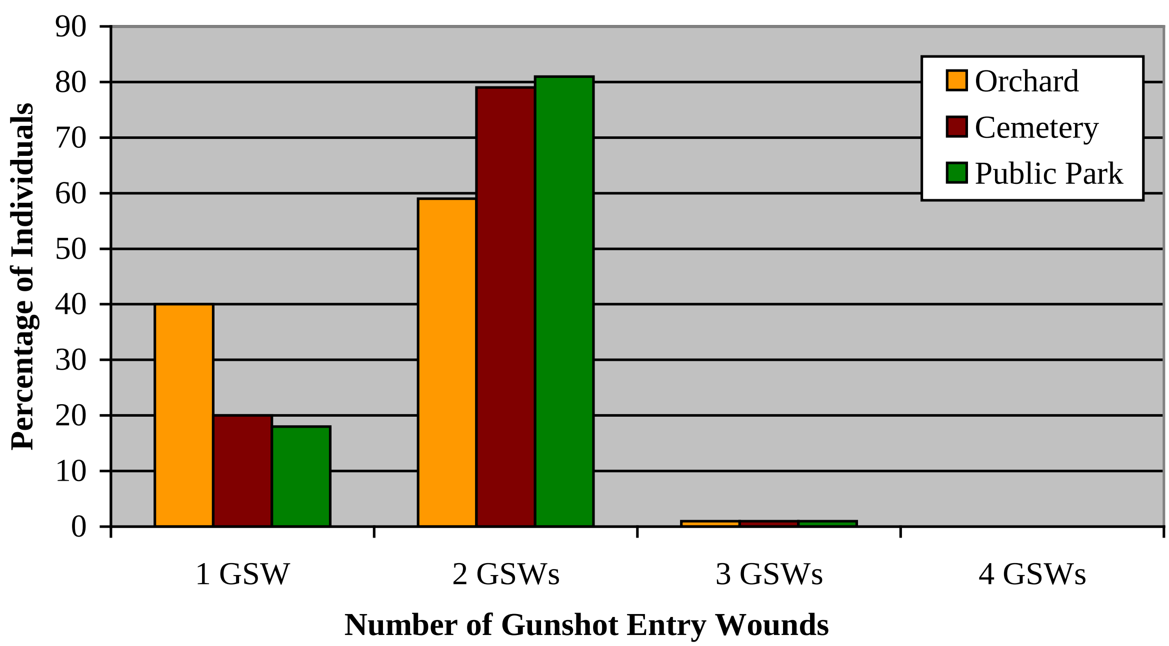
The overwhelming majority of individuals in the Vinnytsia case demonstrated gunshot wounds to the head or neck. However, the site report states that there were "a few exceptions" where GSWs were not observed due to an advanced state of decomposition. However, due to the enormously large sample size, the percentage of individuals demonstrating gunshot wounds likely nears 100%.

Table 70: Number of Gunshot Entry Wounds

GSW Episodes	**Orchard** (n = 5,644)		**Cemetery** (n = 2,405)		**Public Park** (n = 1,383)		**Total** (n = 9,432)	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
1 Entry	2248	39.8	496	20.6	248	17.9	2992	31.7
2 Entries	3345	59.3	1889	78.6	1126	81.4	6360	67.4
3 Entries	50	0.9	19	0.8	9	0.7	78	0.8
4 Entries	1	0	1	0	0	0	2	0
5 Entries	0	0	0	0	0	0	0	0

Table 70 and Figure 76 demonstrate the number of entry wounds per individual across all three sites. At the orchard site, gunshot wounds ranged from one to four shots. Approximately 59% of individuals at the orchard site exhibited two entry wounds, followed by one entry wound (40%) and three entry wounds (1%). One individual at the orchard site demonstrated four gunshot entry wounds. At the cemetery site, gunshot wounds ranged from one to four shots as well. Most individuals (79%) exhibited two gunshot wounds, followed by one entry wound (20%) and three entry wounds (1%). Similar to the orchard site, one individual at the cemetery site demonstrated four gunshot entry wounds. Finally, gunshot wounds ranged from one to three shots at the park site. Most individuals (81%) exhibited two entry wounds, followed by one entry wound (18%) and three entries (1%). When examined as a complete sample, individuals in the Vinnytsia case predominantly exhibited two gunshot wounds (67%) or one gunshot wound (32%).

Figure 76: Number of Gunshot Entry Wounds in the Vinnytsia Case



Nearly 100% of individuals exhibited gunshot wounds to the posterior cranium (occipital protuberance or foramen) or neck (cervical cord wounds) indicating a consistently rear direction of force. Additionally, researchers note that the angle of fire to the posterior cranium was upward, approximately 30º to 45º, while the angle of fire to cervical vertebrae was horizontal. However, four individuals diverge from this pattern. Two individuals were shot from the right side, with the bullet entering the right temporal bone and exiting the left temporal bone. One individual was shot from the front, with the bullet entering the frontal bone and exiting the occipital. Also, one individual demonstrated two gunshot entry wounds on and around bregma. While interesting, these cases appear anomalous in the Vinnytsia case. Thus, nearly all individuals were killed by fusillade to the cranium or neck from a rear direction.

Researchers recovered a number of unjacketed, .22 caliber lead bullets, approximately 1.2 centimeters long with a minimum diameter of 5 millimeters. Researchers also found numerous cases in which bullets failed to penetrate cranial bones. Based on this evidence, they concluded that perpetrators likely shot prisoners with small caliber bullets. Furthermore, researchers observed the presence of soot adhering to the skin and clothing surrounding gunshot wounds. Based on these observations, they argue that victims were likely shot at close range (Kamenetsky 1989).

Blunt Force Trauma

In addition to gunshot trauma, a small percentage of individuals, at all three sites demonstrated evidence of blunt force trauma (Table 71). Approximately 5% of individuals at the orchard site exhibited blunt force trauma, while blunt force was present in 3% of individuals at the cemetery site and 4% at the park. When combined, approximately 4% of all individuals in the Vinnytsia case demonstrate blunt force trauma. The range and total number of blunt force episodes is not discernible from the site report. However, descriptions of injuries indicate that blunt force trauma was directed at the head and/or neck. Specifically, the report describes extensive comminuted fractures on the sides, forehead, midface, mandible, and base of skulls. This would suggest blows from the front, sides, and back-inferior of the head. Researchers argued that due to the localization of fractures in the frontal and lateral areas of the skull, most victims had likely endured blunt force after already dropping to the ground (Kamenetsky 1989). Finally, researchers contend that trauma was probably inflicted by a massive, blunt instrument with an oblong-oval or round form, such as a club or the butt of a gun (Kamenetsky 1989). This inference is based on the documentation of oval or oblong comminuted and depressed fractures. Postcranial blunt force injuries were not observed.

Table 71: Blunt Force Trauma at Vinnytsia Sites

Site	**Number of Individuals**	**Blunt Force Trauma**	
		n	%
Orchard	5,644	268	4.7
Cemetery	2,405	78	3.2
Public Park	1,383	49	3.5
Total	9,432	395	4.2

Additional Trauma

Additionally, a compact loam mass was present in the esophagus of two individuals who had also been shot in the cervical region. Researchers suggested that in these cases, victims likely suffered from quadriplegia due to a spinal cord injury (caused by the gunshot wound), but their swallowing mechanisms remained functional. Thus, they were still alive when buried and died of asphyxiation (Kamenetsky 1989).

Summary of the Vinnytsia Case

Although the Vinnytsia case was formed in Ukraine during the Great Terror of 1937-1938, remains associated with this mass episode of violence were not discovered until 1943. A total of 9, 432 individuals were discovered in 93 mass graves at 3 sites in and around the city of Vinnytsia. These sites included an orchard (n = 5,644; 38 pits), an Orthodox cemetery (n = 2,405; 42 pits), and a public park (n = 1,383; 13 pits). The dimensions of burial pits ranged from 2-5 meters, while their depths ranged from 1-4.5 meters. Clothing was discovered above decedent remains, as well as in intermittent layers between remains. While the number of individuals per pit varied across the sites, burial pits in the entire Vinnytsia sample contained between 2 and 284 individuals, with a mean of 105 individuals per pit. The arrangement of bodies in these burial pits is generally noted as disorganized.

Material culture discovered at all three sites included clothing, personal effects, historical documents, and weaponry. While all male decedents were discovered clothed, 29% of females (mostly young and middle adults) were recovered nude. Thus, investigators speculate that NKVD agents may have sexually assaulted these female prisoners prior to execution. While items related to weaponry were recovered, researchers contend that their low frequency in burial pits indicates that prisoners were not shot at the interment site.

Corrosive materials, specifically chlorinated lime, were discovered in burial pits at the orchard and park sites, but was absent at the cemetery site. Finally, bindings and gags were both observed in the Vinnytsia samples. Specifically, nearly all males were discovered bound at the wrists, elbows, upper arms, or feet. The regularity of the binding suggests that a systematic binding technique was employed. Most (number unspecified) were discovered unbound.

Additionally, gags were discovered around the mouths and necks of an unspecified number of individuals.

Most individuals in the Vinnytsia case exhibited active to advanced decomposition and their remains were considered complete. All individuals demonstrated major trauma. The majority (98%) of victims were male, although a considerable number of females (n = 169) were also present in the Vinnytsia sample. Individuals were predominantly aged between 30 and 40 years (63%) or above 40 years (15%). Approximately 7% of the sample was aged between 20-30 years and no individuals were less than 20 years old at the time of death.

The mechanisms of trauma observed included gunshot wounds, blunt force, and additional mechanisms. Nearly all individuals at Vinnytsia exhibited gunshot wounds to the back of the head or neck. While the number of shots ranged from one to four, more individuals (67%) exhibited two gunshot wounds. While approximately 4% of the Vinnytsia sample exhibited blunt force trauma directed at the head and neck, the total number of episodes and direction of force is unknown. Additionally, researchers suggest that two individuals died of asphyxiation during interment after being shot, but not killed at the time of execution.

KATYN CASE

From April to May 1940, the Soviet state security apparatus launched an organized offensive against Polish prisoners of war. Representing a mainly military population, approximately 22,000 prisoners were executed at three camps and two prisons across the Soviet Union. One of these episodes of mass violence was directed toward approximately 4,400 prisoners from the Kozelsk camp in Russia, who were executed and interred in the Katyn Forest.

The Katyn massacre was investigated by three forensic teams (Figure 77 and Figure 78). The International Commission consisted of forensic medicine professionals from outside the German Reich who examined individuals at Katyn from April 28-30, 1943. The Polish Red Cross Technical Commission was comprised of a team of medical professionals from German-occupied Poland who examined individuals at Katyn from April to May 1943. Finally, the German Special Medical-Judicial Commission consisted of forensic medicine experts who examined the Katyn remains from April to July 1943. Forensic evidence from these investigations is discussed in this section. Archaeological and skeletal data associated with the Katyn case are provided by Cienciala et al. (2007), Sanford (2005), and Zawodny (1972).

Figure 77: Forensic Medicine Investigators in the Katyn Case (Cienciala et al. 2007)

Figure 78: Examination of Executed Prisoners in the Katyn Case (Cienciala et al. 2007)

Interment Sites and Mortuary Variables

Investigations of the Katyn case revealed 8 mass graves containing a total of 4,132 individuals. While the total number of bodies per pit is not known, the mean number of bodies per pit in the Katyn case is approximately 516 individuals. Each of the burial pits ranged from 6 to 11 feet deep and contained layers of bodies. Although the exact dimensions of these pits are unknown, they were likely fairly large given the number of individuals they contained. Finally, lime as a corrosive material was included in the burial pits (Radziwinowicz 2009).

Arrangement of Bodies

Most burial pits exhibited an organized arrangement of prisoner bodies (Figures 79 and 80). In particular, decedents were "stacked neatly head to toe in rows, one on top of the other…" (Cienciala et al. 2007: 131). Excavation revealed bodies stacked in layers of 10 to 12 corpses per pit. All individuals were discovered prone, with their hands beside their bodies or tied behind their backs and their legs extended (Zawodny 1972). The largest burial pit contained twelve rows of neatly organized bodies (Cienciala et al. 2007). While bodies of executed prisoners were noted as haphazardly interred in a few (unspecified number) of burial pits, the general arrangement of the bodies in pits at Katyn was organized, indicating a specific pattern of burial.

Figure 79: Arrangement of Bodies in the Katyn Case

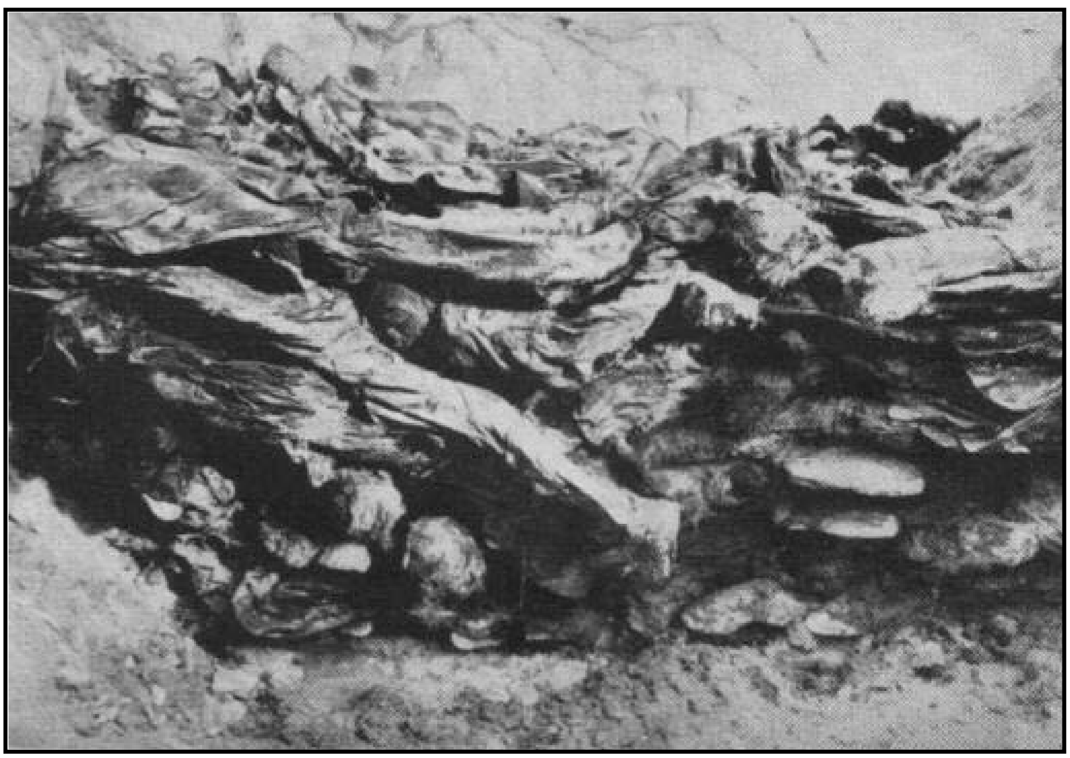
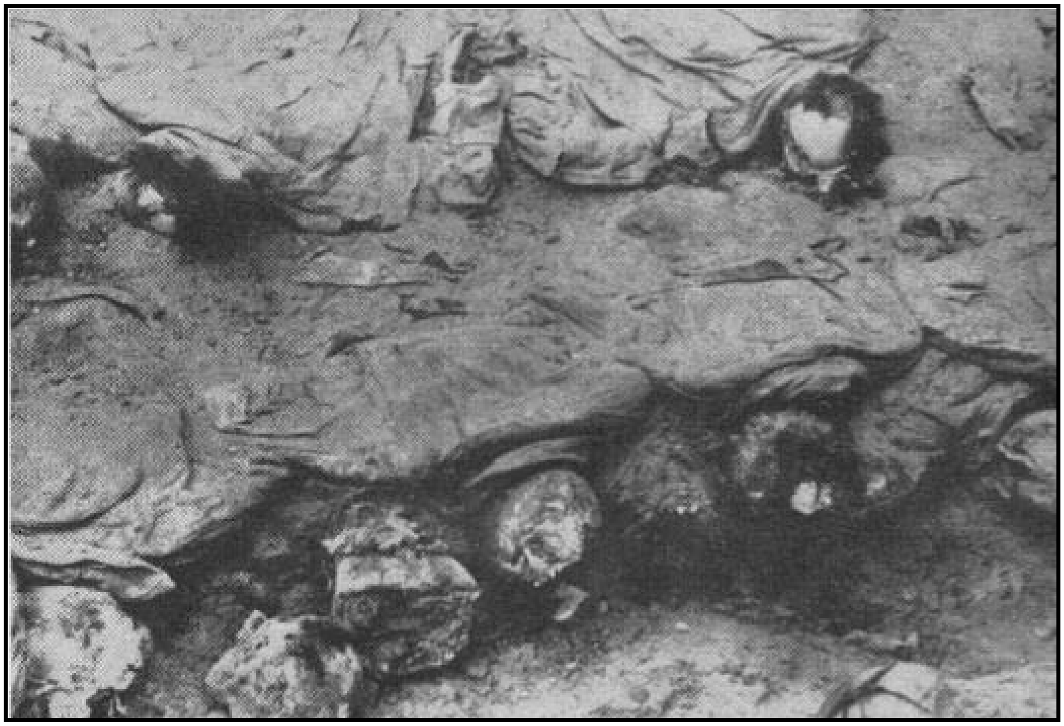


Figure 80: Close-up of Executed Prisoners in Burial Pits at Katyn



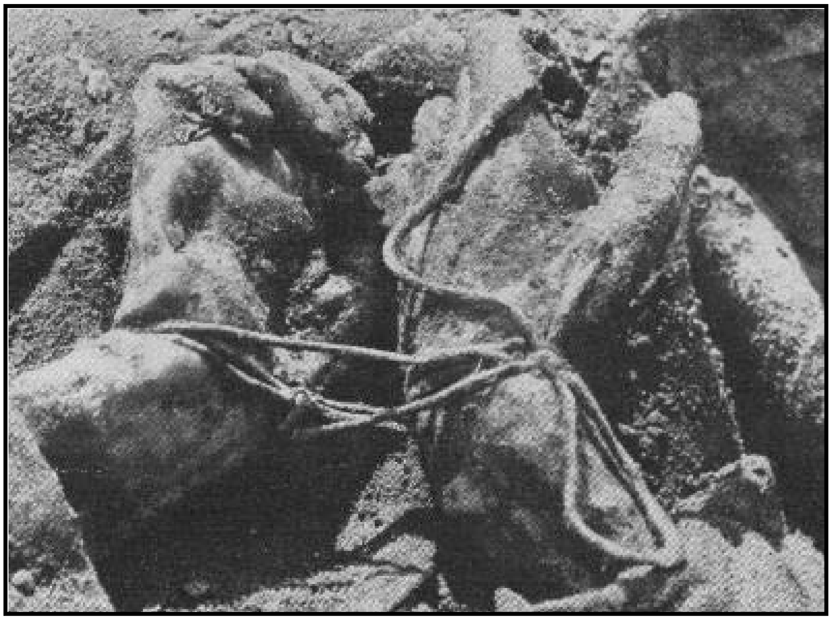
Material Culture

Investigators believe that prisoners were largely stripped of personal belongings before executions. However, numerous clothing items, personal effects, weaponry items, and historical documents were discovered with the remains. These items included greatcoats, military uniforms, identification documents, diaries, notebooks, vaccination cards, correspondence, cards, photos, cigarette cases, wallets, medallions, and aluminum military tags (Sanford 2005). While bullet casings were recovered, they were limited. Thus, investigators argue that prisoners were likely shot before being transported to the burial pits. Interestingly, after the Katyn material culture was examined by the Commissions it was transported and stored in the Forensic-Medical Institute in Krakow. However, due to approach of the Red Army in January 1944, the material was transported to Dresden where it was eventually destroyed. While some copies of the Katyn material were discovered in 1991, very little of this material culture survived (Sanford 2005).

Bindings and Gags

Both binding and gagging was observed on individuals in the Katyn case. According to the Polish Red Cross Technical Commission, approximately 20% individuals, mostly younger men, were found bound with their hands behind their backs, particularly in Burial Pit 5 (Cienciala et al. 2007; Zawodny 1972). Bindings consisted of ropes, which connected their hands to their necks; presumably, if they struggled too much they would suffocate (Cienciala et al. 2007). The cords used to bind victims all displayed a standard configuration, a distinctive double knot, which researchers believed were methodically prepared ahead of execution given their standardized length (Figure 81). Additionally, many of the bound victims were also discovered with coats or sacks pulled over their heads, with the same type of cord tied at the neck level (Cienciala et al. 2007; Zawodny 1972). In an unspecified number (e.g. “few”) of cases, prisoners were found with their mouths filled with sawdust or with felt string passed over the mouth (Zawodny 1972).

Figure 81: A Prisoner Bound at the Hands in the Katyn Case (Cienciala et al. 2007)



Skeletal Variables

Due to the postmortem interval, between the time of body execution/disposal (1940) and discovery (1943), all bodies were observed in an active to advanced stage of decomposition. Due to the extensive presence of soft tissue, nearly 100% of individuals are noted as complete. Additionally, approximately 100% of individuals demonstrated major trauma, which included gunshot trauma, blunt force trauma, and sharp force trauma.

Demographic Variables

Nearly all individuals in the Katyn case are males, which is consistent with a mostly military sample. However, one female was recovered during forensic examination in the Katyn case. Historical data support the presence of a female lieutenant of the Polish Air Force, who had been detained along with the other male Polish officers (Zawodny 1971). Unfortunately, the age distribution of executed prisoners is not discernible from site reports.

Gunshot Wounds

All individuals had been shot in the back of the head. Most individuals exhibited one gunshot to the back of the head, with a "few" individuals shot twice (Figure 82). Only one individual demonstrated three gunshot wounds to the head. Forensic analyses concluded that revolvers were likely placed directly adjacent to the victim's raised collar or head. The trajectory of the gunshot wound was standard in all individuals: the bullet entered low on the posterior aspect of the cranium and traveled in an upward direction. When present, gunshot exit wounds were observed on the anterior aspect of the cranium in the forehead area (Figure 83) or orbits (Zawodny 1972).

