ABSTRACT

AN EXPERIMENTAL STUDY INVESTIGATING THE EFFECTS OF REAL AND SIMULATED CLINICAL TRAINING ON PSYCHOMOTOR, AFFECTIVE AND COGNITIVE VARIABLES DURING REAL CLINICAL PERFORMANCE OF FIRST YEAR OSTEOPATHIC MEDICAL STUDENTS

By

Fred C. Tinning

The purpose of this study was to investigate the effects of simulated clinical training using simulated patients and real clinical training using real patients on psychomotor skills, affective behaviors, cognitive (medical) knowledge and on measures of total clinical competency in the performance of a complete Neurological Evaluation History and Physical Examination. The theoretical foundation for this investigation combines Twelker's propositions on instructional simulation, Barrow's propositions of programmed patients in Neurological evaluation, and propositions of Gagne, Glaser, and others on transfer of learning from the representative world to the real world.

In order to test the effects of these two methods of clinical training, treatment experiences were developed in clinical Neurology which provided first-year Osteopathic Medical students with necessary clinical education experiences during the Systems Biology II Neuromuscular Systems Unit. The clinical experiences were as identical as possible, using simulated patients in a simulated clinical

setting and real patients in a real clinical setting. The neurological cases used for both real and simulated experiences were selected or programmed to be representative of the problems encountered in a Neurological Evaluation History and Physical Examination. During the 10 weeks of the Systems Biology II Neuromuscular Systems Unit, each student had three clinical training treatment experiences. In addition, all students completed a video-taped final practical examination on a real neurological patient. In order to eliminate the Hawthorne effect, the entire class received the clinical training experiences. All students were treated, rated, and evaluated with the same procedures. The treatment materials were prepared in advance and presented to the entire class prior to the treatment period. Each student was aware of the objectives of the entire Neuromuscular Systems Unit and, specifically, the clinical training experiences. An advance organizer on the clinical training experiences, course description handouts, schedules, and other material used as part of the training experience were presented to the students in the pre-treatment period.

The subjects in the investigation were a random sample of 24 students from the first-year class of 33 Osteopathic Medical students at the College of Osteopathic Medicine, Michigan State University, East Lansing, Michigan. The subjects were randomly assigned to the two treatment groups. The remaining students enrolled in the Systems Biology II

Neuromuscular Systems Unit were considered an inactive control. The inactive control received identical training to the real clinical training treatment group. The treatments were administered separately in group settings. Students were aware that the clinical treatment assignments were different, but this was expected. Clinical experiences are generally different for each student or group of students. After the nine weeks necessary for clinical rotation in completing the three treatment training clinical experiences, each subject completed the final practical Neurological Evaluation History and Physical Examination in the tenth week with a real patient in order to test the results of the treatment. The criteria measures were of six types:

1. Cognitive Knowledge Performance
2. Psychomotor Skill Performance
3. Affective Behavior Performance
4. Total Performance in Clinical Competency
5. Patient Evaluation Rating of Student Performance
6. Student Ratings of Self-Performance Experiences and Satisfaction

To measure the behaviors represented in the criteria measures, the experimenter developed or adapted evaluation and rating scales on all of the variables. This required training of raters, establishing standardization procedures, and the development of reliabilities, where possible, on the various rating scales. To measure cognitive medical knowledge, a pre- and post-objective test was developed on

neurological problems and taken by the students. To measure psychomotor technique and skill, a neurological practical examination was developed for rating performance before and after treatment. To measure affective physician behavior, a semantic differential scale on establishing a relationship and evaluating data was developed for the rating of effective affective behaviors. To measure patient satisfaction, a semantic differential scale was developed for patient rating during the clinical treatment and final evaluation experiences. To measure student behaviors, clinical experience and final examination evaluation ratings were used and rated by the students. To measure total performance in clinical competency, the clinical competency formative and summative evaluation rating scale was developed for the clinical instructors' ratings of student performance.

Both multivariate and univariate analysis procedures were completed. A multivariate analysis of covariance was initially planned; however, the covariate information did not correlate with the dependent variables and added little information to the analysis of the study. Additionally, chi-square and correlational tests were used in the analysis of the data. These tests were used in analyzing the ten directional hypotheses. The results of the hypotheses testing indicate that simulated clinical training provided the first-year Osteopathic Medical students with an opportunity to vary behavior, problem solve, and make decisions in an environment that was positive and free from

distraction. The experience provided relevant feedback on critical behaviors which were transferred to the real world in demonstrated learning outcomes. The experiment has demonstrated an alternative in medical education and has added to the body of knowledge of instructional methods in physician education as related to the training and transfer of psychomotor skills, affective behaviors, cognitive knowledge, and clinical performance abilities.

The implications of this investigation indicate that real clinical training with real patients, utilizing the procedures developed for this study, proves to be effective as a clinical instructional technique in medical education. However, the key result is that the use of simulated patients in a simulated clinical environment provides a vehicle for transfer of learning, and therefore can be considered a viable alternative for the clinical teaching of behaviors necessary to the medical student in his formative period of learning.

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Dedicated to

my wife, Janet, for her faith never ending, my bonnie daughters, Marie and wee Jean, to my Mother, family, and friends. They all prove that . . .

> Love is patient and kind; love is not boastful; it is not arrogant or rude. Love does not insist on its own way; it is not irritable or resentful; it does not rejoice at wrong, but rejoices in the right. Love bears all things, believes all things, hopes all things, endures all things. Love never ends; ....
>
> St. Paul

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INTRODUCTION TO THE EXPERIMENT

PROBLEM

Medical schools and medical educators are facing critical times in providing new approaches to the total education and training of physicians. Historically, educational programs in most of the nation's medical schools have been afforded the freedom and funds unavailable to other educational programs (Jason, 1970). Medical education has been accountable to the practicing physician world only. As a result, the quality of medical education, the curriculum, the preparation of programs, and the process of training physicians have been developed many times without research or systematic evaluation or comparisons. Tradition has been the general rule in medical education rather than planned evaluation of program change, of the educational process, and the follow-up on the product. However, today medical education is no longer afforded the luxury of independence, but must plan on accountability to the public in the development of its programs.

Medical schools and the system of medical education are being confronted by all of society. "Never perhaps has there been as much need and as much opportunity for a national examination of the total activities of medical schools"(Fein & Weber, 1971). There are increasing demands for innovation, new policies on student recruitment, pressures for expansion, requests to develop new educational programs for various health personnel, requests for new models of patient care delivery-systems, and need for community-coupled involvement. Studies in medical education are pointing out many interesting paradoxes, nearly all of which undermine the traditionally held rationale for medical education (Glazer, 1971). In fact, the evidence, though not conclusive, suggests a thorough re-examination of current programs in medical education (Wing, 1972).

With the demands for re-examination of medical education has come the emphasis on curricular revision. A recent survey of medical curriculum change in Canada and the United States indicates that 88% of the medical schools are now involved in planning or actually engaged in significant curricular modifications (Hubbard, Gronvall & DeMuth, 1970). The modifications are in the content and pedagogy of traditional curricula, with the trend centering on a systems approach of coupling biomedical sciences, clinical science, and behavioral science, and in providing clinical training early in a student's medical education (Matlack, 1972; Jacobson & Kabara, 1972). Integrated medical education programs need to be coupled with early practical clinical training.

This systems approach reinforced a belief developed through experience as an educator, administrator, and counselor in working with disabled, disadvantaged clients in need of rehabilitation and in providing clinical training programs for counselor education and through educational and professional involvement as a medical educator with the Office of Medical Education Research and Development and with the College of Osteopathic Medicine at Michigan State University. From this practical knowledge, it became evident that learning centered on active involvement was, indeed, a requirement for effective training.

In much of university education, real clinical experiences are difficult to program. The student in counseling or medicine, for example, may not be able to manage the complex problems of the client or patient that would be required in early clinical training exposure. The cost of transporting students to facilities that have training resources, the problems in managing acutely ill patients, and the difficulty in maintaining adequate supervision for prompt feedback are all major problems in providing quality patient-centered clinical education.

Many substitute experiences have been offered as a solution for limited early active clinical education exposure. Traditional didactic instruction, programmed instruction, small group training, and modeling, using high and low fidelity experiences, have all been proposed as instructional methods to be utilized in place of "hands-on-experience" with real patients.

Educational training programs requiring early and long term clinical training experiences in counseling, social work and medicine are very costly in student and faculty time and facilities. However, cost cannot be the reason for eliminating clinical experiences. A more defensible position is to maximize those clinical experiences. This can be accomplished by providing effective preparatory types of learning experiences which are realistic for the parties providing and receiving the learning experience. Instructional simulation, using simulated patients, can be logistically a less complex approach for providing effective, "hands-on," clinical experience during the formative period of learning complicated clinical skills. In the present study, the question being asked is, "Will instructional simulation using simulated patients in clinical training of first-year medical students result in learning and improved transfer of learning to the three domains (psychomotor, affective, cognitive) to real world situations?"

"There is no more important topic in the whole of the psychology of learning than transfer of training," (Deese, 1958, p. 213). In the present study, transfer is considered a product of the learning process. This study is concerned with transfer as a product of the learning experience of real clinical situations versus simulated

clinical situations as instructional models in performance of neurological examinations.

The primary problem in the present research study is to investigate instructional simulation, utilizing simulated learning situations in the clinical education of Osteopathic Medical students as representations of the real world.

PURPOSE

The general purpose of this study is to ascertain the practical effectiveness of instructional simulation. This will be demonstrated by using simulated patients as a viable methodology for providing clinical training experiences in neurological examination for first-year Osteopathic Medical students. Simulation is not a substitute for real clinical experience, but rather a cost/effective method of preparing for early clinical exposure and as a supplement to active long-term training. Simulation's key attribute is that it represents reality and enhances the students' learning and transfer of skills to real patient clinical problems by practicing the necessary skills under realistic conditions. Second, simulated patients can be used early in medical education for practical clinical exposure, and they can also be available or on call at any time. Third, by using advanced medical students programmed as simulated patients, training their junior peers could result in cost/benefits,

reinforcement of previous educational experiences for the advanced student, and could provide an excellent vehicle for feedback while giving first-year students immediate involvement in practical clinical experiences.

Another purpose of this study is to add to the body of knowledge of instructional simulation methods as related to the training and transfer of psychomotor skills, affective behavior, and cognitive knowledge for effective clinical performance with real patients.

There are six specific objectives of this comparative study: (1) the development of new instructional methodology, (2) new training techniques and educational methods in medical education, (3) development of methods of assessing student satisfaction and patient satisfaction, (4) clinical instructor ratings of clinical competency, (5) student performance success criterion measure during training, and finally, (6) more effective student behaviors, more rapid skill development, less fear of failure, and a favorable cost/benefit analysis.

RESEARCH HYPOTHESES

The general hypothesis of this study is that subjects exposed to instructional simulation, utilizing simulated patients, will demonstrate better performance of the psychomotor skills, affective behaviors, and cognitive knowledge used in the total performance of a neurological examination of a real patient when compared with subjects exposed to clinical instruction using real patients.

There are ten directional hypotheses investigated. The hypotheses have been stated in research form.

Ha: 1 Students trained with simulated patients as models in simulated clinical experiences will:

A. Demonstrate a better total performance in clinical competency during the final Neurological Evaluation History and Physical Examination, by receiving higher ratings on the criterion measure rating scale than students trained with real patients as models in real clinical experiences.

B. Demonstrate better psychomotor skills by receiving higher ratings on the final performance criterion measure rating scale than students trained with real patients as models in real clinical experiences.

C. Demonstrate more effective affective behaviors by receiving higher ratings on the final performance criterion measure rating scale than students trained with real patients as models in real clinical experiences.

D. Demonstrate more cognitive knowledge by receiving higher scores on the final performance criterion measure than students trained with real patients as models in real clinical experiences.

Ha: 2 Students trained with simulated patients as models in a simulated clinical experience will demonstrate greater total performance skills in clinical competency in each of the three treatment training experiences by receiving higher ratings on the performance criterion measure rating scale than students trained with real patients as models in real clinical experiences.

Ha: 3 Students trained with simulated patients as models in simulated clinical experiences will:

A. Demonstrate a greater confidence by anticipating higher total performance in clinical competency on the final performance criterion measure self-rating than students trained with real patients as models in real clinical experiences.

B. Demonstrate greater confidence in their own psychomotor skill technique abilities on the final performance criterion measure self-ratings than students trained with real patients as models in real clinical experiences.

C. Demonstrate greater confidence in their own effective affective behaviors of establishing a relationship and eliciting data on the final performance criterion measure self-rating than students trained with real patients as models in real clinical experiences.

D. Demonstrate greater confidence in their performance of a complete Neurological Evaluation History and Physical Examination with real patients on the final performance criterion measure self-rating than students trained with real patients as models in real clinical experiences.

Ha: 4 Students trained with simulated patients as models in simulated clinical experiences will demonstrate greater agreement between the student self-rating and the clinical instructor's rating of total performance in clinical competency on the final performance criterion measure ratings than students trained with real patients as models in real clinical experiences.

Ha: 5 Students trained with simulated patients as models in simulated clinical experiences will respond more positively about their "self" in the criterion measure of self-ratings on factors secure, successful, calm, pleasurable and competent than students trained with real patients as models in real clinical experiences.

Ha: 6 Students trained with simulated patients as models in simulated clinical experiences will rate higher in the criterion measure of self-ratings on the factors realistic, important, useful, meaningful and

successful than students trained with real patients as models in real clinical experiences.

Ha: 7 Students trained with simulated patients as models in simulated clinical experiences will rate the factors providing all the skills and abilities, providing psychomotor skills and techniques, providing the medical knowledge necessary (cognitive), providing the development of affective behaviors, and in providing feedback, higher as vehicles in performing the complete Neurological Evaluation History and Physical Examination on the final performance criterion measure rating than students trained with real patients as models in real clinical experiences.

Ha: 8 Students trained with simulated patients as models in simulated clinical experiences will request additional simulated instructional experiences as evidence of preference for this method of training more than students trained with real patients as models in real clinical experiences on the final performance criterion measure rating scale.

Ha: 9 Students trained with simulated patients as models in simulated clinical experiences will demonstrate greater improvement vs. consistency in the patient evaluation performance criterion measure ratings than students trained with real patients as models in real clinical experiences.

Ha: 10 Students trained with simulated patients as models in simulated clinical experiences will produce greater patient satisfaction, receiving higher ratings in performance on the final patient evaluation performance criterion measure rating than students trained with real patients as models in real clinical experiences.

OVERVIEW

In Chapter II, a comprehensive review of the pertinent literature concerning educational simulation is presented. In Chapter III, methodology is discussed, including descriptions of the sample, Neuromuscular Systems Biology I and II course, clinical experience protocol, treatment materials, training of simulated patients, administrative procedure, criteria measures, Research and Null Hypotheses, design, and analysis. Chapter IV is devoted to the analysis of the results, and the report on the status of the Research Hypotheses. In Chapter V, conclusions are provided; implications of the immediate results of the study on medical education program change and future research suggested by this study will be discussed, and the study is summarized.

CHAPTER II

REVIEW OF LITERATURE

ORGANIZATION

Simulation is best described in relation to its use in a discipline. Inasmuch as this study is constructed around instructional simulation in behavioral sciences related specifically to the use of simulated patients in clinical medical educational experiences, it seems imperative that a selective review of related literature be provided. This is the purpose of Chapter II.

The major organizational divisions of this chapter proceed from general considerations of simulation to specific contributors utilizing instructional simulation as a technique for training in education.

DEFINITION OF EDUCATIONAL SIMULATION

Simulation in education has been used as a blanket term to cover a multitude of activities, all describing a complex system connoting a process or a product (Twelker, 1969a; Fattu, 1965). Simulation is generally defined as obtaining or relating to the essence of something without all aspects of reality (Thomas & Deemer, 1957).

Maatsch (1972, pp. 1-2) identifies educational simulation instruction as "Verisimilar training -- an instructional method that seeks to provide learning in a truthful or realistic representation of real-world situations in which subsequent independent performance will occur. Verisimilar training employs simulation as the primary vehicle for training."

Business, Military and Educational Use:

Twelker (1969a, 1969b) estimates that simulation used as a generic term for a variety of instructional techniques has been applied in the military in over 3,000 different ways. In business and industry there are over 250 different forms of simulation in use.

Zuckerman and Horn (1970) estimate over 1200 simulations/games are in current use in education. In the current issue of Simulation/Gaming News (Twelker et al., 1972), Zuckerman and Horn indicate a 50% increase has occurred in the last two years in the number of simulation/games.

Heritage of Educational Simulation:

Educational simulation has ceased to be the exclusive science or art of applying processes and products in the traditional boundary of military training and has spread across all levels of education--elementary, secondary, college, business, and industry. Educational simulation is used for training hospital administrators, doctors,

nurses, teachers, and business executives (Bartscht, 1962; Twelker, 1969b).

The multi-applications of educational simulation techniques and devices used in business, industry, the military, and more recently, in education, defy a systematic scheme of classification. However, in education, the innovation called "simulation and gaming" or instructional simulation does represent a conjunction of the techniques and devices developed from various heritages--the simulator for training drawn from the equipment oriented military aircraft simulators, the game for entertainment expanded for use in competitive problem-solving management games of business and industry, and the role playing, or small group procedures for understanding one's self and others, as used in the social and behavioral sciences (Thomas & Deemer, 1957; VonNeumann, 1944; Grambs *et al.*, 1938; Twelker, 1970).

Basically, all definitions of simulation relate to the process or technique of doing an activity and/or the product which is the device or model used in the simulation. Several levels can be identified within a simulation system, regarding the variety of activities in which models of real life situations are developed for educational purposes. The levels can be classified: (1) to evaluate or analyze an existing program, (2) to create and evaluate a model or plan for a new program, and (3) to provide a learning environment that represents a life situation (Beck & Monroe, 1969). These three uses of simulation can be adopted by any discipline and represented, in general, as research, development, and training, all of which imply evaluation.

The most logical and workable approach concerning methods applicable to the use of simulation in research, development, and training within educational instruction and evaluation is to develop a taxonomy that utilizes the heritage of simulation. The taxonomy tends to fall into the categories of media ascendant simulation methods emphasizing interaction with equipment, machines, film, etc.; interpersonal ascendant simulation methods characterized by role playing, decision making, and player interactions produced by the game characteristics of the simulations; and non-simulation games emphasizing the competitive aspects of abstract games to motivate learning of concepts and principles of a particular discipline or subject matter (Twelker, 1967; Cruickshank, Broadbent & Bubb, 1967).

Through the proper use of educational simulation, a significant breakthrough for improvement of educational practices is developing. Fattu (1965) indicates that the techniques and devices used in simulation will permit educators and researchers to replace negative attitudes regarding education's inability to study "real" educational problems with attitudes favorable to such exploration. In that simulation provides realistic descriptions and predictions on variables such as motivation decision-making and the educational environment, research development and training programs using simulation methods can put together a larger number of propositions needing evaluation. These propositions can be developed into a realistic predictive model that can be used in solving problems, in acquiring skill proficiency, and in reducing unforseen contingencies in the training environment.

Simulation Design:

Perhaps, as Cherryholmes (1966) has suggested, the problem with simulation training may center on the construction of a good simulation design. The design problem appears to be critical in building an explicit theory about a referent system. The referent system (i.e., the real world that is being simulated), must be analyzed as to subject matter tasks, facts or conditions representative of the real world with actions and consequences of behaviors similar to the real life situation. The individual involved in simulation training should be afforded the opportunity to evaluate the design of the simulation in that confidence in the objectivity of the simulation will support the individual's learning. If an individual can evaluate, or have input into his training experiences, assistance can be given for the improved development of the experience (Herron, 1960). Guetzkow (1963) argues that in constructing a simulation model in

education there is need to build into the design the "isomorphism of the environment" and the critical variables that undergird the nature of reality being simulated.

Abt (1967) contends that simulation designs need to consider the problem in detailing the implementation of the model. The model should relate to the learner's interests and provide an opportunity to experiment actively with the consequences of behaviors employed. The simulation/games design recommended by Abt would have steps that include (1) an analysis of the social system to be simulated, (2) a basic game model, (3) the human player model to be simulated (roles to assume), and (4) a method of refinement to allow continued improvement and simplicity in the design. Bruner (1960) would contend that simplification of complex learning may, in the long run, be a desirable strategy assisting the learner by considering readiness and individual differences. Coleman (1968) would insist that the simulation should state the reality parameters in specifics and that the simulation game and real life relationship be true with clearly stated objectives in order to allow research into content.

Gagne (1965) provides a most logical and consistent guideline for the design of simulations. The designer of simulations must provide specificity of purpose and functions. Gagne points out that "the purpose of simulations are of the utmost importance, not only in determining the way in which simulators are used, but also in

establishing the criteria for their design." The three purposes identified for simulation design are training, assessment, and development, all or some of which may be served by one design if preferred. The designer must be explicit about his choice of purpose or purposes. After the function or purpose of the simulation has been detailed, the operational situation or referent system must be defined. This approach requires definition of the learning functions in specific operational task terms and identification of the situation stimuli that are relevant to the tasks to be included in the simulation design. The situational stimuli need not be the exact replica of real life. Equivalent stimuli are sufficient. It is generally agreed that there is no justification for loading up a design system with variables that are not originally considered as part of the learning functions to be fulfilled by the simulation. Gagne (1965) would not recommend a design based upon an exact physical duplication because there would be no guarantee of maximum positive transfer of learning. Twelker (1969a) would agree with Gagne on the need for psychological fidelity. However, a critical study of the methodology of designs show that designers of educational simulations are more apt to be concerned with physical fidelity of simulation than with concern for psychological fidelity.

Twelker (1969a) contends, "If there exists a 'credibility gap' between instruction and the operational world, then the learner is at a disadvantage when it comes to either performing in the real world, or understanding what the real world is like." Coleman (1968) would support the position that simulation games should offer opportunities to act out life-like, decision-making roles in realistic settings. In Coleman's situation, the instructional simulation game would be a planned strategy enabling the individual learner to model the roles of real-life situations. Coleman believes that games are important to the process by which learning takes place. The game is a way of partitioning off a portion of action from the complex stream of life activities and constructing from this referent point the role which the learner would perform in real life. This approach requires constructing a game that defines the participants, the allowable actions, the time, and the environment in which the actions will take place. Again, the basic design is the same. In this case, a life-like activity of a current social problem is processed through role-playing techniques with basic game strategies as the device or model in the simulation. The design requires descriptions of the purpose, the plays, the constraints, the process of the simulation, and the criterion for assessment. Coleman desires the high investment relationship of in-school activities and out-of-school

activities. This will result in the reduction of the gap between real life role behavior and the behavior displayed in the instructional situation. Emphasis of the "Johns Hopkins" group is on research relative to sociological concepts. The games designed are purposeful in strategy and tactics for research and testing objectives.

In design, the key issues center on what should be simulated and how the simulation should be implemented to effect change in learner behavior and transfer to real-life situations. There is concern for both primary and incidental learning, and therefore, further questions of when, who, where, and why should be considered. A workable design effective in the development of instructional simulation systems for training is offered by Maatsch (1972) and Chapman, Kennedy, Newell, and Biel (1959). The recommendation is to develop the simulation design based on the fundamental breakdown of: (1) the functional environment or setting, (2) the task environment or problem needing simulation, and (3) the scenario or training plan which includes the evaluation performance criteria measures. Through this workable model, the simulation designer can specify the technique or processes of the training evaluation system and provide the method or product necessary for a viable simulation model. This approach is inclusive of both the primary and incidental learning, and provides a functional approach in designing simulation training systems.

Crawford and Twelker (1969) provide the most inclusive rationale for the design of instructional simulation systems. The emphasis is on reviewing the differences between the learner before instruction and after instruction, centering on the conditions of learning. The design needs to apply the learning paradigm to the intellectual problem-solving, decision-making, physical, emotional, and social behaviors desired to be learned. The design must bridge the gap between the "learner's initial repertoire and final criterion repertoire" in an environment that is meaningful to the learner, determined by ideas about self and the world in which the simulation is to be transferred.

Three basic decisions and the thirteen specific steps in designing a simulation system are outlined from the work of Crawford and Twelker (1969) to provide collective insight into what is considered a master protocol in the design of simulation systems:

I. Determining what shall be taught:

Step 1 -- Define instructional problem

Step 2 -- Describe the operational educational system

Step 3 -- Relate the operational system to the problem

Step 4 -- Specify objectives in behavioral terms

Step 5 -- Generate criterion measures

II. Determining how best it might be taught:

Step 6 -- Determine appropriateness of simulation

Step 7 -- Determine type of simulation required

Step 8 -- Develop specifications for simulation experiences

III. Validating the system:

Step 9 -- Develop simulation system prototype

Step 10 - Try out simulation system prototype

Step 11 - Modify the simulation system prototype

Step 12 - Conduct field trial

Step 13 - Make further modifications where appropriate

The design used in simulation by a discipline should consider the total learning experience of the individuals participating. This cannot be accomplished without providing viable parameters, or an organized approach in looking at the process of performing an activity, and at the product, which is the device or model used in the simulation. If designs can be organized around the enabling and terminal objectives of a training program, perhaps evaluation through research and development will prove the relevance of simulation to the psychology of learning. Once a discipline looks at a learning experience, objectives can be detailed and questions can be raised regarding the learning domains; then, the simulation designer can look at cognitive, psychomotor, and affective behaviors related to the specific problem in the simulation training being used for transfer to the real world (Mager, 1962). The experimenter in educational instruction must provide strategies that utilize workable system designs of simulations in order that validation of the educational application can be established.

EDUCATIONAL SIMULATION FOR TRAINING

It is difficult to separate training from research and development within the context of educational simulation. Simulation training, to be of value, should involve continual development of new uses and methods and should be organized around a research effort established in the total evaluation of the program being simulated. Therefore, it must be assumed for training purposes, that an experimenter will follow a design which provides a vehicle for development and research. Educational researchers and practitioners have professional responsibilities to use techniques and methods that are effective in simulation training, as evidenced by behavior change for the learner. Additionally, educators should make a commitment in bridging the gap between "learning theory" and instructional practices that purport to result in learning.

In many educational training simulation systems, the objectives are not clearly stated and whatever learning takes place is difficult to evaluate. Boocock (1968) feels that because there is no guiding theory, there has been very little empirical evidence supporting the effectiveness of simulation. Carter (1968) states that users of simulation need to develop reliable assessment

procedures for determining what has been learned and how it has been learned. Criteria must be established to assess learning in simulation by implementing basic research designs for experimentation.

Simulation Learning and Transfer of Training:

Many of the criticisms of simulation center on the lack of supportable evidence. Cherryholmes' (1966) review of six studies concluded: "Simulation does produce more student motivation and interest compared to other teaching techniques, but these are not consistent or significant differences in learning, retention, critical thinking or attitude change." However, these conclusions are features of many educational research efforts. Results, often, are not significant and even ambigious between various training strategies. While it is believed that simulation may not (at the present time) be the panacea to learning, it is believed that it has the potential of proving to be the most effective instructional or training technique of converting "knowledge" or "theory" into practical action situations which approximate real life.

The methods of media ascendant simulations, interpersonal ascendant simulations or non-simulation games emphasize active responding by the learner in the environment. In a response situation feedback is given as the primary condition to motivate and enable learning. In media and interpersonal simulations the fidelity or realism of the learning situation is promoted to assure relevance and transfer of learning to similar real world situations (Twelker, 1969a; Gagne, 1965; Biel, 1962; Gagne, 1962). In simulation training techniques, propositions or situations can be established that provide the vehicle for individuals to learn from the consequences of their behavior (operant learning), from conditions that become associated with their behavior (respondent learning), and from the human models present in the simulated environment (model learning) (Krumboltz, 1966; McDonald, 1965). In simulation training the common characteristic is that the learning situation can provide the essence of "real life" without all of the particular reality.