Figure 82: Example of Gunshot Trauma in the Katyn Case

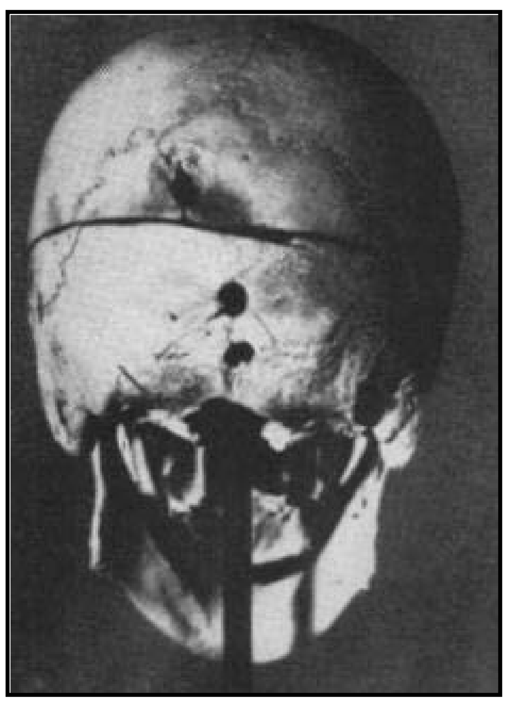
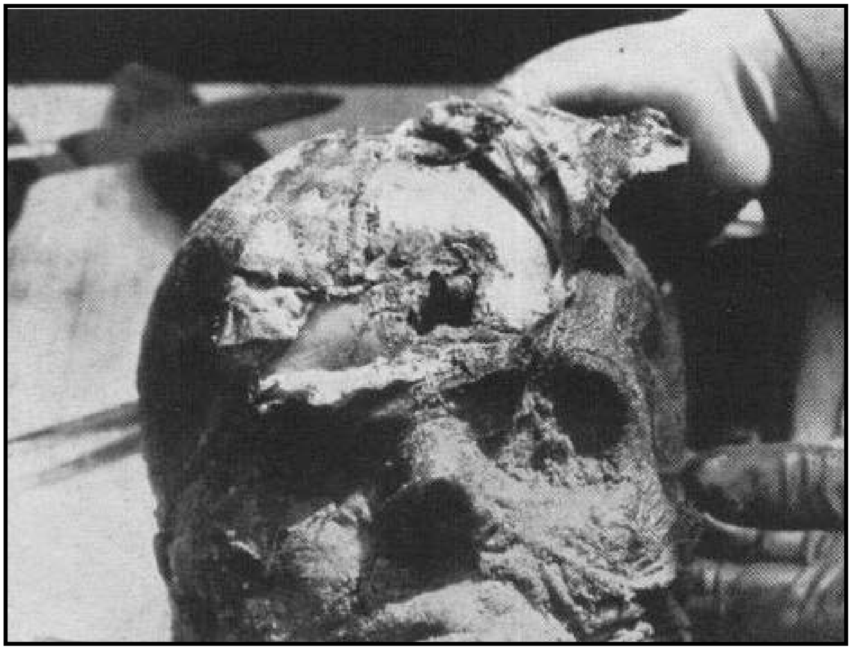


Figure 83: Example of a Gunshot Exit Wound in the Katyn Case



Blunt Force Trauma

While blunt force trauma is noted by forensic investigators, the true extent of its presence is not discernible from the site reports. In particular, researchers note that in addition to gunshot wounds, there were a number of cases where victims were also hit with a blunt object, likely a rifle butt (Sanford 2005). Because of the lack of specificity regarding the number of individuals affected, total number of episodes, anatomical location, and direction of force, the presence of blunt force trauma is difficult to assess in the Katyn case.

Sharp Force Trauma

Finally, an unspecified number of individuals (e.g. "few") demonstrated evidence of sharp force trauma. Specifically, forensic medicine professionals noted that bayonet wounds were observed in a handful of victim remains, which were mirrored in the overlying clothing. In the forensic report, wounds were described as inflicted by “four cornered bayonets,” which were commonly used in the Soviet Army (Zawodny 1972). It is unclear if these bayonets produced wounds similar to quadrilateral defects since the description of these wounds is limited in the site reports, and no photographs were taken. In the present study, these defects remain in the original category (e.g. sharp force trauma) identified by forensic professionals; however, it is worth noting that these defects may bear some resemblance to quadrilateral defects in the Tuskulenai case. Again, due to the lack of specificity regarding the number of individuals affected, total number of episodes, anatomical location, and direction of force, the presence of sharp force trauma is difficult to assess in the Katyn case.

Summary of the Katyn Case

The bodies of Polish prisoners of war executed from April to May 1940 were discovered during the German occupation of western Russia in 1943. This section discussed the findings of three forensic investigations in the Katyn case. A total of 4,132 individuals were discovered in 8 mass graves, with approximately 516 individuals per pit. Although the width and length of these burial pits are unknown, they ranged from 6 to 11 feet deep. Chlorinated lime was discovered in these pits. Most burial pits exhibited an organized arrangement of bodies, which were stacked neatly in rows in 10 to 12 layers. All individuals were discovered in a prone position, with their legs extended. While prisoners were mostly stripped of their belongings, clothing, personal effects, weaponry, and historical documents were recovered in the burial pits. Finally, both bindings and gags were observed in the Katyn case. Approximately 20% of individuals (mostly young males) were found bound with their hands behind their backs by cords tied in a standard configuration. Additionally, an unspecified number of individuals were discovered with ropes around their neck, coats or sacks pulled over their heads, gags over their mouths, or sawdust in their mouths. Presumably this was done to stifle the noises made by prisoners.

Most individuals in the Katyn case exhibited active to advanced decomposition and their remains were considered complete. All individuals demonstrated major trauma. All but one individual was male, but the age distribution of the Katyn sample is unknown. The mechanisms of trauma reported at Katyn include gunshot wounds, blunt force, and sharp force. All individuals exhibited gunshot wounds to the back of the head or neck, mostly consisting of one to two shots. While blunt force trauma and sharp force trauma was observed in the Katyn sample, the percentage of individuals affected, total number of defects, anatomical location, and direction of force is largely not discernible from the site reports. Researchers do note that sharp force wounds may have been inflicted by a four-cornered bayonet, but it is unclear whether these defects resemble the quadrilateral defects observed in the Tuskulenai sample.

RAINIAI CASE

As the German army approached Lithuanian territory in July 1941, members of the Red Army and security apparatus retreated into the Soviet Union. However, before leaving Lithuania, state security agents "evacuated" prisoners through mass deportations and executions. On the night of June 24-25, 1941, 76 prisoners from the Telšiai prison were transported to the Rainiai forest, executed, and interred clandestinely. None of the prisoners had been tried or convicted of crimes. Three days later, German forces discovered 73 of these individuals in four mass graves (Figure 84). Šiušaitė and Landsbergis (2007) provide a translated account of the German forensic medicine analysis of trauma in these remains.

Figure 84: Executed Prisoners in the Rainiai Case (Šiušaitė and Landsbergis 2007)

Interment Sites and Mortuary Variables

Unfortunately, many mortuary variables are not discernible from the Rainiai site report. Forensic medicine professionals discovered a total of 73 individuals in 4 burial pits in the Rainiai forest. Each burial pit contained approximately 18 to 20 individuals. The size and depth of burial pits is not discernible from the site report. No material culture is noted in the Rainiai site report. However, based on photographs taken at the time of analysis, prisoners were clothed during interment. The site report also makes no mention of the presence of corrosive materials in the burials pits. Furthermore, approximately 48% of individuals at Rainiai (n = 35) were discovered bound and/or gagged. Specifically, 41% of individuals were bound at the hands, mostly with their hands tied behind their backs. Additionally, 7% of individuals were bound or gagged at the head, neck, and mouth (Figure 85). This was likely done to stifle noises made by the prisoners.

Figure 85: Prisoners in the Rainiai Case (Šiušaitė and Landsbergis 2007)

Skeletal Variables

Given the short postmortem interval, all individuals in the Rainiai cases exhibited fresh or bloated decomposition. Due to the extensive presence of soft tissue, 100% of individuals were complete. At Rainiai, 95% of individuals (n = 69) demonstrated major trauma. The degree of trauma in the remaining 5% of individuals is unknown because it is not discernible from the site report. All individuals in the Rainiai case were males. Unfortunately, the age distribution of executed prisoners is not discernible from the site report. Perimortem trauma in the Rainiai case included gunshot wounds, blunt force, sharp force, and undetermined trauma.

Gunshot Wounds

At Rainiai, 18% of individuals (n = 13) exhibited a total of 19 gunshot wounds. While the number of gunshot entry wounds ranged from one to four per individual, the majority of individuals (77%) exhibited one gunshot wound (Table 72). More of these wounds (68%) were directed at the postcranium with fewer gunshot wounds (32%) directed at the head and neck (Table 73 and Figure 86). Of the postcranial gunshot wounds, 37% occurred on the chest, 26% occurred on the back and 5% entered the abdomen. The direction of gunshot wounds mostly entered individuals from the front (53%), followed by the rear (26%) and right side (11%). The direction of 2 wounds was not discernible based on descriptions in the site report (Table 74).

Table 72: Number of Gunshot Entry Wounds in the Rainiai Case

Number of GSWs	**n**	**%**
1 Entry	10	76.9
2 Entries	1	7.7
3 Entries	1	7.7
4 Entries	1	7.7
5 Entries	0	0.0

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Table 73: Anatomical Location of Gunshot Wounds in the Rainiai Case

Anatomical Location	**n**	**%**
Head/Neck	6	31.6
Chest	7	36.8
Back	5	26.3
Abdomen	1	5.3

Figure 86: Anatomical Location of Gunshot Wounds in the Rainiai Case

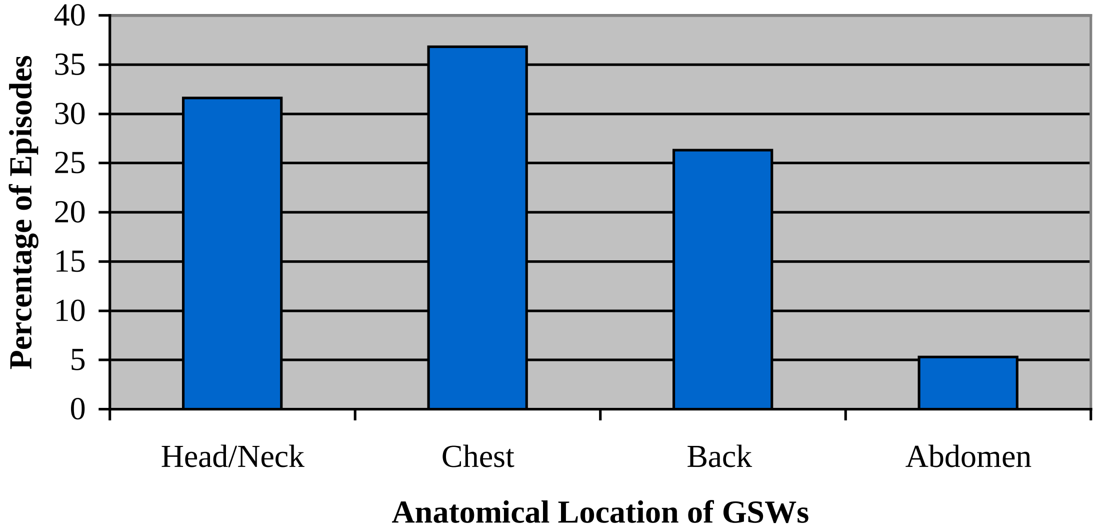


Table 74: Direction of Gunshot Wounds in the Rainiai Case

Direction of Force	**n**	**%**
Rear	5	26.3
L. Side	0	0.0
R. Side	2	10.5
Front	10	52.6
Unknown	2	10.5

Blunt Force Trauma

At Rainiai, 93% of individuals (n = 68) exhibited a total of 182 episodes of blunt force trauma. The number of episodes of blunt force trauma ranged from one to six, with two episodes (31%) being the most common followed by three episodes (22%), four episodes (21%), and five episodes (19%) (Table 75). Notably, of individuals who demonstrated blunt force trauma, 81% exhibited two or more episodes of it. More of these wounds (62%) were directed at the postcranium, with fewer blunt force defects (38%) directed at the head and neck (Table 76 and

Figure 87). Of the postcranial blunt force trauma episodes, 20% were directed at the pelvis, followed by 15% on the lower limbs, 13% on the chest, 8% on the upper limbs, 3% on the back, and 3% on the abdomen. It is noteworthy that nearly half of all individuals (n = 36) demonstrated blunt force trauma to the genitalia. The direction of blunt force trauma is largely not discernible from the site report.

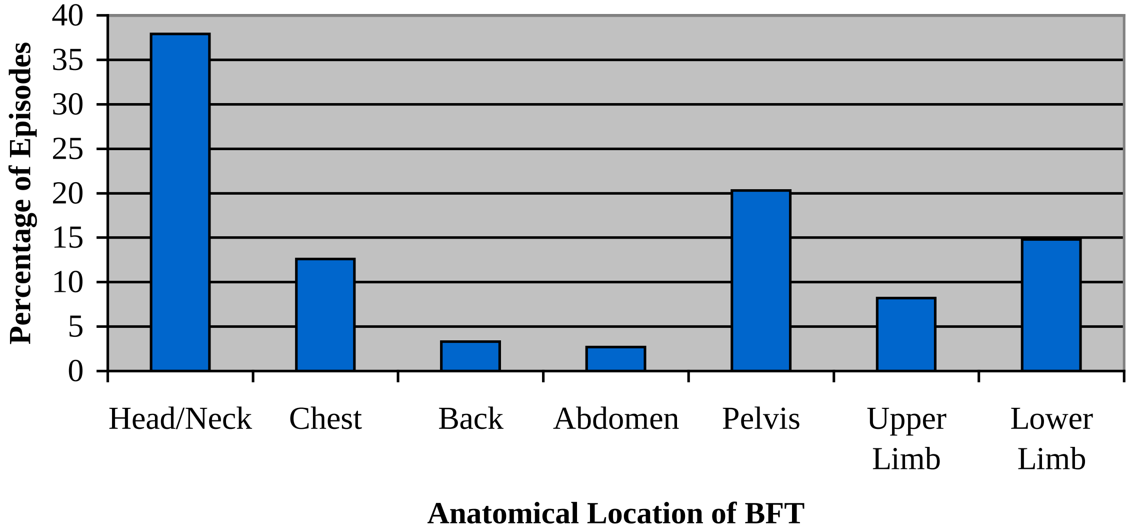
Table 75: Number of Blunt Force Episodes in the Rainiai Case

BFT Episodes	**n**	**%**
1 Episode	13	19.1
2 Episodes	21	30.9
3 Episodes	15	22.1
4 Episodes	14	20.6
5 Episodes	4	5.9
6 Episodes	1	1.5

Table 76: Anatomical Location of Blunt Force Trauma in the Rainiai Case

Anatomical Location	**n**	**%**
Head/Neck	69	37.9
Chest	23	12.6
Back	6	3.3
Abdomen	5	2.7
Pelvis	37	20.3
Upper Limb	15	8.2
Lower Limb	27	14.8

Figure 87: Anatomical Location of Blunt Force Trauma in the Rainiai Case



Sharp Force Trauma

At Rainiai, 47% of individuals exhibited a total of 56 episodes of sharp force trauma. The number of episodes of sharp force trauma ranged from one to five, with one episode (53%) being the most common followed by two episodes (35%), three episodes (9%) and five episodes (3%) (Table 77). The majority of these wounds (77%) were directed at the head and neck, with fewer sharp force defects (23%) directed at postcranial elements (Table 78 and Figure 88). Of the postcranial sharp force trauma episodes, 9% were directed at the chest followed by 7% at the lower limbs, 4% at the pelvis, 2% at the abdomen, and 2% at the back. Most sharp force defects represented puncture wounds (73%), with eight cases (14%) representing punctures to the eyes. Incisions (20%) were the second most common type of sharp force defect, which included four cases of mutilation to tongues (n = 3) and ears (n = 1). Finally, more sharp force trauma was directed to the front of prisoners (48%), followed by the rear (11%), right side (11%), and left side (Table 79). The direction of sharp force was not discernible from the site report in 18% of the sample.

Table 77: Number of Sharp Force Episodes in the Rainiai Case

SFT Episodes	**n**	**%**
1 Episode	18	52.9
2 Episodes	12	35.3
3 Episodes	3	8.8
4 Episodes	0	0
5 Episodes	1	2.9

Table 78: Anatomical Location of Sharp Force Trauma in the Rainiai Case

Anatomical Location	**n**	**%**
Head/Neck	43	76.8
Chest	5	8.9
Back	1	1.8
Abdomen	1	1.8
Pelvis	2	3.6
Upper Limb	0	0.0
Lower Limb	4	7.1

Figure 88: Anatomical Location of Sharp Force Trauma in the Rainiai Case

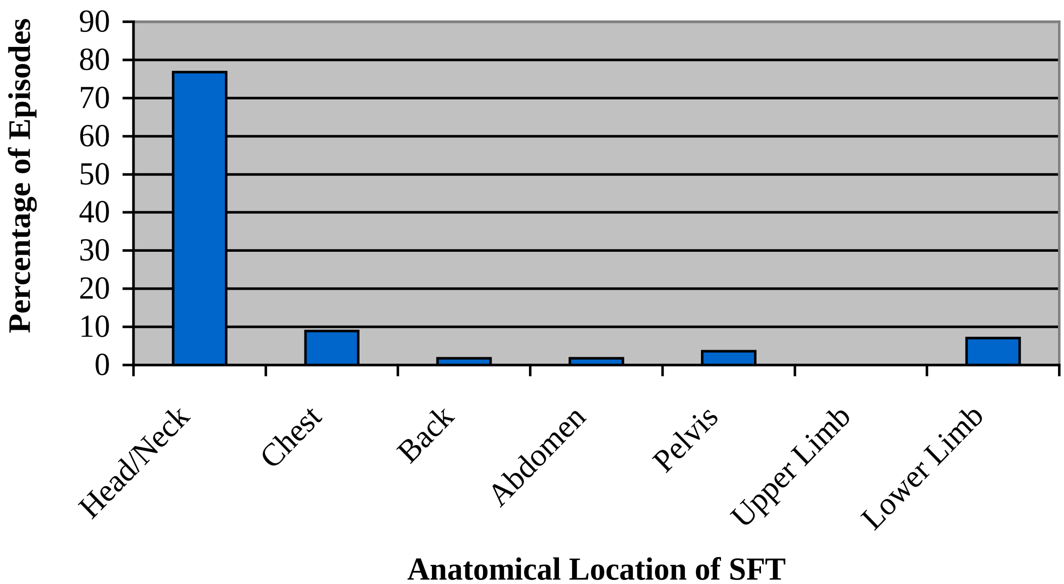


Table 79: Direction of Sharp Force Trauma in the Rainiai Case

Direction of Force	**n**	**%**
Rear	6	10.7
L. Side	5	8.9
R. Side	6	10.7
Front	27	48.2
Superior	2	3.6
Unknown	10	17.9

Undetermined Defects

When the mechanism of injury could not be determined from the site report (e.g. wound on cranium), defects were considered “undetermined.” At Rainiai, 44% of individuals (n = 32) demonstrated a total of 38 undetermined defects. The majority of these wounds (76%) were directed at the head and neck, with fewer undetermined defects (24%) on postcranial elements. Undetermined trauma on postcranial elements included the chest (5%), upper limbs (5%), lower limbs (5%), back (3%), abdomen (3%), and pelvis (3%). Of the 32 individuals exhibiting undetermined defects, 88% demonstrated one episode, followed by two episodes (6%) and three episodes (6%).

Additional Trauma

Additionally, forensic analysts note the presence of scalding, maceration, and peeling on approximately 23 individuals at Rainiai, which they attribute to the purposeful use of thermal (e.g. fire and boiling water) and electrical trauma. Unfortunately, the extent of this trauma is not discernible from the site report, and the role of early signs of decomposition (e.g. skin slippage) is unclear.

Summary of the Rainiai Case

Mass violence at Rainiai occurred on the night of June 25-25, 1941 and remains associated with this case were discovered three days later. Forensic analyses were performed by German forensic medicine professionals, who documented 73 individuals in four burial pits. While the pit features are not known, the site report notes that approximately 18 to 20 individuals were discovered in each burial pit. The presence of concealment materials or material culture is not noted in the site report, but executed prisoners were found clothed. Additionally, 48% of individuals were discovered bound and/or gagged.

All individuals in the Rainiai case exhibited fresh or bloated decomposition and all individuals were considered complete. Approximately 95% of individuals demonstrated major trauma; however, trauma in 5% of the sample is not discernible from the site report. All individuals were males, but the age distribution of the executed prisoners is not known.

Perimortem trauma in the Rainiai case included gunshot wounds, blunt force trauma, and sharp force trauma. Approximately 18% of individuals exhibited gunshot wounds. While gunshots ranged from one to four shots per person, the majority of individuals demonstrated one wound. More gunshot wounds were observed on postcranial elements (68%) than cranial elements (32%), and included shots to the chest, back, and abdomen. Finally, half of gunshot wounds entered individuals from a front direction, followed by the rear and right side.

Blunt force trauma was observed in 93% of individuals. While the number of episodes of blunt force trauma ranged from one to six, more individuals exhibited four, three and two episodes. More blunt force trauma was observed on postcranial elements (62%) than cranial elements (38%), and included trauma to the pelvis, lower limbs, and chest. Nearly half of all individuals in the Rainiai sample exhibited blunt force the genital region. The direction of blunt force is largely not discernible from the site report.

Sharp force trauma was observed in 47% of individuals at Rainiai. While the number of episodes of sharp force ranged from one to five, more individuals exhibited one or two episodes. More sharp force trauma was observed on cranial elements (77%) than postcranial elements (23%), and from the front direction (48%) of prisoners. Furthermore, puncture wounds to the eyes and mutilation of the tongue and ears were observed in the Rainiai sample.

Finally, the mechanism of injury could not be determined from the site report in approximately 44% of individuals. Undetermined defects were observed on both cranial and postcranial elements, and ranged from one to three episodes per person. Additionally, thermal and/or electrical trauma may have also been employed on prisoners in the Rainiai case.

INTEGRATED ANALYSIS

This section compares the mortuary and skeletal variables between the Vinnytsia, Katyn, Rainiai, and Tuskulenai cases. Specifically, it evaluates archaeological variables related to burial pits, material culture, corrosive materials, and bindings/gags. Skeletal variables assessed include decompositional stages, percentage of body recovered, degree of trauma, sex of prisoners, and mechanism of trauma (i.e. number of traumatic episodes, anatomical location, and direction of force). As a cautionary note, archaeological and skeletal variables in the Tuskulenai case are based on sampled data collected in this study, rather than all available data.

Mortuary Variables

When possible, mortuary variables were compared between the four Soviet cases. While the total number of individuals and total number of burial pits in each case varied considerably (especially the Vinnytsia case), these figures likely do not represent the total number of individuals executed or recovered. However, the mean number of individuals per pit can be compared. The mean number of individuals per pit is greatest in the Katyn case, followed by Vinnytsia, Rainiai, and Tuskulenai (Table 80).

Table 80: Mean Number of Individuals per Pit between the Soviet Cases

Case	Total # of Individuals	Total # of Burial Pits	$\bar{x}$ Individuals per Pit
Vinnytsia	9,432	90	105
Katyn	4,132	8	516
Rainiai	73	4	18
Tuskulenai	159	12	13

Table 81 compares the arrangement of bodies, material culture, concealment materials, and bindings/gags between the Soviet sites. The overall arrangement of bodies in burial pits was compared between the Vinnytsia, Katyn, and Tuskulenai cases. While decedents in the Katyn case primarily exhibit an organized arrangement, those in the Vinnytsia and Tuskulenai cases were generally disorganized. The fact that executions were performed over a shorter period of time in the Katyn case, and included fewer burial pits, may account for the organized arrangement of bodies as state agents may have needed to maximize the number of individuals per pit.

Material culture present in burial pits was fairly similar across all Soviet cases. In the Vinnytsia and Katyn cases, material culture recovered included clothing, personal effects, historical documents, and weaponry. While clothing, personal effects, and weaponry were discovered in the Tuskulenai case, historical documents were not recovered. However, the lack of historical documents may be due to the longer postmortem interval in the Tuskulenai case. Material culture was not reported for Rainiai.

Concealment materials were present in the Vinnytsia, Katyn, and Tuskulenai cases. Specifically, lime was discovered in all three cases, while organic materials (e.g. layers of clothing between bodies) were observed in the Vinnytsia and Tuskulenai cases. However, the presence of tar paper was only noted in the Tuskulenai case. The presence of concealment materials in the Rainiai case was not reported.

Bindings and gags were observed in varying frequencies in all four Soviet cases. In the Vinnytsia case, 100% of males were bound with their hands behind their backs while females were discovered unbound. Additionally, prisoners at Vinnytsia were also discovered bound at the elbows and feet. Fewer individuals were discovered bound at the hands at Rainiai (41%), Katyn (41%), and Tuskulenai (17%). While the medium of binding is not discussed at Rainiai and not observable at Tuskulenai, investigators at Vinnytsia and Katyn suggest that a systematic, planned approach was implemented to bind prisoners based on the consistent material and configuration of cord. Furthermore, varying modes of gags were present at Vinnytsia, Katyn, and Rainiai, but were unobservable in the Tuskulenai case. While the frequency of gags is not discernible, variations of gags at all three sites included ropes tied around the neck of prisoners and gags over their mouths. Additionally, an unspecified number of individuals at Katyn also exhibited coats or sack pulled over their heads and sawdust stuffed into their mouths.

Table 81: Comparison of Mortuary Variables in all Soviet Cases

Case	Arrangement of Bodies	Material Culture	Concealment Materials	Bindings	Gags
Vinnytsia	Disorganized	Clothing Personal Effects Historical Documents Weaponry	Lime Organic Materials	Present (100% males) Absent (females)	Present
Katyn	Organized	Clothing Personal Effects Historical Documents Weaponry	Lime	Present (20%)	Present
Rainiai	Unknown	Unknown	Unknown	Present (41%)	Present
Tuskulenai	Disorganized	Clothing Personal Effects Weaponry	Lime Tar Paper Organic Materials	Present (17%)	Unknown

Skeletal Variables

In this section, skeletal variables are examined across all four Soviet cases. Variables examined include the overall decompositional stage, percentage of body recovered, and degree of trauma in all samples. While the sex of victims is discussed, age at death is not because of lack of data in site reports or differences in the collection of data. Additionally, mechanisms of trauma (e.g. gunshot wounds, blunt force trauma, and sharp force trauma) are compared in the four cases. Assessments include the percentage of the sample affected, number of episodes, anatomical location, and direction of force. Quadrilateral defects were not compared since this represents a unique mechanism in the Tuskulenai case.

Decompositional Stage

The decompositional stage varied between the sites (Table 82). At Vinnytsia and Katyn, all individuals demonstrated active to advanced decomposition. At Rainiai, all individuals exhibited fresh to bloated decomposition while all individuals in the Tuskulenai sample were skeletonized. The decompositional stage of remains likely confounds trauma analysis as the observation of injury in soft tissue remains is reduced in extensively decomposed or skeletonized individuals (Komar and Lathrop 2012). Thus, trauma reported in remains from Vinnytsia, Katyn, and especially Tuskulenai may be underestimated.

Table 82: Decompositional Stage for all Soviet Cases

Decompositional Stage	**Vinnytsia**		**Katyn**		**Rainiai**		**Tuskulenai**	
	n	%	n	%	n	%	n	%
Fresh/Bloated	0	0.0	0	0.0	73	100	0	0.0
Active/Advanced	9,432	100.0	4,132	100	0	0.0	0	0.0
Skeletonization	0	0.0	0	0.0	0	0.0	155	100
Unknown	0	0.0	0	0.0	0	0.0	0	0.0

Percentage of Body Recovered

Completeness was consistent at Vinnytsia, Katyn, and Rainiai, but varied in the Tuskulenai case (Table 83). Due to the short postmortem interval and presence of adhering soft tissue, all individuals at Vinnytsia, Katyn, and Rainiai were complete. At Tuskulenai, 90% of individuals were complete and 10% of individuals were partial. Completeness in the Tuskulenai sample varied due to not only taphonomic factors which decreased survivability of skeletal elements, but also because some elements (e.g. left leg) were not available at the time of analysis.

Table 83: Percentage of Body Recovered for all Soviet Cases

% of Body Recovered	Vinnytsia		Katyn		Rainiai		Tuskulenai	
	n	%	n	%	n	%	n	%
Complete	9,432	100	4,132	100	73	100	140	90.3
Partial	0	0.0	0	0.0	0	0.0	15	9.7
Skull only	0	0.0	0	0.0	0	0.0	0	0.0
Unknown	0	0.0	0	0.0	0	0.0	0	0.0

Degree of Trauma

The degree of trauma was relatively consistent at all four sites (Table 84). All individuals at both Vinnytsia and Katyn demonstrated major trauma. At Rainiai, 95% of individuals demonstrated major trauma. The degree of trauma in the remaining 5% of individuals is unknown because of lack of specificity in the site report. Thus, these four individuals may have also demonstrated major trauma as well. Finally, 95% of individuals at Tuskulenai demonstrated trauma while trauma was absent in approximately 2.5% of the total sample. Furthermore, due to the poor preservation and incompleteness of some of the remains, the degree of trauma was unknown in approximately 2.5% of the Tuskulenai sample. The high frequency of major trauma across all four sites (95-100%) is expected given the nature of these samples (e.g. prisoners executed by the state).

Table 84: Degree of Trauma for all Soviet Cases

Degree of Trauma	**Vinnytsia**		**Katyn**		**Rainiai**		**Tuskulenai**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Major	9,432	100	4,132	100	69	94.5	147	94.8
Minor	0	0.0	0	0.0	0	0.0	0	0.0
Absent	0	0.0	0	0.0	0	0.0	4	2.6
Unknown	0	0.0	0	0.0	4	5.5	4	2.6

Sex of Victims

The overwhelming majority of victims (98-100%) are male across all four sites (Table 85). Females were the most represented at Vinnytsia (n = 169); however, given the total sample size at Vinnytsia (n = 9,238), females only represent 2% of the sample. At Katyn, one female was observed which represents less than 0.1% of the sample. Thus, the frequency of males at Katyn nears 100%. At Rainiai, all individuals were males. At Tuskulenai, 94% of victims were male, 2% were female, and 4% were of indeterminate sex. However, based on historical data, individuals of indeterminate sex are likely males. This calculation is factored into Table 85.

Table 85: Sex of Victims for all Soviet Cases

Case	**Males**		**Females**	
	n	%	n	%
Vinnytsia	9,238	98.2	169	1.8
Katyn	4,131	>99.9	1	<0.1
Rainiai	73	100	0	0
Tuskulenai	152	98.1	3	1.9

Gunshot Wounds

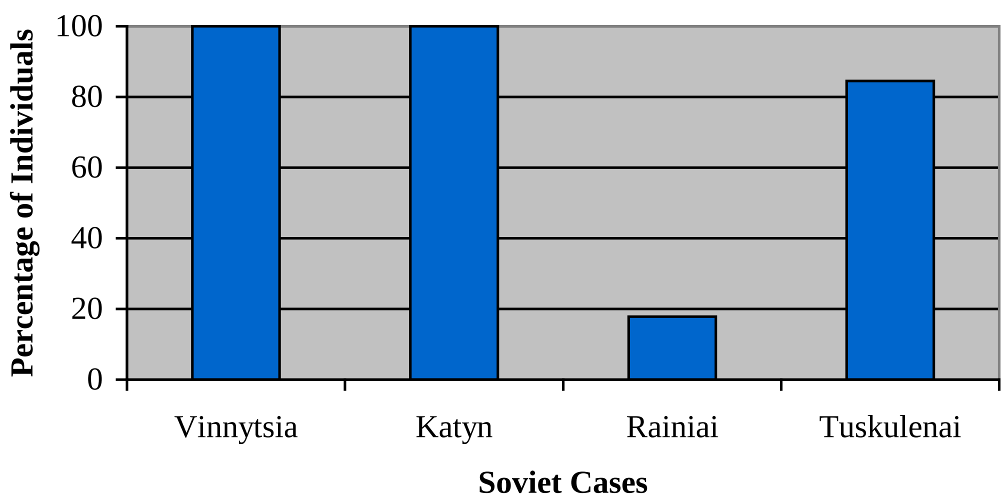
The percentage of individuals exhibiting gunshot wounds varied between the Soviet cases (Table 86 and Figure 89). At Vinnytsia and Katyn, gunshot wounds were observed on all or nearly all individuals. In contrast, gunshot wounds were observed on 87% of individuals in the Tuskulenai case and 18% of individuals in the Rainiai case. The total number of gunshot wounds is unknown in the Katyn case due to lack of specificity in the site report.

Table 86: Gunshot Wounds for all Soviet Cases

Case	**n**	**Total # of GSW**	**Individuals with GSWs**	
			n	%
Vinnytsia	9,432	15,954	9,432	100*
Katyn	4,132	Unknown	4,132	100
Rainiai	73	19	13	17.8
Tuskulenai	151	175	131	86.8

*Site report notes that gunshot wounds neared 100% of individuals

Figure 89: Percentage of Individuals Demonstrating GSWs for all Soviet Cases



The number of gunshot wounds per individual also varied between the Soviet cases (Table 87). In the Vinnytsia case, gunshots ranged from one to four entries, with most individuals (67%) exhibiting two entry wounds. In the Katyn case, the exact number of shots used is not known because the site reports note that a few prisoners had been shot twice and one individual had been shot three times. It is inferred that the vast majority of individuals were executed with one (or occasionally two) gunshots. In the Rainiai case, gunshots ranged from one to four entries, with most individuals (77%) exhibiting one entry wound. In the Tuskulenai case, gunshots ranged from one to five entries, with most individuals exhibiting one entry wound. Thus, while individuals in the Katyn, Rainiai, and Tuskulenai cases exhibited mostly one gunshot entry wound, individuals in the Vinnytsia case demonstrate mostly two gunshot wounds.

Table 87: Number of Gunshot Entry Wounds in the Soviet Cases

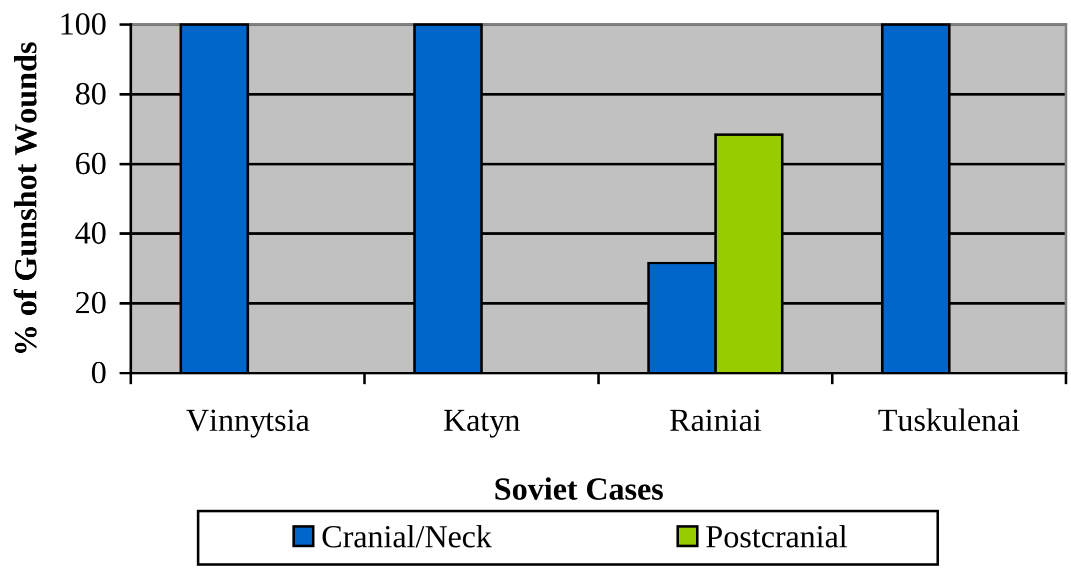
GSW Episodes	Vinnytsia (n = 9,432)		Rainiai (n = 13)		Tuskulenai (n = 131)	
	n	%	n	%	n	%
1 Entry	2992	31.7	10	76.9	102	77.8
2 Entries	6360	67.4	1	7.7	18	13.7
3 Entries	78	0.8	1	7.7	8	6.1
4 Entries	2	0	1	7.7	2	1.5
5 Entries	0	0	0	0	1	0.8

The anatomical location of gunshot wounds was consistent in the Vinnytsia, Katyn, and Tuskulenai cases, but differed in the Rainiai case (Table 88 and Figure 90). All gunshot wounds at Vinnytsia, Katyn, and Tuskulenai were directed at cranial elements. However, in the Rainiai case, gunshot wounds were more frequently observed on postcranial elements (68%) rather than cranial elements (32%). These postcranial wounds included gunshots to the chest, back, and abdomen. Because the total number of gunshot wounds in Katyn case is not known, this sample is omitted from Table 88.

Table 88: Anatomical Location of Gunshot Wounds in all Soviet Cases

Anatomical Location		**Vinnytsia** (n = 15,954)		**Rainiai** (n = 19)		**Tuskulenai** (n = 175)	
		n	**%**	**n**	**%**	**n**	**%**
Cranial	Head/Neck	15,954	100	6	31.6	175	100
Post-Cranial	Chest	0	0	7	36.8	0	0
	Back	0	0	5	26.3	0	0
	Abdomen	0	0	1	5.3	0	0
	Pelvis	0	0	0	0	0	0
	Upper limb	0	0	0	0	0	0
	Lower limb	0	0	0	0	0	0

Figure 90: Anatomical Location of Gunshot Wounds for all Soviet Cases



The direction of gunshot wounds was consistent between Vinnytsia and Katyn, but varied in the Rainiai and Tuskulenai cases (Table 89). Nearly all gunshots in the Vinnytsia and Katyn cases originated from a rear direction. In contrast, gunshot wounds originated from a rear direction in 82% of the Tuskulenai sample and 26% of the Rainiai sample. In the Rainiai case, more gunshot wounds (53%) occurred from the front direction. Pearson's chi-square and Fisher's exact tests were performed to assess whether differences in the direction of force were statistically different between the Vinnytsia, Rainiai, and Tuskulenai samples. Results indicate that there are significantly more rear-oriented gunshot wounds at Vinnytsia than at Rainiai ($\chi2 = 8504.638$, $df = 1$, $p < 0.0001$) or Tuskulenai ($\chi2 = 2510.49$, $df = 1$, $p < 0.0001$). Similarly, there are significantly more rear-oriented gunshot wounds at Tuskulenai than at Rainiai ($\chi2 = 26.096$, $df = 1$, $p < 0.0001$).

Table 89: Direction of Gunshot Entry Wounds in the Soviet Cases

Direction of GSWs	**Vinnytsia** (n = 15,954)		**Rainiai** (n = 19)		**Tuskulenai** (n = 175)	
	n	**%**	**n**	**%**	**n**	**%**
Rear	15,950	>99.9	5	26.3	143	81.7
L. Side	0	0	0	0	13	7.4
R. Side	2	<0.1	2	10.5	13	7.4
Front	1	<0.1	10	52.6	2	1.1
Superior	1	<0.1	0	0	0	0.0
Unknown	0	0	2	10.5	4	2.3

Blunt Force Trauma

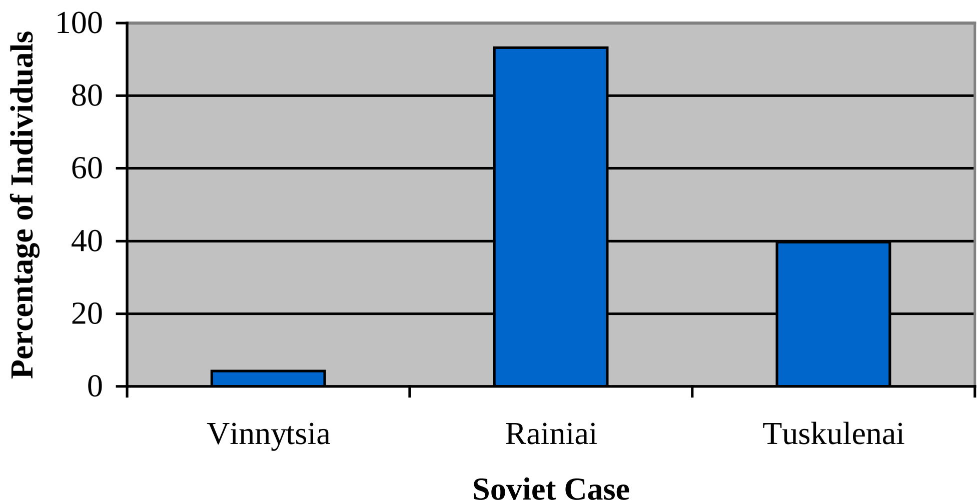
The percentage of individuals exhibiting blunt force trauma varied between the Soviet cases (Table 90 and Figure 91). At Vinnytsia, 4% of the sample exhibited blunt force defects. While blunt force trauma is present in the Katyn case, its extent is not known. Thus, the Katyn sample is omitted from this analysis. In contrast to Vinnytsia, 93% of the Rainiai sample and

40% of the Tuskulenai sample exhibited blunt force defects. Pearson’s chi-square and Fisher’s exact tests were performed to assess whether the presence of blunt force was statistically different between the cases. Results indicate that individuals at Rainiai experienced blunt force trauma significantly more than at Vinnytsia ($\chi2 = 1218.106$, $df = 1$, $p < 0.0001$) or Tuskulenai ($\chi2 = 55.172$, $df = 1$, $p < 0.0001$). Additionally, individuals at Tuskulenai experienced blunt force trauma significantly more than at Vinnytsia ($\chi2 = 407.424$, $df = 1$, p < 0.0001).

Table 90: Blunt Force Trauma in the Soviet Cases

Case	**Total # of Individuals**	**Individuals with BFT**		**Total # of Episodes**
		n	**%**	
Vinnytsia	9, 432	395	4.2	Unknown
Rainiai	73	68	93.2	182
Tuskulenai	151	60	39.7	85

Figure 91: Percentage of Individuals Demonstrating BFT in the Soviet Cases



The number of blunt force episodes per individual was not comparable across all Soviet cases. In particular, the number of blunt force episodes was not available in the site reports from Vinnytsia or Katyn. However, the number of blunt force episodes is compared between Rainiai and Tuskulenai (Table 91). In the Rainiai case, the number of blunt force episodes ranged from one to six, with most individuals exhibiting two, three, or four episodes. In the Tuskulenai case, blunt force episodes ranged from one to four, with most individuals exhibiting one episode. Results of Pearson's chi-square tests demonstrate that individuals in the Tuskulenai sample exhibited single episodes of blunt force trauma significantly more than the Rainiai sample. Conversely, individuals in the Rainiai sample exhibited four, five, and six episodes of blunt force trauma significantly more than the Tuskulenai sample.

Table 91: Number of Blunt Force Episodes at Rainiai and Tuskulenai

BFT Episodes	**Rainiai** (n = 68)		**Tuskulenai** (n = 60)		**$\chi 2$**	**df**	**Two-tail p-value**	**p < 0.05 Yes/No**
	n	**%**	**n**	**%**				
1 Episode	13	19.1	42	70.0	31.632	1	<0.0001	**YES**
2 Episodes	21	30.9	12	20.0	1.445	1	0.2293	No
3 Episodes	15	22.1	5	8.3	3.573	1	0.0587	No
4 Episodes	14	20.6	1	1.7	9.278	1	0.0023	**YES**
5 Episodes	4	5.9	0	0	-	-	-	-
6 Episodes	1	1.5	0	0	-	-	-	-

The anatomical location of blunt force trauma was not comparable across all Soviet cases. Because the anatomical location is evaluated by episode, Vinnytsia and Katyn are excluded from this analysis. However, the anatomical location of blunt force is compared between Rainiai and Tuskulenai (Table 92 and Figure 92). While blunt force trauma was observed in both cranial and postcranial elements in both cases, the frequency of trauma varies. Results of Pearson's chi-square and Fisher's exact tests demonstrate that individuals in the

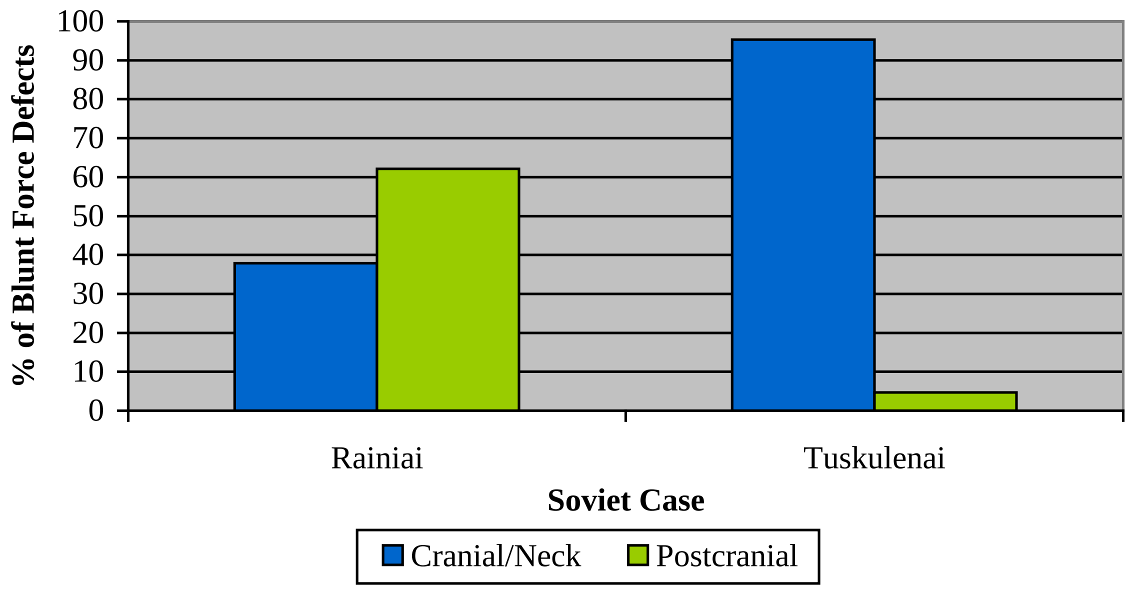
Tuskulenai case experienced significantly more blunt force trauma to the cranium than at Rainiai. Conversely, individuals at Rainiai experienced significantly more blunt force trauma to the chest, abdomen, pelvis, and lower limb than at Tuskulenai. Direction of blunt force trauma was not compared between Soviet sites because directionality was not discernible from any of the site reports.