Either, on the basis of design or on the basis of instructional application, educational simulations utilize the principles and rationales of psychological learning theories. Perhaps the greatest contribution to the theory of the design of educational simulation is the criteria, developed by Twelker (1969a), which embrace the stimulus-response (S-R) theory of learning. Twelker considers that an instructional simulation must embody a stimulus situation presented to the learner, a response, which is an observable change in the learner's behavior, and a feedback sequence (or reinforcer) which interprets the consequence of actions taking place within the learning environment. It also serves as the basis for modifying subsequent responses to the stimulus. In the use of

simulation for training, Twelker (1969a) would state that simulation (1) presents or demonstrates information of the real world through a model that is difficult to distinguish from what is real, (2) provides opportunities for practice or exercise of previously learned principles or for the trial-and-error learning of principles, and (3) assesses performance as used in criterion measures. The second point is classed by Twelker as a "contextual response simulation," and is the activity or process involved in training simulation that makes simulation a viable learning system. The contextual response simulation activity looks at the learner's perceptions of the realness or non-realness of the environment.

Twelker (1969a) characterizes contextual response simulations (those that provide a simulated stimulus which allows a representative response of real life) as: (1) enacted or life-like responses made to (2) simulated stimulus situations that (3) provide feedback to the learner vis-à-vis the learner's behavior in the ongoing training context, and they (4) offer control measuring for realism.

In the interaction involved in an enacted or life-like response, the learner either role plays and assumes the role of someone else or the learner practices a role that may be his own future role. In the latter, the "role-performing simulation," the objective is to reinforce transfer from the training experience to the real-life situation. The greater the representation to the real life role for which the learner is preparing, the more the transfer (Garvey, 1967; Kersch, 1963; Twelker, 1967). Even though the distinction between the learner assuming a role and the learner performing his own expected role appears to be hair-splitting, it is, nevertheless, important. The closer the representation is to reality for the learner, the higher the psychological fidelity and perhaps the greater the transfer. Basically, Twelker is stating a learning paradigm. The "contextual response" model is simply a unique method employed in using simulation training. Twelker emphasizes the need for representative real-life responses made to simulated stimuli with feedback (reinforcement) in the learning experience. In turn, the simulated learning experience offered should provide "control," which is only the assurance that the simulated environment allow the "stress," the "reproduction," and the "planned variations" that occur in real-life situations.

The "contextual response" simulation concept developed by Twelker (1969a) utilizes both major theories of learning. Simulation allows for both discovery learning and reception learning. The learner can practice previously learned principles and/or discover the principles to be learned. The intent of this study is not to become involved in the controversy concerning discovery versus reception learning. The proponents of both theories contend that their own theory facilitates retention, transfer, and motivation for the learner (Bruner, 1960; Asubel, 1963; Gagne, 1965). What appears to be the more important purpose of simulation training is the promotion of positive transfer of learning from the simulated training experiences to the real-world situation. Therefore, in simulation experiences, efforts should be directed at the training situations to determine if the experience in the simulation task facilitates learning of the real-world task and to determine if the learning in a simulated experience will generalize to the same general class of tasks in the contexts of the real world (Gagne & Rohwer, 1969).

Gagne (1965) has delineated transfer as "lateral transfer," which refers to the generalizing of material learned over a broad class of situations at about the same level of complexity, and "vertical transfer," which involves the ability to apply basic principles previously learned to the learning of additional principles requiring higher levels of ability. Twelker (1969a), however, in discussing the training techniques of simulation, offers an additional term: "parallel transfer." Simply stated, "parallel transfer" involves the learner in moving from the role-performing simulation training experience to the real-world situation. In other words, all the learning represented in a simulation situation is operationally the same and the learner simply applies the learning. The

"parallel transfer" concept is of critical importance when the simulation used in training requires performance in the real world. Studies regarding fidelity of simulation are revealing differing results (Gagne, 1962; Cox, Wood, Boren & Thorne, 1963; Gryde, 1966; Crawford, 1962; Bugelski, 1956). Some of these studies state that the simulating must have perfect fidelity or realism for maximum transfer. Others show it is the practice effect that is more important than the realism. However, Muckler et al. (1959) points to psychological fidelity as the key to transfer. Schalock (1967) contends that in order to accurately measure performance, the fidelity of a measure requires that the simulation training experiences be isomorphic (i.e., identical or similar in form and structure). If a stimulus is a real one from the real world then the response must be a real-life response. In "contextual response" training simulations, the stimulus is simulated and as such, the response is representative of real-life stimulus. This allows the contention for transfer of what has been learned from simulated training situations to the reality situation. Gagne (1965) would argue that a simulation is not real-life; it is a representation of real life. Therefore, the degree to which a simulation represents the real-world situation can certainly be measured in a direct manner in terms of the amount of transfer; and "to the extent that the simulation is 'real' the performance is 'real' and one cannot define something which is 'more real.'"

Studies of Educational Simulation:

A few select studies are included in this section to show the recent research on simulation training techniques.

Twelker (1966a) found simulation training a powerful vehicle for teaching principles of instruction or principles of classroom management and control. Prompting as an instructional variable was introduced within the study and it was found that the use of prompts assisted learning. The purpose was to determine if prompting would increase learning efficiency without reducing transfer. The concern again was on the issue of learning by discovery. Wittrock, in Twelker (1966a) study, felt that withholding principles may reduce performance, increase the time required for learning and decrease affectivity toward the learning experience. In further study in teacher preparation, Twelker (1967) found that realism in simulation and prompting are not important variables in enhancing transfer, in comparison with instructor differences and, possibly, length of training.

Cruickshank and Broadbent (1968) found simulation experiences to be at least as effective as an equal period of student teaching in the areas of attitude change, confidence in ability to meet classroom problems, teaching behavior, and the amount of time needed to assume full teaching responsibility as a student teacher. Kersh (1965) from his study "Classroom Simulation: Further Studies on the Dimensions of Realism," concluded that students who underwent simulation training were judged to be ready to assume full responsibility for a new class up to three weeks earlier than students who had no simulation training. However, Kersh (1962a, 1962b) found that simulation training had no measurable effect on actual student teaching one year after students underwent a series of simulation experiences, nor on the types of problems that student teachers found most difficult to overcome during their experiences in student teaching. Also, in this same study, Kersh found that students responded to filmed simulated experiences better when the projections are less realistic (small) than when the projections are life-size (realistic), but that there is no significant difference in post-test performance of students who enact responses to problems on film and those who simply describe how they respond. In a further elaboration, Kersh, in his studies on simulation in teacher education begun in 1961, suggested that high fidelity in simulation is sometimes important for motivation and that the transfer effects may be minimally affected by highly accurate laboratory simulation.

Stewart, Danielian, and Foster (1969), in simulating intercultural communication through role-assuming techniques found that the exercises (role playing) are an effective means of bringing about desired changes in cultural perspective at the emotional as well as the intellectual level. In addition, the technique yielded strong trainee involvement.

Grimsley (1969) examined the effects of varying fidelity of training devices on acquisition, retention, and reinstatement of ability to perform procedural tasks. There was no difference in training time to learn the procedural task, initial performance level, amount remembered or retained between individuals trained on high fidelity devices and those trained on low fidelity.

Results of a survey on a study utilizing simulation as a training experience for administrators in developing decision-making skills in management found that the participants evaluated the simulation exercise as a valuable technique (Dillman & Cook, 1969).

Beaird and Standish (1964) utilized a simulated counseling interview as a training experience to provide counselors with the behaviors of discriminating between cognitive and affective elements of client verbalization and in responding to verbalizations in ways that would facilitate further affective verbalization by the client. The results indicate that the subjects trained with simulation demonstrated a significant gain in their performance from pre-training to post-training interview assessments.

In another study by Twelker (1968) investigating "Successive vs. Simultaneous Attainment of Instructional Objectives in Classroom Simulation," the author concluded, after analysis, that the simultaneous method was more efficient in terms of the learning rate of pre-service teachers.

Alexander _et_ _al_. (1967) used model simulation techniques (in the form of exercises in decision making) with a group of prospective principals to provide practice in administrative decision making, problem solving, and to incorporate these techniques into the training program. The results suggest that in the analysis of behavior on a questionnaire, simulation exercises were effective as training tools for improving administrative decision-making and problem-solving skills.

Johnson (1968) in a study with 288 high school boys used simulated vocational problems in determining the optimal difficulty level of some occupational problems. The criterion for successful performance was set at three levels of difficulty. Difficulty level was not found to produce differences in the measures of expressed interest scores on an information test and incidents of information seeking behavior. However, the simulation technique did generate interest and exploration in the specific occupation used in simulating vocational problems.

In a study on interaction analysis and classroom simulation as adjunct instruction in teacher education, Twelker (1968) used the two approaches as methods for involving maximum student participation in the learning experiences of student teachers. The subjects received either interaction analysis and/or simulation training or neither. Effects were measured with simulation tests, classroom performance records, course grades, Minnesota Teacher Attitude Inventory, Edward's Personal Preference Schedule, and a cognitive test. The study revealed that students receiving only simulation training spent more time than others in simulation and management behaviors. The hypothesis that students in simulation training would benefit from interaction analysis training was not supported. It appeared that concurrent training inhibited students from discriminating problematic cues and responding appropriately on simulation tests.

Wayne State University (1967) in a summer industrial work experience and occupational guidance program called Project Pit, with Detroit's inner-city youth, provided occupational information and guidance to help youth see the need for a good education, provided financial means to return to school and to make useful goods for non-profit organizations. Those aims were fulfilled through a simulated industrial setting and an intensive guidance program. (Questionnaires and analysis of the Detroit High School population revealed that most youths either have not

selected an occupational goal or have selected a goal that is unrealistic for their abilities and potentials.) Project Pit's most important aim, the upgrading of the employee's goals and aspirations and the acquisition of a sound background of the occupations available to them, is an intangible that is difficult to measure in a short-range program; however, results were obtained which indicated a significant shift in educational and occupational aspirations to both a higher and more realistic level through the use of simulated training experiences.

Kersh (1964a, 1962c) in a presentation to the American Educational Research Association, discussed the issue of fidelity in classroom simulation based on the experimental results obtained from his study on the effects of variations in the visual display on learning rate and laboratory performance ratings. He found in his results that there was no support for Thorndike's long-standing identical elements theory of transfer. The results were supportive of more current thinking regarding verbal mediation as a mechanism of transfer.

Stone (1972) in a study on the effect of fidelity of simulation on counselor training found that counselor-tacting-response leads (CTRL's) were learned and transferred to differing conditions. Stone's question was based on Thorndike's theory of transfer of training (Thorndike & Woodworth, 1901) that "improved efficiency at one task, acquired as a result of training, would trasfer to another task only insofar as the two tasks had identical elements." This is also supportive of Bandura's (1969) suggestion that exposure to a variety of stimulus components facilitates generalization (response).

SIMULATED PATIENTS AS A TECHNIQUE FOR TRAINING IN MEDICAL EDUCATION

Enacted Role-Performing Simulation:

In 1962, Dr. Howard Barrows (1971) created the simulated patient technique in medical education training and evaluation. In working as a consultant in neurology at the Goldwater Memorial Hospital in New York during 1959 and 1960, Barrows became involved with David Seegal who was actively investigating the performance of medical students in clinical competency. Additionally, Barrows recalled a personal experience with the board examinations in neurology. The association of these two events provided the spark that gave birth to the use of "programmed patients" used as a technique for evaluation of the neurological performance of medical students in neurological service rotation.

Simulated realism in an enacted role-performing situation through the use of mock-up clinical facilities and programmed or simulated patients has been used by Barrows and Abrahamson (1964) for instruction and assessment of skills in clinical neurology. In their study, established out of the desire to provide quality measurement of student performance, to determine effectiveness of teaching methods, to establish a tool used for providing guidance, and to provide criterion measures in appraising student performance, the authors concluded:

> "Not only does this technique avoid the problems incurred when an observer is present, it offers the far more important advantage of guaranteeing that the patient is constant for all students being tested. Thus, faculty may far more easily determine the strengths and weaknesses of the teaching program through a careful analysis of the types of errors made by students. In addition, records of the performance by individual students may be readily analyzed for purposes of further individual instruction and counseling. While it is true that other techniques of measurement of clinical performance may be used similarly, the virtual elimination of the variable of patient behavior seems to make the use of the programmed patient a most effective evaluative tool." (Barrows & Abrahamson, 1964, p. 802).

What more can really be said in support of simulation training in medical education? The pioneer study has set the standard for further research, development, and use in training medical students. Further support has been provided by McGuire and Soloman (1971) who used simulation for the assessment of clinical skills in orthopedic medicine. Simulation has been used by Jason, Kagan, Werner, Elstein, and Thomas (1970) and Froelich (1969) in the undergraduate training of doctor-patient interaction skills, by Elstein, Kagan, Shulman, Jason, and Taupe (1972) for research on the process of medical inquiry, by Kagan and Schauble (1969) in the assessment and modification of affective responses, and by Levine and McGuire (1968) in developing simulation examinations employing role-playing techniques (i.e., simulated patients).

With increased interest in innovative instructional programs in the preparation of medical students, Morrison and Jones (1972), at the University of Dundee, developed through role-playing sessions using simulated interviews, a pilot study video-taping a 'doctor' who was an experienced general practitioner and a patient who was an actor or actress trained to assume the role of a patient with particular problems and/or symptoms. The entire experience was made as realistic as possible. The objective was to review the video-tapes in an effort to develop an appropriate observation schedule which would record objectively different aspects of the performance of the doctor and the patient, to develop comparative records of the various interviews, and to assist in developing a training program model for student trainees in general practice.

Barrows (1971) reports that Professor Gauthier at the University of Geneva presented a simulated patient at a weekly neurological clinic as a real patient. After the complete presentation, when it was announced that the patient was simulated, all participants were shocked.

In an innovative approach using simulation techniques for performance evaluation, Hubbard et al. (1965, 1971), after stating dissatisfaction with Part III of the National

Board examination, completed a critical incident study to redefine clinical competence that should be assessed in medical student performance. The FLEX test was then developed which used new testing procedures of films, slides, and photographic reproductions to measure diagnostic recognition skills and programmed examinations assessing problem-solving ability.

It appears that simulation techniques in medical education of the variety involving media ascendant methods are securing more research efforts within the United States than the enacted role-performing techniques using simulated patients. McGuire and Babbott (1967) are utilizing the simulated physician patient encounters called patient-management simulation requiring students to problem-solve in reaching a decision on the patient's medical problems.

In a study by deDombal, Smith, Modgill, and Leaper (1972), attempts were made to assess the value of four media ascendant simulation methods of the diagnostic process, used as an adjunct to conventional bedside teaching during a beginning course in clinical medicine. The evaluation of the results indicate that simulation was of benefit--in the group of students having simulation experiences, performance in the diagnostic process skills were higher than students who did not have simulation experiences.

Jason and Tichtov (1971), in reviewing instructional technology in medical education, indicated multiple needs

in providing effective instructional methods for medical education. They feel these needs are so complex in character that simulation is likely to be the most important new educational approach of the decade.

Rationale for Simulation Training in Medical Education:

Role-performing instructional simulations share benefits of supervised clinical experience without its costs, risks, inefficiencies and inconveniences (Barrows, 1971). In further support of simulation in clinical education, Gagne (1965) applies simulation to the process of acquiring skills at a late stage of medical learning where "book knowledge" or "theory" must be put into practical action. Stated simply, instructional simulation in clinical training with an opportunity for feedback as a reinforcing stimulus will prove an effective instructional tool in representing real clinical experience and will provide transfer of learning for first-year osteopathic medical students. With feedback from fellow students, simulated patients, and clinical instructors as a primary condition to motivate and promote learning, the unwanted variables associated with real clinical experience can be avoided. Trivia (or as in Barrows' [1971] description, the "red herrings of medicine"), such as day-to-day variation in the training situations or the many accidental occurrences that detract from student learning, can be controlled, planned variation of experiences can be made, and performance evaluations developed.

Simulation training allows opportunity for continuous formative evaluation while the experience is at hand. The student will be involved in learning effective performance behaviors of the necessary psychomotor skills, affective behaviors, and cognitive knowledges necessary for making accurate clinical judgments in neurological examination.

Barrows (1971) indicates that a closer review of the uses of simulation reveals many advantages in the learning of skills. Simulation allows controlled learning in that a complex task can be presented for instruction in less difficult segments appropriate to a student's level of learning. The tasks and functions that the subjects must learn are the same in the real or simulated instructional experience. The similarities are so close that there is little difference in the amount of learning necessary to excell in either training situation.

The above review supports simulation training as a potentially powerful instructional aid but the answer to the other half of the question, namely the issue of transfer in training from simulated to real situations, can only be partially supported by past research in other areas of simulation training and education.

A primary purpose of the present study is to integrate the cognitive, affective, and psychomotor aspects of learning in a role-performing simulation training activity and to offer a partial solution to the problem of knowing whether performance in a representative environment will transfer to the real through demonstrated clinical competency.

Wittrock (1967) states that hypothetical researchers may be disappointed in the realization that little is known about the conditions of transfer, but believes that Gagne's model in the study of transfer is perhaps the leading contender to be used in the study of instruction.

In the present study, it is not intended to investigate the theoretical model of the conditions of transfer. An objective is to empirically determine if the conditions provided by simulated training (i.e., representative of real world tasks, practice, and feedback) result in better learning and transfer to the real environment in terms of better performance in the real-world situation. This study is primarily concerned with the use of simulated instruction using simulated patients as a viable alternative in training first-year Osteopathic Medical students. In the present study, transfer is considered a product of the learning process. It is hypothesized that lateral, vertical, and parallel transfer from the experimental simulated training experience will occur in the real clinical situation. The rationale for this contention is based on the review of simulation training presented in this chapter and the probability that simulation training using simulated patients in clinical training of first-year medical students will result in the transfer of training within medical education.

CONCLUSION

This concludes the selective review, analysis, and discussion of the literature which relates to educational simulation theories and practice. An effort has been made to present a panoramic perspective of the topic, bringing into focus its utilization in education as a viable technique in training and its transfer of learning from the representative world to the real.

With this conclusion, attention will now center on the problems of methodology and procedure in Chapter III.

CHAPTER III

DESIGN OF THE STUDY

SAMPLE

The population of subjects for this study consists of the 33 students in the first-year class of Osteopathic Medical students, College of Osteopathic Medicine at Michigan State University, East Lansing, Michigan. The sample randomly selected from the population will be carefully described, allowing generalization of the results of the study to similar populations of medical students.

A random sample of 24 subjects (Ss) was obtained from the first-year class of Osteopathic Medical students in the College of Osteopathic Medicine enrolled in the Systems Biology I and II Neuromuscular Systems Unit, Spring and Summer terms, 1972. The Systems Biology I and II course is a requirement of the regular academic program (See Appendix A). The random assignment of the 24 Ss was made to the two treatment groups; T_1 = simulated clinical treatment, and T_2 = real clinical treatment, utilizing a table of random numbers. The remaining nine Osteopathic Medical students, plus a group of five Allopathic Medical students enrolled in the Systems Biology I and II

Neuromuscular Systems Unit, were assigned to real clinical experiences, but not as part of the treatment groups and not with the facilities and clinical instructors utilized for the experimental study. The assignment of Ss in the experimental design is presented in the chart below.

Cell Frequencies, by Treatment Groups.

Treatments	
1	2
Simulated Patient Clinical Experiences	Real Patient Clinical Experiences
12	12

The experiences and the data collected for the remaining nine Osteopathic Medical students and the five Allopathic Medical students are the same as in the experimental study, but the results are not part of the analysis. Therefore this group of 14 students can be considered as inactive control within the study.

Treatment 1 (T_1) Subjects in this group were trained in three clinical training experiences in Neurological Evaluation utilizing simulated patients.

Treatment 2 (T_2) Subjects in this group were trained in three clinical training experiences in Neurological Evaluation utilizing real patients.

Inactive Control The remaining students enrolled in the Systems Biology I and II, Neuromuscular Systems Unit, were trained in three clinical training experiences in Neurological Evaluation utilizing real patients.

Following is a careful delineation of the sample in order to allow the reader to judge how the population in this experimental study compares with other populations to which they might wish to generalize (Cornfield & Tukey, 1956).

Sample Characteristics:

1. Sex: 22 males and 2 females
2. Age: Range = 22-43 Mean = 25.58
   Median = 24 T_1 Mean = 25.58 (Simulated)
   T_2 Mean = 26.08 (Real)
3. Marital Status: 11 married; 13 single
4. Class Standing at Michigan State University: Third term full-time Osteopathic Medical students.
5. Program: All 24 Ss are enrolled in the regular Osteopathic Medical Program.
6. Residency: 17 students are from Michigan; 3 from Ohio; 2 from New York; 1 from Pennsylvania; and 1 from New Jersey.
7. Location of Undergraduate Work: 17 received their undergraduate education in Michigan; 2 in Ohio; 3 in New York; 1 in New Jersey; and

1 in Pennsylvania. Schools represented are Michigan State University; University of Michigan; Ohio State University; Wayne State University; Siena Heights University; Rutgers; City College of New York; Brooklyn College; Ferris State College, Michigan; University of Detroit; Western Michigan University; State University of New York; Queens College, New York; Miami University of Ohio; and Millerville State College of Pennsylvania.

8. Educational Background: Undergraduate Majors: 9 majored in Zoology (Pre-Med); 5 in Biology; 3 in Psychology; 3 in Science Education; 1 in Chemistry; 1 in Political Science; 1 in Pharmacy; and 1 in General Studies. Graduate Work: 1 in Psychology; 1 in Biology; 1 in Medical Technology; and 1 in Podiatry.

9. Employment: Prior to entrance, the following employment histories were recorded for the 24 S̲s randomly selected as the sample from the first-year class of Osteopathic Medical students. Job Categories: 15 were students with part-time employment (i.e., machine design, lab assistant, research chemist, bartender, etc.); 1 was a teacher of high school science; 1 was a teacher of high

school chemistry; 1 was a substitute teacher; 1 was a research chemist and a student; 1 worked as a traveling field representative; 1 was a Podiatrist; 1 was a Pharmacist; 1 worked as a pharmaceutical representative; and 1 was a General Motors representative.

Further description of the "experimentally accessible" population is presented to allow the reader generalization to "target" populations (Bracht & Glass, 1968). The researcher was restricted to one Osteopathic Medical School, but the sample having characteristics the same as the majority of the Osteopathic Medical students (and perhaps Allopathic Medical students) in the country allows application of the conclusions to be generalized to larger target populations of medical students. Cornfield and Tukey (1956) promote generalizations from samples to populations with characteristics like those in the original study. The reader may make inference to other populations based on the characteristics of the sample detailed in this study.

To dissuade concern for other problems of external validity, such as the "Hawthorne Effect," "Novelty and Dissruption Effects," and "Experimenter Effects" (Bracht & Glass, 1968), the reader will have to accept the controls implemented for the study. However, a brief description will be of assistance.

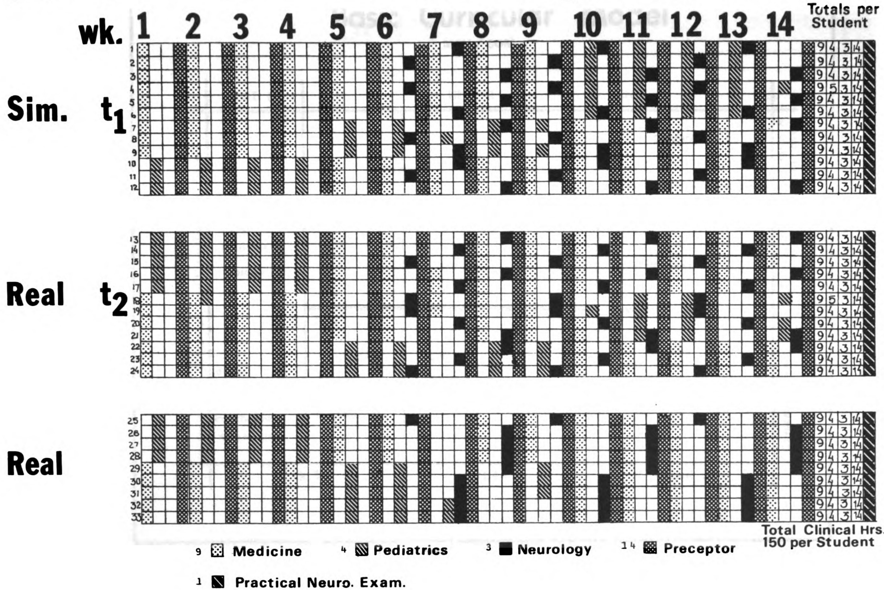
The Systems Biology I and II, Neuromuscular Unit, is the first major system in the Osteopathic Medical students' educational experience. The students (experimental and inactive control) in this study were informed that the experimenter (E) was an administrative assistant for the Systems course, having the responsibility for the educational experiences encountered in the 15 weeks of the Systems Biology I and II, Neuromuscular Unit. The students had no knowledge they were participating in an experiment. The class understanding was that they were involved in the first major systems course within the Osteopathic Medicine curriculum. One of the research hypotheses tests the concern as it relates to the specifics of realism and anxiety regarding the clinical treatment experience. All students in the course realized that they received different clinical assignments. All students in the course were aware that practical clinical experiences would be arranged at various clinics in Detroit and Lansing with real patients and that others would receive training on programmed or "simulated patients" in clinics established on campus. The entire class had other real clinical exposures varying in location and in experiences (i.e., Medicine, Pediatrics, General Office Practice, in Flint, Detroit, Grand Rapids, Lansing, etc.) during the 15-week Systems Biology I and II Unit. As a result of various clinical experiences, questions regarding the use of simulated patients or the various clinical assignments were not raised. Students were simply informed that random assignments were made to the Neurological Clinics in the same manner as other clinical experiences had been made. In order to gain perspective of the clinical exposure during the 15-week Neuromuscular Unit, Figure 1 is presented. During the 15-week Neuromuscular Unit, the Osteopathic Medical student received one hundred fifty (150) hours of clinical experience. His experience is divided into: 9 five-hour units in medicine rotation in the hospital with an internist; 4 five-hour units in pediatrics rotation in the hospital with a pediatrician; 3 five-hour units in neurology rotation in the Neurological Clinics as part of the Neuromuscular Systems Unit; 14 five-hour units with a preceptor, i.e., in the family physician's office; 1 final practical neurological examination evaluating total performance of clinical competency for the systems unit.

Regarding novelty or disruption effects in the experiment, it must be emphasized that Osteopathic Medical students are required to follow a standard ethical decorum when functioning in clinical experiences. All students were advised before the clinical assignment of their professional responsibility to the patient, to the physician in charge, and to the hospital. Clinical experiences in the Osteopathic Medical curriculum are looked forward to as an important segment of the student's education. Clinical exposure as displayed in Figure 1 is

an integral part of the Osteopathic physician's education. Additionally, Figure 2 is presented as self-descriptive material to provide an overview of the basic curricular model of the College of Osteopathic Medicine. Figure 3 provides a detailed view of Unit II, the Systems Biology Sequence, which includes the Neuromuscular Unit. Appendix B provides an excellent description of the systems courses in general.

Regarding experimenter (E) effects, the E acted only as an assistant for the total course which required basic coordination of all course activities. No contact during the specific clinical experience treatments was made other than in collecting the required examination and evaluation forms as outlined and required in the advance organizer (clinical course protocol booklet - Appendix C). The duties as administrative assistant in the systems course had no effect on the behavior of the total class or, in fact, the experimental Ss. The Ss accepted the E's professional responsibility as that of administrative assistant, which required the coordination and contact of collecting the material required for the Systems Biology I and II course as well as for other clinical educational experiences. Other questions on external validity have no relevance for concern in this study as they have all been controlled or have no effect.

Figure 1. 1st Year Clinical Experience (During Neuro. Musc. System)



Basic Curricular Model

Figure. 2.

Basic Curricular Model

MSU/COM

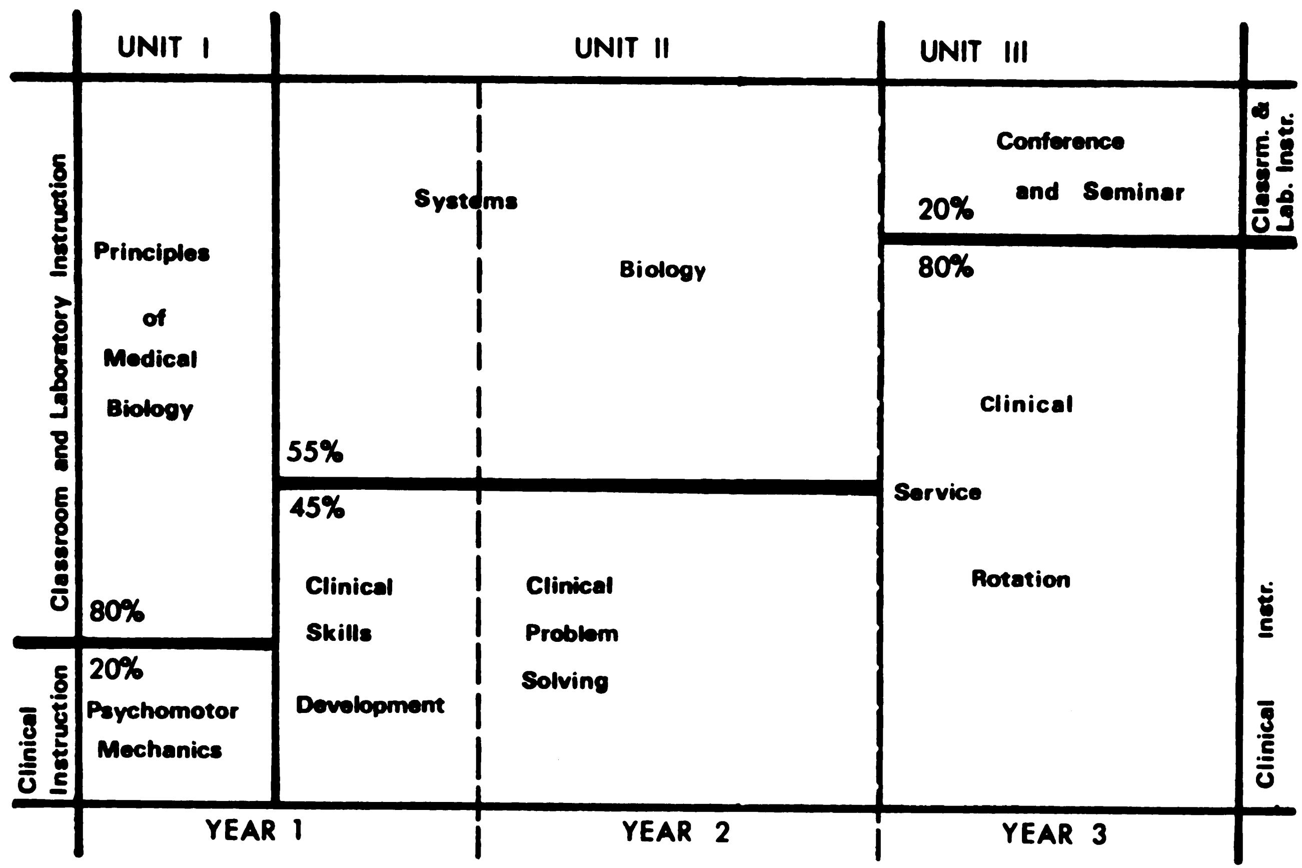
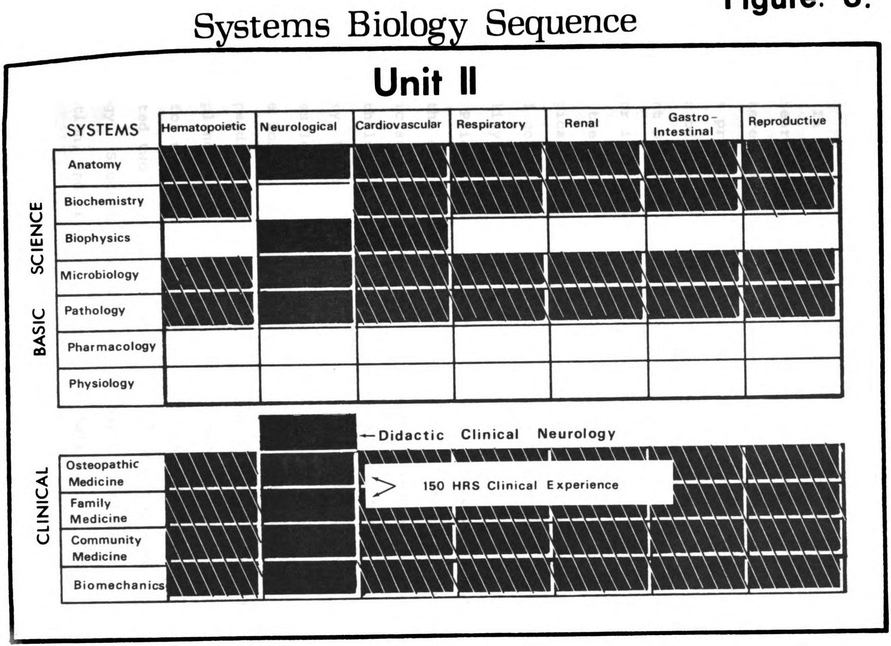


Figure. 3.


Systems Biology Sequence
Unit II
SYSTEMS
Hematopoietic
Neurological
Cardiovascular
Respiratory
Renal
Gastro-Intestinal
Reproductive
BASIC SCIENCE
Anatomy
Biochemistry
Biophysics
Microbiology
Pathology
Pharmacology
Physiology
Didactic Clinical Neurology
CLINICAL
Osteopathic Medicine
Family Medicine
Community Medicine
Biomechanics
150 HRS Clinical Experience

TREATMENTS

Pre-treatment and Treatment Procedures and Plan:

1. In the first week of the 15-week Systems Biology I and II Neuromuscular Unit, a cognitive pre-post test was administered to the entire class (See Appendix D). The test was prepared by L. E. Jacobson, D.O., (Neurologist, Chairman of the Department of Osteopathic Medicine, Assistant Dean for Clinical Affairs and primary clinical professor in charge of the system courses) from past tests used in the evaluation of student performance in the neurological clinical science portion of the course. The internal consistency reliability (Kuder Richardson Reliability #20) is $\Gamma = .83$.

2. Prior to the controlled 10 weeks of the experimental study, the entire class received 5 weeks of instruction in the basic sciences of Neuroanatomy, Neurophysiology, Neuropathology, other neuroscience areas (i.e., Neurochemistry, Pharmacology, etc.), and in Clinical Neurology. The class lectures in the basic and clinical sciences continue for the 10-week remainder of the Systems Unit (See Appendix E). The Neurology section of the unit covers the coupling of all neuroscience information into a practical format for utilization in clinical practice. Students are instructed two times per week for a total of 6 hours in Neurology. Students have lecture seminars, video-tape instruction, and practical supervised instruction. The areas covered are motor skills, the rapport techniques

involved in neurological examination, and the cognitive medical knowledge necessary to clinical problem solving and decision making of neurological disabilities. Each student completes a practical psychomotor pre-test on his skill in neurological physical examination. (This form is also used for the post-test of psychomotor skills--See Appendix F). Each student has had experience in interviewing patients during his Behavioral Science Classes and in the other clinical experience during the 15-week Systems Biology I and II Neuromuscular Unit.

3. During the first 5 weeks all students received training in the affective behavior involved in physician-patient relationships and in the eliciting of information. The E prepared material on effective affective behaviors, which was distributed and discussed in detail prior to the control treatment period (See Appendix G). A video-tape on ideal physician behaviors in completing a basic physical and neurological examination was developed by the E for this study. The video-tape demonstrates critical affective behaviors in the ideal physician-patient examination interaction. The video-tape was used as a behavioral model to assist students in the acquisition of important affective behaviors necessary in establishing a relationship and in effectively eliciting data from the patient. The literature is replete with conclusive evidence that learning can occur through observation of social models (Bandura, 1969; Bourden, 1970). Additional tapes demonstrated proper

psychomotor skills, with the students participating in discussing and identifying the important affective behaviors that should be in operation by the physician (See Appendix H).

4. An instructional booklet was developed by the E for the 10-week clinical experience portion of the course (See Appendix C). It was used as an advance organizer in the instructional process. The students were given detailed course description, objectives, location, instructors, duration, implementation, evaluation processes, and forms in the advance organizer. The students knew exactly what was expected in the clinical experience. Consequently, in this treatment period, the students did not need to discover the principles to be learned by examining discrete facts regarding the format for neurological examination or evaluation; they were subsumed in the advance organizer.

Research has demonstrated the effectiveness of such an approach on several criteria of performance, particularly retention (Ausubel, 1960). David Ausubel's work in the area of meaningful verbal learning theorizes that an individual's existing cognitive structure is a major factor in the learning and retention of new material. In the discussion of cognitive structure, Ausubel (1963) describes that when an individual's knowledge is organized, clear, and stable, meaning will emerge and learning will be enhanced. The contention is that adequate cognitive structure depends upon providing the student with an advance

organizer, in the form, for example, of the clinical booklet (Appendix C) developed by E for this study and for the Systems Biology I and II course.

5. Each simulated and real clinical training experience was prepared in advance by the clinical instructor. The instructors attempted to provide the same types of clinical cases, (real and simulated) or as close as possible, by preparing in advance a Criterion Performance Worksheet which gives a complete and accurate description of the case to be used in the instructional experience. In addition, the Neurological Examination was prepared in advance by the clinical instructor (See Appendix C, pages 11-14 and 15-23). The clinical instructor established in advance, the criterion on which the student was rated, based on the standard maximum of 54 points per case (See Appendix C, pages 24-28). Data was collected each week for all students in the systems unit after each training treatment experience. An office secretary under the supervision of E was responsible for collecting and recording the required incoming evaluations after each session (See Appendix I).

6. Counterbalance of the instructors within the treatment experiences was employed in order to eliminate confounding. The clinical neurologist in Detroit instructing in the real clinical experience switched with the clinical neurologist in the simulated clinical experience during the second treatment period. During the first

clinical treatment experience the simulated and real treatment subjects were randomly assigned to one of the four clinical neurologist instructors. The objective of random assignment of instructors during the first treatment experience and rotation of the two primary instructors for the second and third treatment experiences was to eliminate confounding of instructors with the treatments.

7. The clinical settings for both groups were similar. Examining rooms were developed for the simulated instructional experience. Examining gowns and tables were provided. Arrangements were made for the simulated clinical treatment group to have appropriate lab tests, x-rays, EEG's, etc. for discussion purposes. This material provided as close an experience as possible to that received with real patients in the real clinical treatment group.

8. Eight simulated patients were programmed. The simulated patients were from various areas of the community. In an effort to show that college trained as well as non-college trained individuals could provide effective interaction with the student physician, a variety of individuals were programmed. Eight neurological problems were identified by the neurologists. The simulated patients were instructed on how to provide feedback by viewing tapes and discussing the dynamics of physician-patient relationships. These trained simulated patients were also used to test the inactive control group in the

final examination, the objective being to prove the reliability and validity of simulated patients.

The simulated patient is a critical factor in this study. Dr. H. S. Barrows, in personal correspondence with the _E_, indicated, "I am, of course, very interested in this study. The goals, as stated are excellent, and the results should provide important answers to many of us that hold the same faith as yourself. I have concerns over quality of simulator training and how data is to be obtained to answer your questions." The communication with Dr. Barrows, one of the originators in using simulated or programmed patients, resulted from an abstract of this experimental study presented at the national meeting of the Society of Neuroscience, in Texas, October, 1972.

The concern for quality control in any research project is crucial. Realizing the concern of professionals for quality control and respecting the need for accurate reporting of information, the _E_ expended detailed efforts in training and evaluating simulated patients to develop reliability and validity.

9. Simulated Patient Characteristics:

   A. Sex: 2 Females, 6 Males

   B. Age: Range = 27-53 years, Mean 36.37 years (27, 29, 30, 32, 36, 38, 46, 53)

   C. Marital Status: 1 widow, 1 single female, 6 married males.

D. Employment Status: 1 secretary, 1 former nun working on Ph.D. in teacher education, 1 Ph.D. in experimental psychology working in medical education, 1 real estate salesman, 1 D.O. family medicine practitioner, 1 foreign-born East Indian student, 2 third-year Osteopathic Medical students, (no simulated patient was known to the first-year class).

E. All simulated patients are currently residing in the State of Michigan (i.e., Detroit, East Lansing, Lansing). They are, however, originally from various parts of the country and world.

10. Type of Neurological Problems Programmed: The complete Simulated Neurological Evaluation History and Physical Examination Forms are presented for the reader's review (See Appendix J).

The following are provisional diagnoses for the eight simulated cases and for the eight real cases:

Eight Simulated Cases (T_1)	Eight Real Cases (T_2)
a. Spinal tumor	a. Spinal tumor
b. Mass lesion (i.e., tumor or cervical spondylosis)	b. Brain stem infarct
c. Demyelinating disorder (multiple sclerosis)	c. Cerebral neoplasm
d. Cerebral neoplasm	d. Cerebral hemorrhage
e. Multiple sclerosis	e. Multiple sclerosis
f. Lumbar disc herniation	f. Parkinson's disease
g. Cervical disc (traumatic arthritis)	g. Lumbar disc herniation
h. Sub-dural hematoma	h. Sub-dural hematoma

The clinical cases used in both simulated patient clinical training (T_1) and real patient clinical training (T_2) were as close as possible in neurological provisional and differential diagnoses. All consideration possible was given in providing comparable experiences. The inactive control cases were also similar to the treatment groups.

11. Training Simulated Patients: First, each individual selected for simulation as a neurological patient was requested to present his past basic medical history, including any current chief complaints and onset of real medical problems. This basic core material was used for each patient in order to limit the margin of error in the details of medical history. Second, each simulated patient was given a basic neurological evaluation and general gross physical examination to determine special neurological problems if any, and to assess other medical problems. No gross neurological problems were discovered. However, one of the simulated patients had no patellar reflex on the right and was perfect in his ability to control all reflex reactions. Based on the histories and response to neurological examinations, specific Neurological problems were selected to meet the needs of the Neuromuscular Systems Unit Clinical Training Experience. A total of 12 individuals were asked to participate and 8 individuals accepted. No individual was rejected once selected. Each simulated patient was presented with a Neurological Evaluation Form with his own medical history and with the complete

neurological problems presented (See Appendix J). Six of the simulated patients had an opportunity to view video-tapes of real patient pathology. Each patient was given a total of 6 hours of instruction. Additional instruction on providing feedback to the students and on the use of patient ratings was given. After each session the simulated patients were evaluated by the neurologist (Dr. L. E. Jacobson) to determine progress and needed correction. Each simulated patient was examined on three occasions, plus during the final examination. In addition to the structured training, a fifteen-minute pre-session by a neurologist before examination by the Ss to determine the accuracy of response was given. This additional training period provided good control. The two best estimates of accuracy and realism of the simulated patient are discussed in the analysis section.

12. During the week prior to the 10 weeks of Systems Biology II, (the experimental treatment period) an orientation session was provided for the class. The students were instructed on the requirements of the Systems Biology II Neuromuscular Systems Unit II course. Student responsibility for attendance and completion of all requirements in the clinical experience and for completing the final neurological examination were explained in detail. The various weekly performance criterion measures and rating scales were again explained. Each student reviewed his advance organizer (Appendix C) and the

specific clinical assignment and dates (See Appendices K and E). The Ss were instructed that their first clinical experience (of three) would be from Dr. Jones, Dr. Jacobson, Dr. Kornhiser, or from Dr. Martocci and Dr. Drapkin. (The inactive control students in Lansing with Dr. Calkins would continue with Dr. Calkins for all three experiences.) The second and third experiences were specifically arranged. The 12 Ss receiving training on real patients had Dr. Jacobson for the second clinical experience, and Dr. Kornhiser for the third experience. The 12 Ss trained on simulated patients received their second clinical experience from Dr. Kornhiser and the third experience from Dr. Jacobson. The original intent was to have T_1 (simulated trained) work twice with Dr. Jacobson and T_2 (real trained) work twice with Dr. Kornhiser. The problem, however, could have been instructor confounding. Therefore, the E decided a-priori, to utilize all clinical neurologists previously used in teaching this systems course. All of the clinical neurologists were familiar with the objectives of Systems Neurology and could provide the first clinical experience. The clinical instructors were all introduced to the advance organizer (course booklet). The instructors understood the objectives, their responsibility for student ratings and for providing feedback based on the various evaluation rating forms and on the type of cases required. A training session was held with all instructors involved in the experiment and with the inactive control.

To insure quality control, the E observed on a random basis each instructor's clinical training session. The majority of instructors involved had been working together for two years and were quite familiar with the Systems format. However, the E checked on: (a) whether instructors followed the prescribed format for implementation in the advance organizer (course booklet), (b) whether the instructors spent prescribed time in evaluating the students on the criterion measures, (c) whether they provide feedback, (d) whether the material was organized, (e) whether they discussed the course objectives on each case by reviewing psychomotor, affective and cognitive skills necessary to performance of a neurological examination, and (f) whether they interacted with the students. All instructors within their own teaching styles met the requirement prescribed by the E and most specifically the two key instructors used for the second and third clinical experience with the experimental Ss. This type of control insured quality of clinical instruction for the entire class involved in the Systems Neuromuscular Unit and specifically for the Ss within the experimental study.

13. Treatment Specifics: Students randomly assigned as Ss for the two experimental groups, T_1 (simulated patient) and T_2 (real patient) were again randomly assigned

in groups of 4, and remained together for the required three clinical experiences. It was necessary to rotate the Ss in groups of 4, in order for each student to have three clinical experiences, plus the final practical examination, during the 10 weeks of treatment training.

During the first two clinical experiences, the students in groups of 4, were again randomly assigned in pairs to work on a patient (real or simulated). This same experience held true for the entire class of students. The advance organizer (course booklet) specifies the method of clinical experience. Students work effectively in pairs, and gradually work independently as is traditional in the clinical training of Osteopathic Medical students. The third clinical experience required each student to complete a neurological examination on an individual patient. The third experience prepared all students for the final practical examination.

For the first two clinical treatment experiences, each group of 2 students working together, was required to independently write up the patient's chief complaint, onset, and past history. The students were informed they could work together on the remainder of the examination, but that they were to write up the results of their individual findings independently. After the 1 1/2 hours allowed for the complete Neurological Evaluation History and Physical Examination, all students were given 1 1/2 hours to write up the case findings. Working together

allowed all students to collectively use many sources of information. They were allowed notes and access to the library. Upon completion of this 3-hour period of time, each group of 2 students individually presented the complete case work-up to their clinical instructor (See Appendix C). Each student was rated according to his individual work-up. Many times partners disagreed on what they found in the neurological examination. While students were completing the physical examination of patients, the instructors made routine visits.

During the third clinical treatment experience each student was assigned an individual patient. The same requirements and restrictions were maintained for each treatment experience. Each student examined his patient, completed the case work-up, and defended his total neurological evaluation based on the 10 required criterion measures used in evaluating a neurological physical and history examination (See pages 15-28 of Appendix C). Also, each student rated the clinical experience, and was himself rated by the patient on his performance (See pages 29-31 of Appendix C).

14. Final Examination as Assessment of the Comparative Study: In testing the major hypotheses of this research study, it was necessary to have a practical final examination. The final practical clinical examination involved testing all thirty-eight (38) students in the Systems Biology I and II Neuromuscular Unit. The _E_ arranged for

12 real patients with varying neurological disabilities, who were not used during the treatments, to be used to test both T_1 Ss trained with simulated patients and T_2 Ss trained with real patients. The 24 Ss in the study were randomly paired and assigned to patients to protect against bias of either group having the advantage of seeing the patient first on all occasions. The following 12 Neurological Disabilities were used to test the Ss within the experiment: (a) 2 Parkinsonism cases, (b) 2 Multiple Sclerosis cases, (c) Optic Nerve Glioma, (d) Collagent Vascular Disease with Cranial Arthritis, (e) Charcot-Marie-Tooth, (f) Porencephalic Cyst-congenital, (g) Neuroma (Forme fruste von Ricklinghausen's), (h) Peripheral Vascular Insufficiency, (i) Amyotrophic Lateral Sclerosis, (j) Brain Stem Infarct.

The detailed provisional and differential diagnoses of the real patients, and their complete neurological case work-ups used in the final examination, are not being included in the appendices of this study. The material is confidential, privileged, and there may be litigation pending. Each patient signed a release form allowing the student, the physician, the university, the college, and the hospital to utilize him as a patient for this study. In an agreement made with Dr. R. Calkins, the neurologist supervising the 12 real patients utilized in the final examination, the case histories were not to be printed in the study. The cases are available for review with the

E. Each real case was also standardized in advance of the final examination. The criterion measures and total points equaled 54, the same as in the three clinical treatment training experiences. To gain understanding of a neurological case the reader can refer to the Simulated Neurological Case Evaluations presented in Appendix J. The format and point system are identical.

The remaining 14 inactive students in the Systems Biology I and II Neuromuscular Unit also had the same final examination. Eleven of the students examined the simulated patients used in the T_1 simulated clinical treatment group. Three students had real patients, who requested to return to be used as real programmed patients, willing to be examined by students. The programmed patient concept was tried because the E wanted to test whether individuals with real physical disabilities would be willing, for a fee, to be used on an on-call basis to be examined by Osteopathic Medical students. In fact, all 12 of the real patients indicated a willingness to be on-call for examination by medical students for Neurological Examination (excluding lab tests, of course). There appear to be possibilities of not only using simulated patients, but the consideration of using real patients with real disabilities (i.e., on Social Security Disability Benefits) as programmed patients on-call, willing to be examined by Osteopathic Medical students, will be discussed in the final chapter.

Three weeks prior to the practical final examination, each student received a memorandum of his examination schedule (See Appendix L). (It must be noted on Page 2 of Appendix L that names have been eliminated and numbers substituted.) Prior to the practical examination, each student was given the opportunity to look at the video-taping clinical facilities. The facilities were as realistic as a doctor's examining room. In addition, each student was given refreshment and an opportunity to relax in an interviewing room off the library, which was closed for the day and used only for the students to write-up their examinations.

A final examination packet (See Appendix M) was prepared in advance for each student. The students were given a blank copy of the Neurological Evaluation History and Physical Examination form. It was explained to the students that this blank examination could be used during the final as a guide and that they would be given another copy of the form to complete as their final write-up. Each student was also asked pre- and post-questions regarding the experience, similar to the rating completed after each of their treatment experiences. In addition, each student was informed that he would be rated by the patient in the same manner in which he was rated during the treatment period. Each student agreed to being video-taped and was advised that permission slips were signed by the patient for his protection. Each student was

advised that (a) psychomotor skills in completing the examination, (b) his affective behavior in establishing a relationship and eliciting data, and (c) the total write-up of the Neurological Examination would be reviewed and graded. Each student was also advised that the video-tape would be reviewed with him on an individual basis next quarter and he would be given the total results of the practical clinical performance final neurological examination. Each student was also advised he could review his video-tapes as often as he desired. The following forms are included in Appendix M:

(1) Neurological Evaluation History and Physical Examination

(2) Clinical Instructor's Formative and Summative Evaluation Rating Scale

(3) Pre-Test Final Assessment of Experiences in Neurology Training

(4) Post-Test Final Assessment of Experiences in Neurology Training

(5) Neurological History and Physical Assessment Affective Rating

(6) Pre-Post Test Form for the Neurological Practical Examination

(7) Patient Rating Scale

(8) Medical Release Forms

Upon completion of the final neurological practical examination, each student's final examination packet was held until all 38 students completed the practical examination. During the week of the final examination, the affective ratings were begun since each video-tape had to be rated by one of three raters trained on the utilization of this semantic differential scale (See next section on treatment material). During the two weeks immediately following the practical examination, they were graded by Dr. L. Jacobson for the 24 Ss in the experiment. The grading was accomplished on a rater-blind basis. In the next two weeks, the video-tapes were again viewed by Dr. L. Jacobson and the post-test psychomotor ratings were completed. (Dr. Jacobson also did the pre-test psychomotor ratings.) At this point, all pertinent data were collected, rated and readied to be coded for statistical analysis.

TREATMENT MATERIALS AND ADMINISTRATION

The treatment materials utilized for all students enrolled in the Systems Biology I and II Neuromuscular Systems Unit were developed or adapted by the experimenter (E). All materials in Appendices A through M were used in the experimental study.

General Information Course Protocol (Appendix A):

The "General Information, Course Protocol" was adapted by E for the Systems Biology I and II Neuromuscular Systems Unit. The course protocol provides the students with information on (a) textbooks, (b) laboratories, (c) specialty clinics (i.e., the Neurological clinics used in the experimental study), (d) self-study units,

(e) examination, (f) grading, and (g) course organization including a description of the basic course objectives. All students received a copy of the "Course Protocol" prior to the beginning of the Neuromuscular Systems 15-week unit. The protocol was reviewed on the first day of class with students by the primary systems instructor. All students, therefore, were aware of their responsibility, authority, and accountability within the course.

General Protocol of the Systems Biology Courses (Appendix B):

This material was given to all students as a basic reminder of the breadth and depth of Systems courses. The material was developed by Dr. L. Jacobson as handout material for students to use in understanding the systems teaching model used in the Osteopathic Medical curriculum.

The Advance Organizer (Course Booklet) (Appendix C):

This material was developed by the E to provide all students with a well-organized protocol to be utilized in the 10 weeks of the experimental study. All students received a copy of the advance organizer prior to the beginning of the three clinical training treatment experiences. The advance organizer is unique in providing the students with all of the information necessary to complete the 10 weeks of the Neuromuscular Systems II Unit. The advance organizer includes: (a) complete course description of the clinical training experiences, pp. 1-2;

(b) general and specific behaviors objectives, pp. 2-3; (c) training locations, pp. 3-4; (d) clinical instructors, p. 4; (e) duration of training, p. 4; (f) implementation procedures, pp. 4-6; and (g) evaluation process and forms. The rationale of the evaluation process, forms, and techniques on pp. 6-31 include (g-1) the Physician Neurological History and Physical Criterion Performance Worksheet, pp. 11-14; (g-2) Neurological Evaluation History and Physical Examination Form, pp. 15-23; (g-3) Instructor's Clinical Competency Formative and Summative Evaluation Rating Scale, pp. 24-28; (g-4) Student Clinical Experience Evaluation Rating Form, pp. 29-30; and (g-5) the Patient and Simulator Rating, p. 31. Prior to the beginning of the 10-week experimental study, each student, on a group basis and individually, reviewed the advance organizer with the Administrative Assistant. The advance organizer was reviewed during the 5 weeks of pre-treatment training. During this 5-week period, while students were being instructed in clinical laboratory experiences on the proper techniques of neurological examination, the advance organizer was reviewed on a group basis and individually. This allowed each student to become familiar with all forms used in the clinical training experiences. The interaction also provided the opportunity for student questions and time for the students' personal organization of the cognitive information necessary in completing a neurological evaluation.

The Cognitive Pre-Post Test (Appendix D):

This was used to measure a student's cognitive knowledge in Neurology. These 35 items were selected as a representative random sample of questions that would provide information on individual student's cognitive knowledge a-priori in the field of Neurology. The internal consistency reliability is $\Gamma = .83$. The pre-test was administered during the orientation class prior to the beginning of the 15-week Systems Biology I and II Neuromuscular Systems Unit. The post-test was administered within the objective portion of the Neuromuscular Systems written final exam. It was scored as a separate sub-test.

Day-by-Day Class Schedule of All Lectures and Assignments (Appendix E):

This schedule was maintained for the students during the 15-week Neuromuscular Systems Unit and includes specific details of all class lectures in the Neuromuscular Systems Unit (i.e., Neuroanatomy, Physiology, Biochemistry, Neurology, Pharmacology) in addition to other classes and the clinical experiences for the first-year Osteopathic Medical student during the 15-week period. The schedule is standard operating procedure. The E assisted in scheduling in order to provide control for the experimental study.