Table 92: Anatomical Location of Blunt Force Trauma at Rainiai and Tuskulenai

Anatomical Location		**Rainiai** (n = 182)		**Tuskulenai** (n = 85)		**χ2**	**df**	**Two-tail p-value**	**p < 0.05 Yes/No**
		n	**%**	**n**	**%**				
Cranial	Head/Neck	69	37.9	81	95.3	75.182	1	<0.0001	**YES**
Post-cranial	Chest	23	12.6	0	0	-	-	-	-
	Back	6	3.3	0	0	-	-	-	-
	Abdomen	5	2.7	0	0	-	-	-	-
	Pelvis	37	20.3	0	0	-	-	-	-
	Upper limb	15	8.2	3	3.5		1	0.1949	No
	Lower limb	27	14.8	1	1.2		1	0.0004	**YES**

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Figure 92: Anatomical Location of Blunt Force Defects at Rainiai and Tuskulenai



Sharp Force Trauma

The percentage of individuals exhibiting sharp force trauma varied considerably between the Soviet cases (Table 93). Sharp force trauma was not observed in any individuals in the Vinnytsia case. While the presence of sharp force trauma is present in the Katyn case, its extent is not known. Thus, the Katyn sample is omitted from this analysis. In the Rainiai sample, sharp force trauma was observed in 47% of individuals while at Tuskulenai it was observed in only 3% of the sample. Results of Pearson's chi-square test indicate that significantly more individuals experienced sharp force trauma at Rainiai than at Tuskulenai ($\chi 2 = 64.324$, $df = 1$, $p < 0.0001$).

Table 93: Sharp Force Trauma at the Soviet Sites

Case	**Total # of Individuals**	**Individuals with SFT**		**Total # of Episodes**
		n	**%**	
Vinnytsia	9,432	0	0.0	0
Rainiai	73	34	46.6	56
Tuskulenai	151	4	2.6	5

While the number of sharp force episodes varied between Tuskulenai and Rainiai, the difference was not significant (Table 94). In particular, the number of sharp force episodes at Rainiai ranged from one to five episodes, while they ranged from one to two at Tuskulenai. Results of Fisher's exact tests indicate no significant difference between the use of one and two episodes of sharp force trauma between the sites.

Table 94: Number of Sharp Force Episodes at Rainiai and Tuskulenai

SFT Episodes	**Rainiai (n = 34)**		**Tuskulenai (n = 4)**		**χ2**	**df**	**Two-tail p-value**	**p < 0.05 Yes/No**
	n	**%**	**n**	**%**				
1 Episode	18	52.9	3	75.0		1	0.6131	No
2 Episodes	12	35.3	1	25.0		1	1.000	No
3 Episodes	3	8.8	0	0	-	-	-	-
4 Episodes	0	0	0	0	-	-	-	-
5 Episodes	1	2.9	0	0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

The Rainiai and Tuskulenai samples demonstrated varying frequencies of sharp force trauma by anatomical location (Table 95). In particular, 100% of sharp force trauma at Tuskulenai was observed in crania, while 77% of sharp force at Rainiai was observed in cranial elements and 23% was observed in postcranial elements. While statistical tests were not performed due to small sample sizes and low variability between the cases, sharp force trauma in the Rainiai sample appears more extensively distributed throughout various anatomical regions.

Table 95: Anatomical Location of Sharp Force Trauma at Rainiai and Tuskulenai

Anatomical Location		**Rainiai** (n = 56)		**Tuskulenai** (n = 5)	
		n	**%**	**n**	**%**
Cranial	Head/Neck	43	76.8	5	100
Post-cranial	Chest	5	8.9	0	0
	Back	1	1.8	0	0
	Abdomen	1	1.8	0	0
	Pelvis	2	3.6	0	0
	Upper limb	0	0.0	0	0
	Lower limb	4	7.1	0	0

The Rainiai and Tuskulenai samples demonstrated varying directions of sharp force trauma. In particular, sharp force from the rear was observed in 40% of the Tuskulenai sample and 11% of the Rainiai sample. Conversely, sharp force trauma from the front was observed in 48% of the Rainiai sample and only 20% of the Tuskulenai sample. However, results of Fisher's exact tests demonstrate that the direction of sharp force trauma did not differ significantly between the Rainiai and Tuskulenai samples (Table 96).

Table 96: Direction of Sharp Force Trauma at Rainiai and Tuskulenai

Direction of SFT	**Rainiai** (n = 56)		**Tuskulenai** (n = 5)		**χ2**	**df**	**Two-tail p-value**	**p < 0.05 Yes/No**
	n	**%**	**n**	**%**				
Rear	6	10.7	2	40.0		1	0.1239	No
L. Side	5	8.9	1	20.0		1	0.4153	No
R. Side	6	10.7	1	20.0		1	0.4684	No
Front	27	48.2	1	20.0		1	0.3626	No
Superior	2	3.6	0	0	-	-	-	-
Unknown	10	17.9	0	0	-	-	-	-

*Empty cells indicate that Fisher's exact test was used instead of Pearson's chi-square

Compliance with the State Guideline

Compliance with the state guideline for executions was cautiously compared in three of the four cases of Soviet state-sponsored violence. While all individuals in the Katyn case demonstrated gunshot trauma to the back of the head, the lack of specificity regarding the presence of sharp and blunt force trauma in the Katyn case prevents the comparison of compliance to other cases of Soviet violence. Thus, the Katyn sample is excluded from this analysis. In the Vinnytsia, Rainiai, and Tuskulenai cases, categories of full compliance, partial compliance, and non-compliance were analyzed (Table 97).

Table 97: Compliance with the State Guideline between Soviet Cases

Case	**Sample Size**	**Full Compliance**		**Partial Compliance**		**Non-Compliance**	
		n	**%**	**n**	**%**	**n**	**%**
Vinnytsia	9,432	9031	95.7	4	<0.1	397	4.2
Rainiai	71	0	0	1	1.4	70	98.6
Tuskulenai	147	59	40.1	8	5.4	80	54.4

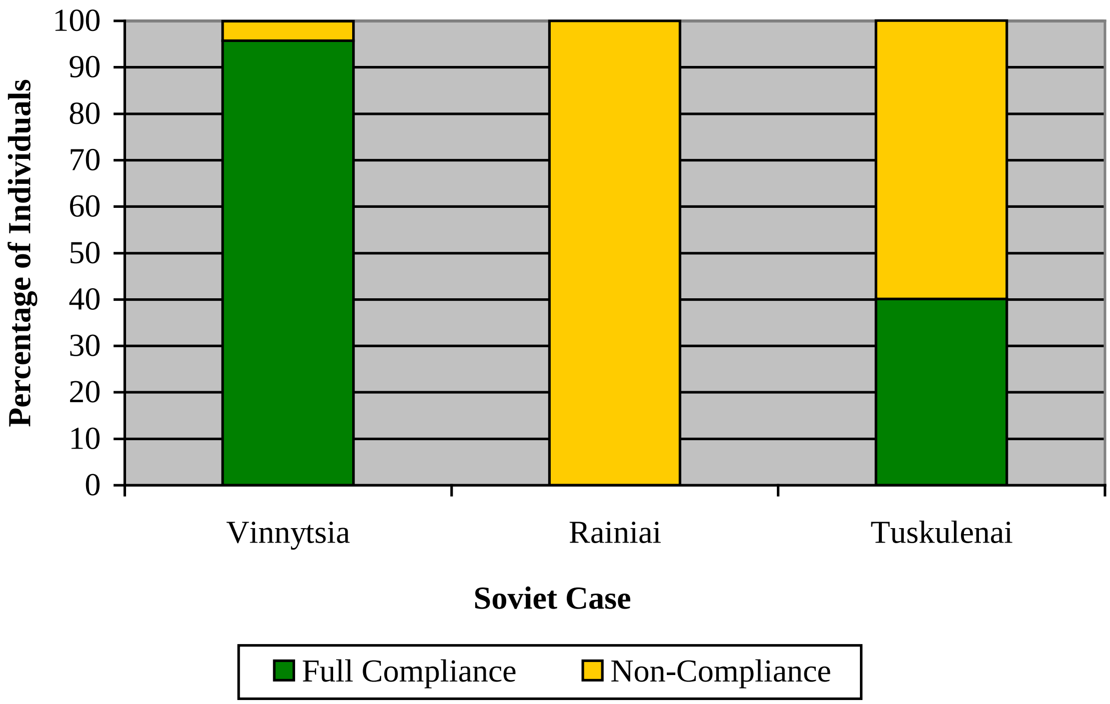
At Vinnytsia, nearly all individuals demonstrated gunshot trauma to the rear of the cranium in accordance with the state guideline. However, 395 individuals exhibited evidence of blunt force trauma and 2 individuals likely died of asphyxiation in the burial pit. Thus, these 397 individuals are considered in non-compliance with state guidelines. Furthermore, four individuals exhibited gunshot wounds in crania from non-rear directions. These individuals are considered in partial compliance with state guidelines. In the Vinnytsia sample, 96% of prisoners were executed in full compliance, 4% were executed in non-compliance, and an insignificant percentage of individuals were executed in partial compliance.

In the Rainiai sample, the pervasiveness of non-gunshot trauma (e.g. blunt and sharp force) coupled with gunshot wounds to postcranial regions (i.e. the back) meant that no individuals were executed in full compliance. One individual was considered executed in partial compliance because he exhibited a single gunshot wound to the cranium from a non-rear direction. Compliance was not evaluated in two individuals, whose trauma was not discernible from the site report. Thus in the Rainiai sample, 99% of prisoners were executed in non-compliance while 1% was executed in partial compliance. However, if partial compliance is added to the non-compliance category, all individuals in the Rainiai sample are considered executed in non-compliance with state standards.

In the Tuskulenai sample, 40% of individuals were executed in full compliance. Approximately 5% of individuals were considered executed in partial compliance because they demonstrated non-rear gunshot wounds to the head with no other mechanism of trauma present (e.g. blunt force). Finally, non-compliance was observed in 52% of individuals, all of whom demonstrated non-gunshot trauma (e.g. quadrilateral defects). Compliance was not evaluated in eight individuals, four of whom demonstrated no perimortem trauma and four whose remains were too damaged to assess trauma. When partial compliance is added to the non-compliance category, 40% of individuals are executed in full compliance and 60% of individuals are executed in non-compliance.

Since partial compliance ultimately constitutes non-compliance, each case is evaluated statistically with partial compliance added to the non-compliance category (Figure 93). Pearson's chi-square tests were performed to evaluate whether differences in full compliance were significant between Soviet cases. Results indicate that fewer individuals at Tuskulenai were executed in full compliance than at Vinnytsia ($\chi2$ =912.643, $df = 1$, $p < 0.0001$). However, both the Tuskulenai samples and Vinnytsia samples show greater frequencies of compliance that Rainiai.

Figure 93: Compliance and Non-Compliance between Soviet Cases



Summary of the Integrated Analysis

This integrated analysis compared both mortuary and skeletal variables in the Vinnytsia, Katyn, Rainiai, and Tuskulenai cases. The overall number of individuals executed, number of burial pits, and mean number of individuals per burial pit varied between all the cases. In particular, Katyn had the greatest mean number of individuals per pit, followed by Vinnytsia, Rainiai, and Tuskulenai. Additionally, the overall arrangement of bodies in burial pits varied, with the Katyn case demonstrating an organized arrangement while the Vinnytsia and Tuskulenai cases demonstrated a disorganized arrangement. The presence of material culture in burial pits was fairly consistent at Vinnytsia, Katyn, and Tuskulenai, and included clothing, personal effects, and weaponry. Additionally, historical documents were discovered in pits at Vinnytsia and Katyn. Concealment materials (e.g. lime) were also consistently present at Vinnytsia, Katyn, and Tuskulenai. Furthermore, bindings were observed at all of the Soviet sites, although at varying frequencies. Finally varying modes of gags were observed at Vinnytsia, Katyn, and Rainiai.

This study also evaluated skeletal variables across all Soviet sites. The decompositional stage and percentage of body recovered varied depending on the length of interment. Remains in the Vinnytsia and Katyn cases exhibited active to advanced decomposition, while remains at Rainiai were fresh or bloated and remains at Tuskulenai were skeletonized. Due to the presence of soft tissue, individuals at Vinnytsia, Katyn, and Rainiai were all considered complete. However, due to the longer postmortem interval, remains at Tuskulenai were both complete and partial. While the decompositional stage and completeness of remains likely affected the overall assessment of trauma, major trauma was observed in 95 to 100% of all samples. Finally, the overall majority (98-100%) of victims were male across all four sites.

Evaluation of perimortem trauma revealed interesting differences between the cases. The percentage of individuals demonstrating gunshot wounds was the same for Vinnytsia and Katyn (100%), but lower for Tuskulenai (85%) and Rainiai (18%). The number of gunshot wounds used per individual also varied across the sites. Individuals were executed more often with single gunshots at Rainiai (77%) and Tuskulenai (78%). In contrast, individuals at Vinnytsia were executed more often (67%) with two gunshots. The anatomical location of gunshot wounds was exclusively observed in cranial elements at Vinnytsia, Katyn, and Tuskulenai. However, at Rainiai, significantly more gunshot wounds were observed in postcranial elements. Finally, the direction of gunshots was the same for Vinnytsia and Katyn, as nearly 100% of gunshot wounds originated from rear directions. However, the direction of gunshot wounds at these sites differed significantly from that at Rainiai and Tuskulenai. Furthermore, there were significantly more rear-oriented shots at Tuskulenai than at Rainiai, and significantly more front-oriented shots at Rainiai than at Tuskulenai.

The percentage of individuals demonstrating blunt force trauma varied considerably between the Soviet cases. Blunt force trauma was observed in 4% of the Vinnytsia sample, 93% of the Rainiai sample, and 40% of the Tuskulenai sample. While the presence of blunt force was noted in the Katyn case, the true extent of its application is not known. The number of episodes and anatomical location of blunt force was only comparable in the Rainiai and Tuskulenai cases. Results of statistical tests indicate that individuals in the Tuskulenai sample exhibited single episodes of blunt force trauma significantly more than the Rainiai sample. Conversely, individuals in the Rainiai sample exhibited four, five, and six episodes of blunt force trauma significantly more than the Tuskulenai sample. With regard to anatomical location, individuals in the Tuskulenai case experienced significantly more blunt force trauma to the cranium than at Rainiai. Conversely, individuals at Rainiai experienced significantly more blunt force trauma to the chest, abdomen, pelvis, and lower limb than at Tuskulenai. Direction of blunt force trauma was not compared between Soviet sites because directionality was not discernible from any of the site reports.

The percentage of individuals demonstrating sharp force trauma also varied considerably between the Soviet cases. In particular, sharp force trauma was not observed in the Vinnytsia case, although it was noted as present in an unspecified number of individuals in the Katyn case. Sharp force trauma was observed significantly more in the Rainiai sample (47%) than in the Tuskulenai sample (3%). While the number of episodes, anatomical location, and direction of sharp force trauma varied between Rainiai and Tuskulenai, the differences were not significant.

Finally, Vinnytsia demonstrated the greatest percentages of individuals executed in full compliance. Significantly fewer individuals were executed in full compliance at Tuskulenai and no individuals were executed in full compliance at Rainiai. Due to the lack of specificity regarding the presence of sharp and blunt force trauma in the Katyn case, compliance with the state guideline for execution was not evaluated.

SUMMARY

Mass graves from Vinnytsia, Katyn, and Rainiai demonstrate a range of cases of violence perpetrated by the Soviet state during the post-1936 period until the Second World War. This analysis attempts to shed light on how violence in the Soviet Union changed from the pre-War period through the 1940s. Using data published in site reports, this chapter compares mortuary and skeletal variables in the Vinnytsia, Katyn, and Rainiai cases with observed data in the Tuskulenai case. When possible, features of the burial pits, and the presence of material culture, concealment materials, and bindings/gags were evaluated. Additionally, skeletal variables related to preservation, sex of victims, and perimortem trauma were assessed.

One specific research hypothesis was tested in this chapter to answer the second research question. This hypothesis anticipated that the frequency of perimortem injuries in prisoners would be consistent in the Vinnytsia and Katyn cases, but vary in the Rainiai and Tuskulenai cases. Furthermore, burial treatment was expected to be consistent across all four sites. This hypothesis was partially rejected.

Evaluation of mortuary features demonstrated that burial treatment was fairly consistent across all cases, with some exceptions. Consistency was seen in the presence of both material culture and concealment materials in the burial pits, and the binding/gagging of prisoners.

However, the organization of bodies in the burial pits differed between the sites, as did the mean number of individuals per pit.

Overall, perimortem injuries at Vinnytsia and Katyn were consistent with regard to gunshot wounds (e.g. percent affected, anatomical location, direction of force). However, they differed with regard to the number of gunshot episodes employed. Specifically, executioners at Vinnytsia employed two gunshot wounds significantly more than at Katyn.

Perimortem injuries at Rainiai significantly differed from those at Vinnytsia, Katyn, and Tuskulenai. Individuals in the Rainiai sample demonstrated fewer gunshot wounds, which were located on postcranial elements from a non-rear direction. Furthermore, the percentage of individuals affected by blunt force and sharp force trauma was significantly greater at Rainiai than at Vinnytsia.

The Tuskulenai sample exhibited both consistency with and variation to the Vinnytsia and Katyn samples. The number of individuals affected by gunshot wounds was significantly lower in the Tuskulenai sample, and there were significantly more non-rear gunshot wounds. However, the anatomical location of gunshot trauma was consistent in the Vinnytsia, Katyn, and Tuskulenai samples. Additionally, the percentage of individuals affected by blunt force and sharp force trauma was significantly higher at Tuskulenai than at Vinnytsia. Finally, compliance with the state guideline for execution was significantly lower at Tuskulenai than at Vinnytsia or Katyn, but significantly greater than Rainiai. Thus, frequencies of perimortem trauma in the Tuskulenai case appear to fall in between the Vinnytsia/Katyn cases and the Rainiai case.

The following chapter discusses characteristics of quadrilateral defects in the Tuskulenai case, proposing a typology of these defects based on features observed in two burial pits. The chapter also examines a historical case of Soviet violence and its implications for the interpretation of quadrilateral defects in the Tuskulenai case.

CHAPTER 9: QUADRILATERAL DEFECTS

This chapter discusses characteristics of quadrilateral defects encountered in the Tuskulenai case. In particular, features of these defects, such as size, direction of force, bone of entry, and associated damage, are highlighted in two of the dated burial pits. A typology of quadrilateral defects, along with the class of associated weaponry, will be proposed. Finally, this chapter will conclude with a historical case of Soviet violence, the assassination of Leon Trotsky, and its implications for the Tuskulenai case.

MATERIALS AND METHODS

Quadrilateral defects in two burial pits in the Tuskulenai case were examined, including burial pit 23 and 26. Burial pit 23 contained 11 individuals who were executed on the 26th of August 1946 by Vasilij Dolgirev's execution squad. Analyses of these individuals demonstrated 10 males and 1 female who were mostly middle aged or young adults, followed by subadults and older adults. All individuals exhibited major trauma directed at crania and all individuals exhibited gunshot entry wounds mostly from the rear. One individual exhibited blunt force trauma to the face.

Burial pit 26 contained 13 individuals executed on the 18th of November 1946 by Boris Prikazchikov's execution squad. However, only 10 individuals were available for analysis at the time of study. Examination of remains revealed nine males and one adult whose sex could not be confidently determined. Most individuals were young or middle aged adults, followed by older adults and subadults. Only eight individuals demonstrated major trauma, while trauma was absent in two individuals. Only one individual in pit 26 exhibited a gunshot wound (to the L. temporal) and one individual exhibited blunt force trauma to the face.

A total of 15 individuals exhibited quadrilateral defects from these two burial pits. Quadrilateral defects were analyzed with regard to a number of variables. Entry wounds were first distinguished from exit wounds. Defects were then examined with regard to location, direction of force, shape, number of radiating fractures, and edge damage. The location of defects refers to the bone (i.e. right parietal) or suture (left squamosal suture) affected. Direction of force included the following categories: left side, right side, posterior, anterior, superior, or inferior. The shape of quadrilateral defects was also examined and included the categories of square, rectangular, irregular, and incomplete. Square shapes were arbitrarily defined as the length and width within 5mm of each other, while rectangular shapes were defined as the length and width greater than 5mm of each other. Irregular defects were defined when one or more edges of the defect were missing or damaged (and thus the true shape could not be assessed). Incomplete defects were noted when the defect did not appear to fully penetrate the inner and outer table of crania. Finally, the number of radiating fractures and description of edge damage was noted. Each quadrilateral defect was also digitized and superimposed on a cranial homunculus to depict the approximate placement, size and shapes of all defect entry wounds for each pit.

RESULTS

A total of 24 entry defects were observed in the two burials pits. In pit 23, 9 individuals (82%) exhibited a total of 13 quadrilateral entry defects, all of which were observed in crania. In burial pit 26, 7 individuals (70%) exhibited a total of 11 quadrilateral entry defects, all of which were observed in crania. When accounting for only individuals who exhibited major trauma, 7 out of 8 (87%) individuals with perimortem trauma demonstrated quadrilateral defects in Pit 26.

Table 98: Location of Quadrilateral Entry Wounds

Bone/Suture	**Pit 23 (n)**	**Pit 26 (n)**	**Total**
L. Parietal	2	2	4
R. Parietal	4	1	5
L. Temporal	0	1	1
R. Temporal	0	3	3
R. Squamosal suture	2	1	3
L. Squamosal suture	0	0	0
Occipital	2	3	5
Frontal	1	0	1
Coronal suture	2	0	2
Total	**13**	**11**	**24**

Table 98 demonstrates the location of quadrilateral entry wounds (bone or suture) in the two burial pits. Given the small sample sizes, defects appear relatively evenly distributed throughout crania. As one would expect, the direction of force generally corresponds to the bone or location of entry. Table 99 demonstrates that the majority of entries occurred on the right side and posterior, with fewer to the left side, superior, and anterior aspects. No defects were observed on the inferior aspect of crania.

Table 99: Direction of Force of Quadrilateral Entry Wounds

Direction of Force	**Pit 23 (n)**	**Pit 26 (n)**	**Total**
Left-Right	0	4	4
Right-Left	4	4	8
Posterior-Anterior	5	3	8
Anterior-Posterior	1	0	1
Superior-Inferior	3	0	3
Inferior-Superior	0	0	0
Total	**13**	**11**	**24**

Composite images of quadrilateral defects in pit 23 demonstrate that defects cluster on the superior, posterior, and right sides of crania. Only one quadrilateral defect entrance wound was observed on the anterior aspect, while no entries were observed on the left side or inferior of any crania in pit 23 (Figure 94). In pit 26, quadrilateral defect entries were observed on the right side, left side, or posterior of crania, while no defects were observed on the superior, inferior, or anterior aspect of any crania (Figure 95).