<u>Neurological Practical Examination of Psychomotor Techniques and Skills (Appendix F):</u>

This was used in the pre-post test as the criterion measure of students' psychomotor performance abilities. In the pre-treatment period during the practical laboratory session, Appendix F was used as a specific guide on psychomotor skill and technique development in completing the neurological physical examination. Upon completing 5 weeks of the Systems, each student was given a pre-test of his basic psychomotor skills. The test is very easy to use and requires no elaborate procedures. The student either elicits the proper neurological response by (a) accuracy of instruction, (b) proper positioning of patient, and (c) proper technique, or he does not. The psychomotor test is simple and practical. If the student does excellent in any of the three areas, he receives a score of 1 point for each area; if his performance is adequate, he receives 2 points; and if he fails, he receives 3 points. The composite score obtained in completing all the various psychomotor neurological tests is the total score for each student used as the criterion measure of psychomotor performance. The lower the score the better the performance. This form was used each of the 5 weeks by the students as a self-instructional tool. All students were aware of the psychomotor skills necessary in performing a neurological examination. Dr. L. Jacobson has used this practical test for three years and provided an inter-judge

reliability of $\Gamma = .94$. Dr. Jacobson and another neurologist were almost in perfect agreement in comparing their rating on 10 students. With the availability of the 38 video-tapes developed in this study and the accessability to other neurologists, the E will in future research run detailed reliability studies of this rating scale. The scale is functional and either the student performs the proper test or he does not. The test certainly is consistent in measuring basic psychomotor skills and is highly recommended as an effective training aid and tool.

Affective Training Aids - Video-Tape Series and Script (Appendices G and H):

In Appendix H, the E developed a complete training script, trained patients, and made a video-tape on affective physician behavior used in a physician-patient interaction during examination. This tape was used in the pre-treatment training period with all students in the Neuromuscular System. The basic objective was to insure that all students entered the clinical treatment experience with comparable skills in the affective domain. In working with Dr. M. Clark (the model in the video-tapes) the E attempted to reveal in the video-tape ideal physician behaviors used in establishing a relationship and in eliciting data from the patient. All students were given the training aids in Appendix G developed by the E.

The behaviors described in the training aids were discussed with the class prior to viewing the key training tape on May 15 and 19, 1972. The students received the memo and schedule of the review sessions, including the objectives for this short training series (Appendix H). The other scheduled tapes were not of primary concern to this study but were used as aids. The E feels that all students benefited from the video-tape made specifically for this study on ideal physician behavior, as well as from the handouts in Appendix G.

The objective in identifying the (1) critical verbal and non-verbal behaviors, (2) ten important qualities inherent in a doctor-patient relationship expressed by a family physician, and (3) effective and ineffective affective behaviors in establishing a relationship and in eliciting data was to train students or assist them in becoming specific in the behaviors necessary in completing a neurological examination. Student comments were all positive about this experience and statements were made indicating that this material provided a consolidating learning experience on physician behaviors effective in a physical examination.

Master Control Sheet (Appendix I):

Appendix I is the master control sheet on scheduling the treatment sessions for (T_1) the simulated patient clinical treatment group, for (T_2) the real patient clinical

treatment group, and for the Inactive Control group. The master control sheet was also used to record weekly data collection and for recording the practical final examination schedule. To further negate any possible Hawthorne effects, the department secretary checked in the required treatment evaluation forms; she also could advise the E of any missing data and insure immediate control. The required materials to be turned in after each treatment experience by each student are (1) Evaluation of Clinical Experience - CE; (2) Patient Evaluation - PE; (3) Neurological Examination Form - NE; and (4) The Instructor's Clinical Competency Formative and Simulative Evaluation Rating Scale - FSE. All of these forms are in Appendix C and M. If any form was not turned in, the secretary wrote a memo immediately to the student advising him of missing data. During the entire experiment, all material was turned in as scheduled. There was no missing data. In addition, it must be reported that all students met the scheduled times of the treatment.

Simulated Cases (Appendix J):

The eight simulated Neurological Evaluation History and Physical Examinations are presented in complete form. The (1) Chief Complaint(s), (2) Onset and Course of Chief Complaint(s), (3) Past History (family-medical and social), (4) Systems Review, (5) Physical Examination (i.e., general appearance, general findings, mental status,

reflexes, sensory, muscle function and gait, cerebellar and dorsal column functions, extrapyramidal and cranial nerves are assessed), (6) Summary (i.e., general results, assessment of area of neurological system dysfunction, and anatomical location are reported), (7) Provisional or Working Diagnoses including all systems, (8) Differential Diagnoses, (9) Tests (laboratory and other diagnostic procedures), and (10) Treatment and Therapy, are presented for each of the simulated patient cases. The cases are self-explanatory and require no interpretation for the reader. The simulated case work-ups along with the real case material (laboratory studies) were made available for student review after the completed training series.

The Clinical Rotation Schedule (Appendix K):

Appendix K is the Clinical Rotation Schedule for the first year class clinical experiences during the 10 weeks of the control treatment period. Student names have been eliminated from the schedule. Specific dates, physician and type of service involved in the clinical training experience are presented. From this schedule the reader can refer back to Figure 1 and determine the specifics of each student's clinical experiences during the treatment training period. This form of presenting student clinical schedules is very effective and easy to work with in coordinating large numbers of students and varied clinical rotations. All students received a copy of the schedule

prior to the ten-week control training period. All conflicts with other departments offering special training sessions and lectures were resolved before the 10-week program began. Controlled scheduling is of prime importance, not only to the experimental study, but also in the management of a medical curriculum.

Final Examination Schedule (Appendix L):

The Final Examination Schedule is issued to all students. The schedule gives detailed instruction on the time of the objective cognitive examinations and of the specific date and time for each student's practical neurological evaluation examination. The memo and schedule were submitted three weeks in advance in order to advise each student of his examination time. The advance scheduling and built-in controls are necessary in completing 38 video-taped practical neurological examinations. The problems centered around students requesting early dates and times for practical examinations. However, only two dates were altered. The need for advance scheduling is critical in coordinating patient-student examination times. Dr. Calkins and his medical secretary scheduled all patients in advance and had back-up patients waiting. Dr. Calkins personally talked with each patient about his examination with the medical students. Patients were advised that this examination was a follow-up appointment (which it was) and that they were not to inform the student

of their diagnosis. Each patient was advised by Dr. Calkins and the E that he was assisting in the training of Osteopathic Medical students and would receive a $15.00 payment for each examination. Prior to the scheduled time, the E discussed the procedures and explained again to the patient (over a cup of coffee) what would happen in the examination. Also, complete details on rating the student physician (patient rating) were given to each patient. The patients were all co-operative. However, the anxiety and magnitude of completing 38 video-taped practical examinations cannot be described. Advance scheduling is essential. The camera crew included 3 individuals plus a director. A secretary from the Department of Osteopathic Medicine assisted as a nurse's aide by helping the patient dress in examining gowns and in preparing the examining room. The camera crew was assigned from the College of Osteopathic Medicine, the Department of Psychiatry at Michigan State University and from Instructional Television (ITV). The video-taping facilities were provided through the cooperation of St. Lawrence Hospital's Mental Health Center and the Department of Psychiatry. The video-tapes were provided by the College of Osteopathic Medicine. The camera crew was well trained in the procedures of video-taping physical examinations. The E acted as producer and executive director in coordinating the video-taping sessions. Extra or back-up equipment and cameramen were available.

The Final Examination Packet (Appendix M):

This is the Final Examination Packet. In advance of the scheduled practical examination, the packet of material used in gathering the final criterion measures for each student was prepared. The material was placed in a large brown envelope, labeled with student identification number, patient identification number, and with the time and date of the final practical examination.

The following forms are included in the Final Examination Packet:

Form 1: Neurological Evaluation History and Physical Examination.

Two copies were provided in each packet. One to be used during the examination and one to turn in as a final copy. The examination form is self-explanatory. There are ten required factors to be completed in a neurological evaluation.

Form 2: Instructor's Clinical Competency Formative and Summative Evaluation Rating Scale.

This form follows specifically the 10 required criterion factors on the Neurological Examination and is used as the rating sheet for evaluating and scoring the three clinical treatment experiences (Formative Evaluation). It is also used for evaluating and scoring the final performance examination (Summative Evaluation). The form has the listed key criterion to be rated and the specific questions the clinical instructor must use in scoring a student's clinical competency performance. This form provides the instructor with specific criterion required and allows objective evaluation of the data completed.

Form 3: Pre-Test Final Assessment of Experiences in Neurology Rating Scale.

This form was used to gather evaluative data of each student's assessment of Systems Biology Neurology Systems course, of the final examination experience, of his feelings about the experience and of his self-ratings in total performance on the final neurological examination, his psychomotor performance, and on his affective behavior in establishing a relationship and eliciting data prior to the final examination. There are six questions requiring responses.

Form 4: Post-Test Final Assessment of Experiences in Neurology Training Rating Scale.

After the experience each student was asked to rate the final practical clinical examination experience, his feelings about "self" after taking the final practical clinical examination, his total performance in the final neurological examination, his psychomotor performance, his affective behavior and his satisfaction ratings regarding critical behaviors in the clinical training experience. In total, there are 14 questions asked on this form. The basic format for Forms 3 and 4 is the semantic differential scale. Data over and above that necessary in answering information, but wanted to insure adequate coverage for the research and for additional studies was included. Both Forms 3 and 4 were developed by the E to answer the research hypotheses.

Form 5: Neurological History and Physical Assessment Affective Rating.

This rating involves a semantic differential and is a modification of a scale developed in cooperation with Dr. J. Schneider, Department of Psychiatry, Michigan State University. The E wanted to assess each student's affective behavior regarding establishment of a working relationship, and in eliciting data during the examination. Interview skills are crucial to a physician's behavior. The physician must know what to observe and how to report the data gathered. Also, on this rating, the E wanted each case on the final exam assessed as to individual difficulty. In working with Dr. Schneider, he provided the services of three Ph.D. counseling psychology students trained in counseling to work with the E in obtaining reliability data on the affective rating scale. The E used the video-tape developed in training the Ss on effective affective behaviors and also ten other video-tapes, of varying qualities of physicians performing neurological examinations. The model tape was used repeatedly over a 12-week period as were all training tapes. Three key tapes were identified for establishing inter-rater reliability over the 12-week training period. The three raters worked two afternoons per week for 10 weeks and one afternoon for the remaining 2 weeks of the training period. Dr. Schneider assisted in training the raters. The rating scale was reworked until all raters, Dr. Schneider and the E agreed on the evaluation factors. Each training tape was rated each time by each rater and the inter-rater reliability after 12 weeks in scoring the affective rating scale on the three key training tapes is $\Gamma = .87$. The affective rating scale will be used by Dr. Schneider in the Department of Psychiatry. Having inter-rater reliability of .87 with the affective rating scale allowed each rater to rate two tapes every day in completing the affective final criterion measure ratings. In order to check the ratings, the E asked each rater during his evaluation of the student final exam video-tape to re-rate one of the other rater's tapes. The correlations between raters averaged .89.

Form 6: Pre-Post Test Rating Scale for the Neurological Practical Examination of Psychomotor Skills and Techniques.

This form was explained in detail under Appendix F. In reviewing the form the reader will note that it is practical and self-explanatory. The form should be used as a training tool.

Form 7: Patient Rating Scale.

This form was used during the entire experiment. After each treatment training session, the patient was asked to provide feedback to the student physician. Feedback is critical as a reinforcer in the development of physician behaviors. The E developed this form not only for the current study, but to be utilized as a tool for follow-up studies. This scale briefly evaluates a physician's behaviors in the three learning domains. There is one question on cognitive abilities, two on affective, and one on psychomotor skills. The form is simple and effective as an accurate rating device in patient assessment of physician behavior.

Form 8: Medical Release Forms.

In order to protect all parties involved in the study, two medical release forms were developed by the E. All patients, real and simulated, signed the forms, and they were dated and witnessed by the E.

NULL HYPOTHESES

Following are the 10 null statements of hypotheses under investigation in this study:

Ho: 1 There will be no significant differences in the total performance in clinical competency, psychomotor, affective, and cognitive final performance criteria measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 2 There will be no significant difference on total performance in clinical competency criterion measure ratings in the three treatment training clinical experiences of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 3 There will be no significant difference in confidence demonstrated in the anticipated total performance in clinical competency, in psychomotor skill technique abilities, in affective behaviors, and in the actual total performance in clinical competency criterion measures self-ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 4 There will be no significant difference in agreement on student final performance criterion measure self-rating and the clinical instructor's rating of total performance in clinical competency on the final criterion measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 5 There will be no significant difference in responses about "self" in the treatment training criterion measure self-ratings on factors secure, successful, calm, pleasurable, and competent of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 6 There will be no significant difference in responses on the treatment training criterion measure self-rating on the factors realistic, important, useful, meaningful, and successful of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 7 There will be no significant differences in the practical clinical training experience factors of providing all the skills and abilities, providing psychomotor skills and techniques, providing the medical knowledge necessary (cognitive), providing the development of affective behaviors, and in providing feedback as vehicles in performing the complete Neurological Evaluation History and Physical Examination final performance criterion measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 8 There will be no significant differences in requests for additional simulated instructional experiences as evidence of preference for this method of training on the final performance criterion measure rating scale of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 9 There will be no significant differences in demonstrated improvement vs. consistency in the treatment training patient evaluation performance criterion measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Ho: 10 There will be no significant difference in patient satisfaction in student performance on the final patient evaluation criterion measure rating of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

MEASURES

The effects of the experimental variables of simulated clinical training using simulated patients and real clinical training using real patients on the dependent variables of

(1) cognitive knowledge, (2) psychomotor skills, (3) affective behavior, (4) total performance, as a measure of the combined effects in a practical neurological evaluation history and physical examination experience, (5) patient ratings on student-physician behaviors, and (6) student ratings on self, the experiences, and satisfaction will be tested.

CRITERION MEASURES

Cognitive Knowledge Performance Criterion Measure:

This pre-post test is a measure of students' medical knowledge in clinical neurology. The 35-item objective examination requires students to problem solve and arrive at the appropriate medical decision on neurological symptoms. The pre-test measure will be used as a covariate, if highly correlated with the dependent variables, in the analysis (See Treatment Materials, Appendix D).

Psychomotor Skill Performance Criterion Measure:

This pre-post test is a measure of the students' techniques and skills in performing the physical examination tests necessary to neurological evaluation. The total score represents the student's psychomotor skill or technique in performing the mental status, reflex, sensory, muscle function, cerebellar and dorsal column function, extrapyramidal, and cranial nerve tests (See

Treatment Materials, Appendix F). The pre-test measure will be used as a covariate if highly correlated with the dependent variables in the analysis. The inter-rater reliability is $\Gamma = .94$.

Affective Behavior Performance Criterion Measure:

This semantic differential evaluative scale measures effective affective behaviors of (1) establishing an inter-personal relationship and (2) elicitation of data during the history physical examination. The scale was developed specifically for this study through cooperation with the Department of Psychiatry, Michigan State University. The E refined and reworked a scale formerly used by Dr. J. Schneider in the evaluation of student physician psychiatric interviews.

The scale also had an item for the rater in evaluating patient difficulty. Trained raters (as described in detail under the section on treatment procedure) with inter-rater reliability of $\Gamma = .87$ rated each student's affective behavior on the practical clinical neurological performance examination. All 38 video-tapes were rated. Each rater rating independently pairs of Ss' tapes (Ss trained on simulated patients and Ss trained on real patients) completed the 38 video-tapes in one week. In checking on reliability between the raters during the final assessment period, each rater was asked to rate one tape. For the three raters on one student tape, an inter-rater reliability of $\Gamma = .89$ was obtained (See Appendix M, Form 5).

Total Performance in Clinical Competency Performance Criterion Measure:

This is a measure of the standardized Neurological Evaluation History and Physical Examination Form as rated on the Instructor's Clinical Competency Formative and Summative Evaluation Rating Scale (See Appendix C, Advance Organizer and Appendix M, Form 2). Each of the three treatment training experiences is rated using the same basic criteria. The E, in developing the 10 specific factors involved in completing a neurological evaluation, worked with Dr. L. Jacobson in assigning weights to the ten factors used as the major criteria. The rationale for weighting was based on Dr. Jacobson's professional experience as a neurologist. Dr. Kornhiser, Dr. M. Jones, and Dr. Calkins were also consulted and an agreement was reached in the assigned point system. The ten criteria included:

(1) Chief Complaints - (3 points): Generally, a patient had two or three basic problems associated with a neurological difficulty, and the evaluation is based on the clarity, brevity, and accuracy of the student's response in reporting the chief complaints.

(2) Onset and Cause of Chief Complaints - (6 points): Evaluation is based on organization and write-up as to onset, location, duration, severity, course of previous treatment, and other general symptoms or descriptive characteristics of the chief complaints.

(3) Past History (Family, Medical and Social) - (9 points): There are 9 basic questions, with 1 point for each correct answer on the facts regarding past history (i.e., previous hospitalization, allergies, surgery, diseases, habits, medications), social history (i.e., work, hobbies, recreation), family history and accidents.

(4) Systems Review - (4 points): Generally, the skilled student physician will obtain appropriate data on other medical problems (such as Obstetrical or Cardiovascular). This review will provide data for consideration in the provisional and differential diagnoses, and for the necessity of ordering various lab studies.

(5) Physical Examination - (10 points): The examination is divided into 10 parts. One point was given for each part of the physical examination correctly answered. (Half points were also used for all sections of the examination.)

(6) <u>Summary - (5 points)</u>: The evaluation is based on 1 point for general results, 2 points for assessment of the area of neurological system dysfunction, and 2 points for identifying the proper anatomical location.

(7) <u>Provisional or Working Diagnosis - (5 points)</u>: The evaluation is based on the appropriateness of the diagnosis as related to demonstration of problem-solving, clinical judgment, and decision-making skills. The differential diagnosis is also reviewed in evaluating the provisional diagnosis. A student must be consistent in his data synthesis.

(8) <u>Differential Diagnosis - (5 points)</u>: The evaluation is again based on the appropriateness of the diagnosis as related to demonstration of problem-solving, clinical judgment, and decision-making skills. The student must evaluate the entire examination. The student's observations during the History and Physical Examination are all coupled in the formulation of hypotheses about the patient's diagnosis. At this point, the student must problem solve on the synthesis of the data gathered, and make clinical judgments.

(9) Laboratory Test and Other Diagnostic Procedures - (5 points): The evaluation is based on the appropriateness of the tests or procedures recommended and their necessity in demonstrating the student's ability in utilizing clinical laboratory data critical to the diagnosis presented.

(10) Therapy and Treatment - (2 points): The evaluation is based on the supportive and specific treatment recommendations. Concern is in the clinical judgment used in planning and recommending critical (primary and supportive) forms of treatment necessary to patient care.

Each Neurological Evaluation History and Physical Examination used in the three treatment training experiences has 54 points established as the maximum score. The cases were reviewed in advance and the data required for quality patient neurological work-ups by the clinical instructor were recorded. This same procedure was followed for the final performance examination--all cases were standardized in advance. The E believes that the procedures established for performance evaluation criterion measure and grading of the total performance in clinical competency is objective and well controlled. Consideration was given to case difficulty regarding type of patient neurological problems, patient's age, ability to communicate

and cooperate in the examination. All cases used in the study were equitable for the students. The evaluation procedures used in standardizing the neurological cases used in the study are reliable and valid as measures of total performance.

Patient Evaluation Rating Performance Criterion Measure:

This semantic differential evaluative scale measures the patients' perceptions of the student-physicians' competence, secureness, interest, and gentleness. The rating scale was completed after each session and after the final examination. One of the key factors in the study is the importance of feedback used as a reinforcer in the transfer of training. The E has hypothesized that because of the greater opportunity to provide feedback in the simulated clinical training experience, students trained with simulated patients would perform more effectively. The patient rating scale provides necessary feedback especially in the simulated clinical experiences. During the final examination, the E had to provide a brief 15-minute training session for each patient, emphasizing the importance of and the responsibility for rating their physician (See Appendix C, Page 31).

Student Ratings of Self, the Experiences, and Satisfaction Performance Criterion Measures:

Semantic differential evaluative scales were developed to answer questions regarding student perceptions. After each clinical treatment experience, each student rated the experience and himself in the experience. Also, after the practical final examination (post-test), self-evaluative questions were given to the students (See Appendix C, pp. 28-29 and Appendix M, Form 4 for the factors).

ANALYSIS OF DATA AND DESIGN

Statistical Analysis:

The analysis to be used for Hypothesis 1 is a multivariate analysis of covariance (MANCOVA). The effects of the experimental variables, simulated clinical training using simulated patients and real clinical training using real patients on the dependent variables of total performance in clinical competency, psychomotor, affective, and cognitive performances will be tested by MANCOVA where pre-tests on psychomotor and cognitive criteria measures are used as covariates. If the pre-test measures are not highly correlated with the dependent variables, they will not be used as covariates in the analysis and the *E* will then use the multivariate analysis of variance (MANOVA).

The analysis to be used for Hypothesis 2 is a multivariate analysis of variance. The effects of the experimental variables of simulated clinical training using simulated patients and real clinical training using real patients on the three treatment training clinical experiences as dependent variables will be tested by MANOVA.

In Hypothesis 3, the analysis will be a multivariate analysis of variance of confidence scores obtained from the final performance criterion measure self-ratings.

Hypothesis 4 will be analyzed by a test of the equality of correlations. The effects of the experimental variables of simulated clinical training using simulated patients and real clinical training using real patients on the agreement between the students' self-ratings and the clinical instructor's rating of total performance in clinical competency on the final performance criterion measure ratings will be tested.

The analysis to be used in Hypotheses 5-7 is multivariate analysis of variance. The effects of the experimental variables on the performance criteria measure ratings of "self" in the treatment training clinical experience, the treatment training clinical experience in Neurology, and the practical clinical training experiences as a vehicle for providing all the skills and abilities in performing the complete Neurological Evaluation History and Physical Examination will be tested.

In Hypothesis 8, a two-sample χ^2 test of homogeneity will be the analysis. The simple question of preference for and request of additional simulated instructional experiences is being tested.

The analysis to be used in Hypotheses 9 and 10 is the multivariate analysis of variance. The effects of the experimental variables, simulated clinical training using simulated patients and real clinical training using real patients on the dependent variable of improvement vs. consistency in the patient evaluation performance criterion measure ratings, and patient satisfaction in the final complete Neurological evaluation History and Physical Examination measured on the final patient evaluation rating will be tested.

Level of Significance:

Meaningful vs. statistical significance is an important issue in practical research studies. Caro (1971) suggests a .10 level of significance as appropriate for practical field research which attempts to measure new and innovative programs. The multivariate F ratio obtained in the analysis indicates whether there are any group differences when all dependent variables are considered simultaneously. In that the step-down F ratio is highly dependent on the order in which the dependent variables are presented to the computer for analysis, the E did attempt some ordering. However, the study and the dependent variables measured are so unique that the E could not afford to determine a preference and use the step-down F ratio, because once significance is ascertained for one variable, the separate effects of all other variables following are not testable or the assumption of independence is violated.

In looking at the given dependent variable, the univariate F will be used. Univariate F tests indicate whether or not a given dependent variable is statistically significant at a given alpha level for a given hypothesis examined by the study assuming that the dependent variable is independent of every other dependent variable. Univariate F tests are not independent, and therefore, to insure that the overall alpha level of $\alpha = .10$ is not exceeded in this study, each univariate F test statistic has been restricted on an a-priori basis.

The MANCOVA and MANOVA programs developed by Finn on the 3600 computer were used to analyze the data (Finn, 1970).

Design:

(T_1) Simulated Patient Clinical Experience (N=12)	(T_2) Real Patient Clinical Experience (N=12)
Ss1......................Ss12	Ss13.................Ss24
Cognitive	Cognitive
Psychomotor	Psychomotor
Affective	Affective
Total Performance	Total Performance
Patient Ratings	Patient Ratings
Student Ratings	Student Ratings

SUMMARY

The purpose of this study was to investigate the effects of simulated clinical training using simulated patients and real clinical training using real patients on the total performance in clinical competency, psychomotor skill-technique abilities, affective behaviors, student ratings and patient ratings as performance criteria measures of a random sample of first year Osteopathic Medical students in the Systems Biology I and II Neuromuscular Systems Unit. The specific purpose of this study is to ascertain the practical effectiveness of "instructional simulation" using simulated patients.

The treatment materials were developed by the experimenter to transmit and to study the treatment effects. The treatment materials and procedures described in this chapter and presented in the appendices were received by all subjects on the same days according to the master schedule of the 15-week Neuromuscular System Unit.

After the treatment training clinical experiences, a video-taped complete practical performance Neurological Evaluation History and Physical Examination was accomplished to measure the effects of transfer of training from simulated to real clinical experiences.

The data were coded, key punched and verified by the *E* within one week after all required grading was completed.

The data analysis was accomplished using MANCOVA, MANOVA, χ^2 (chi-square) and correlation tests. The 3600 computer was used to test eight different hypotheses. Hand computations were completed with a desk calculator for the remaining two hypotheses tested. The results of the study are reported in Chapter IV.

CHAPTER IV

ANALYSIS OF THE RESULTS

In this chapter, the hypotheses will be restated and discussed in terms of their statistical test on the Null and conclusions on the Research outcomes. An alpha level of .10 was chosen for all hypotheses to determine statistical significance for reporting this study. Both a multivariate and univariate analysis of variance were computed comparing the groups receiving simulated clinical training and the groups receiving real clinical training. In looking at the univariate analysis of variance for the effects of the treatment training on the individual dependent variables, an alpha level was established a-priori.

COVARIATE EFFECTS

Inspection of the correlation matrix between the dependent variables and the covariates yields no meaningful relationships (See Table 1.1). The chi-square tests for association between the dependent variables and covariates was not significant (See Table 1.2). It was, therefore, decided to re-analyze the data eliminating the two covariates in order to increase power. The multiple

Table 1.1. Correlation Matrix for Hypothesis 1.

	Final Total Performance	Pre-Psychomotor	Post-Psychomotor	Affective Behavior$_1$	Affective Behavior$_2$	Affective Behavior$_3$	Pre-Cognitive	Post-Cognitive
Final Total Performance	1.000000							
Pre-Psychomotor	-0.254470	1.000000						
Post-Psychomotor	-0.362325	0.254692	1.000000					
Affective Behavior$_1$	-0.278256	0.384882	-0.108019	1.000000				
Affective Behavior$_2$	0.118200	0.337883	-0.100420	0.834931	1.000000			
Affective Behavior$_3$	0.274573	0.038831	0.083466	-0.226563	-0.107307	1.000000		
Pre-Cognitive	0.357186	-0.157799	0.153147	-0.372462	-0.097723	-0.060938	1.000000	
Post-Cognitive	-0.129865	-0.087379	0.032700	-0.169825	-0.061238	0.005339	0.110560	1.000000

Table 1.2. Testing Regression Coefficient for 2 Covariates of Hypothesis 1.

Overall Chi-Square Test of no Association Between Dependent and Independent Variables	
D.F. = 12	Chi-Square = 13.2875
$p < 0.3485$	
Adding Covariate 1 (PRE-COGNITIVE) to the Regression Equation	
D.F. = 6	Chi-Square = 8.4352
$p < 0.2080$	
Adding Covariate 2 (PRE-PSYCHOMOTOR) to the Regression Equation	
D.F. = 6	Chi-Square = 4.9413
$p < 0.5514$	

regression data revealed no significant effect of the covariates upon the dependent variables with the exception of some minor potential effect on affective behaviors. Adding only the pre-cognitive covariate revealed some minor effect in total final performance.

RESULTS OF THE TESTS OF THE HYPOTHESES

Total Performance in Clinical Competency, Psychomotor, Affective and Cognitive Differences Between Simulated Clinically Trained and Real Clinically Trained Groups

Null hypothesis 1. There will be no significant differences in the total performance in clinical competency, psychomotor, affective, and cognitive final performance criteria measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Both multivariate and univariate analyses comparing the simulated clinically trained and the real clinically trained groups were computed. A summary of the results is displayed in Table 1.3. The F ratio for the multivariate test of equality of mean vectors is significant at $p < 0.0907$. Of particular interest in the test of Hypothesis 1 is the univariate analysis of the effect on the dependent variables. The results on the dependent variable of Final Total Performance in Clinical Competency

Table 1.3. Multivariate and Univariate Tests for Hypothesis 1.