Figure 94: Quadrilateral Entry Defect Composites for Pit 23

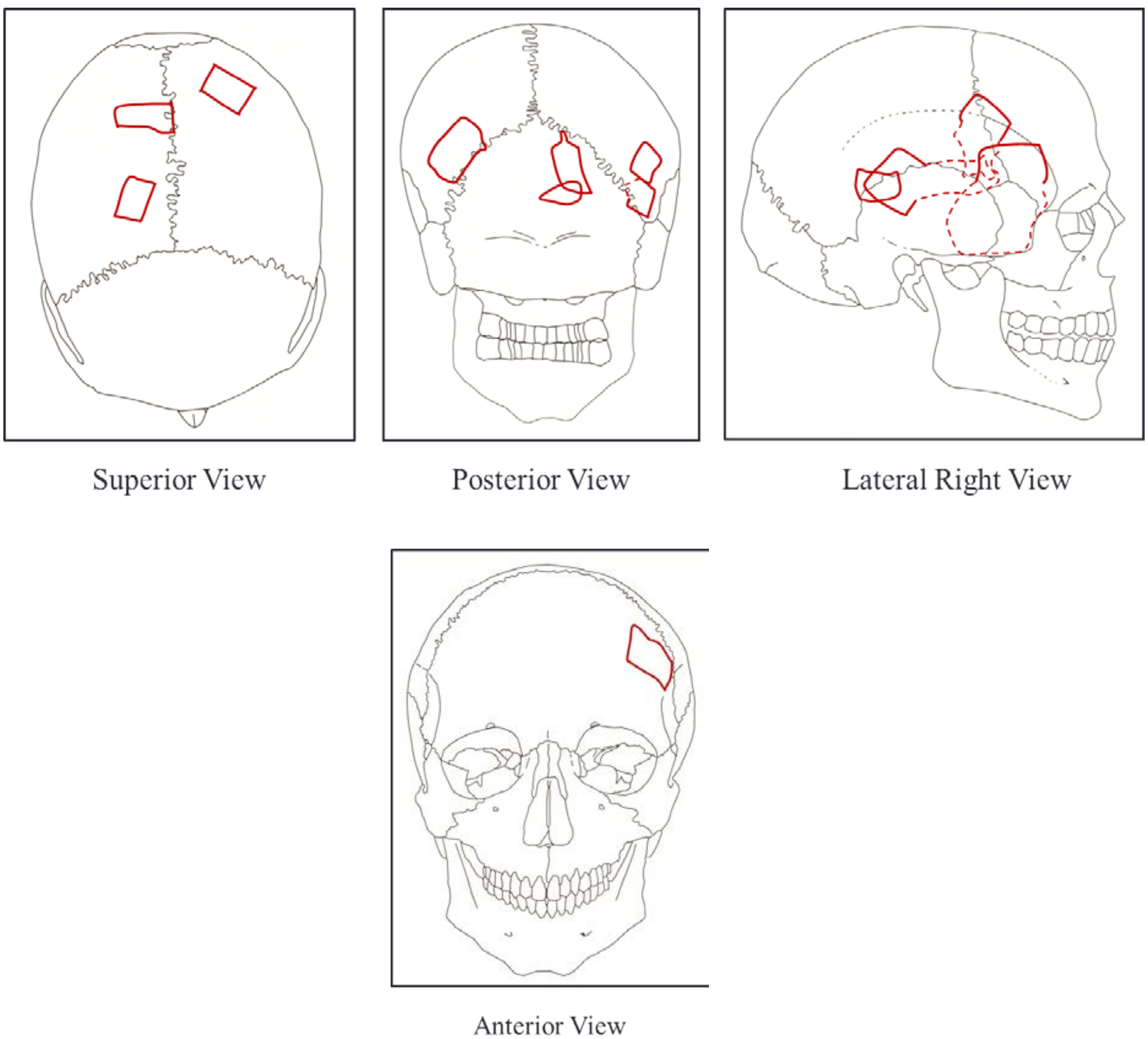
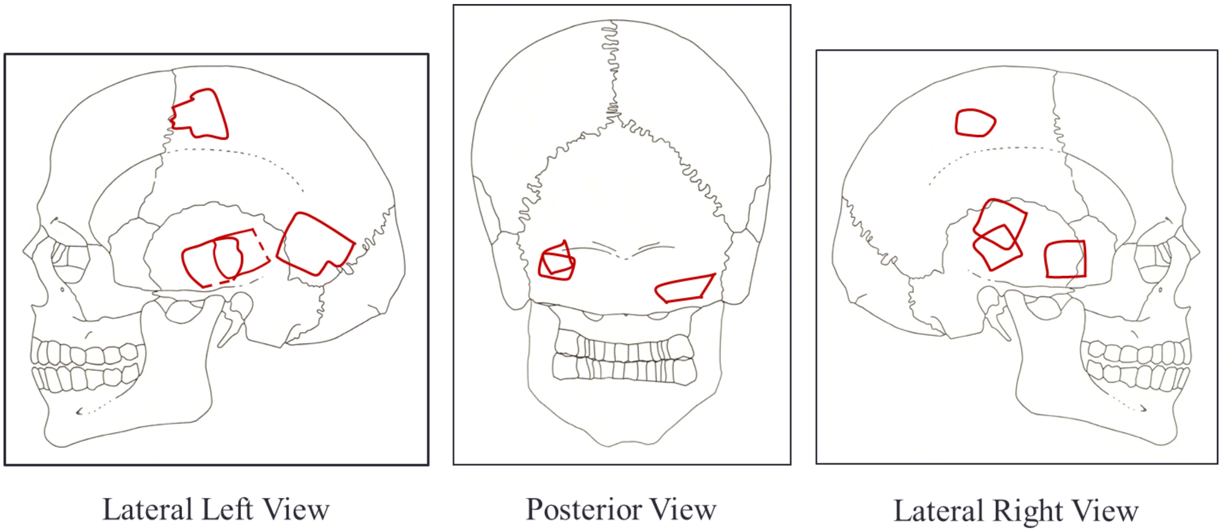


Figure 95: Quadrilateral Entry Defect Composites for Pit 26

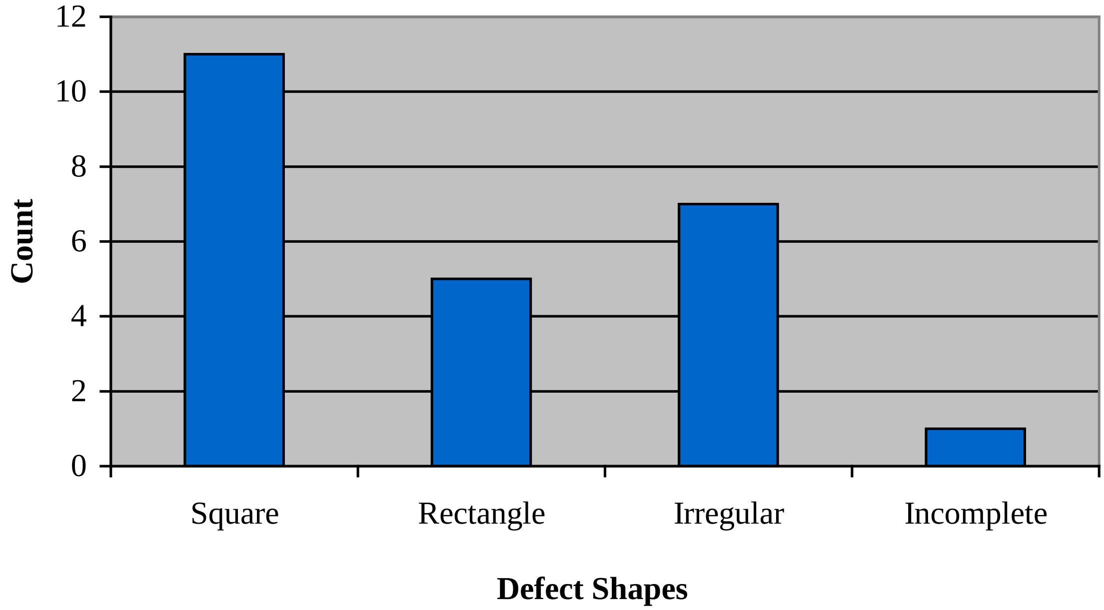


The maximum dimension of all defects were between 10 and 30 millimeters in size. Square defects were the most commonly observed shapes (46%), followed by irregular shapes (29%), rectangular shapes (21%), and incomplete (4%) (Table 100 and Figure 96). Differences in defect shape, particularly irregular and rectangular shapes, may represent varying angles or depths of penetration of the implement or possibly the use of a completely different implement.

Table 100: Shapes of Quadrilateral Entry Defects

Shape	**Pit 23 (n)**	**Pit 26 (n)**	**Total**	
			n	**%**
Square	5	6	11	45.8
Rectangle	3	2	5	20.8
Irregular	4	3	7	29.2
Incomplete	1	0	1	4.2

Figure 96: Shapes of Quadrilateral Entry Defects



Examples of square and rectangular defects are visible in Figure 97, while Figure 98 demonstrates irregular-shaped defects. Additionally, Figure 99 demonstrates the sole case of an incomplete square defect on the occipital, which was observed in close proximity to a complete square defect to the right. A closer view of the defect reveals that it was likely caused by a pointed object, which slid across the bone surface but did not penetrate the endocranium. Radiating fractures, as well as a wedge of bone lifted outward (indicated by an X) is present which likely corresponds to damage associated with removal of the object. This incomplete defect is particularly helpful in elucidating the shape (pointed end) of the object.

Figure 97: Square and Rectangular-Shaped Quadrilateral Entry Wounds

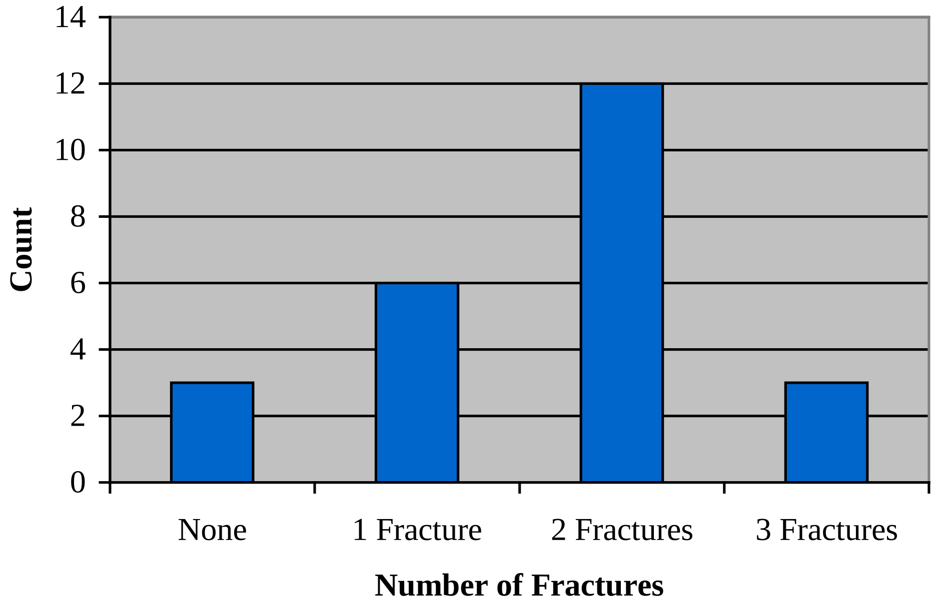
Figure 98: Irregular-Shaped Quadrilateral Entry Wounds

Figure 99: Example of an Incomplete Quadrilateral Entry Defect

Table 101: Number of Radiating Fractures

Radiating Fractures	**Pit 23 (n)**	**Pit 26 (n)**	**Total**
None	0	3	3
1 fracture	3	3	6
2 fractures	7	5	12
3 fractures	3	0	3

Figure 100: Number of Radiating Fractures



Radiating fractures were also observed in association with quadrilateral defect entry wounds. These ranged from zero to three fractures, with two radiating fractures being the most common (Table 101 and Figure 100). Additionally, a number of quadrilateral defect entry wounds demonstrated lipped or raised edges and "wedges" of bone pulled outward between radiating fractures (Figure 101). Internal and external beveling was also observed, however, internal beveling tended to be much more extensive than external beveling. This edge damage is likely associated with the object penetrating the cranium and then being extracted.

Figure 101: Examples of Edge Damage on Quadrilateral Entry Wounds

Quadrilateral exit wounds were far less common. Two cases were observed in burial pit 23. Individual 489 demonstrated a possible incomplete exit wound on the inferior of the cranium, just right of the foramen magnum (Figure 102). This exit defect was directly across from a quadrilateral entrance wound, which was on the superior aspect of the cranium. The exit defect manifested as bone pushed outward (like a reverse depressed fracture), but the instrument did not completely penetrate the outer table. Individual 484 also demonstrated a possible exit on the right squamosal suture, which lay directly across from a much larger entry wound on the left side of the cranium (Figure 103). External beveling was noted, but no internal beveling was observed. Furthermore, one radiating fracture was noted extending superiorly.

Figure 102: Possible Exit Wound on Individual 489

Figure 103: Possible Exit Wound on Individual 484

In summary, quadrilateral entry wounds were generally square or rectangular in shape, but also exhibited irregular patterns. Associated radiating fractures were quite common, ranging from 0 to 3 radiating fractures. Entrance defects also demonstrated different types of edge damage, including lipped margins and wedges of bone pulled outwards. Although internal and external beveling was observed, internal beveling was more extensive. In contrast, few quadrilateral exit wounds were observed. Exit wounds were always observed in opposition to a larger quadrilateral entrance wound. When present, they were more variable in shape than the corresponding entry wounds, ranging from bone pushed outward (where the endocranial surface was impacted but not penetrated) to small, square-shaped wounds. Radiating fractures also occurred in association with exit wounds. Exit wounds also tended to be externally beveled, with limited to no internal beveling.

Based on these characteristics, I argue quadrilateral defects are likely caused by long objects with sufficient mass to penetrate bone. They are square in cross section, taper from base to tip, have a pointed tip, and are long enough to span the width of a cranium. They likely represent a combination of sharp and blunt force trauma, similar to trauma caused by machetes or axes. Previous researchers (Jankauskas et al. 2005) have speculated that these quadrilateral defects may have been caused by axe or bayonet. While it is not my intention to identify a particular object, it may be possible to identify a class of weapon that produced these wounds. Historical cases, such as that of Leon Trotsky's assassination, may help with interpretation of quadrilateral defects in the Tuskulenai case.

TROTSKY CASE

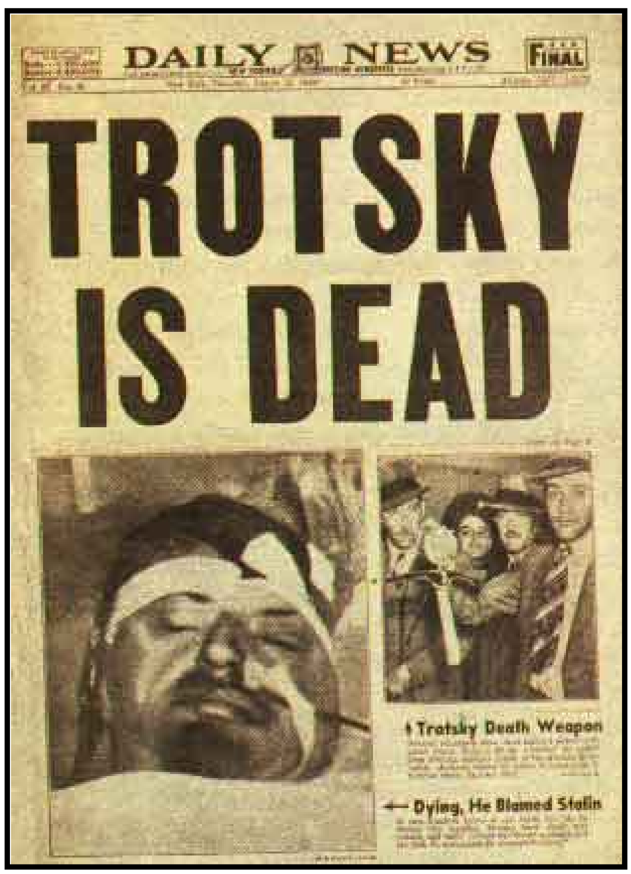
Leon Trotsky represented a principal organizer of the Bolshevik revolution, an effective military leader, and one of the architects of the U.S.S.R. (Thompson 1998). During the early years of the Soviet state, Joseph Stalin and Trotsky fundamentally disagreed regarding the direction of the party's policies. Yet, relations between the men remained civil while Lenin dominated the party. However, as Lenin's power and health waned during the early 1920s, Stalin's power increased. Following Lenin's death in January 1924, Stalin isolated Trotsky by removing him as the Commissar for War (1925), from the Politburo (1926), and expelling him from the party (1926). By 1928, Stalin exiled Trotsky from the Soviet Union (Thompson 1998).

Trotsky eventually settled in Mexico City in a community of fellow communists including Diego Rivera and Frida Kahlo. However, Stalin was notoriously suspicious of many of his rivals and ordered their assassinations from afar, including that of Trotsky. As early as 1931, Stalin secretly noted to other Soviet leaders that, "Trotsky, this criminal gang-boss and Menshevik charlatan, has to be bumped on the head….he has to know his place" (Volkogonov 1996:439).

Trotsky survived numerous assassination attempts throughout his life. However, on August 20, 1940, he was attacked in his home in Mexico City by Ramon Mercader, who had befriended Trotsky in the previous year. As Trotsky directed his attention away from Mercader, Mercader allegedly hit Trotsky with an ice axe, which he brought with him (Volkogonov 1996). Upon hearing a commotion, Trotsky's bodyguards rushed into the room and detained Mercader for questioning (Figure 104). While Trotsky lived more than a day and was lucid for some of that time, he eventually died of blood loss and shock on August 21, 1940 (Figure 105).

Figure 104: Ramon Mercader in Custody (Volkogonov 1996)

Figure 105: Article Reporting Trotsky's Death (New York Daily News 1940)



DAILY NEWS

FINAL

TROTSKY IS DEAD

Trotsky Death Weapon

Dying, He Blamed Stalin

Mercader was tried for Trotsky's murder in 1940. During the trial, he testified: "I laid my raincoat on the table in such a way as to be able to remove the ice axe which was in the pocket. I decided not to miss the wonderful opportunity that presented itself. The moment Trotsky began reading the article, he gave me my chance; I took out the ice axe from the raincoat, gripped it in my hand and, with my eyes closed, dealt him a terrible blow on the head" (Volkogonov 1996).

The ice axe used during the Trotsky assault represents a heavy object that can be swung with one hand (Figures 106 and 107). It has a wooden handle and two metal projections, which include a long pointed end and a short, flat end. The pointed end tapers from base to tip and is square in cross-section. Ice axes resemble a lighter, less cumbersome pick axe. However, this choice of weapon is perplexing in Mexico. Ice axes are typically used to break up ice, and was likely not readily available as a utilitarian item in Mexico City due to the moderate climate. Mercader's background, specifically his association with the Soviet security apparatus, possibly sheds light on his choice of weapon for the assassination.

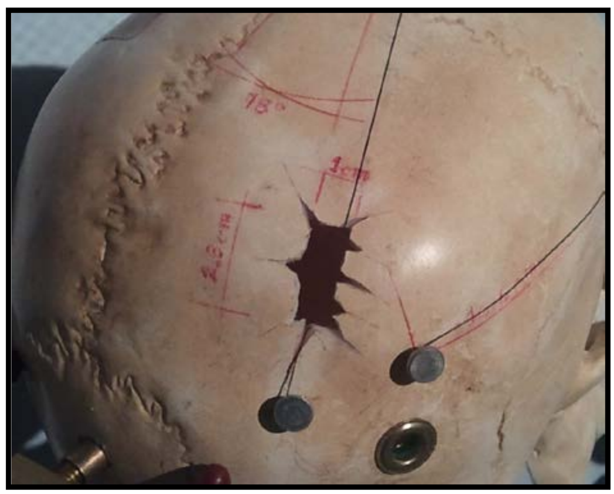
Figure 106: Press Photograph of the Ice Axe Recovered at the Crime Scene

Figure 107: The Ice Axe used by Ramon Mercader (Photo Courtesy of Jason Bird)

Ramon Mercader was born in Spain in 1913 to Communist parents. During the 1930s, he was allegedly recruited by the Soviet security apparatus and trained as an agent in Moscow (Volkogonov 1996). In 1938, he moved to Mexico City and, after befriending and then assassinating Trotsky, Mercader spent the next 20 years in prison. After his release in 1960, Mercader was awarded the Hero of the Soviet Union (one of the highest awards individuals could receive) by the head of the KGB. For the rest of his life, he travelled between the Soviet Union and Cuba (Volkogonov 1996). The Soviet security apparatus has an extensive history of training agents in unusual assassination techniques. Mercader's background, specifically his alleged association with the Soviet security apparatus, makes this case significant.

After Trotsky's death, an autopsy was performed and a cast of his skull was made which demonstrated his injury (Figure 108). The wound is located on the right parietal, and indicates a superior direction of force consistent with Mercader's testimony. The quadrilateral defect, which is approximately 10 x 23 mm in size, has four straight sides and four corners. Linear projections extend from the defect, but these may represent an artifact of casting. Overall, the quadrilateral defect in the Trotsky case resembles those found in the Tuskulenai case. The similar patterning of defects suggests that a similar class of object, such as a pointed axe, may have been employed in both cases.

Figures 108: Quadrilateral Defects on Trotsky's Skull (Photo Courtesy of Jason Bird)



SUMMARY

Individuals in the Tuskulenai case exhibit a number of different types of traumatic injuries. Specifically, they provide a range of variation associated with quadrilateral defects. This chapter indicates that quadrilateral defects represent patterned wounds. Entrance wounds were generally square or rectangular in shape, but many appeared irregular when accompanied by adjacent fragmentation. Exit wounds were more variable in shape than entrance wounds. Entry and exit wounds both exhibited associated radiating fractures. Finally, both entry and exit wounds exhibited edge damage: entrance wounds often demonstrated lipped edges or wedges of bone pulled outwards, as well as both internal and external beveling. Exit wounds demonstrated external beveling with limited internal beveling. Based on these characteristics, I argue that quadrilateral defects are likely caused by long objects with sufficient mass to penetrate bone. They are square in cross section, taper from base to tip, have a pointed tip, and are long enough to span the width of a cranium. They likely represent a combination of sharp and blunt force trauma. In the Tuskulenai case, quadrilateral defects were found alone as well as in conjunction with other mechanisms of trauma (e.g. gunshot wounds). Thus, perpetrators may have been employing these weapons in a variety of capacities (e.g. to wound, to kill, or as a coup-de-grace).

The Trotsky assassination is particularly useful for interpreting the Tuskulenai case. Specifically, it provides a precedent for state security agents employing objects, such as ice axes, to kill or injure “enemies.” While this study does not identify the exact weapon used to create quadrilateral defects, it suggests a class of weapon (e.g. pointed axes) that may have been employed in the Tuskulenai case.

CHAPTER 10: DISCUSSION OF MORTUARY & SKELETAL RESULTS

State-sponsored violence is more than policies and laws enacted by bureaucratic elites. It also represents the behavior of individual agents acting on behalf of the state. Due to nature of state bureaucracies, especially those dealing with state security, researchers cannot assume that records of violence reported by state bureaucrats reflect the true extent of violence perpetrated. While historical data document the presence of conflict, analysis of burial conditions and trauma represent the direct evidence of violent interactions. Specifically, skeletal and archaeological data permit researchers to test the actual adherence to bureaucratic standards of violence established by state authorities.

This dissertation attempts to shed light on the relationship between the state security apparatus and its agents in the Soviet Union during the Stalinist period through bioarchaeological and forensic analyses of burial treatment and perimortem trauma. A number of research goals were pursued, including 1) to understand how execution and interment procedures changed *over time* in the Tuskulenai case; 2) to evaluate how execution and interment procedures varied between two of the *execution squads* in the Tuskulenai case; and 3) to investigate how execution and interment procedures varied among four Soviet cases of violence (e.g. Vinnytsia, Katyn, Rainiai, and Tuskulenai). With these goals in mind, this chapter reexamines the results of skeletal and mortuary analyses presented in chapters six through nine. It also explores potential reasons for the improvisation of violence and places the findings of this research into the broader discussion of the anthropology of state-sponsored violence.

This chapter is divided into four major sections. The first section evaluates the results of mortuary analysis in the Tuskulenai case, addressing the first hypothesis related to burial treatment. The second section examines the results of skeletal analyses in the Tuskulenai case. This section also addresses the first hypothesis related to perimortem trauma. The third section discusses the results of the integrated analysis of Soviet cases of violence, addressing the second hypothesis. Finally, the fourth section examines the broader implications and limitations of this dissertation. It also suggests future avenues of research for state-sponsored violence.

DISCUSSION OF MORTUARY RESULTS IN THE TUSKULENAI CASE

This section reviews the results of the mortuary analysis in the Tuskulenai case. Employing data from the Tuskulenai site report, I examined archaeological variables related to pit features (i.e. length, width, depth, number of individuals per pit), the body arrangement of prisoners (e.g. head orientation and body position), material culture (e.g. artifact number and type), the inclusion of concealment materials, and the presence of bindings. These variables were evaluated for the entire sample, as well as over time and between execution squads in order to address the first research question: Does burial treatment vary over time or between security personnel in the Tuskulenai case?

Mortuary Results for All Tuskulenai Samples

This dissertation sampled 159 individuals from 12 burial pits in the Tuskulenai case. All of the sampled burial pits represent mass graves created from 14 July 1945 to 21 January 1947. Prisoners were interred in two locations on the Tuskulenai Estate: within the former garage and north of the garage. The earliest pits sampled were located north of the garage and interred in a sequential east to west pattern. These pits contained prisoners executed during the late summer/early fall of 1945. The mid to late dated burial pits were located within the former garage and were interred in a general west to east pattern. These pits contained prisoners executed during winter 1945/46, fall 1946, and winter 1946/47. The spatial layout supports Jankauskas et al.'s (2005) findings that perpetrators were burying prisoners' remains within the garage during colder months and outside of the garage in warmer months. Furthermore, the orderly layout of burial pits by time indicates that perpetrators systematically planned for the disposal of prisoner remains in future episodes of mass violence.

The number of individuals per pit ranged from 6 to 19 individuals, with a mean of 13.25 individuals per pit. For all burial pits combined, pit sizes ranged from 0.90 meters to 2.80 meters. The mean starting depth for all pits was 152 cm with a mean ending depth of 236 cm. The thickness of all pits ranged from 40 to 130 cm, with a mean thickness of 84 cm.

The arrangement of bodies was evaluated by the orientation of the head and position of the body of individuals in burial pits. Individuals were discovered with varying head orientations throughout the Tuskulenai sample. Heads were located more commonly in the western and eastern ends of pits, while the body positions of individuals were relatively evenly distributed between supine and prone positions. While a general east-west head orientation existed, approximately 29% of the Tuskulenai sample demonstrated other (e.g. north, south, etc.) head orientations. The lack of a single preferred head orientation or body position suggests that perpetrators did not bury prisoners with a standard, mortuary norm in mind. Instead, the placement of prisoners may have been haphazard or a product of functional requirements of the pit (e.g. pit dug in an east to west orientation based on space available in the former garage). This inference is confirmed when head orientation and body position are analyzed together. Approximately 83% of the sampled pits demonstrated a disorganized arrangement of bodies (neither the head orientation nor the body position was consistent throughout all individuals in a pit). Only 17% of pits demonstrated a semi-organized arrangement, as the head orientation of all individuals in both of those pits were consistently located in the north (although body positions varied). None of the burial pits demonstrated an organized arrangement of bodies.

The sampled pits contained a total of 196 artifacts, most of which were clothing items (e.g. buttons), followed by personal effects and weapons. Historical documents were not discovered in any of the Tuskulenai sampled pits. Various combinations of concealment materials were discovered in burial pits at Tuskulenai. Burial pits equally demonstrated tar paper only and combined tar paper, lime, and organic materials. Fewer burial pits contained lime and tar paper or tar and organic material. Concealment materials were absent in three burial pits. Finally, the presence of bindings was assessed cautiously from the position of remains within burial pits. Approximately 17% of individuals in the Tuskulenai sample were discovered *in situ* with both arms bent behind their backs, indicating that they may have been bound at the time of execution and interment.

Mortuary Results over Time and Between Execution Squads

Comparison of mortuary variables *over time* revealed that while pit features varied from the earliest to latest dated pit, they were not significantly different. The body position of prisoners was relatively evenly distributed between prone and supine positions through time. While prisoners were interred with their heads in the east or west throughout time, north or south head orientations were only discovered later in time. Generally, a disorganized pattern of burial was observed across all burial pits, and little difference was observed in material culture and concealment materials. However, the presence of bindings significantly varied over time, as bindings were only observed in early to mid-dated pits. Thus, hypothesis 1 (i.e. burial treatment will remain consistent *over time*) was partially supported based on lack of consistency in head orientation and the presence of bindings over time.

Comparison of mortuary variables *between execution squads* revealed no significant differences in pit features (e.g. number of individuals per pit, and pit length, width, and thickness), body position, material culture, and concealment materials. However, significant differences were observed in the head orientation and binding of prisoners between Dolgirev's and Prikazchikov's samples. Similar to the evaluation of mortuary variables over time, hypothesis 1 (i.e. burial treatment will remain consistent *between security personnel*) was partially supported.

DISCUSSION OF SKELETAL RESULTS IN THE TUSKULENAI CASE

This section discusses results of skeletal analyses in the Tuskulenai case. Specifically, skeletal variables related to the degree of trauma, percentage of body recovered, decompositional stage, victim demographics (e.g. age and sex), and mechanism of perimortem trauma (e.g. percentage affected, number of episodes, anatomical location, and direction of force) are reviewed. Additionally, compliance with the state guideline for execution and specific features of quadrilateral defects are also reviewed. Variables are discussed for the entire sample, as well as over time and between execution squads in order to address the first research question: Do perimortem injuries vary over time or between security personnel in the Tuskulenai case?

Skeletal Results for All Tuskulenai Samples

A total of 155 individuals were assessed in 12 dated burial pits. All remains were skeletonized, demonstrating various degrees of preservation. Approximately 88% of individuals were complete and 12% were partial. While 95% of individuals demonstrated major trauma, trauma was absent or unobservable in 5% of the sample. Perimortem trauma was absent in the remains of four complete and well-preserved individuals in the Tuskulenai sample. This is perplexing, given the fact that individuals buried at Tuskulenai were prisoners who were reportedly executed by the NKGB-MGB. Numerous explanations may account for these cases. First, it is possible that these prisoners died of "natural" causes (e.g. heart attack) during imprisonment or interrogation and thus, were not executed (in a traditional sense). Given the reported use of physical coercion during interrogations (Vaitiekus 2011), it is possible that abuse may have exacerbated the health of some individuals. Another possibility is that the prisoners were in fact executed, but due to the location of trauma, skeletal tissues were unaffected (e.g. execution by gunshot to the abdomen, which injured soft tissue but not bone).

The Tuskulenai sample does not represent a normal population, such as a cemetery might. Individuals were targeted for violence by the Soviet state. As such, the sample is overwhelmingly composed of males (94%), with very few females (2%). Sex could not be determined in 4% of the sample, but these individuals likely represent males as well. Furthermore, young (41%) and middle adults (39%) dominate the Tuskulenai sample, with fewer old adults (10%) and subadults (7%). Evaluation of mechanism of trauma by age category reveals that the application of perimortem trauma did not vary by age group.

Perimortem trauma was evaluated in 151 individuals in the Tuskulenai sample. Gunshot trauma (87%) was most prevalent, followed by blunt force (40%), quadrilateral defects (15%), and sharp force (3%). Most gunshot wounds represented single entries, although up to five entry wounds were observed. All gunshot wounds were observed in crania, predominantly on the occipital bone, followed by the left parietal, or right parietal. Approximately 84% of gunshot wounds arose from a posterior direction of force.

Blunt force trauma was observed in 40% of the Tuskulenai sample. Single episodes of blunt force trauma were most common, although up to four episodes were observed. Most blunt force defects were observed in crania, although four episodes of postcranial trauma were noted. Finally, approximately 49% of traumatic episodes occurred as a result of blunt force to the posterior of the head while 24% occurred as a result of blunt force to the face.

Only 3% of individuals in the Tuskulenai sample exhibited sharp force trauma. The number of sharp force wounds varied from one to two entries, with single entries (75%) being the most frequent. All sharp force defects were observed on crania and the direction of force of these wounds varied considerably.

Quadrilateral defects were observed in 15% of the sample. Most quadrilateral defects represented single entries, although up to three entry wounds were discovered. All quadrilateral defects were observed in crania, predominantly on the right parietal, left parietal, and occipital, and the direction of force varied mainly among posterior-anterior, right to left, and left to right.

Perimortem defects that were ambiguous or difficult to discern were placed in an "undetermined" category. Undetermined defects were observed in 13% of crania in the Tuskulenai sample. However, all individuals who demonstrated undetermined defects also exhibited at least one recognizable mechanism of trauma (e.g. gunshot wound) in conjunction with these defects. The anatomical location and direction of force associated with these defects varied widely.

In order to assess whether state agents implemented violence according to the bureaucratic standard of the security apparatus, overall compliance was evaluated per individual. The state guideline for execution in the Soviet Union during the 1930s and 40s mandated fusillade (firearm) to the back of the head (Vaitiekus 2011). Fulfillment of this directive required that a specific mechanism of trauma (gunshot wound), direction of force (rear), and region of injury (cranium/neck) be employed. Three categories of compliance (with the state guideline for execution) were evaluated, including full compliance, partial compliance, and non-compliance. In the combined Tuskulenai sample, approximately 40% of individuals were executed in full compliance, 5% in partial compliance, and 54% in non-compliance.

Finally, a number of quadrilateral defects were observed in the Tuskulenai case. These patterned wounds represented a mixed mechanism category of injuries, with distinct characteristics. For instance, entrance wounds were generally square or rectangular in shape whereas exit wounds were more variable in shape. Entry and exit wounds both exhibited associated radiating fractures. Finally, both entry and exit wounds exhibited edge damage: entrance wounds often demonstrated lipped edges or wedges of bone pulled outwards, as well as both internal and external beveling. Exit wounds demonstrated external beveling with limited internal beveling. Based on these characteristics, I argue that quadrilateral defects are caused by long objects with sufficient mass to penetrate bone. Associated objects are likely square in cross section, taper from base to tip, have a pointed tip, and are long enough to span the width of a cranium. The Trotsky assassination provides a precedent for state security agents employing these objects, such as ice axes, to kill or injure “enemies.” While this study does not identify the exact weapon used to create quadrilateral defects, it suggests a class of weapon (e.g. pointed axes) that may have been employed in the Tuskulenai case.

Skeletal Results over Time and Between Execution Squads

Comparison of skeletal results over time revealed that while the number of individuals affected by gunshot wounds decreased over time, the number of individuals affected by non-gunshot mechanisms increased over time. The anatomical location of trauma and direction of gunshot wounds, blunt force, sharp force, and quadrilateral defects did not change over time. However, compliance with state standards generally decreased from the early to later dated pits. Thus, hypothesis 1a, which anticipated that skeletal samples in the Tuskulenai case would exhibit increasing variation of perimortem trauma over time, was partially supported.

Comparison of skeletal results between execution squads revealed that there were significant differences in the mechanism of trauma employed between execution squads. Analysis of gunshot trauma demonstrates that both the *number of individuals* shot and the *number of times* prisoners were shot were greater in Dolgirev's sample than Prikazchikov's sample. Thus, not only was Prikazchikov's squad shooting fewer people than Dolgirev's squad, but they were using fewer bullets as well. At the same time, Dolgirev's squad employed less blunt force and fewer quadrilateral defects. No difference was observed in the use of sharp force, or the anatomical location or direction of force of trauma between executioners. Comparison of compliance reveals that Dolgirev's squad executed prisoners in compliance with state standards significantly more than Prikazchikov's squad. Thus, hypothesis 1b, which anticipated that skeletal samples in the Tuskulenai case would exhibit increasing variation of perimortem trauma between security personnel, was also partially supported.

Compliance in the Tuskulenai Case

Since execution squads and time are intimately related (i.e. execution squads operated consecutively, rather than concurrently) it is difficult to completely separate the two variables. However, evaluation of compliance versus non-compliance over time within each execution squad helped elucidate the role of these variables. In Dolgirev's sample, a general decrease in compliance from the first to the last dated burial pits was observed, yet compliance fluctuated considerably over time.

The overall pattern of compliance observed in the Tuskulenai case was generally expected. Caton and Zacka (2010) argue that in conditions of uncertain or unanticipated threats, agents may perceive a need to improvise violence. In the Tuskulenai case, the Soviet Army pushed the Nazis west toward the end of the Second World War and re-occupied Lithuanian territory. Shortly after this occupation, the Soviet security apparatus (NKGB) targeted individuals they suspected of collaborating with the Nazis during the German occupation of Lithuania (Vaitiekus 2011). Since these prisoners likely did not pose an imminent threat and agents would have been acting in a disciplinary capacity, it was expected that agents would comply with the state guideline for execution. However, as time progressed, the partisan war in Lithuania intensified and the state began targeting anti-Soviet resistance fighters who posed an active threat to state security (Vaitiekus 2011). Since agents may have also perceived these prisoners as more threatening, it was expected that agents would improvise violence rather than comply with the state guideline. However, the demarcation between these periods was not known.

Skeletal analysis of compliance in Dolgirev's sample revealed that compliance was highest in the first dated burial pit, but steadily declined until the fifth dated burial pit. These pits correspond to the period of July to September 1945, and represent a narrow period of executions which occurred approximately one year after the commencement of the Tuskulenai case. Thus, the initially high rate of compliance and gradual decline may be capturing the transition between varying levels of threats. In the last three dated pits of Dolgirev's sample, which correspond to the period of December 1945 to August 1946, compliance fluctuates considerably. Since these pits represent a wider breadth of time, this study may be missing minor variations occurring over this nine month period. One of the lowest rates of compliance in Dolgirev's sample occurred in the last burial pit (August 1946), just prior to replacement by Prikazchikov's execution squad (November 1946). Interestingly, compliance in this last sampled pit more closely resembles compliance rates in Prikazchikov's samples.

The last four dated pits represent prisoners executed by Prikazchikov's squad and correspond to a narrow period of time, between November 1946 and January 1947. Skeletal analysis of Prikazchikov's sample revealed that compliance remained low, but stable over this period. Evaluation of the mechanism of trauma demonstrates that while Prikazchikov's squad was still employing fusillade to execute prisoners, they not only killed fewer prisoners by gunshot wounds than Dolgirev's squad but they also used fewer bullets. At the same time, they increased their use of blunt force and quadrilateral defects. Thus, it appears that both time and execution squad affected compliance rates in the Tuskulenai case.

However, a number of factors must be considered before this interpretation is unequivocally accepted. In particular, the broad time associated with Dolgirev's last three burial pits and the small sample size associated with Prikazchikov's squad restricts this analysis. Compliance in additional burial pits from Prikazchikov and Dolgirev's squad should be tested. Furthermore, evaluation of historical data in conjunction with skeletal data should be also performed. Specifically, data regarding crimes that prisoners were accused of committing may elucidate whether threats are truly driving compliance rates. Finally, a major limitation to this analysis includes the role that non-written commands for violence from superiors may have played. While a state standard for execution existed during the Stalinist period, state agents may have received contradictory orders through verbal or tacit orders. This problem is illustrated in a quote by Andrey Vyshinisky, the Procurator General of the Soviet Union and state prosecutor during the 1930 show trials, who in March 1937 stated: "There are stages in the history of man, and in our lives, when the laws are seen to be obsolete, and one must push them aside" (Levytsky 1972:119-120). Levytsky (1972) argues that this declaration reflected the Soviet security apparatus' true *modus operandi*. Unfortunately, the influence of verbal commands is difficult to assess given the secrecy of the Soviet security apparatus and the length of time since the case occurred.

DISCUSSION OF THE INTEGRATED ANALYSIS

Mass graves from Vinnytsia, Katyn, and Rainiai demonstrate a range of cases of violence perpetrated by the Soviet state during the post-1936 period until the Second World War. This analysis attempted to illustrate how violence in the Soviet Union changed from the pre to post-War period. This section reviews comparisons between mortuary and skeletal variables in the Vinnytsia, Katyn, Rainiai, and Tuskulenai cases in order to address the second research question: Do perimortem injuries and burial treatment vary among cases of Soviet state-sponsored violence during the Stalinist period? When possible, features of the burial pits, and the presence of material culture, concealment materials, and bindings/gags were evaluated. Skeletal variables compared included the preservation of remains, sex of victims, presence of perimortem trauma, and compliance. Additionally, this section discusses implications for the concealment of crimes in the Soviet cases and possible explanations for the improvisation of violence by state agents.

Summary of the Integrated Analysis

The integrated analysis discussed in chapter eight compared mortuary and skeletal variables in the Vinnytsia, Katyn, Rainiai, and Tuskulenai cases in order to address the second research question and hypothesis. This hypothesis anticipated that the frequency of perimortem injuries in prisoners would be consistent in the Vinnytsia and Katyn cases, but vary in the Rainiai and Tuskulenai cases. Furthermore, burial treatment was expected to be consistent across all four sites. This hypothesis was rejected. Evaluation of mortuary features demonstrated that burial treatment was fairly consistent across all cases, with some exceptions. Consistency was seen in the presence of both material culture and concealment materials in the burial pits, as well as the binding/gagging of prisoners. However, the organization of bodies in the burial pits differed between the sites, as did the mean number of individuals per pit.

Overall, perimortem injuries at Vinnytsia and Katyn were consistent with regard to gunshot wounds (e.g. percent affected, anatomical location, direction of force). Consistency in perimortem trauma between these cases confirms conclusions from historical data that mass violence was performed by a highly efficient bureaucracy. The Vinnytsia case formed as a result of the Great Terror of 1937-1938. During this period, quotas for arrests and executions were issued by principals (e.g. Stalin) and careful planning ensued regarding the handling of prisoners (Kamenetsky 1989).

At Katyn, senior NKVD agents in Moscow were provided an entire month to prepare for five weeks of mass violence against 22,000 prisoners of war (Sanford 2005). The evacuation, transportation, and execution of prisoners represented discrete phases, with security agents playing bureaucratic roles in each of these stages (e.g. security agents who evacuated prisoners did not participate in their execution and vice versa). The differentiation of these stages, along with distinct role of agents, created the maximum amount of secrecy. Additionally, individuals outside of the security apparatus (e.g. camp personnel) had limited knowledge of the plans for mass execution. Prisoners were even lulled into a false sense of security by the spread of false rumors (e.g. transporting prisoners back home) and the vaccination of prisoners against typhus, dysentery, and cholera in light of scarce medical resources (Sanford 2005). The execution stage was also performed systematically. Sanford (2005: 95) contends that, "The element of planned, impersonal and unemotional control predominated even though the chosen Soviet method of execution was about as direct and personal a relationship between executioner and victim as one could get…every single one of the victims was shot…by an individual NKVD executioner aiming to kill his victim with a single shot to the back of the head." In all, the mass violence that conspired in the Katyn case required the cooperation of decision makers, planners, and implementers, differentiated in a vast state bureaucracy of violence (Cienciala et al. 2007).

Perimortem injuries in the Rainiai case differed significantly from those at Vinnytsia, Katyn, and Tuskulenai. Individuals in the Rainiai sample demonstrated fewer gunshot wounds, which, when present, were often located on postcranial elements and/or were from a non-rear direction. Furthermore, the percentage of individuals affected by blunt force and sharp force trauma was greater at Rainiai than at Vinnytsia or Tuskulenai. There may be multiple explanations for these differences. First, regards the tenuous climate of the pre-War period of June 1941. Given the unanticipated German invasion into Lithuanian territory, Soviet authorities did not organize a clear plan to manage prisoners. Additionally, the danger of an impending invasion and ensuing chaos to evacuate may have heightened agents' sense of threat and increased the likelihood of the improvisation of violence. However, an additional (although not mutually exclusive) reason for the diversity of violence inflicted on prisoners may concern the perpetrators involved. Šiušaitė and Landsbergis (2007) contend that NKGB agents were assisted by members of the Red Army. These soldiers would have been outside of the formal security apparatus, and thus were likely not trained according to professional standards and not directly answerable to NKGB superiors. The admixture of perpetrators and impending threat of German invasion may account for the diversity of violence seen in the Rainiai case.

Perimortem trauma in the Tuskulenai case is different from both the Vinnytsia/Katyn cases and the Rainiai case. The number of individuals affected by gunshot wounds was significantly lower in the Tuskulenai sample than Vinnytsia or Katyn, and there were significantly more non-rear gunshot wounds. However, the anatomical location of gunshot trauma was consistent across the Vinnytsia, Katyn, and Tuskulenai samples. Additionally, the percentage of individuals affected by blunt force and sharp force trauma was significantly higher at Tuskulenai than at Vinnytsia. Finally, compliance with the state guideline for execution was significantly lower at Tuskulenai than at Vinnytsia or Katyn, but significantly greater than Rainiai. These results are not surprising. The Tuskulenai case was formed over a greater length of time (1944-1947) than any of the other cases. Not only did the security apparatus encounter varying levels of threat over this three year period, but security personnel (e.g. executioners) changed multiple times. Given these factors, it is not expected that perimortem trauma fluctuated in the Tuskulenai case.