Multivariate				
D.F. = 6 and 15			F-Ratio = 2.2281	
		$p < 0.0907$*		

Univariate				
Variable	Alpha	Between Mean Squares	Univariate F	P Less Than
Final Total Performance	.05	308.1667	4.5208	0.0450*
Psychomotor	.01	308.1667	14.2082	0.0011*
$Affective_1$	.01	0.1667	0.0040	0.9500
$Affective_2$	.01	15.0417	0.5123	0.4817
$Affective_3$	.01	0.0417	0.0310	0.8619
Cognitive	.01	15.0417	1.6070	0.2182
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

and Psychomotor Skills show the groups differed in the direction hypothesized to a degree that was statistically significant at $p < 0.0450$ and $p < 0.0011$, respectively. Inspection of cell means in Table 1.4 indicates the simulated clinical training treatment produced significantly higher demonstrated performance on Final Total Performance in Clinical Competency and on Psychomotor Skills. The demonstrated performance of cognitive knowledge is higher in the simulated trained group. On inspection of the cell means for the pre-cognitive and post-cognitive performance measures, it is important to note the real trained group had higher pre-cognitive scores, but the simulated trained group displayed significantly higher post-cognitive scores. In the affective behavior measures, the real clinical training treatment produced minimal performance differences which were not apparent in the simulated training treatment group.

Transfer of learning was reflected in the psychomotor, affective, and cognitive knowledge behaviors demonstrated in clinical competency performance in the real world on real patients by the simulated clinically trained group. Based on this analysis, the null hypothesis is rejected and the conclusion is that simulated clinical training proved more effective than real clinical training.

Table 1.4. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 1.

	Final Total Performance	Pre-Psychomotor	Post-Psychomotor	Affective $Behavior_1$	Affective $Behavior_2$	Affective $Behavior_3$	Pre-Cognitive	Post-Cognitive
Grand Mean	79.9167	107.2500	98.1667	23.0833	24.7083	4.6250	15.0417	30.9583
Variance	68.1666	176.5151	21.6894	41.3485	29.3598	1.3447	16.1629	9.3598
Standard Deviation	8.2563	13.2910	4.6572	6.4303	5.4185	1.1596	4.0203	3.0594
Means Simulated (T_1) Clinical	83.5000 *	105.1667 **	94.5833 **	23.1667	25.5000	4.5833 **	14.4167	31.7500 *
Means Real (T_2) Clinical	76.3333	109.3333	101.7500	23.0000 **	23.9167 **	4.6667	15.6667 *	30.1667

*Higher mean implies better performance.

**Lower mean implies better performance.

Differences Demonstrated in Total Performance Skills in Clinical Competency on Each of the Three Treatment Training Experiences Between Simulated Clinically Trained and Real Clinically Trained Groups

Null hypothesis 2. There will be no significant difference on total performance in clinical competency criterion measure ratings in each of the three treatment training experiences of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

The F ratio for the multivariate test of equality of mean vectors, as reported in Table 2.1, is significant at $p < 0.0101$ and the null hypothesis is rejected. Of particular interest in the test of Hypothesis 2, is the univariate analysis of the effect of the Second Clinical Experience ($p < 0.0007$) and the Third Clinical Experience ($p < 1.0000$). The results indicate that the simulation training produced an effect on performance. However, several factors may be in operation. The instructors were randomly assigned for the First Experience and the two principal instructors rotated between real and simulated clinical trained groups for the second and third treatment training experience. The Second Experience is the variable providing the significance at $p < 0.0007$. Table 2.2 demonstrates differences in cell means of the treatment groups. There may have been, as Barrows (1971) would state, "many red herrings" in operation. The

Table 2.1. Multivariate and Univariate Tests for Hypothesis 2.

Multivariate				
D.F. = 3 and 20			F Ratio = 4.9370	
		p < 0.0101*		
Univariate				
Variable	Alpha	Between Mean Squares	Univariate F	P Less Than
First Clinical Experience	.03	2.6667	0.0587	0.8108
Second Clinical Experience	.03	408.3750	15.5579	0.0007*
Third Clinical Experience	.04	0.0000	0.0000	1.0007
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 2.2. Grand Mean, Variance, S.D. and Cell Means for Hypothesis 2.

	First Clinical Experience	Second Clinical Experience	Third Clinical Experience
Grand Mean	80.3333	82.4583	85.3333
Variance	45.3939	26.2537	35.6969
Standard Deviation	6.7375	5.1238	5.9747
Means* Simulated (T_1) Clinical	80.6666	86.5833	85.3333
Means* Real (T_2) Clinical	80.0000	78.3333	85.3333

*Higher mean implies better performance.

Table 2.3. Correlation Matrix for Hypothesis 2.

	First Clinical Experience	Second Clinical Experience	Third Clinical Experience
First Clinical Experience	1.000000		
Second Clinical Experience	0.221642	1.000000	
Third Clinical Experience	0.264981	0.088098	1.000000

students may have been tired from the drive, the hospital may have been extremely busy, and the patients may have been upset. These factors contribute to problems in student performance. However, provisions were made for normal stress in the simulation training. Simulation training, because of the option for control, planned variation, and the reduction of accidental occurrences, seems to reduce the distractions from learning and allow controlled learning of the complex tasks involved in medical education.

Differences in Anticipated and Demonstrated Confidence in Performance Between Real Clinically Trained and Simulated Clinically Trained Groups

Null hypothesis 3. There will be no significant difference in confidence demonstrated in the anticipated total performance in clinical competency, in psychomotor skill technique abilities, in affective behaviors, and in the actual total performance in clinical competency criterion measures self-ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Both multivariate and univariate analyses were computed. The F ratio for the multivariate test of equality of mean vectors, as presented in Table 3.1 is significant

Table 3.1. Multivariate and Univariate Tests for Hypothesis 3.

Multivariate				
D.F. = 4 and 19			F Ratio = 2.5163	
		p < 0.0757*		
Univariate				
Variable	Alpha	Between Mean Squares	Univariate F	P Less Than
Confidence Anticipated Total Performance	.05	1.0417	4.6610	0.0421*
Confidence Demonstrated Psychomotor	.01	1.0417	4.6610	0.0421
Confidence Demonstrated Affective	.01	0.0417	0.1549	0.6977
Confidence Demonstrated Total Performance	.03	1.500	5.6571	0.0265*
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

at $p < 0.0757$. The null hypothesis is rejected. The multivariate and univariate analyses support the hypothesized direction for the simulated clinical trained group. The $p < 0.0421$ for confidence in anticipated total performance and $p < 0.0265$ for confidence in demonstrated total performance in clinical competency are significant. Inspection of cell means in Table 3.2 indicates that the simulation training treatment produced more confidence, anticipated and demonstrated, on total performance in clinical competency, and there is also evidence to support simulation training for producing confidence demonstrated in psychomotor skills and techniques. There is a minimal difference in confidence demonstrated in affective behaviors. Simulation yields greater anticipated and demonstrated confidence in a student's ability to transfer his experiences in clinical training.

Differences in Agreement on Student Self-Rating and Clinical Instructor's Rating on Total Performance in Clinical Competency Ratings Between the Simulated Clinically Trained and the Real Clinically Trained Groups

Null hypothesis 4. There will be no significant difference in agreement on student final performance criterion measure self-rating and the clinical instructor's rating of total performance in clinical competency on the final criterion measure ratings of students trained with simulated patients as models in simulated clinical

Table 3.2. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 3.

	Confidence Anticipated Total Performance	Confidence Demonstrated Psychomotor	Confidence Demonstrated Affective	Confidence Demonstrated Total Performance
Grand Mean	1.7916	1.4583	1.4583	1.8333
Variance	0.2235	0.2235	0.2689	0.2651
Standard Deviation	0.4727	0.4727	0.5186	0.5149
Means* Simulated (T_1) Clinical	1.5833	1.2500	1.5000	1.5833
Means* Real (T_2) Clinical	2.0000	1.6666	1.4166	2.0833

*Lower mean implies greater confidence.

Table 3.3. Correlation Matrix for Hypothesis 3.

	Confidence Anticipated Total Performance	Confidence Demonstrated Psychomotor	Confidence Demonstrated Affective	Confidence Demonstrated Total Performance
Confidence Anticipated Total Performance	1.0000			
Confidence Demonstrated Psychomotor	0.4576	1.0000		
Confidence Demonstrated Affective	0.4635	0.4017	1.0000	
Confidence Demonstrated Total Performance	0.5446	0.4823	0.3546	1.0000

experiences and that of students trained with real patients as models in real clinical experiences.

The results of the test for equality of correlations reported in Table 4.1 indicate that the null hypothesis is not rejected. The simulation trained and the real trained groups are equal in the agreement of students' and instructors' ratings. It was hypothesized that the simulation trained group would show greater agreement in the performance rating they thought they would receive and what they actually received on the final criterion measure rating. The results indicate that simulation training does what the real training experience does regarding a subject's ability to predict his performance in an examination situation. There are many variables operating in a subject's ability to predict, which are really over and above the immediate experience. Perhaps it would have been more realistic to predict agreement based on the statement of Gagne (1965): "To the extent that simulation is 'real' the performance is 'real' and one cannot define something which is 'more real.'" It appears that simulation training does nothing for a subject's ability to predict his performance in the real world environment over that which is provided by the real world training.

Table 4.1. Testing Significance of Correlation for Hypothesis 4.

	FISHER'S Z - TRANSFORMATION N	r_{xy}	z_r	Significance
(T_1) Simulated Clinical Trained	$n_1 = 12$	.36		
			-.1273	N/S
(T_2) Real Clinical Trained	$n_2 = 12$	.42		

Do Not Reject H_0:4 The Correlations are Equal

$r_1 = r_2$

Differences in Responses on Feelings About "Self" in the Treatment Training Clinical Experiences in Neurology Between Simulated Clinically Trained and Real Clinically Trained Groups

Null hypothesis 5. There will be no significant differences in responses about "self" in the treatment training criterion measure self-ratings on factors secure, successful, calm, pleasurable, and competent of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

The F ratio for the multivariate test of the equality of mean vectors, as presented in Table 5.1 is significant

Table 5.1. Multivariate and Univariate Tests for Hypothesis 5.

Multivariate

D.F. = 5 and 18 | F Ratio = 2.2054

$p < 0.0989$*

Univariate

Variable	Alpha	Between Mean Squares	Univariate F	P Less Than
Secure Insecure	.02	1.3113	3.3149	0.0823
Calm Anxious	.02	3.3078	3.5683	0.0722
Competent Incompetent	.02	0.2904	0.7946	0.3824
Successful Unsuccessful	.02	0.0726	0.1853	0.6711
Pleasurable Unpleasurable	.02	0.2904	0.5029	0.4857

D.F. for Hypothesis = 1 | D.F. for Error = 22

*Significant but not in direction hypothesized.

at $p < 0.0989$, but not in the direction hypothesized. The univariate analysis of the effect of the factors secure-insecure, calm-anxious, competent-incompetent, successful-unsuccessful, and pleasurable-unpleasurable indicate no significant differences at the alpha levels established a-priori in looking at each of the responses about "self" in the treatment training. However, inspection of cell means in Table 5.2 seems to indicate that simulation training results in insecure and anxious feelings about "self." Yet the experience is rated more pleasant by the simulated trained group. The direction of the individual differences on factors relating to "self" indicate that the simulation trained group is less secure, less calm but the experience was more pleasurable and more successful. The real clinically trained group was more secure, more calm, and felt more competent, but the experience was less pleasurable and they felt less successful. The simulation experience was more pleasurable, which one would think would not be related to anxiety. However, it appears that the anxiety is goal directed and represents a positive investment of "self" in the learning experience. Perhaps what has been isolated within simulation is the stress of learning and the elimination of uncontrolled stimuli that operate in the real world and detract from the learning task. However, the real experience may not have been challenging the competency of the students; therefore, they felt less successful and the experience

Table 5.2. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 5.

	Secure Insecure	Successful Unsuccessful	Calm Anxious	Pleasurable Unpleasurable	Competent Incompetent
Grand Mean	2.1312	2.3375	2.5162	1.9525	2.3925
Variance	0.3956	0.3919	0.9269	0.5775	0.3655
Standard Deviation	0.6290	0.6260	0.9627	0.7599	0.6045
Means* Simulated (T_1) Clinical	2.3650	2.2825	2.8875	1.8160	2.5025
Means* Real (T_2) Clinical	1.8975	2.3925	2.1450	2.0350	2.2825

*Lower mean implies more positive response.

Table 5.3. Correlation Matrix for Hypothesis 5.

	Secure Insecure	Successful Unsuccessful	Calm Anxious	Pleasurable Unpleasurable	Competent Incompetent
Secure Insecure	1.0000				
Successful Unsuccessful	0.7407	1.0000			
Calm Anxious	0.5722	0.3881	1.0000		
Pleasurable Unpleasurable	0.4091	0.4787	0.0845	1.0000	
Competent Incompetent	0.7366	0.7303	0.1807	0.6213	1.0000
Total Response	0.8902	0.8424	0.6452	0.6581	0.8054

was less pleasurable. On the other hand, perhaps the real experience caused the students to assume an artificial assurance about "self" to protect against the negative anxiety associated with uncontrolled variables found in the real world.

Differences in Responses About the Treatment Training Clinical Experience in Neurology Between Simulated Clinically Trained and Real Clinically Trained Groups

Null hypothesis 6. There will be no significant difference in responses on the treatment training criterion measure self-rating on the factors realistic, important, useful, meaningful, and successful of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

The F ratio for the multivariate test of the equality of mean vectors, as presented in Table 6.1 is significant at $p < 0.0018$ in the hypothesized direction. The univariate analyses support the factors of realism at $p < 0.0024$ for real trained, importance at $p < 0.0363$ for simulated trained, and meaningful at $p < 0.0207$ for simulated trained. The null hypothesis is rejected. Subjects trained in simulated clinical training rate the neurology training experiences higher. Inspection of cell means in Table 6.2 dispells the concern for the issue of realism in simulation. The

Table 6.1. Multivariate and Univariate Tests for Hypothesis 6.

Multivariate				
D.F. = 5 and 18			F Ratio = 6.0595	
		p < 0.0018*		
Univariate				
Variable	Alpha	Between Mean Square	Univariate F	P Less Than
Realistic Artificial	.01	2.4003	11.8513	0.0024*
Important Unimportant	.04	4.6464	4.9753	0.0363*
Meaningful Meaningless	.03	1.3113	6.2211	0.0207*
Useful Useless	.01	0.1633	1.2774	0.2706
Successful Unsuccessful	.01	0.1633	0.3708	0.5489
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 6.2. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 6.

	Useful Useless	Meaningful Meaningless	Important Unimportant	Realistic Artificial	Successful Unsuccessful
Grand Mean	1.2650	1.3612	1.5400	1.5537	1.8975
Variance	0.1279	0.2108	0.9339	0.2025	0.4405
Standard Deviation	0.3576	0.4591	0.9664	0.4500	0.6637
Means* Simulated (T_1) Clinical	1.1825	1.1275	1.1000	1.8700	1.8150
Means* Real (T_2) Clinical	1.3475	1.5950	1.9800	1.2375	1.9800

*Lower mean implies more positive response.

Table 6.3. Correlation Matrix for Hypothesis 6.

	Useful Useless	Meaningful Meaningless	Important Unimportant	Realistic Artificial	Successful Unsuccessful
Useful Useless	1.0000				
Meaningful Meaningless	0.7914	1.0000			
Important Unimportant	0.7257	0.7624	1.0000		
Realistic Artificial	0.4178	0.4831	0.1973	1.0000	
Successful Unsuccessful	0.2607	0.2030	0.3087	0.1822	1.0000
	—	—	—	—	—
Total Response	0.8304	0.8526	0.8706	0.5275	0.5730

difference is in favor of the real clinical training treatment experience which is expected. However, the difference is not that great to assume that the simulation seems artificial to the students. In fact, the cell means support simulation training in all factors except in realism.

On the semantic differential evaluative scale of realism vs. artificiality on a 1-7 point scale (Real = 1 - Artificial = 7) the mean for the simulated clinically trained group is 1.87 and the real clinically trained group mean is 1.24. This difference is minimal and, although statistically significant, it is not meaningfully significant for the overall objectives of this study. Simulated patients are representative stimuli of the real world patient.

In further explanation, within the treatment experience, each student performed a complete neurological evaluation as a final performance criterion measure. Thirty-eight video-tapes were completed, one for each student. All Ss in the experiment had to complete their neurological examination on a Real patient. Therefore, the E programmed the final examination in order for the inactive control to examine the simulated patients used in the treatment of simulated clinically-trained Ss. These students did not know if the patients were real or simulated. In fact, if the E was asked by the student what type of case he would have for the practical final, the student was informed by all involved in the course that: "Your patient will be real, but there may, out of necessity, have to be a few simulated cases." Note again that no simulated patients were used in the final practical examination of the treatment groups. However, of the 14 students not involved in the experimental study (the inactive control), 11 were evaluated using simulated patients and 3 using real patients. As part of the final examination evaluation procedures, each student was asked if he thought his patient was real or simulated. (Special emphasis was placed on the 14 inactive control students not in the study.) This question was asked after each student had completed the total case write-up.

The assessment of the 14 inactive control students as to whether the case they examined was real or simulated, provided the following results:

The total N = 14 (total students)
11 evaluated with simulated patients, and
3 with real patients.

8 students having simulated patients stated their patients were real.

1 student having a real patient stated his patient was simulated.

2 students having real patients stated their patients were real.

1 student having a simulated patient stated his patient was simulated.

2 students having simulated patients indicated uncertainty whether their patient was real or simulated.

A basic percentage computation indicates that 84% of the inactive control students could not tell whether their patient was real or simulated. Visual inspection of this data reveals that the utilization of simulated patients works and is a viable technique that can be used in the education of medical students.

Differences on Factors Contributing to Performance on the Training Experience Between the Simulated Clinically Trained and the Real Clinically Trained Groups

Null hypothesis 7. There will be no significant differences in the practical clinical training experience factors of providing all the skills and abilities, providing psychomotor skills and techniques, providing the medical knowledge necessary (cognitive), providing the development of affective behaviors, and in providing feedback as vehicles in performing the complete Neurological Evaluation History and Physical Examination final performance criterion measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

Both multivariate and univariate analyses comparing the simulated clinically trained group and the real clinically trained group were computed. The F ratio for the multivariate test of equality of mean vectors, as presented in Table 7.1 is significant at $p < 0.0766$ in the hypothesized direction supporting the simulated clinically trained group and rejecting the null hypothesis. Inspection of the univariate analysis is of particular interest regarding the effect of the variable Feedback. One of the key attributes of simulation training is the opportunity it gives to provide controlled feedback within training. This is reinforcement for the learning task presented, which may not be available in the real training. The univariate analysis for Feedback is significant at $p < 0.0044$ in the hypothesized direction. Inspecting the cell means in Table 7.2, supports simulated clinical training on all variables except in providing for the development of affective behaviors. The reported mean differences are minimal in all areas of providing for the ability to perform in the clinical experience except in that of Feedback. Simulation training more adequately provides the vehicles necessary to perform a complete neurological examination.

Differences in Request for Simulated Instruction Experiences Between the Simulated Clinically Trained and the Real Clinically Trained Groups

Null hypothesis 8. There will be no significant differences in requests for additional simulated instructional experiences as evidence of preference for this method of training on the final performance criterion measure rating scale of students trained with simulated

Table 7.1. Multivariate and Univariate Tests for Hypothesis 7.

Multivariate				
D.F. = 5 and 18			F Ratio = 3.4146	
		p < 0.0766*		

Univariate				
Variable	Alpha	Between Mean Square	Univariate F	P Less Than
Providing All Skills and Abilities	.02	0.0417	0.0485	0.8378
Providing Feedback	.02	8.1667	10.0748	0.0044*
Providing Medical Knowledge	.02	1.0417	0.8958	0.3543
Providing Psychomotor Skills and Techniques	.02	0.1667	0.2316	0.6352
Providing Affective Behaviors	.02	0.6667	0.9670	0.3362
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 7.2. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 7.

	Providing All Skills and Abilities	Providing Psychomotor Skills and Techniques	Providing Medical Knowledge	Providing Affective Behaviors	Providing Feedback
Grand Means	2.0416	2.0000	2.1250	1.9166	2.0000
Variance	0.8398	0.7197	1.1629	0.6894	0.8106
Standard Deviation	0.9273	0.8483	1.0784	0.8303	0.9003
Means* Simulated (T_1) Clinical	2.0000	1.9166	1.9166	2.0833	1.4166
Means* Real (T_2) Clinical	2.0833	2.0833	2.3333	1.7500	2.5833

*Lower mean implies higher rating of the factor.

Table 7.3. Correlation Matrix for Hypothesis 7.

	Providing All Skills and Abilities	Providing Psychomotor Skills and Techniques	Providing Medical Knowledge	Providing Affective Behaviors	Providing Feedback
Providing All Skills and Abilities	1.0000				
Providing Psychomotor Skills and Techniques	0.8041	1.0000			
Providing Medical Knowledge	0.2575	0.5258	1.0000		
Providing Affective Behaviors	0.6051	0.6023	0.1565	1.0000	
Providing Feedback	0.2949	0.5257	0.4720	0.2635	1.0000

patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

The Chi-Square test is significant at $p < 0.03$ (See Table 8.1). Since the Chi-Square test is significant, the null hypothesis is rejected and it is concluded that subjects with simulated clinical training requested additional simulation experiences more than do students with real clinical training. Student support for the simulation training concept is critical to the implementation of the concept within the curriculum. Without student support, administration and faculty would have difficulty in providing any alternatives to traditional instruction. Students must be given options in learning the required material. Perhaps, if various methods were employed within a teaching model, the educational process would, indeed, be supporting a key objective of education which is meeting individual differences in the ability to learn.

Table 8.1. Chi-Square - Testing of Hypothesis 8.

D.F. = (2-1) (2-1) = 1 df	Chi-Square = 5.3
$p < .03$	
χ^2 (Chi-Square) .10, 1 df = 2.71	

Differences in Demonstrated Improvement vs. Consistency on Patient Evaluation During the Treatment Training Between the Simulated Clinically Trained and the Real Clinically Trained

Null hypothesis 9. There will be no significant differences in demonstrated improvement vs. consistency in the treatment training patient evaluation performance criterion measure ratings of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

The F ratio for the multivariate test of equality of mean vectors for the First, Second, and Third Clinical Training Experiences, reported in Tables 9.1, 9.2, and 9.3, are significant at $p < 0.0003$, $p < 0.0024$ and $p < 0.0008$, respectively, in the hypothesized direction. Inspection of the univariate analysis for the First, Second, and Third Experiences, also supports an improved demonstrated satisfaction in performance for the simulated trained group on patient evaluations (See Tables 9.1, 9.2, and 9.3. The final patient evaluation criterion measure is presented in Table 10.1). Within the First Experience, the univariate analysis on the dependent variable competent-incompetent is supportive of the simulated clinical group at $p < 0.0001$. All other factors also support the simulated clinical group. Secure-insecure is significant at $p < 0.0001$ for simulation, interested-uninterested is significant at $p < 0.0062$, and gentle-rough is significant at $p < 0.0081$ (all in favor of the positive behaviors). In the Second Experience, the univariate analysis is supportive of the simulated clinical group on all variables. In the Third Experience, the factors of competent-incompetent and secure-insecure support demonstrated improvement for the simulation instructional technique. Of particular interest are the cell means of Table 9.4. Inspection of this table reveals the demonstrated improvement in performance of the simulated trained group vs. the consistency in performance of the real trained group in patient evaluations criterion measures. The evidence that is provided supports the change in demonstrated behaviors which occurs in simulation training. Subjects trained in real clinical experience receive little constructive reinforcement. Real patients are reluctant to rate physician behaviors, even though the clinical instructor advised them to do so, and as a result, student-physician behaviors continue to operate without change. Through feedback from simulated patients there is a demonstrated improvement in patient satisfaction in the First, Second, and Third Experiences.

Table 9.1. Multivariate and Univariate Tests for Hypothesis 9, First Experience.

Multivariate				
D.F. = 4 and 19			F Ratio = 9.1540	
		$p < 0.0003$*		
Univariate				
Variable	Alpha	Between Mean Square	Univariate F	P Less Than
Competent Incompetent	.025	40.0417	22.8315	0.0001*
Secure Insecure	.025	32.6667	31.0216	0.0001*
Interested Uninterested	.025	13.5000	9.1856	0.0062*
Gentle Rough	.025	8.1667	8.4882	0.0081*
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 9.2. Multivariate and Univariate Tests for Hypothesis 9, Second Experience.

Multivariate				
D.F. = 4 and 19			F Ratio = 6.1576	
		p < 0.0024*		
Univariate				
Variable	Alpha	Between Mean Square	Univariate F	P Less Than
Competent Incompetent	.025	28.1667	26.7482	0.0001*
Secure Insecure	.025	20.1667	16.8481	0.0005*
Interested Uninterested	.025	13.5000	8.6505	0.0076*
Gentle Rough	.025	8.1667	7.7554	0.0109*
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 9.3. Multivariate and Univariate Tests for Hypothesis 9, Third Experience.

Multivariate				
D.F. = 4 and 19			F Ratio = 7.5810	
		$p < 0.0008$*		

Univariate				
Variable	Alpha	Between Mean Square	Univariate F	P Less Than
Competent Incompetent	.025	16.6667	16.1765	0.0006*
Secure Insecure	.025	18.3750	24.3769	0.0001*
Interested Uninterested	.025	3.3750	3.6073	0.0708
Gentle Rough	.025	5.0417	4.7032	0.0412
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 9.4. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 9.

	FIRST EXPERIENCE COMPARED TO FINAL				SECOND EXPERIENCE COMPARED TO FINAL				THIRD EXPERIENCE COMPARED TO FINAL			
	Competent	Secure	Interest	Gentleness	Competent	Secure	Interest	Gentleness	Competent	Secure	Interest	Gentleness
Grand Mean	-0.1250	0.0833	0.0833	0.3333	0.1667	0.2500	0.0833	0.1667	0.3333	0.0417	0.2083	0.1250
Variance	1.7538	1.0530	1.4697	0.9621	1.0530	1.1969	1.5606	1.0530	1.0303	0.7538	0.9356	1.0719
Standard Deviation	1.3243	1.0262	1.2123	0.9809	1.0262	1.0941	1.2492	1.0262	1.0150	0.8682	0.9673	1.0354
Means* Simulated (T_1) Clinical	-1.4167	-1.0833	-1.6667	-0.2500	-0.9167	-0.6667	-0.6667	-0.4167	-0.5000	-0.8333	-0.1667	-0.3333
Means* Real (T_2) Clinical	1.1667	1.2500	0.8333	0.9167	1.2500	1.1667	0.8333	0.7500	1.1667	0.9167	0.5833	0.5833

*Means show growth and improvement in demonstrated vs. consistency in performance from experience 1-3 compared with the final performance. Scores should move from high negative and approach one.

Table 9.5. Correlation Matrix for Hypothesis 9.