Comparison of the decompositional stage and percentage of body recovered revealed variations between sites based on the length of interment. The Rainiai case had the shortest postmortem interval (3 days). As such, remains in this case were fresh or bloated. In comparison, remains at Vinnytsia and Katyn were buried for longer periods of time (5 years and 3 years respectively) and showed active to advanced decomposition. Finally, remains in the Tuskulenai case were buried for the longest period (~50-60 years) and all remains demonstrated skeletonization. Due to the presence of soft tissue, individuals at Vinnytsia, Katyn, and Rainiai were all considered complete. However, remains at Tuskulenai were both complete and partial. While the decompositional stage and completeness of remains likely affected the overall assessment of trauma, major trauma was observed in 95 to 100% of all samples.

The overall majority (98-100%) of victims were male across all four sites. The sex distribution in these samples is different from those in other human rights contexts (Flavel and Barker 2009; Komar and Lathrop 2012). The overwhelming sexual selection of males as targets for execution, demonstrated in this study, may reflect the Soviet state's reluctance to execute females. Additionally, it may also reveal a reduced role of females in (overt or covert) anti-Soviet activity. However, females are not completely absent in these cases of Soviet mass violence. Furthermore, historical data confirms that females actively participated in the resistance movement in Lithuania (Kuodyte and Tracevskis 2004; Rudienė and Juozevičiūtė 2006) and were also subject to deportation, exile, and hard labor (Applebaum 2003). Thus, while the Soviet state more frequently selected males as targets for execution, females were not immune to mass violence by the security apparatus.

Concealment of Crimes

Dead bodies serve as powerful symbols, which can be manipulated by the living for political benefits (Verdery 1999). But this manipulation does not always manifest as commemoration, veneration, or even recognition of remains. The “annihilation” of the deceased, through the destruction, mutilation, or concealment of the corpse, reinforces the power of perpetrators, emphasizes the subjugation of victims, and can disrupt the mourning process for survivors (Pérez 2012). This study demonstrated that Soviet agents attempted to conceal their crimes from the general public, such as including corrosive materials (e.g. chlorinated lime) in the burial pits of executed prisoners. However, additional mechanisms of concealment were also employed by state agents at Vinnytsia, Katyn, Rainiai, and Tuskulenai.

At Vinnytsia, remains were discovered in three locations: an orchard, an Orthodox cemetery, and a public park. At all of these sites, Soviet agents actively attempted to conceal these remains. The orchard site was located outside, but near the city center and was surrounded on two sides by a boarded fence approximately three meters high, which was constructed in the winter of 1937/38. Additionally, the orchard was used for military purposes and under constant surveillance by NKVD agents (Kamenetsky 1989). Mass graves at the public park site were more conspicuous than those at the orchard site. Managed by the Soviet state as the “Park for Culture and Recreation,” burial pits were located in close proximity to a public dancing area, a swing set, and a “fun house” (Kamenetsky 1989). Soviet security forces actively concealed these graves by carefully landscaping the surfaces of burial pits, including planting thick shrubbery (as high as four meters tall) over their surfaces. Furthermore, the mass graves in this park bordered an NKVD prison which provided some protection (Kamenetsky 1989). While the cemetery site was also used by the public, graves were still not conspicuous. Investigations at this site revealed that the area had been enclosed by a boarded fence which was constructed in 1937-38. Additionally, low lying shrubbery had been planted on and around the mass graves. The mere placement of clandestine burials in a cemetery is an act of concealment since the graves of executed prisoners were assimilated into graves of the legitimately deceased. It is possible that the exposure of these mass graves was greatly diminished by the community's desire to keep sacred ground undisturbed.

The remains of executed prisoners in the Katyn case were buried in a remote, forested area. This interment site was located approximately ten miles west of Smolensk. From approximately 1917 to 1941, this area was under the control of the Soviet security apparatus. During the 1930s and early 1940s, a vacation villa for Soviet officials and agents was constructed, and the grounds were actively patrolled by NKVD agents with dogs (Zawodny 1971).

The Rainiai case differs with regard to concealment from the three other cases in a number of ways. In particular, the interment site was located within four kilometers of the town of Telšiai and within close proximity to a road and homesteads (Šiušaitė and Landsbergis 2007). Furthermore, while executions in the Vinnytsia, Katyn, and Tuskulenai cases purportedly took place in heavily guarded security buildings (e.g. NKVD central prison), executions associated with Rainiai were performed at the burial site rather than at the Telšiai prison. These behaviors likely increased the risk of exposure. However, based on historical data, state agents attempted to mitigate publicity by choosing a forested area, and masking the sounds of executions by keeping the engines of lorries and tanks running (Šiušaitė and Landsbergis 2007).

The Tuskulenai remains rested undisturbed for fifty years, until historical documents led forensic investigators to the mass graves following the restoration of independence. From 1944 until 1947, prisoners were executed at NKGB-MGB prison in Vilnius; their bodies were then transported by trucks to the Tuskulenai Estate where they were interred in mass graves. The Tuskulenai Estate was built during the 16th century as a royal manor. However, following the

Second World War, the Estate was nationalized by the Soviet Union and operated by the NKGB-MGB. The Tuskulenai Estate was chosen as the burial site by General Lieutenant Ivan Tkachenka, the Soviet NKVD-NKGB representative to the LSSR due to its proximity to the NKVD headquarters and the security provided by both NKGB agents and the Soviet army garrison (Vaitiekus 2011). Additionally, due to the partisan war in the countryside, Soviet authorities did not believe it was safe to venture far beyond the city boundaries. Located on outskirts of Vilnius (at that time), the Tuskulenai Estate provided an ideal location for clandestine burials. Concealment of burials was supplemented by a high stone and wooden wall which surrounded the estate. Furthermore, 37 of the burial pits were located within a garage structure (formerly the Estate stable), which provided shelter for the perpetrators and privacy from the public.

In addition to the inclusion of lime, tar paper, and organic materials in burial pits at Tuskulenai, agents also reportedly used additional concealment tactics. Based on historical data, in 1951 Soviet authorities became concerned about the discovery of the Tuskulenai remains. Thus, a special team of security agents made a concerted effort to destroy the remains through a number of processes. First, they bored holes throughout the Estate and filled them with sodium hydrate (a.k.a. lye) to hasten decomposition. State agents also destroyed the garage, leveled the territory, covered mass graves with soil and stones, and planted trees and bushes (Vaitiekus 2011). Furthermore, the Estate was developed into a summer camp for the children of security employees and eventually (1970s) included a sports hall and tennis courts. Renovations, such as the installation of paths and underground cables, were closely supervised by the KGB, who acted as successors to the 1940s security apparatus (Vaitiekus 2011). Thus, an active agenda of concealment was pursued by Soviet authorities in the Tuskulenai case.

Agents of the Soviet security apparatus went to great lengths to conceal their crimes in each of the cases. Not only were victims buried in clandestine graves with corrosive materials, but these sites were largely concealed by execution-interment site distancing: at Vinnytsia, Katyn, and Tuskulenai, prisoners were buried away from the site of execution. Selected interment sites included those protected by state forces (e.g. NKVD or military posts) or those that had a diminished likelihood of being disinterred (e.g. cemeteries or isolated forests). When human remains were interred within or close to cities, authorities often managed the landscape around the mass graves by erecting fences, planting shrubbery, or building structures on top of burial pits. These cases demonstrate concerted efforts to deter the local population from investigating executions committed by the state.

And yet, the population was not totally unaware of these clandestine affairs. In the Vinnytsia, Katyn, and Rainiai cases, members of the general populace led German forces to these locations because they suspected the Soviet state of burying prisoners at them. At Tuskulenai, remains were discovered after investigation of security documents which marked a possible location of clandestine graves. Since the Tuskulenai case occurred after the previous three cases (and the international publicity caused by the Katyn case), perhaps the security apparatus became more sensitive to best concealment practices later in time.

Improvisation of Violence

Max Weber's paradigm of bureaucracy provides a framework in which to analyze state-sponsored violence. However, this study demonstrates that principal-agent problems may exist in state bureaucracies. Specifically, agents may not comply with state guidelines for violence. Explanations for the improvisation of violence by state security agents is likely multifactorial.

Researchers have proposed numerous motivations for this improvisation, including exogenous threats, training, materialism, prisoner compliance, sadism, and desensitization to violence. This section reviews those reasons in light of the cases of Soviet violence.

Caton and Zacka (2010) contend that state agents retain the capacity for judgment, initiative, and creativity within the bureaucratic structure, which may result in the improvisation of violence. Caton and Zacka largely draw of Foucault's idea of the security apparatus, arguing that there are fundamental differences between disciplinary and security spaces. A security apparatus constantly deals with risk and uncertainty, and attempts to gauge what is actually happening in the population in order to manage it. In conditions of uncertain or unanticipated threats, such as managing enemy combatants, the improvisation of violence over discipline may be exercised by security agents. Thus, when exogenous threat levels are high, violence on the ground may take on an arbitrary quality. In the Tuskulenai case, historians have proposed two general categories of threat levels, although the exact demarcation between these periods is unclear. Researchers believe that early on in the Tuskulenai case, the security apparatus primarily targeted Nazi collaborators, who by 1944 no longer posed a tangible threat in Lithuania. This period is associated with Dolgirev's squad, who showed greater compliance with state guidelines. This makes sense if agents were acting in more of a disciplinary capacity during Dolgirev's tenure. However, as time progressed, the security apparatus began targeting anti-Soviet resistance fighters, who posed real threats to both state and individual security. Thus Prikazchikov's squad may have been improvising violence in this period of increased and uncertain threat, which would account for the greater frequency of non-compliance. Similarly, the Rainiai case occurred at the beginning of World War II. Due to the impending invasion of German forces into Lithuanian territory, the Soviet security apparatus attempted to quickly manage prisoners throughout Lithuania (Šiušaitė and Landsbergis 2007). Thus, exogenous and uncertain threat of invasion may have contributed to the improvisation of violence by perpetrators in the Rainiai case. While exogenous threats can be a motivating factor, additional explanations must be investigated.

In order for bureaucracies to function effectively, agents need to be formally incorporated into the institution (Weber 1958b). Training is one method that principals employ to monitor and modify the character of agents. The expert training of agents ensures that individuals are versed in the official conduct of the bureaucracy which is regulated by formal rules and documents. Furthermore, since bureaucracies employ a hierarchical organizational structure, agents need be held accountable for their actions to superiors. In the Tuskulenai case, primary executioners were NKGB-MGB commanders who were responsible for performing fusillades. However, these executioners were aided by warders of the prison, responsible for transporting condemned prisoners to the execution chamber, assisting in the executions, and disposing of the bodies (Vaitiekus 2011). Not much is known about these warders, including their extent of participation in executions and their training. Thus, it is possible that the improvisation of violence in the Tuskulenai case may be due to the participation of these non-experts during executions. In the Rainiai case, executions were performed not only by security agents, but also by Red Army soldiers and local communists (Šiušaitė and Landsbergis 2007). These individuals, who were not formally incorporated into the Soviet security apparatus, may have had less motivation to adhere to state standards for execution. In contrast to the Rainiai case, prisoners executed in the Vinnytsia case consistently demonstrated gunshot wounds to the back of the head or neck. Surprisingly, based on bullets recovered at the scene, forensic investigators argued that the small caliber ammunition employed at Vinnytsia lacked adequate force to penetrate thicker areas of cranial bone (Kamenetsky 1989). Thus, these investigators contend that executioners were skilled in maximizing the fatal potential of small-caliber weapons (Kamenetsky 1989). Specifically, the weapons they were provided necessitated a distinct technique to be effective, such as angle of fire and location. Thus, the standardized presence of perimortem trauma on the remains of prisoners executed in the Vinnytsia case suggests the involvement of highly trained and experienced state agents.

A resource-based, materialist argument can also be made in the cases of Rainiai and Tuskulenai. Fusillade requires ammunition, which in times of conflict may be hoarded. If state agents were motivated to “save bullets,” they would need to improvise violence during executions. However, every action requires the expenditure of some resource, be it material, time, or energy. In the case of executions, violence workers needed to weigh the benefit of saving ammunition with the energy (and time) cost of beating or stabbing to death tens, hundreds, or thousands of victims. At Katyn, the gross number of executions performed within a short amount of time required the execution of 200 to 300 prisoners every night, with one prisoner shot approximately every two minutes (Sanford 2005). It is doubtful that violence workers could have executed the large number of prisoners in this case simply using blunt or sharp force.

The role of prisoner compliance may also be a motivating factor for agents improvising violence. Historical documents note that the Soviet security apparatus went to great lengths to lull prisoners into a false sense of security (e.g. Katyn prisoners being vaccinated against typhus prior to execution). Fears of prisoner uprisings or resistance, especially in cases where victims outnumbered executioners, may have motivated agents to mitigate problems (beyond merely employing bindings or gags). For instance, the spatial design of the NKGB-MGB prison in the

Tuskulenai case meant that the execution chamber was a short walk from the prison cells. It is possible that execution squads in the Tuskulenai case attempted to reduce the possibility of prisoner resistance through the application of force quieter than that of a gun.

While individuals commit violence for a plethora of reasons, enjoyment of the pain and suffering of others cannot be overlooked, especially in episodes of mass executions. Sadism may be a motivating factor for agents to improvise violence. This may occur as a result of the initial adverse selection of agents. Specifically, Bohara et al. (2008) contend violent agencies attract more violent agents and some of these agents may pursue selfish interests (e.g. revenge, rape, or violence itself). Gregory (2009) contends that Stalin purposely selected agents for employment in the security apparatus who demonstrated brutality. The adverse selection of sadistic agents may have been a motivating factor especially in the Rainiai case, where perpetrators extensively applied painful, but not necessarily lethal trauma such as eye gouging and mutilation to the ears, tongues, and genitals of prisoners.

While it might be expected that a certain proportion of violence workers are drawn to the trade because of sadistic tendencies, but this likely does not motivate all perpetrators of violence. In state bureaucracies, guidelines not only reign in the improvisation of potential sadists, but also provide clear expectations for violence workers averse to gruesome details. Bohara et al. (2008) suggest that the desensitization of violence over extended periods, coupled with group pressure, may also result in the improvisation of violence. In the Tuskulenai case, it is possible that as execution squads were exposed to brutality over months or years, they gradually became more desensitized to it and were prone to improvise violence.

Explanations for the improvisation of violence proposed in this section are not mutually exclusive. Instead, this study advocates a multifactorial approach which takes into account multiple psychological, social, political, and material motivations for the improvisation of violence by state agents.

CHAPTER 11: CONCLUSIONS & FUTURE RESEARCH

This final chapter discusses the major conclusions of this dissertation, as well as the major contributions and limitations to this study. Additionally, this chapter suggests future directions for research on Stalin-era crimes and state-sponsored violence.

CONCLUSIONS

Historical analyses of state-sponsored violence often focus on leaders and bureaucratic elites who command violence. However, researchers should not assume that violence remained static over time or that state agents adhered to guidelines provided by principals. Using a principal-agent framework, this dissertation demonstrates that compliance and perimortem trauma varied over time and between security personnel in the Tuskulenai case, as well as among cases of Soviet violence during the Stalinist period. Specifically, compliance in the Tuskulenai case was greater in Dolgirev's sample than in Prikazchikov's sample, while compliance was greatest in the Vinnytsia case, followed by Tuskulenai and then Rainiai. Only minor differences were observed in the evaluation of mortuary variables over time and between security personnel in the Tuskulenai case, and among the cases of Soviet violence. Thus, all three proposed hypotheses are partially supported. This study also suggests multiple psychological, material, and social motivations for the improvisation of violence by state agents, including exogenous threats, training, materialism, prisoner compliance, sadism, and desensitization to violence.

Contributions of this Dissertation

This dissertation advocated a multidisciplinary, population-based approach to the study of state-sponsored violence in the Soviet Union. Analyzing trauma on an assemblage level reveals information not discernible from individual examinations and helps in identifying signature forms of interpersonal conflict in human rights contexts. Additionally, data in this study were collected according to suggested standards (Komar and Lathrop 2012) with the express intent of comparing patterns of trauma to other episodes of mass violence.

One of the valuable contributions of this study is that it evaluated both the victims and perpetrators of state violence through a site-specific and regional approach. In human rights contexts, human remains retain both an individual and collective identity. Forensic analyses, which highlight the death experiences of victims, can help serve humanitarian functions, determine legal accountability, and rectify historical inaccuracies (Stover et al. 2003; Juhl and Olsen 2006; Jankauskas 2009). Analyses can also facilitate reconciliation after conflicts have ceased. In the Tuskulenai case, atrocities still reside in the collective memory of society and represent tangible evidence of abuses committed by the Soviet state in Lithuania. I hope that data from this analysis can contribute to the memorialization of victims of this atrocity.

Forensic analyses also permit the evaluation of perpetrators of mass violence. Historical data are important in establishing the role that principals play in ordering state violence (e.g. quotas). However, it should not be assumed that agents implemented violence according to state guidelines. Analysis of perimortem trauma present on executed prisoners represents direct evidence of violence committed by state agents. This study demonstrated that in the Tuskulenai and Rainiai cases, state agents largely acted in non-compliance with state guidelines by improvising violence. Thus, this analysis contends that while violence may be ordered at the top by state leaders, the implementation of violence relies on the discretion of individual agents.

Furthermore, it is hoped that the unique theoretical framework in this study permits researchers to move beyond a Weberian model of bureaucracy, in order to discuss agency among individual violence workers and the role of accountability in episodes of mass violence.

Limitations of this Dissertation

While this dissertation contributes to the study of state-sponsored violence in the Soviet Union, it also has limitations. One of the primary limitations is the relatively small sample size of skeletal remains observed in the Tuskulenai case. Due to the nature of the study, only burial pits with known dates of execution and interment were sampled. This study examined only 155 individuals (159 individuals in mortuary analyses) from 12 burial pits. Because of this limited sample size, burial pits were not evenly distributed throughout the three year period (1944-1947) and the samples were not equally divided amongst the execution squads. As discussed previously, the presence of meaningful differences over time and between execution squads in the Tuskulenai case should be tested further against historical data while including data from additional burial pits.

Another limitation concerns the decompositional stage and degree of completeness in the Tuskulenai sample. Komar and Lathrop (2012) argue that trauma analysis may be confounded in highly decomposed individuals, where observation of injuries in soft tissue is reduced in extensively decomposed or skeletonized remains. Since all individuals in the Tuskulenai sample were skeletonized and only 90% of the sample was complete, frequencies of trauma may be underestimated. Furthermore, methodological problems sometimes existed in the differentiation of mechanisms of trauma. While an “undetermined defects” category was used, these data could not be included in analyses of compliance.

Additionally, compliance in this study was evaluated based on whether perimortem trauma conformed to the state standard for execution (i.e. fusillade to the back of the head). However, the role of verbal commands for violence from superiors is not known. Unfortunately, the influence of verbal commands in the Soviet security apparatus may never be known given the high degree of secrecy and the large interval of time between executions and analysis.

Finally, this study was complicated by the inability to directly observe remains in the Vinnytsia, Katyn, and Rainiai cases. Instead, translations of data published in site reports were relied upon for the investigation of mortuary and skeletal variables. Problems largely arose when data lacked specificity (e.g. a “few” individuals showed two gunshot wounds, or a “wound” was observed on the cranium). Additionally, it is unclear whether errors were introduced during the translation of skeletal and archaeological data from German to English, especially since not all translators/authors are forensic scientists.

FUTURE RESEARCH

A number of directions for future research can be explored. In particular, conclusions from this study would be strengthened by the sampling of additional dated burial pits in the Tuskulenai case. Furthermore, historical data (e.g. reasons for convictions) associated with the Tuskulenai case should be evaluated in order to confirm the relationship between compliance and the threat prisoners posed. Additionally, the typology of quadrilateral defects proposed in this study could be improved by incorporating additional examples of quadrilateral defects from Tuskulenai or other cases, such as the Battle of Towton (Novak 2007).

While this study employed a regional approach to the study of state-sponsored violence, it could be developed by incorporating other episodes of mass violence committed by the Soviet state during the Stalinist period. Specifically, these include human rights abuses committed against thousands of individuals in Belarus, Chechnya, Estonia, Latvia, Lithuania, Romania, Russia, and Ukraine (Table 102). Research regarding other cases of Soviet mass violence should evaluate how patterns of perimortem trauma, compliance, and concealment practices changed in different geographical, temporal, and political contexts. For instance, at the Pravieniškės forced labor camp near Kaunas (Lithuania), Red Army soldiers allegedly machine-gunned 500 prisoners, administrative personnel, camp guards, and their families as they were retreating in 1941 (Pajaujis-Javis 1980). In order to truly understand the breadth of violence and motivations of violence workers, additional cases should be incorporated into this analysis.

Finally, in order to make sense of patterns of violence committed by the Soviet state, it would be useful to compare perimortem trauma in these cases to other cases of state-sponsored violence. Thus, in the future I hope to collaborate with other physical anthropologists to build an index of skeletal trauma from other geographical and cultural contexts throughout the twentieth and twenty-first centuries. I believe a large-scale, global analysis of trauma patterns is essential for understanding how and to what extent states differentially implement violence against citizens.

The Stalinist period represented one of the worst eras of human rights abuse in the Soviet Union. Millions of victims at dozens of sites were terrorized by the state during Stalin's 30 years of power. This dissertation attempted to evaluate both the victims and perpetrators of state violence by employing a site specific and regional approach to the study of state-sponsored violence in the Soviet Union during the 1930s and 40s. It demonstrates that while violence may be ordered by state leaders, its implementation relies on the discretion of individual agents. As data from additional sites in this period become available they too can be included in this regional index of violence. In turn, it is hoped that results from this study can be used by other researchers to locate Soviet violence within a global framework of state-sponsored violence during the twentieth and twenty-first centuries.