		FIRST EXPERIENCE COMPARED TO FINAL				SECOND EXPERIENCE COMPARED TO FINAL				THIRD EXPERIENCE COMPARED TO FINAL			
		Competent 1	Secure 2	Interest 3	Gentleness 4	Competent 1	Secure 2	Interest 3	Gentleness 4	Competent 1	Secure 2	Interest 3	Gentleness 4
First Experience	1	1.0000											
	2	0.5045	1.0000										
	3	0.5349	0.5785	1.0000									
	4	0.2070	0.0903	0.2230	1.0000								
Second Experience	1	0.5992	0.5323	0.4080	0.0677	1.0000							
	2	0.4183	0.5601	0.5141	-0.0353	0.6545	1.0000						
	3	0.4121	0.5905	0.7603	-0.0804	0.5023	0.6651	1.0000					
	4	0.1143	-0.0719	0.1522	0.3838	0.3525	0.3306	0.3250	1.0000				
Third Experience	1	0.6143	0.2618	0.4925	0.2587	0.5236	0.3547	0.3704	0.5236	1.0000			
	2	0.2767	0.5314	0.4822	0.1290	0.5144	0.7417	0.6356	0.4889	0.5759	1.0000		
	3	0.3903	0.4159	0.8076	0.1477	0.5228	0.5799	0.8589	0.4541	0.5941	0.6991	1.0000	
	4	0.0718	-0.3030	-0.1630	0.6527	-0.0178	-0.1137	-0.2284	0.6453	0.3388	0.0632	0.1135	1.0000

Differences in Patient Satisfaction of Student Performance on the Final Patient Evaluation Between the Simulated Clinically Trained and Real Clinically Trained Groups

Null hypothesis 10. There will be no significant difference in patient satisfaction in student performance on the final patient evaluation performance criterion measure rating of students trained with simulated patients as models in simulated clinical experiences and that of students trained with real patients as models in real clinical experiences.

The F ratio for the multivariate test of equality of mean vectors, as reported in Table 10.1 is significant at $p < 0.0298$ in the hypothesized direction. The univariate analysis reveals that factors competent-incompetent, and secure-insecure are significant at $p < 0.0030$ and $p < 0.0078$ respectively. Of particular meaningful significance and interest are the cell means reported in Table 10.2. Inspection of the cell means indicates that the real patients were satisfied with the performance of the simulated clinically trained group, as demonstrated in the patients' evaluations of the student physician behaviors during the final complete Neurological Examination.

Table 10.1. Multivariate and Univariate Tests for Hypothesis 10.

Multivariate				
D.F. = 4 and 19			F Ratio = 3.3884	
		p < 0.0298*		
Univariate				
Variable	Alpha	Between Mean Square	Univariate F	P Less Than
Competent Incompetent	.025	6.0000	11.1549	0.0030*
Secure Insecure	.025	5.0417	8.5871	0.0078*
Interested Uninterested	.025	2.0417	2.6552	0.1175
Gentle Rough	.025	1.0417	1.5363	0.2283
D.F. for Hypothesis = 1			D.F. for Error = 22	

*Significant

Table 10.2. Grand Mean, Variance, S.D., and Cell Means for Hypothesis 10.

	FINAL PERFORMANCE PATIENT EVALUATION			
	Competent Incompetent	Secure Insecure	Interested Uninterested	Gentle Rough
Grand Mean	0.1497	0.1564	0.1789	0.1680
Variance	0.5378	0.5871	0.7689	0.6780
Standard Deviation	0.7334	0.7662	0.8769	0.8234
Means* Simulated (T_1) Clinical	1.0833	1.0833	1.0000	1.2500
Means* Real (T_2) Clinical	2.0833	2.0000	1.5833	1.6667

*Lower mean implies greater patient satisfaction in student performance.

Table 10.3. Correlation Matrix for Hypothesis 10.

	FINAL PERFORMANCE PATIENT EVALUATION			
	Competent Incompetent	Secure Insecure	Interested Uninterested	Gentle Rough
Competent Incompetent	1.0000			
Secure Insecure	0.3976	1.0000		
Interested Uninterested	0.5242	0.6088	1.0000	
Gentle Rough	0.3073	0.0540	0.0209	1.0000

SUMMARY

All proposed hypotheses are analyzed using either multivariate analysis of covariance, multivariate analysis of variance with individual dependent variables analyzed by univariate analysis of variance, chi-square or by equality of correlation procedures. In testing the effects of simulated clinical training and real clinical training, an alpha level of .10 was used for all hypotheses. In looking at the univariate analysis for the effects of treatment training on the individual dependent variables, an alpha level was established a-priori.

STATUS OF THE RESEARCH HYPOTHESES

There are 10 directional hypotheses investigated. Six of the research hypotheses are supported, two are partially supported, and two are not supported.

The status of the research hypotheses follows:

Research hypothesis 1. Students trained with simulated patients as models in simulated clinical experiences will:

A. Demonstrate a better total performance in clinical competency during the final Neurological Evaluation History and Physical Examination, by receiving higher ratings on the criterion measure rating scale than students trained with real patients as models in real clinical experiences.

SUPPORTED $p < 0.0450$

B. Demonstrate better psychomotor skills by receiving higher ratings on the final performance criterion measure rating scale than students trained with real patients as models in real clinical experiences.

SUPPORTED $p < 0.0011$

C. Demonstrate more effective affective behaviors by receiving higher ratings on the final performance criterion measure rating scale than students trained with real patients as models in real clinical experiences.

NOT SUPPORTED $p < 0.9500$, Affective Behavior_1

NOT SUPPORTED $p < 0.4817$, Affective Behavior_2

NOT SUPPORTED $p < 0.8619$, Affective Behavior_3

D. Demonstrate more cognitive knowledge by receiving higher scores on the final performance criterion measure than students trained with real patients as models in real clinical experiences.

NOT SUPPORTED $p < 0.2182$

The multivariate analysis has simultaneously evaluated the six dependent variables resulting in a $p < 0.0907$ which is interpreted as partial support of the overall hypothesis.

RESEARCH HYPOTHESIS 1. PARTIALLY SUPPORTED $p < 0.0907$

* * *

<u>Research hypothesis 2</u>. Students trained with simulated patients as models in a simulated clinical experience will demonstrate greater total performance skills in clinical competency in each of the three treatment training experiences by receiving higher ratings on the performance criterion measure rating scale than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 2. SUPPORTED $p < 0.0101$

* * *

<u>Research hypothesis 3</u>. Students trained with simulated patients as models in simulated clinical experiences will:

A. Demonstrate a greater confidence by anticipating higher total performance in clinical competency on the final performance criterion measure self-rating than students trained with real patients as models in real clinical experiences.

SUPPORTED $p < 0.0421$

B. Demonstrate greater confidence in their own psychomotor skill technique abilities on the final performance criterion measure self-ratings than students trained with real patients as models in real clinical experiences.

NOT SUPPORTED $p < 0.0421$

C. Demonstrate greater confidence in their own effective affective behaviors of establishing a relationship and eliciting data on the final performance criterion measure self-rating than students trained with real patients as models in real clinical experiences.

NOT SUPPORTED $p < 0.6977$

D. Demonstrate greater confidence in their performance of a complete Neurological Evaluation History and Physical Examination with real patients on the final performance criterion measure self-rating than students trained with real patients as models in real clinical experiences.

SUPPORTED $p < 0.0265$

The multivariate analysis has simultaneously evaluated the four dependent variables resulting in a $p < 0.0757$ which is interpreted as partial support of the overall hypothesis.

RESEARCH HYPOTHESIS 3. PARTIALLY SUPPORTED $p < 0.0757$

* * *

Research hypothesis 4. Students trained with simulated patients as models in simulated clinical experiences will demonstrate greater agreement between the student self-rating and the clinical instructor's rating of total performance in clinical competency on the final performance criterion measure ratings than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 4. NOT SUPPORTED $\Gamma_1 = \Gamma_2$

* * *

<u>Research hypothesis 5</u>. Students trained with simulated patients as models in simulated clinical experiences will respond more positively about their "self" in the criterion measure of self-ratings on factors secure, successful, calm, pleasurable and competent than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 5. NOT SUPPORTED $p < 0.0989$

* * *

<u>Research hypothesis 6</u>. Students trained with simulated patients as models in simulated clinical experiences will rate higher in the criterion measure of self-ratings on the factors realistic, important, useful, meaningful and successful than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 6. SUPPORTED $p < 0.0018$

* * *

Research hypothesis 7. Students trained with simulated patients as models in simulated clinical experiences will rate the factors providing all the skills and abilities, providing psychomotor skills and technique, providing the medical knowledge necessary (cognitive), providing the development of affective behaviors, and in providing feed-back, higher as vehicles in performing the complete Neurological Evaluation History and Physical Examination on the final performance criterion measure rating than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 7. SUPPORTED $p < 0.0766$

* * *

Research hypothesis 8. Students trained with simulated patients as models in simulated clinical experiences will request additional simulated instructional experiences as evidence of preference for this method of training more than students trained with real patients as models in real clinical experiences on the final performance criterion measure rating scale.

RESEARCH HYPOTHESIS 8. SUPPORTED $p < 0.03$

* * *

Research hypothesis 9. Students trained with simulated patients as models in simulated clinical experiences will demonstrate greater improvement vs. consistency in the patient evaluation performance criterion measure ratings than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 9. SUPPORTED $p < 0.0003$, First Experience
SUPPORTED $p < 0.0024$, Second Experience
SUPPORTED $p < 0.0008$, Third Experience

* * *

Research hypothesis 10. Students trained with simulated patients as models in simulated clinical experiences will produce greater patient satisfaction, receiving higher ratings in performance on the final patient evaluation performance criterion measure rating than students trained with real patients as models in real clinical experiences.

RESEARCH HYPOTHESIS 10. SUPPORTED $p < 0.0298$

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CHAPTER V

DISCUSSION, CONCLUSIONS, IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE, ADDITIONAL DATA, AND SUMMARY

DISCUSSION

Many of the criticisms of simulation center on the lack of supportable evidence. The primary purpose of this study was to investigate the effects of a simulation training model using simulated patients on measures of cognitive (medical) knowledge, affective behavior, psychomotor skill techniques, and on total performance in clinical competency. The aspects of learning in a role-performing simulation clinical training activity were investigated to offer a partial solution to the problem of knowing whether performance in a representative environment would transfer to the real world.

The results of the study support utilizing simulation training techniques on medical education problems. Simulation training using simulated patients provides the vehicle for realistic descriptions and predictions on variables, such as motivation, decision making, skill development, problem solving, and performance demonstration, in a representative real world environment. In this study, answers to questions about learning transfer from role-performing simulations, training methods and propositions, and evaluation of clinical competency were put together in a training model. The simulation design allowed for the development of an alternative to traditional, clinical teaching and for a demonstration of the training outcomes in a viable research form.

The findings show that simulation training with simulated patients provides the environment for first-year medical students to practice psychomotor, affective and cognitive behaviors involved in the higher order abilities of performing problem-solving and decision-making clinical competency skills. Furthermore, these physician behaviors can be practiced in an environment that controls for unforeseen contingencies, provides variation in experiences, allows latitude in acquiring proficiency, provides feedback, and provides for the demonstration and measurement of the transfer of learning. Simulation training in medical education is, indeed, a viable alternative to traditional methods.

Medical education can no longer operate without searching innovation for increasing manpower supply. Medical education programs must provide the productivity in health care delivery and make provisions for coherent plans for undergraduate physician training programs based on factual evidence that reduce cost while increasing quality. One need only review the special report and recommendations by the Carnegie Commission (1970) on "Higher Education and the Nation's Health," and John S. Millis' (1971) "A Rational Public Policy for Medical Education and Its Financing," to realize that the public is requesting better and more health services.

Simulation training in physician education may not be the panacea to learning. However, this study has proven the potential of the technique as an alternative to traditional clinical training procedures. The current research has adequately supported previous research in educational simulation regarding transfer, fidelity, assessment, instructional methodology, the use of advance organizers in clinical medical training, and ways in which learning can be facilitated in real-world tasks. The study was not intended to be a treatise on the psychology of learning or on instructional methodologies. The main effort was to show that role-performing instructional simulation shares benefits of supervised real clinical experiences without some of the costs, risks, inefficiency and inconvenience during the formative period of student-physician education. In fact, the results have shown that simulation in medical education is a new, workable approach that can be used as a technique for training medical students and in measuring their performance.

CONCLUSIONS

1. A. Simulation training for first-year medical students was shown to result in higher ratings on their total performance in clinical competency as shown on the Final Neurological Evaluation History and Physical Examination with real patients, than real clinical training.

   B. Simulation training was shown to result in higher ratings of demonstrated psychomotor skills and techniques in the final performance examination, than real clinical training.

   C. Simulation training was not shown to result in higher ratings on demonstrated affective physician behavior in the final performance examination, than real clinical training.

   D. Simulation training was not shown to result in higher ratings on demonstrated cognitive knowledge on the final performance examination, than real clinical training.

2. Simulation training resulted in greater demonstrated total performance skills in clinical competency in the training experiences, than real clinical training.

3. A. Simulation training resulted in greater demonstrated confidence of anticipating higher total performance in clinical competency in the final examination, than real clinical training.

B. Simulation training did not result in greater demonstrated confidence of psychomotor skill technique abilities in the final examination, than real clinical training.

C. Simulation training did not result in greater demonstrated confidence of effective affective physician behavior in the final examination than real clinical training.

D. Simulation training resulted in greater demonstrated confidence in total performance of a complete Neurological Evaluation History and Physical Examination with real patients, than real clinical training.

4. Simulation training did not result in greater agreement between the students' self-ratings and the clinical instructors' ratings of total performance in clinical competency on the final examination, than real clinical training.

5. Simulation training did not result in more positive responses about "self" in the training experiences in neurology, than real clinical training.

6. Simulation training resulted in higher ratings of the training experience in Neurology than real clinical training.

7. Simulation training resulted in higher ratings of the factors providing all the skills and abilities, providing the medical knowledge necessary, providing

psychomotor skills and techniques, and in providing feedback as vehicles contributing to performing the complete Neurological Evaluation History and Physical Examination, than real clinical training.

8. Simulation training resulted in more requests for additional simulated instructional experiences as evidence of preference for this method, than real clinical training.

9. Simulation training resulted in greater demonstrated improvement vs. consistency as shown on patient evaluations in the training experiences, than real clinical training.

10. Simulation training resulted in providing greater patient satisfaction in the student performance of the Final Neurological Evaluation History and Physical Examination, than real clinical training.

IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE

Implications of this investigation must be interpreted in terms of the population used in the study, the training techniques employed in the treatments, and the performance criterion measures before applications of this investigation are made and generalized by the reader.

Simulation training, using role-performing instructional experiences with simulated patients has been shown to have effective transfer of learning in clinical medical education. Research using different types of criterion measures could be beneficial in studying the effect of other specific behaviors involved in the education of medical students. Patterns of behaviors could be studied on students' abilities in responding to emergencies, students' reactions in crises intervention, and the effects of practice or repetition on basic technical skills used in medical examination. Additionally, the evaluation of learning styles by employing different methods of presenting patient data and further investigation of methods for measuring clinical performance skills could be studied.

Future research and practice with simulation training should involve the following:

1. Vary the degree of psychological fidelity of the simulated patients to investigate the effects of transfer.
2. Study the effects of repetition and practice with varied degrees of physical and psychological fidelity employed in the simulation training.
3. Investigate techniques for training or programming simulated patients by utilizing modeling tapes of other patients' behaviors.
4. Investigate the effect of using simulated patients on the development of skill in problem solving and medical judgment, regarding the reality of pathological symptoms. Allow practice with both real and simulated patients by different groups

of students and force a choice of decision by the students on the reality of patient problems. This could assist in understanding the cues given by patients that trigger the development of hypotheses about patient pathology by the student. Use simulated patients as a key tool in understanding student behavior in medical education.

5. Investigate further use of video-taping of practical clinical examinations for measuring student performance and for determining the value of the video-tapes as tools in self instruction or as modeling tapes for other students.
6. Investigate the effects of entering medical students observing advanced student peers performing specific examinations with simulated patients. The purpose would be to study the effects of this type of modeling on the development of the various physical diagnostic skill behaviors necessary for the beginning student.
7. Investigate the approach used in the advance organizer of presenting closer control of clinical experiences.
8. Investigate the use of simulation techniques in teaching principles of patient management.
9. Investigate further the effect of simulation training on the medical students' feelings of

"self," regarding confidence, success, security, and competency.

10. Investigate further the effect of patient evaluation and feedback on student physician behavior change.
11. Measure long term effects of the Systems Neurology simulation training.
12. Investigate the use of advanced students programmed as simulated patients to determine the reinforcement of previously learned skills, to determine a possible vehicle for providing student financial support by re-cycling funds, that is, scholarships for advanced students for participating as simulated patients.
13. Investigate the use of paying real patients who are receiving disability benefits through social security. The current study indicates that individuals classed as disabled would participate in a physician education program by allowing students to examine them for their specific physical disability. Additionally, rehabilitation clients with varying disabilities who are students at the university could be used as programmed patients. This entire concept has considerable merit in cost/benefit/effectiveness, and in the potential advantage to the psychological and monetary support of disabled individuals.

14. Investigate further the reliability of ratings used in measuring psychomotor and affective behaviors.
15. Investigate the use of low fidelity trained simulation patients utilizing computer simulation training techniques and devices.
16. Investigate the use of simulated patients in simulating cardiac, renal, respiratory, and other systems involvements for the training of medical students.
17. Investigate further use of simulated patients in training medical students, by varying the degree of psychological and physical fidelity. For example, program a patient with a cardiac problem but have the heart sounds on tapes. This would provide a lower fidelity situation because of the use of devices to complement the patient's interaction with the student-physician.
18. Develop and explore the use of various training simulation aids in the diagnosis of patient problems, i.e., simulation kits for simulated patients with all necessary laboratory work completed.
19. Investigate the use and effects of developing a cadre of high fidelity simulated patients on call for student use at any time in practicing specific skills within an instructional learning unit. Didactic teaching could be enhanced and student

skills developed more rapidly. Real patients at teaching hospitals are in great demand. In promoting clinical teaching at community hospitals, the university program without large clinical facilities must find methods of providing clinical input. Utilizing simulated patients and other simulation techniques could be an answer.

20. Explore and investigate further the use of simulated patients and standardized cases for measuring clinical performance.

21. Investigate a model in the analysis of cost/effectiveness. The model should compare (1) objectives, (2) alternatives, (3) costs, (4) the benefits of the instructional model used, and (5) criterion for ranking the alternative methods' desirability by weighing costs against effectiveness. This requires the development of probability statements and the use of regression equation analyses.

ADDITIONAL DATA

For the purposes of this study the E looked at specific costs comparing the models of simulation instructional training and real instructional training. Costs in relation to student travel, student time, and clinical professional staff contributions were reviewed. In computing an analysis for this problem, only differences in additional costs are considered. Direct costs remain the same for both training experiences. The analysis reveals that real clinical training is more costly than simulation clinical training in the factors outlined.

Perhaps in this specific instance, simulation is less expensive. Students had to travel in groups of four to Detroit on nine occasions @ 10¢ per mile; the expense was $130.50. Student time required in travel is an additional 3 hours per individual for each clinical experience. The University standard relative to credit hours indicates that each 1 credit has been defined to require 3 hours each week in class, laboratory and preparation for a full term of approximately 12 weeks. Following this standard, the Systems Biology II Neuromuscular Unit at 6 credits would require 18 hours per week x 12 weeks divided by 1/3. If a student pays $15.00 per credit, then a student's time is equal to $5.00 per hour, (1/3 for instruction, 1/3 for laboratory, and 1/3 for preparation). In a quarter, the medical student should study a minimum of 72 hours for the 6 credits. The time for travel to Detroit and return is 3 hours each trip. There were nine trips for a total of 27 hours in travel. For 12 students, this would equal 324 hours. At a cost of $5.00 per hour for student time, this equals $1,620.00, or $135.00 per student in time spent. Part-time faculty consideration for teaching clinical neurology is approximately $28.00 per hour. If a neurologist can earn, in consultation and professional services, approximately $75.00 per hour, and his time is given to the college for clinical instruction, then, the difference is $47.00 per hour. At 36 hours of clinical teaching, the difference is equal to $1,692.

There is no question that the entire cost/effectiveness model should be studied. However, for the purpose of this study, even considering the costs of the simulation patients at $250.00, and adding the costs of the final evaluation using the real patients at $225.00, there is still a benefit in cost-time and in experimentation gained from simulation training. Considerations of this nature will have to be studied in developing options in physician education.

SUMMARY

The general purpose of this study was to demonstrate that another approach for providing effective "hands-on" clinical training during the formative period of learning complicated clinical skills was available in medical education. The specific purpose was to ascertain the practical effectiveness of instructional simulation. This was demonstrated by comparing the use of simulated patients and real patients in clinical education. A comparison of the effects of the two training techniques in the development and transfer of total performance in clinical competency, psychomotor skills, affective behaviors of medical students, and cognitive medical knowledge was measured. A final Practical Neurological Evaluation History and Physical Examination on real patients was used to assess learning transfer in student performance.

Other objectives of the study center on the development of methods of evaluating student clinical performance by patient, clinical instructor, and the student. Additionally, methods were developed for evaluating student confidence and satisfaction.

The setting for the study was the College of Osteopathic Medicine, Michigan State University, East Lansing, Michigan. The basic curriculum course model was the Systems Biology II Neuromuscular Unit for first-year Osteopathic Medical students.

Practical clinical training experiences are a requirement of the Neuromuscular Systems Unit. The clinical training treatments were held in Detroit at Detroit Osteopathic Hospital's Neuromuscular Unit for the subjects trained with real patients and at simulated clinical facilities in the College of Osteopathic Medicine for subjects trained with simulated patients. The College of Osteopathic Medicine is an innovative physician education program providing an integrated, basic, clinical, and behavioral science curriculum with early practical clinical training experiences. The emphasis is on comprehensive patient care within the total family, coupled with community involvement. In the first-year Osteopathic Medicine class studied, there were 33 full-time students. Enrollment has expanded to 64 students as of September, 1972.

Subjects were randomly assigned to two treatment groups, using a table of random permutations. The two experimental treatment groups were: T_1 Simulated Patient Clinical Training and T_2 Real Patient Clinical Training. The remaining students enrolled in the Neuromuscular Systems Unit were considered as inactive control. Each subject had three treatment training experiences and a practical clinical final examination. The subjects were presented with an advance organizer consisting of all details for the clinical training experience.

The treatments were administered over a 10-week period. Each subject received his three clinical training experiences spaced every three weeks. The entire 33 members of the first-year Osteopathic Medical class and five Allopathic Medical students received the training.

The experimental treatments consisted of the subjects in the simulated patient clinical training and subjects in the real patient clinical training performing Neurological Evaluation History and Physical Examinations, which requires clinical competency performance, psychomotor skill and technique performance, affective physician behavior performance, and cognitive medical knowledge performance abilities. The students' examinations of patients were written-up, presented, and defended by each student in the clinical review session. Student performance was rated by the clinical instructor on the Instructor's Clinical Competency Formative and Summative Evaluation Rating Scale. Also, each student rated "Self" in the clinical experience and the Clinical Experience as an entity. Pre-cognitive and pre-psychomotor measures were obtained as covariate information. Each student was required to turn in his written material within one day after each clinical treatment training experience. Inactive control subjects were trained at St. Lawrence Hospital, Lansing, Michigan, and at Martin Place East Hospital in Detroit, and were required to follow the same format as the treatment groups. The entire class was not aware of their participation in an experimental study. After the completion of the three clinical treatment training experiences, each subject received a schedule of the practical video-taped final examination.

The final Practical Neurological Evaluation History and Physical Examination was completed on real patients for the 24 subjects in the treatment groups, and 11 of the 14 inactive control students completed their final practical clinical examinations on the simulated patients used in the experiment.

The six criterion measures were: (1) Cognitive Knowledge Performance, (2) Psychomotor Skill Performance, (3) Affective Behavior Performance, (4) Total Performance in Clinical Competency, (5) Patient Evaluation Ratings of Student Performance, and (6) Student Ratings of Self-Performance Experiences and Satisfactions.

All materials utilized in this study were developed or originated by the experimenter for both the general and specific purposes of this study. The experimental study required the development of pre-treatment materials, rating scales, evaluation forms, the training of raters, standardizing ratings, establishing reliabilities, training instructors, and a great deal of cooperative support from professional colleagues.

The research completed in this study demonstrated that instructional simulation using simulated patients in a simulated clinical environment is a viable technique that facilitates the learning and transfer of clinical competency behaviors. Application through demonstration, further technique development, additional research into the benefits of simulation training in student physician education, and experimentation of the uses in evaluation of clinical performance must be tried.

In general, it can be stated that simulated clinical training provided the learner with an opportunity to vary behavior, problem solve, and make decisions in an environment that was positive and free from distraction. The experiences provided relevant feedback on critical behaviors which were transferred to the real world in demonstrated learning outcomes. The experiment has demonstrated an alternative in medical education and has added to the body of knowledge of instructional methods in physician education as related to the training and transfer of psychomotor skills, affective behavior, cognitive knowledge, and clinical competency performance.

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APPENDICES

APPENDIX A

GENERAL INFORMATION

COURSE PROTOCOL

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

FRESHMAN CLASS - SPRING QUARTER - 1972
SYSTEMS BIOLOGY I and II
NEUROMUSCULAR SYSTEM UNIT

GENERAL INFORMATION

COURSE PROTOCOL

TEXTBOOKS

1. COURSE TEXTBOOKS

Neuroanatomy

Human Neuroanatomy - Traux and Carpenter, 6th Edition, Williams & Wilkins

Neurology

Medical Neurology - Gilroy-Myers
Textbook of Medicine - Cecil and Loeb, 13th Edition
or
Principles of Internal Medicine - Harrison, 6th Edition

Pathology

Pathology - Robbins, 3rd Edition

Physiology

Fundamentals of Neurology - Gardner, 5th Edition

Other Basic and Clinical Science Textbooks as previously assigned.

2. REFERENCE TEXTBOOKS

Neuroanatomy

Manter's Essentials of Clinical Neuroanatomy and Neurophysiology - Arthur Gatz, 4th Edition

Correlative Anatomy of the Nervous System - Crosby, Humphrey, Lauer, 1962

Functional Neuroanatomy - N. B. Everett, 6th Edition

Functional Mammalian Neuroanatomy - Jenkins, 1972

A Functional Approach to Neuroanatomy - House and Pansky, 2nd Edition, 1967

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REFERENCE TEXTBOOKS (Cont'd)

Microbiology

Clinical Immunology - Friedman

Medical Virology - Fenner and White

Physiology

Medical Physiology - Ganong

Radiology

Fundamentals of Roentegenology - Squires

Neuropathology

Basic Neuropathology - Slager

Pathology of Tumors of the Nervous System - Russel and Rubenstein

Introduction to Neuropathology - Adams

Neurology

Diseases of the Nervous System in Infancy, Childhood and Adolescence - Ford

Textbook of Neurology - Merritt

Neurology - Grinker and Sahs

Correlative Neuroanatomy - Chusid and McDonald, 14th Edition

Clinical Neurology - Alpers

The Neurologic Examination - DeJong

Cervical Syndrome - Jackson

Technique of the Neurologic Examination - DeMeyer

Clinical Examination in Neurology - Mayo Clinic

Appendix A (Cont'd)
Page 3

REFERENCE TEXTBOOKS (Cont'd)

Neurology

Clinical Neurology - Brain

Nervous System - Brain

Lecture Notes on Neurology - Draper

Orthopedics

Fundamentals of Orthopedics - Gartland

LABORATORIES

It will be a requirement of the course to complete each of the scheduled laboratory sessions to the satisfaction of the instructor in charge of the particular teaching unit.

SPECIALTY CLINICS

During the summer quarter of the Neuromuscular System Unit, assignments will be made in various hospitals or clinics for student evaluation of patients with neurological disorders. Attendance at all of these clinics will be a requirement of the Unit. If, however, circumstances prevent attendance at any of these clinic sessions, the student should make certain that he notifies the Office of Chairman of the Department of Osteopathic Medicine (Dr. Jacobson) as well as the physician in charge of the teaching unit. As indicated, clinical assignments will be made at the beginning of summer quarter. Each student will have three (3) five-(5) hour clinical experiences in the Specialty clinics. Additionally, a practical final examination is being planned.

SELF-STUDY UNITS

At the beginning of the summer quarter each student will receive an advance organizer clinical workbook that will be used as a guide for completing the clinical assignment responsibilities. Self-study units will be available in the

Appendix A (Cont'd)
Page 4

Osteopathic Medicine Reading Room. This material will cover a variety of areas being taught within the fifteen weeks that the neuromuscular unit will be given. Use of this material is optional but the student may find this material quite useful in aiding his comprehension of the course material.

EXAMINATIONS

1. Practical Exams

Neurology testing practical - Each student will be given a practical evaluation to assess his or her skills in performing a neurological examination. This test will be given on Wednesday, June 7, beginning at 12:40 p.m. Each student will receive an individual time schedule for taking this examination prior to the test.

2. Written Objective Examination - Systems I

Because of the extensive amount of material being presented during this block, the final written objective comprehensive examination will be given in two parts as follows:

a. Anatomy - This first unit will consist of an objective examination in neuroanatomy.

b. Basic and Clinical Sciences - The remaining basic science material and the clinical sciences input will be included on the second unit of the examination.

The examinations will all be administered during final exam week with the times and dates to be announced.

3. Any other forms of evaluation to be conducted by individual instructors will be announced by them individually at the beginning of the course.

4. Written Objective Examination - Systems II

Because of the extensive amount of material being presented during this block, written objective comprehensive examination will be given in parts as follows:

Appendix A (Cont'd)
Page 5

a. Anatomy - This unit will consist of a written and practical examination in neuro-anatomy. The exam will be given on:

1. Monday
July 17
9:10 a.m. - 12:30 p.m.

b. Basic and Clinical Sciences - The remaining basic science material and the clinical sciences input will be included on two examinations where the material will be subdivided for grading. The exams will be given on:

1. Monday
July 24
9:10 a.m. - 12:30 p.m.

2. Final Week

5. Any other forms of evaluation to be conducted by individual instructors will be announced by them individually at the beginning of the course.

6. A Clinical Practical Exam will be given during finals week. Each student will examine a patient and complete the required work-up.

GRADING

Grading in this unit will be based on completion of the following requirements:

1. Overall passing average in all basic science written examinations.

2. Overall passing average in all clinical science written examinations.

3. Satisfactory completion of all laboratory assignments.

4. Satisfactory performance on the practical examination in neurological testing.

Satisfactory completion of all the above requirements will be necessary for receiving a passing grade in the course.

Appendix A (Cont'd)
Page 6

COURSE ORGANIZATION

Description

The Neurosciences Unit included in the Systems Biology I and II course provides an integrated approach to the teaching of the normal and abnormal functions of the nervous system. The course will incorporate both basic science and clinical science principles that are pertinent to clinical problems involving the nervous system. The course material will be presented through classroom teaching, as well as by clinical instruction utilizing case material. The primary effort of the course will be directed at providing the students with a functional and practical comprehension of those principles that are pertinent to the diagnosis, evaluation and treatment of neurological and musculoskeletal disorders.

Objectives

The objectives of the course are divided into two basic areas:

(1) Didactic concepts and principles
(2) Diagnostic skills

1. Didactic Concepts and Principles

   a. To develop in the student a comprehension of those basic science principles and concepts that are pertinent to the understanding of the diagnosis and treatment of clinical disorders of the nervous system.

   b. To develop in the student an understanding of specific clinical disorders involving the nervous and musculoskeletal systems with major emphasis on specific conditions encountered with great frequency in medical practice.

2. Diagnostic Skills

   a. To develop in the student those motor skills necessary for conducting a competent and organized neurological examination.

Appendix A (Cont'd)
Page 7

b. To develop in the student the ability to differentiate normal from abnormal neurological findings and to localize the site of neuropathology on the basis of these abnormal clinical signs.

APPENDIX B

SYSTEMS BIOLOGY COURSES

GENERAL PROTOCOL

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

SYSTEMS BIOLOGY COURSES

GENERAL PROTOCOL

APPENDIX B

SYSTEMS BIOLOGY COURSES
GENERAL PROTOCOL

I. Description

The systems biology courses are a sequence of teaching units that encompass six quarters or sixty teaching weeks beginning in the last half of the freshman year and continuing throughout the entire sophomore year. Each unit is designed in order to present an integrated or coordinated body of material covering a particular diagnostic area of medical practice. The material presented provides both basic science and clinical input presented in a sequential manner so that the students may develop not only a comprehension of important clinical diagnostic considerations but also strong appreciation for basic science principles underlying diagnosis and treatment of medical problems.

Within each systems unit, the clinical component somewhat exceeds the basic science input so that in essence the major emphasis tends to be slightly balanced toward a clinical appreciation of the area being taught.

II. Method of Instruction

The instructional techniques will include standard lectures, laboratories, simulated and live case presentations, audio-visual materials, self-study units, and the assessment of patients by students. Attempts will be made to utilize all of these formats within any one unit. However, regardless of the number of instructional techniques utilized a major effort will be made, as frequently as possible, to coordinate actual clinical problems with the didactic input so that there is an opportunity for some practical concurrent reinforcement of classroom teaching.

III. Techniques of Evaluation

In the systems units the following methods will be utilized in varying degrees for evaluation purposes:

Appendix B (Cont'd)
Page 2

A. Objective Examinations

1. Comprehensive Tests - Within each instructional quarter a comprehensive objective examination will be given at approximately five week intervals. These examinations will include material submitted by all of the instructors having input during the preceding five week period. This input will be determined on the basis of the relative number of hours of input that the instructor has had. These tests will be computer analyzed and graded on a standard score basis. Essentially this is equivalent to using a standard distribution curve for each examination. A standard score of 35 (i.e., one and a half standard deviation below the mean) will be used as the pass level. A student answering 75% or more of the total number of questions will receive a passing grade regardless of the standard score. This latter procedure will establish a specific level for passing when the total performance of the group appears to be in a uniformly high range. On each comprehensive examination two grades will be issued; one for the basic science input and a second grade covering the clinical areas included on the test. At the conclusion of each quarter, the grades in each of these areas (Basic Science and Clinical Science) will be averaged separately. To satisfactorily pass the course, the student must have a passing grade in each of these areas.

2. Quizzes - Any instructor has the prerogative to give individual quizzes during his class sessions. The policy for the administration of quizzes should be announced by each instructor at the beginning of the course as prescribed in the examination guidelines of the college. If these tests are used for grading purposes their scores will be averaged in on a weighted basis with the input of the instructor on the comprehensive examinations given during the unit.

Appendix B (Cont'd)
Page 3

B. Practical Examinations

1. Graded Practical Tests - An instructor has the option of using practical examinations where this is felt to be a more appropriate method of determining the level of comprehension of the student in a particular area. Once again the grade on this examination will be averaged in on a weighted basis with the Basic or Clinical Science grade for the unit.

2. Mastery Level Practical Examinations - In some of the units, tests may be given of a practical nature to ascertain the proficiency of students in certain psychomotor skills. In some instances the students may be required to pass these tests in order to pass the unit regardless of their numerical scores in other course examinations. In these cases a mastery of the skills involved in the practical examination will be felt to be a vital requirement in the assessment of clinical patients.

C. Clinical Case Testing

1. Clinical Case Evaluations - Within some of the units the student may have the requirement of working up a complete diagnostic assessment of certain specified patients. These examinations will generally be performed in a hospital or clinic setting where the instructor will grade the student according to preestablished parameters. These grades will be considered separately from other evaluation scores.

IV. Additional Responsibilities

1. Laboratories - Unless otherwise specified all the laboratories scheduled are to be completed to the satisfaction of the instructor in charge. If a student is absent from a laboratory session and the instructor does not feel he has demonstrated appropriate competency in the area

Appendix B (Cont'd)
Page 4

covered, the student will be required to complete this deficiency before receiving a passing grade in the unit.

2. Clinical Sessions - Students will be expected to attend all assigned clinical conferences or meetings where clinical cases will be assessed. If the student is unable to attend a particular session, for any reason, he should in all instances notify (1) the instructor in charge of the particular clinical unit and (2) the office of the Department of Osteopathic Medicine. Unauthorized absences will be considered deficiencies in the unit requirements and must be appropriately satisfied before a passing grade will be issued.

V. Subjective Course Evaluations

1. Student Course Evaluations - At the conclusion of each quarter a student evaluation form will be distributed for completion of each member of the class. Each student is expected to return this form to the course coordinator to provide specific feedback for consideration by the teaching staff.

2. Instructor Evaluation of Subjective Characteristics - In some clinical segments evaluation forms distributed to instructors may include the assessment of certain behavioral characteristics deemed to be important in carrying out patient care responsibilities. Inadequacies in this particular area will again reflect a possible inadequacy in performance. A passing grade may not be issued until some indication of improved performance is demonstrated by the procedure approved by the members of the unit who are involved in this aspect of the student's evaluation. These completed evaluation forms will be available on request to each student.

VI. Textbook

Textbooks for each instructional unit will be indicated in advance. Textbooks will be identified as course textbooks which the instructors feel should be purchased by the student for comprehension of the particular input that instructor is providing. In addition, suggested textbooks will also be noted and whenever possible copies of these will be available in the Osteopathic Medicine Reading Room for student use. These books will be used in the reading room facility and will not be available for distribution except at the discretion of the librarian.

VII. Self-Study Units

In each instructional quarter self-study units will be provided whenever possible. These will be available in the Osteopathic Medicine Reading Room for use within those facilities. They are not to be taken from the premises without the specific consent of the librarian. In some instances these units will be provided simply for use by the student on an optional basis. In other instances units will be identified which the student will be required to cover during a particular quarter. In these latter cases an evaluation of the student's comprehension of the material involved will be conducted and appropriately graded either as part of a comprehensive examination or as part of a special skills examination.

VIII. Special Problems

1. Tutoring - Any student feeling the necessity for special attention or instruction should contact the Dean for Student Affairs, the Chairman of the Department of Osteopathic Medicine, or specific instructors to discuss the problems involved and to arrange for individual tutoring services.

2. Any other difficulties that might arise should be communicated to the Chairman of the Department of Osteopathic Medicine and/or the Assistant Dean for Student Affairs.

APPENDIX C

THE ADVANCE ORGANIZER
(CLINICAL COURSE BOOKLET)

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

SYSTEMS BIOLOGY II
NEUROMUSCULAR UNIT

CLINICAL SCIENCE LABORATORY PROGRAM
FIRST YEAR
SUMMER QUARTER

Fred C. Tinning
Lawrence E. Jacobson, D.O.
Department of Osteopathic Medicine

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CLINICAL SCIENCE NEUROLOGICAL LABORATORY PROGRAM
FIRST YEAR

APPENDIX C

THE ADVANCE ORGANIZER
(CLINICAL COURSE BOOKLET)

I. GENERAL COURSE DESCRIPTION

A. The Clinical Science Laboratory Program is planned as a clinical instructional experience organized around the Systems Biology II Neuromuscular Unit emphasizing the evaluation of the patient's neuromuscular functioning. The course strategy recommended to clinical instructors is to provide basic instruction in neurological examination. Patient neurological evaluation by the first year student will be accomplished through the completion of a history and physical examination.

At the completion of this phase of a first year student's development, basic competency should be displayed in an ability to demonstrate through observation, discussion and performance a basic history and neurological examination.

In the three hours per week clinical instruction, the student will be given the necessary didactic instruction and clinical experience to develop: 1. the observational skills, 2. the discussed principles and 3. the performance techniques that will allow him/her to demonstrate the proficiency and competency in:

1. Completing a History by:

   a. Obtaining information from patient.
   b. Obtaining information from other sources.
   c. Using judgment.

2. Performing a Basic Neurological Examination by:

   a. Performing general physical examination. (See Neurological Exam Form)
   b. Noting manifest signs.
   c. Using appropriate techniques.

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Page 2

3. Recommending Tests and Procedures by:

   a. Utilizing appropriate neurological tests and procedures.
   b. Applying test methods correctly.
   c. Modifying tests to meet the patient's needs.
   d. Interpreting test results.

4. Deciding on the Diagnostic Acumen by:

   a. Recognizing causes.
   b. Exploring condition thoroughly.
   c. Arriving at a reasonable differential diagnosis.

5. Recommending a Course of Treatment by:

   a. Suggesting the appropriate type of treatment, specific and supportive.
   b. Judging the appropriate extent of treatment.

6. Demonstrating Physician-Patient Relation by:

   a. Establishing rapport with the patient.
   b. Relieving tensions.
   c. Improving patient co-operation.

II. OBJECTIVES

A. The primary objectives of the clinical laboratory program will be to develop in the first year student a <u>basic</u> demonstratable proficiency and competency for the organization of medical knowledge, patient rapport techniques, psychomotor and observational skills necessary in performing a basic neurological patient history and physical examination.

   1. <u>Objective</u>: The student is to perform basic history taking with observation and discussion by an organized approach. The student is to establish rapport (affect) in the evaluation of data from the patient and demonstrate observational and judgment skills by confirming and clarifying the clinical data collected from the patient by:

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Page 3

a. Identification of chief complaint(s) or problem(s) clearly and briefly.

b. Obtaining relevant data pertinent to the patient's current medical problem(s) and medical history and to accurately and completely describe these factors relative to (1) onset, (2) location, (3) duration, (4) severity, (5) previous treatment, and (6) general symptoms.

2. Objective: The first year student is to demonstrate quality performance in conducting a neurological examination; first with observation and discussion from the clinical instructor, stressing an organized approach. Then the student is to conduct an independent basic neurological examination, including all factors pertinent to the patient's problem(s) to demonstrate his/her medical knowledge, psychomotor skills, patient rapport (i.e., the establishment of a relationship and the ability to elicit data) and observational skills by:

a. Accurately eliciting abnormal neurological findings in the patient.

3. Objective: The first year student is to demonstrate his/her problem-solving abilities in utilizing clinical data through a neurological examination by:

a. Localizing the site (site of neuropathology).
b. Establishing a working diagnosis and a differential diagnosis.
c. Selecting appropriate diagnostic tests in order to substantiate diagnostic conclusions and
d. Determine specific types of treatment and therapy that is appropriate in the management of the patient's neurological problem.

III. LOCATION

Currently clinical instructors for the Clinical Science Laboratory Program will be located in clinics at Detroit Osteopathic Hospital, St. Lawrence Hospital, Lansing,

Appendix C (Cont'd)
Page 4

and in simulated clinical settings at the College of Osteopathic Medicine, Michigan State University, East Lansing, Michigan.

IV. INSTRUCTORS

Physicians who are specialists in neurology and also clinical faculty will be designated. Three or four specialists will be used to insure quality small group and individual instruction.

V. DURATION

To meet the objectives outlined, the entire Neuromuscular Unit will run 15 weeks. The Clinical Science Laboratory Program will be offered three (3) hours per week for three (3) sessions during the nine (9) week clinical series. Each student will have three (3) supervised clinical experiences. In addition, each student will perform a final patient neurological examination.

VI. IMPLEMENTATION

A. The format for organization of the weekly clinical instruction will be on a observation, discussion and performance basis that allows immediate feedback and interaction between the first year student, physician and patient.

1. The class will be divided into small groups with a maximum of four (4) students in each group. Each group will meet once every third week during the quarter, for a total of three (3) meetings.

2. Each group will meet at 1:30 p.m. on the assigned afternoon. Students meeting in clinical facilities will spend fifteen (15) minutes on Rounds seeing a select neurological. Students meeting in simulated clinical facilities will spend fifteen (15) minutes viewing video tapes of select cases discussing problems with the clinical instructor or practicing their skills of completing a neurological examination. During the

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Page 5

Rounds Session, the students will have an opportunity, whether real or simulated, to elicit and perform certain types of neurological tests as suggested by the clinical instructor.

3. Following the clinical Rounds Session, each two (2) students (in group of four) will be assigned one (1) neurological patient for a general diagnostic work-up. The Neurological Evaluation Examination Forms are provided for each student to complete based on his evaluation of the patient. The first two sessions two (2) students will cooperate with each other in completing the exam and providing feedback to each other in making clinical judgments. The last training session will require an individual work-up as will the final examination. Students will be permitted approximately one hour and a half to complete their evaluation of the patient and to complete the neurological examination form.

4. The clinical instructor need not be in immediate attendance at all times during the students' assessment or the patient, but he should be available if the students wish to discuss some particular findings that might be somewhat confusing. In addition, the instructor should attempt to make periodic spot-checks to assess the student's progress in general.

5. After the Neurological Evaluation History and Physical Examination Form has been completed, the students will meet for approximately one hour to present their case and to discuss their findings with the clinical instructor. Each work-up will be appropriately critiqued, evaluated and rated by the clinical instructor for self-assessment purposes and to prepare the student for his final examination. The form will be turned in to the Department of Osteopathic Medicine. In addition to the exam form and rating, each student must turn in the patient evaluation form. The final exam follows the same format but will be graded based on the criterion established for each patient's case.

Appendix C (Cont'd)
Page 6

6. On the final meeting date (the third time that the groups meet with their instructor), prior to the final examination, each student will be assigned an individual case to work-up independently. Once again, at the end of the one to one and a half hours required to complete the neurological work-up an oral discussion and written evaluation will be performed by the clinical instructor with the students for each of the cases assessed. To provide sufficient time, there will be no clinic rounds on the final clinical training meeting day.

7. During the course of evaluating the patient, students should be permitted access to library facilities, if they wish, but not to the patient's chart or other records. (This latter material should be available, however, when the case is discussed.)

8. All evaluation forms should be graded and signed by the supervising clinical instructor and turned into the Department of Osteopathic Medicine office by the student no later than one day following the examination.

9. The final performance examination of a patient and neurological evaluation will follow the same general format as to time of examination and write-up. The performance exam will be held in the Lansing area hospitals and clinics at a designated time and date during final exam week.

VII. EVALUATION PROCESS AND FORMS

A. Evaluation involves finding answers to questions such as: (1) What is it that needs to be achieved through Clinical Science? (2) Is the program movement in the appropriate and desirable direction? (3) Will the ultimate goal of training first year students to the highest quality be achieved? (4) Are the original purposes in our training program worth achieving? and (5) Are the objectives of the clinical science program being fulfilled?

The program of clinical instruction for the first year students has continued weekly input through

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Page 7

interaction of student, clinical instructor and the patient. With a format for training that requires feedback before a final assessment can be achieved, it is necessary that students' process growth during training be reviewed.

1. This method of assessment is called Formative Evaluation. The function of formative evaluation is to continuously shape the instructional program and examine the component parts. Formative evaluation is the feedback to students in an ongoing process. The learning process desired for the first year student is one that proceeds when the student can see results, has knowledge of his status and progress. When he achieves insight and understanding, that is, information about the nature of a good performance, knowledge of his own mistakes and knowledge of successful results, growth in performance will be achieved. The formative evaluation approach considers the clinical instructor as the advocate of the student in that the instructor continuously feeds back progress as the student progresses in his observation, discussions, and performance of completing a neurological history and physical examination of the patient. With this approach, the learning process becomes one of experiencing, doing, reacting and undergoing growth in the clinical training situation.

2. The second type of evaluation that is of concern in our clinical science program is called Summative Evaluation. This evaluation is accomplished at the end of an educational experience, assessing the final product. Realizing that when the products of the clinical experience are properly achieved and integrated, they are complex and adaptable, not simple and static, our need for effective summative evaluation becomes realizable. Summative evaluation needs to be adaptable and complex from the standpoint of requiring time and commitment. Summative evaluation must be as objective as possible. It should be standardized in format and developed to a high degree of reliability, validity, objectivity, discrimination

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and provide a vehicle for adequate feedback in order to have desirable effects on the planning-action cycle needed for program growth. In addition to the prime responsibility for better program operations, the summative evaluation function has administrative responsibilities. This is where the accountability for delegated responsibilities are assessed. Questions on student certification, selection, promotion, and overall assessment of the clinical program will be made from the results of summative evaluation.

B. There are two phases in evaluating the first year student's achievement in the neurological clinical laboratory experience. This first phase called formative centers on the three (3) clinical training experiences during the nine (9) weeks and the second phase called summative will be the final exam assessment of the students' performance.

1. Phase I - Clinical Instructor's Formative and Summative Evaluation Rating Scale:

   Weekly formative evaluation will be limited to a self-evaluation type format relying on the discussion between the clinical instructor, patient and the student to provide the feedback in terms of identifying the student's strengths and weaknesses in the neurological evaluation of the patient. The clinical instructor will from his review of the patient neurological history and physical write-up, from his observation of the various examination components and through discussion of performance, rate the student based on the criterion required section of the Clinical Instructor's Formative and Summative Rating Scale (See Page 24). The student is responsible for maintaining the three (3) weekly records of his own performance on the rating scale by having the clinical instructor grade and sign as approval for completing the neurological history and physical of the patient.

2. Phase II - Clinical Instructor's Formative and Summative Evaluation Rating Scale:

   A formal evaluation is to be conducted on the final (10th) week of the Quarter. Students will be evaluated by an outside evaluator and not by the physician with whom they have had their weekly meetings. Each student will be presented a patient to complete a neuro history and physical examination. The student can use the same format that was utilized during his training. Upon completion of the neuro patient examination, the student will present his written evaluation for grading by the College of Osteopathic Medicine's Department of Osteopathic Medicine. Each case will have been examined by a neurologist and have a standard number of findings and conclusions that will be recorded on the Physician Criterion Performance Worksheet (See Page 11). The student will be graded based on his performance abilities.

There is a realization of the problem of patient consistency and consideration has been given to this concern by selecting cases of equal difficulty. In addition, each case is selected based on a predetermined number of criterion. Every effort will be made to provide equitability, objectivity, reliability, and validity in standardizing the types of cases used in the summative evaluation. The written evaluation is standard for all students; the clinical raters will be trained in their use of the ratings. The evaluating clinical raters rating students will have a prepared Physician Criterion Performance Worksheet on the neurological history and physical form (See Page 11) listing the number of factors a student should accomplish. The first year student will then perform his neurological patient history and physical examination and submit the completed form for rating. (The honor system for osteopathic medicine students will be followed.)

Each student evaluation will be critiqued and graded on the following aspects:

(a) Accuracy and identification of chief complaint
(b) Description of onset and history of chief complaint
(c) Elicitation of abnormal findings
(d) Localization of pathology
(e) Identification of working diagnosis and differential diagnosis

(f) Selection of diagnostic tests
(g) Discussion of treatment and therapy
(h) Assessment of affect, behavior, and general doctor-patient rapport

For specific details, see the Rating Scale.

3. Additional objective summative evaluation of course progress by the College will be accomplished. Techniques such as objective examinations that can test recall and patient management problems that will test higher cognitive levels of problem solving will be considered in student evaluation.

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MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

PHYSICIAN NEUROLOGICAL HISTORY AND PHYSICAL CRITERION PERFORMANCE WORKSHEET

Examining Physician ______________ Student ______________

Date ________________ Hospital or Clinic ________________

PATIENT PROTOCOL:

1. CHIEF COMPLAINT:

How many and what are the complaint(s) or problem(s) that the patient has: How many? _____ What? ________________

__________________ __________________ __________________

2. ONSET AND COURSE OF CHIEF COMPLAINT:

Identify the following factors the students must elicit:

Onset ________________ Severity ______________________

Duration _____________ Other descriptive characteristics that are important in this case ______________

Location _____________

3. FAMILY HISTORY: (MEDICAL HISTORY)

How many and what are the vital factors in the patient's past history that contribute to the diagnosis and management of the patient:

How many? _____ What? __________________________________

__________________ __________________ __________________

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4. SYSTEMS REVIEW:

How many and what are the factors in the student's review of the systems vital in the diagnostic work-up of the patient?

How many? _____ What? ________________________________

____________________ ____________________ ____________________

5. PHYSICAL EXAM:

How many and what physical findings, either normal or abnormal should the student identify in establishing a diagnosis of this case?

How many? _____ What? ________________________________

____________________ ____________________ ____________________

____________________ ____________________ ____________________

6. SUMMARY:

A. General Results: (check)

_____ Normal Neurological

_____ Abnormal Neurological

_____ Equivocal

B. Assessment of Area of Neurological System Dysfunction: (check)

_____ Motor

_____ Sensory

_____ Mentation and Behavior

Appendix C (Cont'd)
Page 13

C. Anatomical Location: (check)

_____ Primary Muscle Dysfunction

_____ Peripheral Nerve or Root Dysfunction

_____ Spinal Cord

_____ Brain Stem

_____ Cerebral Hemispheres

7. <u>WORKING OR PROVISIONAL DIAGNOSIS</u>:

How many and what appropriate working diagnosis must be identified in this case?

How many? _____ What? ________________________________

________________ ________________ ________________

8. <u>DIFFERENTIAL DIAGNOSIS</u>:

How many and what appropriate differential diagnostic consideration must be identified in this case?

How many? _____ What? ________________________________

________________ ________________ ________________

9. <u>LABORATORY TESTS AND OTHER DIAGNOSTIC PROCEDURES</u>:

How many and what are the tests or procedures critical to the diagnosis of this case?

How many? _____ What? ________________________________

________________ ________________ ________________

10. <u>THERAPY AND TREATMENT</u>:

How many and what supportive and/or primary forms of treatment or therapy are critical to effective case planning and management of this case?

How many? _____ What? ________________________________

________________ ________________ ________________

Appendix C (Cont'd)
Page 14

11. <u>GRADING</u>:

Total number of criterion required: __________

Total number of criterion completed: __________

Appendix C (Cont'd)
Page 15

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: ____________ TYPE OF CASE: ____________

STUDENT: ____________ PATIENT'S AGE: ____________

INSTRUCTOR: ____________ RACE: ____________

	Grade
1. CHIEF COMPLAINT(S)	Total points= 3
2. ONSET AND COURSE OF CHIEF COMPLAINT(S)	Total points= 6
3. PAST HISTORY (Mother, Father, Wife, Siblings, Children)	1

Endocrine Dysfunction ______
Cancer ______
Tuberculosis ______
Neurosis, Psychosis ______
Cardiovascular Disease ______
Other ______

Appendix C (Cont'd)
Page 16

	Grade
MEDICAL HISTORY	
Previous Hospitalization:	1
Allergies:	1
Medications:	1
Accidents:	1
Surgery:	1
Diseases:	1
Habits:	1
SOCIAL HISTORY (Work, Hobbies, Recreation)	1 Total points= 9
4. SYSTEMS REVIEW (if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)	Total points= 4

Appendix C (Cont'd)
Page 17

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera) ____	1
Physical Development (Asthenic, Obsese, etc.) ____ ____	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ____	
Rhythm ____	
Murmurs ____	
Neck Auscultation	
Bruits ____	
Ophthalmoscopic (GRI-IV)	
Vessels ____	
Disc ____	
Retina ____	
MENTAL STATUS:	1
State of Consciousness (check)	
____ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix C (Cont'd)
Page 18

	Grade
Speech and Language Function	
____ Aphasic or dysphasic	
____ Dysarthric or anarthric	
REFLEXES:	
Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive)	1

	Left	Right
Patellar		
Biceps		
Tricep		
Brachioradial		
Achilles		

	Grade
Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal)	1

	Left	Right
Plantar		
Babinski		
Ankle Clonus		
Abdominal		
Hoffman		

Appendix C (Cont'd)
Page 19

Grade

SENSORY:
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction) 1

	Response	Location
Vibration		
Pinprick		
Light touch		
Position sense		
Stereognosis		

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations 1

Yes ______ No ______

Gait: Normal ____ Abnormal (describe also)______

____

Muscle Tone: Spastic ____ Flaccid ___

Rigid ______ Normal ____

Muscle Strength (indicate specific muscle weakness)

____

____

____

____

____

Appendix C (Cont'd)
Page 20

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
_____Finger to nose	
_____Dysdiadochokinesia	
_____Tandem gait	
_____Heel to knee	
_____Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____Spontaneous movements (describe)	
_____Cog Wheel Rigidity	
_____Mask like facies	
_____Decreased eyeblinks	
_____Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1.__________ 7.__________	
2.__________ 8.__________	
3.__________ 9.__________	
4.__________ 10.__________	
5.__________ 11.__________	
6.__________ 12.__________	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____Normal Neurological	
_____Abnormal Neurological	
_____Equivocal	

Appendix C (Cont'd)
Page 21

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
_____Motor	
_____Sensory	
_____Mentation and Behavior	
3. Anatomical Location (check)	2
_____Primary Muscle Dysfunction	
_____Peripheral Nerve or Root Dysfunction	
_____Spinal Cord	
_____Brain Stem	
_____Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
____________________	____________________
____________________	____________________
____________________	____________________

Appendix C (Cont'd)
Page 22

Grade ______

8. DIFFERENTIAL DIAGNOSIS (identify no more than <u>three neurological</u> disorders) — Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	______
Infectious	______
Traumatic	______
Autoimmune	______
Metabolic	______
Inherited	______
Neoplastic (or mass lesion)	______
Cardiac Dysfunction	______
Degenerative or Demyelinating	______
Others	______

9. TESTS (laboratory tests and other diagnostic procedures) — Total points= 5

Specific Neuro-diagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
______	______
______	______
______	______
______	______
______	______
______	______

Appendix C (Cont'd)
Page 23

Grade

10. THERAPY

Total points=
2

Specific | Supportive

______________________ ______________________

______________________ ______________________

______________________ ______________________

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

Appendix C (Cont'd)
Page 24

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

INSTRUCTOR'S CLINICAL COMPETENCY FORMATIVE AND SUMMATIVE EVALUATION
RATING SCALE FOR PATIENT NEUROLOGICAL HISTORY AND PHYSICAL EXAMINATION

Student's Name____________________ Date____________________

Examining Physician____________________ Hospital or Clinic____________________

CRITERION		FACTOR
Data Required	Data Completed	THE STUDENT HAS UNDER:
3		1. Chief Complaint(s):
		A. Clearly and briefly identified the correct number of problems or chief complaints.
6		2. Onset and Course of Chief Complaints:
		A. Described the onset and course in an organized and coherent manner.
		1. Onset
		2. Duration
		3. Location
		4. Severity
		5. Course of previous treatment
		6. General symptoms or other descriptive characteristics
9		3. Past History:
		A. How many significant factors necessary to demonstrate a neuro patient history and physical did the student identify?