Table 102: Known Cases of Soviet State-Sponsored Violence during the Stalinist Period

Location of Execution		**Date**	**Approximate Number of Victims**
Former Republic	**Case**		
Belarus	Berezwecz	June1941	800
	Chervyen	June 1941	Several thousand
	Hrodna (Grodno)	June 1941	Several dozen
	Kuropaty	1937-1941	30,000-200,000
	Ulla	June 1941	1,000
	Vileyka	June 1941	Several dozen
Chechnya	Khaibakh	January 1944	700
Estonia	Kautla	July 1941	20
	Tartu	July 1941	250
Latvia	Litene	June 1941	120
Lithuania	Lukiškės	June 1941	Unknown
	Panevėžys	June 1941	500
	Pravieniškės	June 1941	260
	Rainiai	June 1941	76
	Tuskulenai	1944-1947	767
Romania	Fântâna Albă	April 1941	200-2,000
Russia	Butovo	1937-1938	20,000
	Katyn	Spring 1940	4,400
	Oryol	September 1941	150
	Sandarmokh	1937	9,000
Ukraine	Bykovnia Forest	1920s-1940s	30,000-225,000
	Berezhany	June-July 1941	300
	Dubno (Łuck)	June 1941	1,500-4,000
	Kharkiv	1934-1940	8,000
	Kremenets	June 1941	100-150
	Lutsk	June 1941	1,500-2,800
	Lviv	June 1941	2,000-2,500
	Samarstinov	June 1941	460
	Sambor	June 1941	570
	Simferopol	October 1941	Unknown
	Vinnytsia	1937-1938	9,500
	Zlochev	June 1941	700

APPENDIX

MORTUARY VARIABLES BY BURIAL PIT IN THE TUSKULENAI SAMPLE

Table 103: Archaeological Features of Pits for all Tuskulenai Samples

Pit #	Pit by Time	# of Individuals	Pit Dimensions	Starting Depth	Ending Depth	Pit Thickness
35	1	12	2.00m x 1.60m	140cm	197cm	57cm
36	2	12	2.80m x 1.30m	140cm	180cm	40cm
37	3	17	2.30m x 2.00m	140cm	200cm	60cm
38	4	10	2.00m x 1.90m	150cm	200cm	50cm
39	5	15	2.50m x 1.90m	160cm	280cm	120cm
2	6	14	2.50m x 1.30m	150cm	250cm	100cm
5	7	19	1.30m x 2.10m	150cm	260cm	110cm
23	8	11	1.90m x 0.90m	175cm	280cm	105cm
26	9	13	2.30m x 1.40m	175cm	230cm	55cm
24	10	6	2.10m x 1.00m	145cm	230cm	85cm
27	11	18	1.90m x 1.20m	140cm	270cm	130cm
31	12	12	1.90m x 1.00m	160cm	250cm	90cm

Table 104: Number and Artifact Type by Pit

Pit #	# of Artifacts	Clothing	Personal Effects	Weapons	Historical Documents	Other
35	12	11	1	0	0	0
36	0	0	0	0	0	0
37	29	22	5	1	0	1
38	0	0	0	0	0	0
39	62	53	6	1	0	2
2	11	8	0	1	0	2
5	4	2	1	1	0	0
23	8	8	0	0	0	0
26	7	6	0	0	0	1
24	14	12	1	1	0	0
27	21	19	2	0	0	0
31	28	25	2	1	0	0

Table 105: Body Position of Individuals for all Tuskulenai Samples

Pit #	Time	n	Prone		Supine		R. Side		L. Side		Unknown	
			n	%	n	%	n	%	n	%	n	%
35	1	12	4	33.3	6	50	1	8.3	0	0	1	8.3
36	2	12	5	41.7	6	50	0	0	1	8.3	0	0
37	3	17	10	58.8	7	41.2	0	0	0	0	0	0
38	4	10	7	70	3	30	0	0	0	0	0	0
39	5	15	4	26.7	11	73.3	0	0	0	0	0	0
2	6	14	4	28.6	8	57.1	0	0	2	14.3	0	0
5	7	19	5	26.3	13	68.4	1	5.3	0	0	0	0
23	8	11	7	63.6	4	36.4	0	0	0	0	0	0
26	9	13	5	38.5	5	38.5	1	7.7	2	15.4	0	0
24	10	6	2	33.3	3	50	0	0	1	16.7	0	0
27	11	18	8	44.4	9	50	1	5.6	0	0	0	0
31	12	12	7	58.3	3	25	2	16.7	0	0	0	0

Table 106: Head Orientation of Individuals for all Tuskulenai Samples

Pit	East		West		SW		SE		South		North		NE	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
35	4	33.3	7	58.3	1	8.3	0	0	0	0	0	0	0	0
36	5	41.7	7	58.3	0	0	0	0	0	0	0	0	0	0
37	6	35.3	9	52.9	0	0	2	11.8	0	0	0	0	0	0
38	6	60	4	40	0	0	0	0	0	0	0	0	0	0
39	7	46.7	8	53.3	0	0	0	0	0	0	0	0	0	0
2	7	50	6	42.9	1	7.1	0	0	0	0	0	0	0	0
5	12	63.2	7	36.8	0	0	0	0	0	0	0	0	0	0
23	1	9.1	0	0	0	0	0	0	7	63.6	3	27.3	0	0
26	0	0	0	0	0	0	0	0	5	38.5	7	53.8	1	7.7
24	0	0	0	0	0	0	0	0	0	0	6	100	0	0
27	4	22.2	12	66.7	0	0	0	0	2	11.1	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	12	100	0	0

Table 107: Concealment Materials and Bindings for all Tuskulenai Samples

Pit #	Pit by Time	# of Individuals	Tar Paper	Lime	Presence of Binding	
					n	%
35	1	12	Present	Present	3	25.0
36	2	12	Present	Present	3	25.0
37	3	17	Present	Absent	4	23.5
38	4	10	Absent	Absent	6	60.0
39	5	15	Absent	Present	9	60.0
2	6	14	Absent	Absent	2	14.3
5	7	19	Present	Absent	0	0
23	8	11	Present	Present	0	0
26	9	13	Present	Absent	0	0
24	10	6	Present	Present	0	0
27	11	18	Present	Absent	0	0
31	12	12	Absent	Absent	0	0
Total		159			27	17.0

Burial Pit 35

Burial Pit 35 contained a total of 12 individuals. The pit size was 2.00m x 1.60m, with a starting depth of 140cm and an ending depth of 197cm. Thus, Burial Pit 35 was approximately 57cm thick. Skeletal remains were predominantly oriented in an east-west direction, with heads in both directions. Individuals were discovered in both prone and supine positions, although one individual was found on his right side and one individual's burial position is indiscernible from the site report. The legs and arms of individuals were observed in extended, crossed, flexed, and semi-flexed positions. Tar paper, lime, and organic material were observed in pit 35. Furthermore, three individuals were possibly bound by the hands behind their backs. Finally, Burial Pit 35 contained a total of 12 artifacts, including 11 clothing items (buttons) and 1 personal effect (medallion).

Table 108: Artifacts in Burial Pit 35

Artifact Type	Material	Size	Associated Skeleton
Button	Unknown	25mm	664
Button	Unknown	12mm	664
Button	Unknown	Unknown	667
Button	Unknown	16mm	673
Medallion	Metal	23mm x 18mm	675
Button	Unknown	16mm	675
Button	Unknown	9mm	675
Button	Unknown	9mm	675
Button	Unknown	15mm	Unknown
Button	Unknown	9mm	Unknown
Button	Unknown	9mm	Unknown
Button	Metal	Unknown	Unknown

Burial Pit 36

Burial Pit 36 contained a total of 12 individuals. The pit size was 2.80 x 1.30 meters, with a starting depth of 140cm and an ending depth of 180cm. Thus, Burial Pit 36 was approximately 40cm thick. Skeletal remains were oriented in an east-west direction, with heads in both directions. Individuals were discovered in both supine and prone positions, although one individual was recovered on his left side. The legs of all individuals were extended, while their arms were observed in both extended and semi-flexed positions. Furthermore, three individuals were possibly bound by the hands behind their backs. Both tar paper and lime were included above the remains. Finally, no artifacts were recovered from Burial Pit 36.

Burial Pit 37

Burial Pit 37 contained a total of 17 individuals. The pit size was 2.30 x 2.00 meters, with a starting depth of 140cm and an ending depth of 200cm. Thus, Burial Pit 37 was approximately 60cm thick. Skeletal remains were predominantly oriented in an east-west direction, with heads in both directions. Individuals were discovered in both prone and supine positions. The legs and arms of individuals were observed in extended, semi-flexed, and crossed positions. Furthermore, four individuals were possibly bound by the hands behind their backs. Tar paper and rocks were included above the remains. Finally, Burial Pit 37 contained a total of 29 artifacts, including 22 clothing items (buttons, shoe fragment, and cap fragment), 5 personal effects (cigarette holder, hairbrush, medallion, and spoons), 1 weapon item (bullet fragment), and one additional item (ceramic fragment).

Table 109: Artifacts in Burial Pit 37

Artifact Type	Material	Size	Associated Skeleton
Ceramics	Clay	?	625
Spoon	Aluminum	115 x 65 x 25mm	626
Button	Unknown	15mm	626
Button	Unknown	10mm	626
Shoe	Leather	Unknown	626
Button	Unknown	12mm	637
Button	Metal	20mm	639
Medallion	Metal	18mm x 20mm	644
Button	Mother of pearl	18mm	645
Button	Mother of pearl	18mm	650
Button	Mother of pearl	Unknown	652
Button	Unknown	20mm	653
Button	Unknown	16mm x 14mm	653
Bullet	Metal	Unknown	653
Button	Metal	17mm	654
Button	Unknown	20mm	661
Button	Unknown	11mm	Unknown
Button	Metal	16mm	Unknown
Button	Unknown	10mm	Unknown
Button	Unknown	25mm	Unknown
Button	Unknown	22mm	Unknown
Button	Unknown	21mm	Unknown
Button	Unknown	25mm	Unknown
Button	Unknown	25mm	Unknown
Button	Metal	20mm	Unknown

Table 109 (cont'd): Artifacts in Burial Pit 37

Artifact Type	Material	Size	Associated Skeleton
Cigarette holder	Bone	55mm	Unknown
Hairbrush	Bone	95mm	Unknown
Spoon	Wood	90mm	Unknown
Cap Fragment	Textile	Unknown	Unknown

Burial Pit 38

Burial Pit 38 contained a total of 10 individuals. The pit size was 2.00 x 1.90 meters, with a starting depth of 150cm and an ending depth of 200cm. Thus, Burial Pit 38 was approximately 50cm thick. Skeletal remains were oriented in an east-west direction, with heads in both directions. Individuals were discovered in both supine and prone positions. The legs and arms of individuals were observed in extended, semi-flexed, and crossed positions. Furthermore, six individuals were possibly bound by the hands behind their backs. Neither tar paper nor lime was observed in pit 38; however, the site report notes a layer of small stones above skeletons. No artifacts were recovered from Burial Pit 38.

Burial Pit 39

Burial Pit 39 contained a total of 15 individuals. The pit size was 2.50 x 1.90 meters, with a starting depth of 160cm and an ending depth of 280cm. Thus, Burial Pit 39 was approximately 120cm thick. Skeletal remains were oriented in an east-west direction, with heads in both directions. Individuals were discovered in both prone and supine positions. The legs and arms of individuals were primarily observed extended and semi-flexed, although the arm and/or leg position of four individuals were not discernible from the site report. Furthermore, nine individuals were possibly bound by the hands behind their backs. Tar paper and an organic layer (i.e. 26 leather shoes, leather jackets, and wool blanket) were discovered atop decedent remains. Remnants of lime were observed during the laboratory analysis. Finally, Burial Pit 39 contained a total of 62 artifacts, including 53 clothing items (buttons and shoe fragments), 6 personal effects (medallion, perfume bottle, smoking pipe, and spoons), 1 weapon item (bullet cartridge case), and 2 additional item (wooden box and brass hook).

Table 110: Artifacts in Burial Pit 39

Artifact Type	Material	Size	Associated Skeleton
Shoe	Unknown	Unknown	677
Shoe	Unknown	Unknown	677
Button	Unknown	30mm	679
Smoking Pipe	Wood	70mm, 30mm x 30mm	679
Button	Unknown	30mm	680
Spoon	Wood	100mm	680
Button	Unknown	12mm	681
Button	Unknown	Unknown	684
Shoe	Unknown	Unknown	685
Button	Mother of pearl	Unknown	685
Perfume bottle	Glass	35mm x 30mm	686
Box	Wood	Unknown	686
Button	Leather	25mm x 17mm	686
Button	Unknown	22mm	Unknown
Medallion	Metal	25mm x 20mm	Unknown
Button	Unknown	26mm	Unknown
Button	Unknown	17mm	Unknown
Button	Unknown	15mm	Unknown
Button	Unknown	13mm	Unknown
Button	Unknown	25mm	Unknown
Button	Unknown	15mm	Unknown
Button	Unknown	18mm	Unknown
Button	Unknown	30mm	Unknown
Button	Unknown	25mm	Unknown
Button	Unknown	25mm	Unknown

Table 110 (cont'd): Artifacts in Burial Pit 39

Artifact Type	Material	Size	Associated Skeleton
Button	Unknown	25mm	Unknown
Button	Unknown	21mm	Unknown
Button	Unknown	20mm	Unknown
Button	Unknown	20mm	Unknown
Button	Metal	25mm	Unknown
Button	Unknown	15mm	Unknown
Button	Unknown	17mm	Unknown
Button	Unknown	10mm	Unknown
Button	Unknown	11mm	Unknown
Button	Unknown	15mm	Unknown
Button	Leather	30mm	Unknown
Button	Leather	25mm	Unknown
Button	Leather	25mm	Unknown
Button	Leather	25mm	Unknown
Button	Wood	25mm	Unknown
Button	Wood	25mm x 15mm	Unknown
Button	Wood	Unknown	Unknown
Button	Wood	Unknown	Unknown
Button	Wood	25mm x 20mm	Unknown
Button	Unknown	35mm	Unknown
Button	Wood	25mm	Unknown
Button	Wood	25mm	Unknown
Button	Leather	25mm	Unknown
Button	Wood	25mm x 15mm	Unknown
Button	Wood	25mm x 15mm	Unknown
Button	Unknown	25mm	Unknown
Button	Unknown	25mm	Unknown
Button	Metal	20mm	Unknown
Button	Unknown	12mm	Unknown
Button	Unknown	11mm	Unknown
Button	Unknown	10mm	Unknown
Button	Metal	28mm	Unknown
Button	Metal	28mm	Unknown
Hook	Brass	15mm	Unknown
Bullet cart. Casing	Metal	Unknown	Unknown
Spoon	Metal	60mm x 60mm	Unknown
Spoon	Metal	60mm x 60mm	Unknown

Burial Pit 2

Burial Pit 2 contained a total of 14 individuals. The pit size was 1.30 x 2.50 meters, with a starting depth of 150cm and ending depth of 250cm. Thus, burial pit 2 was approximately 100cm thick. Skeletal remains were mainly oriented in an east-west direction, with heads located in both directions. Individuals were discovered in both prone and supine positions, as well as lying their left sides. The legs and arms of individuals were observed in extended, flexed, and semi-flexed positions. However, two individuals were discovered in a sitting position within burial pit 2. No corrosive materials were observed in situ or in the laboratory analysis of remains. Two individuals were possibly bound by the hands behind their backs. Finally, Burial Pit 2 contained a total of 11 artifacts, including 8 clothing items (buttons), one weapon item (bullet fragment), and two other items (metal pipes).

Table 111: Artifacts in Burial Pit 2

Artifact Type	**Material**	**Size**	**Associated Skeleton**
Bullet	Unknown	57mm x 11mm	2
Button	Mother of pearl	14mm	2
Button	Bone	14mm	2
Button	Plastic	18mm	2
Button	Plastic	15mm	2
Metal Pipe	Iron	220mm x 20mm x 8mm	12
Button	Bone	22mm	13
Button	Mother of pearl	12mm	16/19
Button	Glass	12mm	19/21
Metal Pipe	Iron	310mm x 33mm	21
Button	Bone	13mm	22

Burial Pit 5

Burial Pit 5 contained a total of 19 individuals. The pit size was 1.30 x 2.10 meters, with a starting depth of 150cm and an ending depth of 260cm. Thus, Burial Pit 5 was approximately 110cm thick. Skeletal remains were oriented in an east-west direction, with heads located in both directions. Individuals were discovered in both prone and supine positions, as well on lying on the right side. The legs of individuals were extended or crossed, while their arms were extended, flexed, and semi-flexed. The archaeological site report notes that carbon (tar) paper was observed on prisoner remains, although remnants of tar paper were not observed in the laboratory analysis of remains. There is no evidence that prisoners were bound. Additionally, Burial Pit 5 contained a total of four artifacts, including 2 clothing items (buttons), 1 personal effect (tin plate), and one weapon item (bullet fragment).

Table 112: Artifacts in Burial Pit 5

Artifact Type	**Material**	**Size**	**Associated Skeleton**
Button	Bone	14mm	46
Button	Mother of Pearl	12mm	55
Tin Plate	Metal	285mm x 87mm	62
Bullet	Metal	Unknown	64

Burial Pit 23

Burial Pit 23 contained a total of 11 individuals. The pit size was 0.90 x 1.90 meters, with a starting depth of 175cm and an ending depth of 280cm. Thus, Burial Pit 23 was approximately 105cm thick. Skeletal remains were predominantly oriented in north-south direction, with heads located in both directions. Individuals were discovered in both prone and supine positions. The legs and arms of individuals were observed in extended, flexed, and semi-flexed positions. Although no corrosive materials were noted in the archaeological site report, remnants of both lime and tar paper were observed during the laboratory analysis of remains. There is no evidence that prisoners were bound. Finally, Burial Pit 23 contained a total of eight artifacts, all of which were clothing (five buttons and three shoes).

Table 113: Artifacts in Burial Pit 23

Artifact Type	Material	Size	Associated Skeleton
Button	Metal	17mm	482
Button	Plastic	23mm	482
Button	Metal	17mm	487
Button	Mother of pearl	20mm	Unknown
Button	Bone	17mm	Unknown
Partial shoe	Leather	310mm (length)	Unknown
Partial shoe	Leather	310mm (length)	Unknown
Shoe	Rubber	Unknown	Unknown

Burial Pit 26

Burial Pit 26 contained a total of 13 individuals. The pit size was 1.40 x 2.30 meters, with a starting depth of 175cm and an ending depth of 230cm. Thus, Burial Pit 26 was approximately 55cm thick. Skeletal remains were predominantly oriented in north-south direction, with heads located in both directions. Individuals were discovered in both prone and supine positions, as well lying on the left and right sides. The legs and arms of individuals were observed in extended, flexed, and semi-flexed positions. Remnants of tar paper were observed during the laboratory analysis of remains. There is no evidence that prisoners were bound. Additionally, Burial Pit 26 contained a total of seven artifacts, including six clothing items (five buttons and one strap) and one other item (chalk).

Table 114: Artifacts in Burial Pit 26

Artifact Type	Material	Size	Associated Skeleton
Button	Bone	19mm	508
Strap	Leather	360mm x 17mm	509
Button	Metal/Textile	17mm	513
Button	Metal/Textile	17mm	513
Button	Bone	13mm	514
Chalk	Chalk	Unknown	Unknown
Button	Metal	12mm	Unknown

Burial Pit 24

Burial Pit 24 contained a total of six individuals. The pit size was 1.00 x 2.10 meters, with a starting depth of 145cm and an ending depth of 230cm. Thus, Burial Pit 24 was approximately 85cm thick. All skeletal remains were oriented in a north-south direction, with all heads in the north. Individuals were discovered in both prone and supine positions, as well as lying on the left side. The legs and arms of individuals were observed in extended, flexed, and semi-flexed positions. Although no corrosive materials were noted in the archaeological site report, remnants of both lime and tar were observed during the laboratory analysis of remains. However, the site report does note that remains were covered in a non-specific organic material. There is no evidence that prisoners were bound. Finally, Burial Pit 24 contained a total of 14 artifacts, including 12 clothing items (buttons), 1 personal effect (toothbrush), and one weapon item (bullet fragment).

Table 115: Artifacts in Burial Pit 24

Artifact Type	Material	Size	Associated Skeleton
Button	Glass	10mm	491
Button	Glass	10mm	491
Button	Bone	15mm	493
Button	Glass	11mm	493
Button	Mother of pearl	14mm	493
Button	Mother of pearl	23mm	493
Button	Metal	17mm	494
Button	Iron	17mm	494
Bullet	Metal	11mm x 8mm	494
Button	Metal	17mm	495
Toothbrush	Plastic	Unknown	496
Button	Bone	17mm	Unknown
Button	Plastic	25mm	Unknown
Button	Plastic	25mm	Unknown

Burial Pit 27

Burial Pit 27 contained a total of 18 individuals. The pit size was 1.90 x 1.20 meters, with a starting depth of 140cm and an ending depth of 270cm. Thus, Burial Pit 27 was approximately 130cm thick. Skeletal remains were predominantly oriented in an east-west direction, although two individuals lay with their heads in the south. Individuals were discovered predominantly in both the prone and supine positions, while one individual was positioned on his right side. The legs and arms of individuals were observed in extended, flexed, and semi-flexed positions. Remnants of tar paper were observed during the laboratory analysis of remains. Additionally, the archaeological report notes the presence of rocks above and below decedent remains, as well as organic materials (possibly wool sweaters) in the northern part of the pit. There is no evidence that prisoners were bound. Additionally, Burial Pit 27 contained a total of 21 artifacts, including 19 clothing items (buttons) and 2 personal effects (1 tin plate and 1 stamp).

Table 116: Artifacts in Burial Pit 27

Artifact Type	Material	Size	Associated Skeleton
Button	Bone	11mm	520
Button	Plastic	14mm	520
Button	Glass	20mm	520
Button	Bone	15mm	521
Tin plate	Iron	90mm x 25mm	521
Button	Glass	12mm	523
Button	Bone	19mm	523
Button	Bone	14mm	535
Button	Glass	11mm	529
Button	Mother of pearl	22mm	536
Stamp	Unknown	44mm x 14mm	Unknown
Button	Metal	15mm	Unknown
Button	Metal/Textile	20mm	Unknown
Button	Plastic	22mm	Unknown
Button	Plastic	23mm	Unknown
Button	Bone	12mm	Unknown
Button	Leather	16mm	Unknown
Button	Bone	Unknown	Unknown
Button	Plastic	18mm	Unknown
Button	Bone	20mm	Unknown
Button	Mother of pearl	18mm	Unknown

Burial Pit 31

Burial Pit 31 contained a total of 12 individuals. The pit size was 1.90 x 1.00 meter, with a starting depth of 160cm and an ending depth of 250cm. Thus, Burial Pit 31 was approximately 90cm thick. Skeletal remains were oriented in a north-south direction, with all heads in the north. Individuals were discovered predominantly in prone and supine positions, as well as on the right sides. The legs and arms of individuals were observed in extended, crossed, and semi-flexed positions. No tar paper or lime was observed, however, the site report does note the presence of rocks on the top of decedents. There is no evidence that prisoners were bound. Additionally, Burial Pit 31 contained a total of 28 artifacts, including 25 clothing items (buttons, textile, and a strap), 2 personal effects (hairbrush and wallet), and 1 weapon item (bullet fragment).

Table 117: Artifacts in Burial Pit 31

Artifact Type	Material	Size	Associated Skeleton
Button	Plastic	17mm	569
Button	Glass	10mm	570
Button	Glass	11mm	570
Button	Glass	10mm	575
Button	Glass	10mm	575
Button	Plastic	16mm	577
Bullet	Metal	9 x 13mm	577
Button	Glass	12mm	579
Button	Mother of pearl	13mm	579
Wallet	Leather	Unknown	580
Button	Bone	14mm	580
Textile	Unknown	Unknown	580
Button	Metal	17mm	580
Button	Glass	11mm	580
Button	Glass	10mm	580
Button	Glass	10mm	Unknown
Button	Bone	14mm	Unknown
Button	Bone	17mm	Unknown
Button	Plastic	15mm	Unknown
Button	Glass	16mm	Unknown
Button	Metal	17mm	Unknown
Button	Plastic	18mm	Unknown
Button	Plastic	18mm	Unknown
Button	Leather	22mm	Unknown
Button	Metal	19mm	Unknown
Button	Metal	19mm	Unknown
Hairbrush	Plastic	Unknown	Unknown
Strap	Leather	Unknown	Unknown

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