Appendix C (Cont'd)
Page 25

CRITERION		FACTOR
Data Required	Data Completed	THE STUDENT HAS UNDER:
		B. How many significant factors, which the student identified, do you consider to be extremely vital points contributing to the diagnosis and management of the patient's case?
4		4. Systems Review:
		A. How many significant factors necessary to demonstrate a complete review of the systems did the student identify?
		B. How many significant factors, which the student identified, do you consider to be extremely vital in the diagnostic work-up of the patient's case?
10		5. Physical Examination:
		A. How many significant physical findings, either normal or abnormal, necessary to demonstrate a neurological physical examination did the student identify?
		B. How many critical physical findings, which the student elicited, do you consider to be extremely vital in the diagnostic work-up of the patient's case?
5		6. Summary:
		A. General Results: (check)
		1. Normal Neurological
		2. Abnormal Neurological
		3. Equivocal
		B. Assessment of Area of Neurological System Dysfunction
		1. Motor
		2. Sensory
		3. Mentation and Behavior

Appendix C (Cont'd)
Page 26

CRITERION		FACTOR
Data Required	Data Completed	THE STUDENT HAS UNDER:
		C. Anatomical Location
		1. Primary Muscle Dysfunction
		2. Peripheral Nerve or Root Dysfunction
		3. Spinal Cord
		4. Brain Stem
		5. Cerebral Hemispheres
5		7. Working or Provisional Diagnosis:
		A. How many appropriate diagnosis necessary to demonstrate problem solving, clinical judgment and decision making, did the student identify?
		B. How many appropriate diagnostic considerations necessary to demonstrate a working diagnosis did the student identify?
		C. How many provisional considerations necessary to demonstrate effective problem solving did the student identify?
5		8. Differential Diagnosis:
		A. How many appropriate differential diagnostic considerations necessary to demonstrate problem solving, clinical judgment and decision making did the student identify?
		B. How many considerations, which the student identified, do you consider to be extremely vital in contributing to an appropriate or realistic differential diagnosis in the patient's case?
5		9. Laboratory Tests and Other Diagnostic Procedures:
		A. How many appropriate tests or procedures necessary to demonstrate the ability in utilizing clinical laboratory data critical to the diagnosis of this case did the student identify?

Appendix C (Cont'd)
Page 27

CRITERION Data Required	CRITERION Data Completed	FACTOR THE STUDENT HAS UNDER:
		B. How many diagnostic tests or laboratory procedures, which the student identified, do you consider to be extremely critical in reaching a final diagnosis in the patient's case?
2		10. Therapy and Treatment:
		A. How many critical or primary forms of treatment or therapy necessary to demonstrate clinical judgment did the student identify?
		B. How many types of supportive therapy or treatment of a more secondary nature are necessary to demonstrate clinical judgment did the student identify?
		C. How many forms of therapy or treatment, which the student recommended, do you consider to be extremely critical to the patient's case?
		11. Grading:
54		Total number of criterion required:
		Total number of criterion completed:

A. In your ratings above as a clinical instructor, has the student on the neurological patient history and physical examination, demonstrated performance of a minimum pass level or above. This level must be established by the criterion developed for the patient's case being examined?
Yes____________ No____________

B. Based on the objective rating of factors just completed, what is your final examination rating?

(1) Excellent [ ]
(2) Good [ ]
(3) Fair [ ]
(4) Poor [ ]

COMMENTS:

____
Clinical Instructor's Signature

STUDENT CLINICAL EXPERIENCE EVALUATION RATING FORM

INSTRUCTIONS: The purpose of this rating is to measure the meanings of certain things to various people by having them judge them against a series of descriptive scales. In rating the scale, please make your judgements on the basis of what these things mean to you.

EXAMPLE: I. The test in Neuroanatomy was:

(If you feel that the concept or statement about the test is very closely related to the one end of the scale, you circle the number accordingly.)

1. Fair	1	(2)	3	4	5	6	7	Unfair

(If you feel the statement about the test is quite closely related you should circle the number accordingly.)

2. Bad	1	2	3	4	5	(6)	7	Good

(If you feel the statement about the test is neutral, you should circle the number accordingly.)

3. Useful	1	2	3	(4)	5	6	7	Useless

ON THE FOLLOWING PAGE THERE ARE TWO QUESTIONS WITH FIVE ITEMS EACH. PLEASE COMPLETE EVERY ITEM UNDER EACH QUESTION AND CIRCLE ONLY ONE NUMBER PER ITEM. NOTE THAT POSITIVE STATEMENTS CAN BE EITHER AT THE LEFT OR THE RIGHT, SO READ EACH STATEMENT.

Appendix C (Cont'd)
Page 30

CLINICAL EXPERIENCE

Student's Name_______________

Assigned Clinic_______________

I. How would you describe your Clinical Experience in Neurology:

1. Useful	1	2	3	4	5	6	7	Useless
2. Meaningless	1	2	3	4	5	6	7	Meaningful
3. Important	1	2	3	4	5	6	7	Unimportant
4. Artificial	1	2	3	4	5	6	7	Realistic
5. Successful	1	2	3	4	5	6	7	Unsuccessful

II. How would you describe your feelings about yourself in the Clinical Experience in Neurology?

1. Secure	1	2	3	4	5	6	7	Insecure
2. Unsuccessful	1	2	3	4	5	6	7	Successful
3. Anxious	1	2	3	4	5	6	7	Calm
4. Pleasurable	1	2	3	4	5	6	7	Unpleasurable
5. Competent	1	2	3	4	5	6	7	Incompetent

Appendix C (Cont'd)
Page 31

PATIENT AND SIMULATOR RATING

I. In the history and physical examination just completed, I felt that the Doctor doing the examination was:

(A-Cog)

1	2	3	4	5
Competent (Very Bright)		Average (Knew What He Was Doing)		Incompetent (Did Not Know What He Was Doing)

(B-Aff)

1	2	3	4	5
Secure (Very Relaxed and Confident)		Average (Reasonably Relaxed)		Insecure (Puzzled and Hesitant)

(C-Aff)

1	2	3	4	5
Very Interested (Paid Attention To Me Genuinelly Warm and Anxious to Help)		Reasonably Interested (Seemed Interested In Me and Tried to Help)		Very Uninterested (Seemed Cool Indifferent - Not Caring to Help)

II. During the physical examination, the Doctor was:

(D-PM)

1	2	3	4	5
Very Gentle	Reasonably Gentle	Careful	A Little Rough	Very Rough

STUDENT NAME ____________________

APPENDIX D

COGNITIVE
PRE-TEST - POST-TEST

APPENDIX D

COGNITIVE
PRE-TEST - POST-TEST

FOR QUESTIONS 1-10

For each of the following questions select the one appropriate answer from the following list and mark the corresponding number on your answer sheet.

1. Cerebellar system
2. Vestibular system
3. Basal ganglion
4. Dorsal columns of cord
5. Pyramidal system

1. Paucity of eyeblinks and masklike facies

2. Abnormal finger to nose test with difficulty in coordinated control noted near reaching endpoint

3. Positive Romberg eyes closed only

4. Rebound phenomenon on releasing restrained flexed forearm

5. Abnormal cold caloric test

6. Postitive Romberg eyes open and only slightly accentuated with eyes closed

7. Slowness in starting movement (bradykinesia)

8. Muscle spasticity

9. Muscle rigidity (cog-wheel type)

10. Loss of vibratory sensation

NOTE FOR POST-TESTS: These same questions were given within the final exam as a separate section marked "Neurology."

Appendix D (Cont'd)
Page 2

FOR QUESTIONS 11-20:

Select the most appropriate type of general lesion for each of the following questions from the four listed below and mark the corresponding number on your answer sheet.

1. Lower motor lesion
2. Upper motor lesion
3. Fairly equally applies to both upper and lower motor lesion
4. None of the above

11. Flaccidity of muscles

12. Fasciculations

13. Babinski sign

14. Ankle Clonus

15. Hyperreflexia

16. Rossolimo sign

17. Difficulty in closing the right eye and drooping of the right corner of the mouth

18. Weakness

19. Spasticity of muscles

20. Hyperactive jaw reflex

Appendix D (Cont'd)
Page 3

FOR QUESTIONS 21-25:

For the following items select the one most appropriate answer from the list below in deciding on a diagnosis of primary muscle disease or muscle dysfunction secondary to a peripheral nerve or lower motor neuron lesion.

1. Muscle dysfunction secondary to a peripheral nerve or lower motor neuron lesion.
2. Primary muscle disease
3. Found fairly equally in both A and B
4. None of the above

21. Frequent fibrillations noted on EMG studies

22. Muscle wasting

23. Objective loss of pain and light touch sensations associated with muscle dysfunction

24. Frequent fasciculations observed on gross inspection

25. Retained deep tension reflexes despite marked loss in muscle bulk and weakness.

Appendix D (Cont'd)
Page 4

FOR QUESTIONS 26-35:

In the following questions select from the list below the one most likely site where a single lesion could produce the described symptomatology. Mark your answer sheet with the appropriate number.

1. Lumbar cord or nerve root
2. Thoracic cord or nerve root
3. Cervical cord or nerve root
4. Brain stem
5. Cerebral cortex or internal capsule

26. Difficulty in abducting the left eye with weakness of the right hand and leg and a right Babinski.

27. Ptosis with outward and downward deviation of the left eye as well as weakness of the right arm and leg and a right Babinski.

28. Inability to close eye on the left and drooping of the left corner of the mouth with a right Babinski.

29. Loss of sensation to pinprick and light touch on the right side of the face and left side of the body with slight ataxia and falling to the right.

30. Extreme pain radiating down left lower extremity.

31. Right hemiparesis including the lower half of the face on the right and a right Babinski.

32. Atrophy of biceps and deltoid on the right and small muscles of both hands with fasciculations of the involved muscles and bilateral ankle clonus and hyper-reflexia.

33. Inability to speak with no paralysis of the muscles of speech (expressive aphasia).

34. Inability to differentiate size of coins and texture of materials with the right hand with no loss of light touch.

35. Deviation of the tongue to the right with frequent fasciculations as well as a left Babinski and Hoffman sign.

APPENDIX E

SYSTEMS BIOLOGY I & II

NEUROMUSCULAR UNIT
SPRING-SUMMER CLASS SCHEDULE
INCLUDING OTHER CLASSES SCHEDULED

APPENDIX E

SYSTEMS BIOLOGY I & II

FIRST YEAR
SIXTH WEEK - THIRD QUARTER
1972

Begin Neuromuscular Systems I & II Unit

<u>Monday - May 1</u>

8:00 - 8:50	PHM 520	Cancer Chemotherapy	Dr. Goodman
9:10 - 12:20		Examination Systems Biology (Objective Comprehension)	
12:40 - 1:30			
1:50 - 5:00	FCM 541	UDC/FPC/OHC/Phy. Th./	Dr. Fiel

<u>Tuesday - May 2</u>

8:00 - 8:50	PHM 520	Cancer Chemotherapy I	Dr. Goodman
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Behavioral Science	
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	Staff

<u>Wednesday - May 3</u>

8:00 - 8:50	PHM 520	Cancer Chemotherapy II	Dr. Goodman
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 550	Neurological Testing (Lab. I)	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	OM 550	Neurological Testing (Lab. I)	Dr. Jacobson

<u>Thursday - May 4</u>

8:00 - 8:50	PHM 520	Viral Infection	Dr. Goodman
9:10 - 10:00	OM 550	Biochemistry: Muscle Metabolism	Dr. Wells

Appendix E (Cont'd)
Page 2

<u>Thursday - May 4</u>

10:20 - 11:10	OM 550	Physiology: Nerve Conduction, Myoneural Transmission, Muscle Contraction	Dr. Eisenstein
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Behavioral Science	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

<u>Friday - May 5</u>

8:00 - 8:50			
9:10 - 10:00	OM 550	Neurology: Fundamentals of Muscle Dysfunction	Dr. Jacobson
10:20 - 12:20	OM 550	Physiology: Nerve Conduction, Myoneural Transmission, Muscle Contraction (Cont'd)	Dr. Eisenstein
12:40 - 1:30			
1:50 - 5:00	FCM 541	Preceptors	Dr. Fiel

FIRST YEAR
SEVENTH WEEK - THIRD QUARTER
1972

<u>Monday - May 8</u>

8:00 - 8:50	PHM 520	Immunosuppressants	Dr. Goodman
9:10 - 12:20	OM 550	Neuroanatomy	Dr. Jenkins
12:40 - 1:30			
1:50 - 5:00	FCM 541	(C) Osteopathic Examination	Dr. Fiel

Appendix E (Cont'd)
Page 3

<u>Tuesday - May 9</u>

8:00 - 8:50	PHM 520	Drug Allergy	Dr. Goodman
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Behavioral Science	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

<u>Wednesday - May 10</u>

8:00 - 8:50	PHM 520	Principles of Hormone Replacement Therapy	Dr. Stolman
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 550	Neurological Testing (Lab. II)	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	OM 550	Neurological Testing (Lab. II)	Dr. Jacobson

<u>Thursday - May 11</u>

8:00 - 8:50	PHM 520	Thyroid, Anti-thyroid	Dr. Stolman
9:10 - 10:00	OM 550	Specialty Diagnosis	Dr. Billman
10:20 - 11:10	OM 550	Physiology: Synaptic Transmission	Dr. Eisenstein
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Thought Disorders	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

<u>Friday - May 12</u>

8:00 - 8:50			
9:10 - 10:00	OM 550	Neuropathology	Dr. Jones
10:20 - 12:20	OM 550	Neurology: Clinical Diagnosis of Muscle Dysfunction	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	FCM 541	Preceptors	Dr. Fiel

Appendix E (Cont'd)
Page 4

FIRST YEAR
EIGHTH WEEK - THIRD QUARTER
1972

<u>Monday - May 15</u>

8:00 - 8:50	PHM 510	Pituitary Adrenal Drugs	Dr. Stolman
9:10 - 12:20	OM 550	Neuroanatomy	Dr. Jenkins
12:40 - 1:30			
1:50 - 5:00	FCM 541	(C) Osteopathic Examination	Dr. Fiel

<u>Tuesday - May 16</u>

8:00 - 8:50	PHM 520	Insulin	Dr. Stolman
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Behavioral Science	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

<u>Wednesday - May 17</u>

8:00 - 8:50	PHM 520	Calcium Metabolism	Dr. Stolman
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 550	Neurology: Primary Muscle Disorders	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	OM 550	Neurological Testing (Lab. III)	Dr. Jacobson

<u>Thursday - May 18</u>

8:00 - 8:50	PHM 520	Anti-fertility Agents	Dr. Reinke
9:10 - 10:00	OM 550	Microbiology: Tetanus, Botulism	Dr. Black
10:20 - 11:10	OM 550	Physiology: Spinal Reflexes	Dr. Eisenstein
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			

Appendix E (Cont'd)
Page 5

Thursday - May 18

1:50 - 5:00	FCM 522	Behavioral Science	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

Friday - May 19

8:00 - 8:50			
9:10 - 11:10	OM 550	Neurology: Myoneural Dysfunctions	Dr. Jacobson
11:30 - 12:20	OM 550	Physiology: Pyramidal and Associated Systems	Dr. Eisenstein
12:40 - 1:30			
1:50 - 5:00	FCM 541	Preceptors	Dr. Fiel

FIRST YEAR
NINTH WEEK - THIRD QUARTER
1972

Monday - May 22

8:00 - 8:50	PHM 520	Mechanisms of Anti-Coagulant Action	Dr. Ferguson
9:10 - 12:20	OM 550	Neuroanatomy	Dr. Jenkins
12:40 - 1:30			
1:50 - 5:00	FCM 541	(C) Osteopathic Examination	Dr. Fiel

Tuesday - May 23

8:00 - 8:50	PHM 520	Principles of Modern Toxicology	Dr. Gibson
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Behavioral Science	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

Appendix E (Cont'd)
Page 6

Wednesday - May 24

8:00 - 8:50	PHM 520	Teratogenesis, Mutagenesis, Carcinogenesis	Dr. Gibson
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 550	Physiology: Pyramidal and Associated Systems (Cont'd)	Dr. Eisenstein
12:40 - 1:30			
1:50 - 5:00	OM 550	Neurological Testing (Lab. IV)	Dr. Jacobson

Thursday - May 25

8:00 - 8:50	PHM 520	Emergency Measures in Poisonings	Dr. Gibson
9:10 - 10:00	OM 550	Neuropathology: Cerebellum	Dr. Jones
10:20 - 11:10	OM 550	Physiology: Cerebellum	Dr. Eisenstein
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 522	Behavioral Science	Staff
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

Friday - May 26

8:00 - 8:50			
9:10 - 11:10	OM 520	Neurology: Pyramidal Systems Disorders	Dr. Jacobson
11:30 - 12:20	OM 550	Physiology: Basal Ganglion	Dr. Eisenstein
12:40 - 1:30			
1:50 - 5:00	FCM 541	Preceptors	Dr. Fiel

FIRST YEAR
TENTH WEEK - THIRD QUARTER
1972

Monday - May 29

MEMORIAL DAY BREAK

Appendix E (Cont'd)
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Tuesday - May 30

8:00 - 8:50	PHM 520	Mechanisms of Antidotal Treatment I	Dr. Gibson
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00			
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

Wednesday - May 31

8:00 - 8:50	PHM 520	Mechanisms of Antidotal Treatment II	Dr. Gibson
9:10 - 11:10	OM 550	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 550	Neurology: Cerebellum	Dr. Jacobson
12:40 - 5:00	OM 550	Neurological Testing Practical Examination	Dr. Jacobson

Thursday - June 1

8:00 - 8:50	PHM 520	Review	Staff
9:10 - 10:00	OM 550	Neuroanatomy	Dr. Jenkins
10:20 - 11:10	OM 550	Neuropathology: Basal Ganglion	Dr. Jones
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00			
1:00 - 5:00	OM 532	Clinical Science III Clinic Rotation	

Friday - June 2

8:00 - 8:50			
9:10 - 11:10	OM 550	Neurology: Dysfunctions of the Basal Ganglion System	Dr. Jacobson
11:30 - 12:20	OM 550	Neurology: Treatment of Basal Ganglion Problems	Dr. Jacobson
12:40 - 1:30			

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FIRST YEAR
FIRST WEEK - FOURTH QUARTER
1972

Begin Neuromuscular Systems I & II Unit
Clinical Experience

<u>Monday - June 19</u>

8:00 - 8:50			
9:10 - 12:20	OM 551	Neurology: Sensation, Corticol Association, Areas & Aphasias	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00			

<u>Tuesday - June 20</u>

8:00 - 8:50			
9:10 - 11:10	OM 551	Neurology: Problems of the Spinal Canal	Dr. Jacobson
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

<u>Wednesday - June 21</u>

8:00 - 8:50	PHAR 521	Intro to Chemtrans.	Dr. Moore
9:10 - 10:00	OM 551	Physiology: Sensation	Drs. Eisenstein Jacobson
10:20 - 12:20	OM 551	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 551	Neurology: Aphasias	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology: Testing Laboratory Practical Problems and Self-Assessment	Dr. Jacobson

Appendix E (Cont'd)
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Thursday - June 22

8:00 - 8:50	Phar 521	Adrenergic Drugs	Dr. Moore
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Maturational Crises (Adulthood)	Staff
		or	
	OM 533	Clinical Sciences: Clinic Rotation	

Friday - June 23

8:00 - 8:50	Phar 521	Adrenergic Drugs (Cont'd)	Dr. Moore
9:10 - 10:00	OM 551	Biochemistry	Dr. Wells
10:20 - 11:10	OM 551	Orthopedics	Drs. Mandell Swienckowski
11:30 - 12:20			
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

FIRST YEAR
SECOND WEEK - FOURTH QUARTER
1972

Monday - June 26

8:00 - 8:50	Phar 521	Adrenergic Blockade	Dr. Moore
9:10- 12:20	OM 551	Neuroanatomy	Dr. Jenkins
12:40 - 1:30			
1:50 - 5:00	FCM 542	VDC/FPC/OHC/Phy.Th.	Dr. Fiel

Tuesday - June 27

8:00 - 8:50	Phar 521	Adrenergic Blockade (Cont'd)	Dr. Moore
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins

Appendix E (Cont'd)
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<u>Tuesday - June 27</u>

11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation *or*	
	FCM 523	Behavioral Science	Staff

<u>Wednesday - June 28</u>

8:00 - 8:50	Phar 521	Cholinergic Drugs	Dr. Welsch
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins
11:30 - 12:20			
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

<u>Thursday - June 29</u>

8:00 - 8:50	Phar 521	CHEase - Anti CHEase	Dr. Welsch
9:10 - 11:10	OM 551	Physiology: Autonomic Nervous System: (Organization & Functions)	Drs. Eisenstein Johnson
11:30 - 12:20	OM 551	Elective Self Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Behavioral Science *or*	Staff
	OM 533	Clinical Science: Clinic Rotation	

<u>Friday - June 30</u>

8:00 - 8:50	Phar 521	Cholinergic Blockade	Dr. Welsch
9:10 - 10:00	OM 551	Biochemistry	Dr. Wells
10:20 - 11:10	OM 551	Physiology: Autonomic Nervous System (Higher Regulation-Hypothalamus, etc.)	Drs. Eisenstein Johnson

Friday - June 30

11:30 - 12:20	OM 551	Neurology: Autonomic Nervous System	
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

FIRST YEAR
THIRD WEEK - FOURTH QUARTER
1972

Monday - July 3

8:00 - 8:50	Phar 521	Antihistamines & Xanthines	Dr. Hook
9:10 - 12:20	OM 551	Neuroanatomy	Dr. Jenkins
12:40 - 1:30			
1:50 - 5:00	FCM 542	VDC/FPC/OHC/Phy.Th.	Dr. Fiel

Tuesday - July 4

HOLIDAY

Wednesday - July 5

8:00 - 8:50	Phar 521	Ganglionic Blockade	Dr. Gebber
9:10 - 11:10	OM 551	Orthopedics	Drs. Mandell Swienckowski
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

Thursday - July 6

8:00 - 8:50	Phar 521	Pharmacology of NMJ	Dr. Gebber
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins

Appendix E (Cont'd)
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Thursday - July 6

11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Science: Clinic Rotation or	
	FCM 523	Behavioral Science	Staff

Friday - July 7

8:00 - 8:50	Phar 521	Prin. of Cardiac Pharm.	Dr. Gebber
9:10 - 10:00	OM 551	Neuropathology: Peripheral Neuropathies	Dr. Jones
10:20 - 12:20	OM 551	Neurology: Peripheral Neuropathies	Dr. Rentz
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	

FIRST YEAR
FOURTH WEEK - FOURTH QUARTER
1972

Monday - July 10

8:00 - 8:50	Phar 521	Exam I	Dr. Moore
9:10 - 12:20	OM 551	Neuroanatomy	Dr. Jenkins
12:40 - 1:30			
1:50 - 5:00	FCM 542	(S) Osteo. Exam.	Dr. Fiel

Tuesday - July 11

8:00 - 8:50	Phar 521	Cardiac Drugs	Dr. Gebber
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			

Appendix E (Cont'd)
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<u>Tuesday - July 11</u>

1:50 - 5:00	OM 551	Clinical Sciences: Clinic Rotation *or*	
	FCM 523	Behavioral Science	

<u>Wednesday - July 12</u>

8:00 - 8:50	Phar 521	Cardiac Drugs (Cont'd)	Dr. Gebber
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

<u>Thursday - July 13</u>

8:00 - 8:50	Phar 521	Cardiac Drugs (Cont'd)	Dr. Gebber
9:10 - 11:10	OM 551	Neuroanatomy	Dr. Jenkins
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Maturational Crises (Aging) *or*	Staff
	OM 551	Clinical Science: Clinic Rotation	

<u>Friday - July 14</u>

8:00 - 8:50	Phar 521	Anti-anginal Drugs	Dr. Gebber
9:10 - 10:00	OM 551	Biochemistry	Dr. Wells
10:20 - 12:20	OM 551	Orthopedics	Drs. Mandell Swienckowski
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

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FIRST YEAR
FIFTH WEEK - FOURTH QUARTER
1972

Monday - July 17

8:00 - 8:50	Phar 521	Autocoids	Dr. Welsch
9:10 - 12:20	OM 551	Systems Biol. II Comprehensive Exam (Part I) Neuroanatomy	
12:40 - 1:30			
1:50 - 5:00	FCM 542	(S) Osteo. Exam.	Dr. Fiel

Tuesday - July 18

8:00 - 8:50	Phar 521	Oxytocics	Dr. Welsch
9:10 - 11:10	OM 551	Toxic Metabolic Disorders	Dr. Jones
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

Wednesday - July 19

8:00 - 8:50	Phar 521	GI Drugs	Dr. Welsch
9:10 - 11:10	OM 551	Physiology: Visual System	Drs. Eisenstein Johnson
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

Appendix E (Cont'd)
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<u>Thursday - July 20</u>

8:00 - 8:50	Phar 521	Local Anesthetics	Dr. Welsch
9:10 - 10:00	OM 551	Physiology: Taste and Smell	Drs. Eisenstein Johnson
10:20 - 11:10	OM 551	Neurology: Problems of the Spinal Canal (Cont'd)	Dr. Jacobson
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Behavioral Science <u>or</u>	Staff
	OM 533	Clinical Science: Clinical Rotation	

<u>Friday - July 21</u>

8:00 - 8:50	Phar 521	CNS Stimulants	Dr. Rech
9:10 - 10:00	OM 551	Biochemistry	Dr. Wells
10:20 - 12:20	OM 551	Neurology: Visual System Dysfunctions	
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

FIRST YEAR
SIXTH WEEK - FOURTH QUARTER
1972

<u>Monday - July 24</u>

8:00 - 8:50	Phar 521	NO CLASS	
9:10 - 12:30	OM 551	Systems Biol. Exam I (Part 2)	
12:40 - 1:30			
1:50 - 5:00	FCM 542	(S) Osteo. Exam.	Dr. Fiel

<u>Tuesday - July 25</u>

8:00 - 8:50	Phar 521	NO CLASS	
9:10 - 10:00	OM 551	Physiology: Auditory System	Drs. Eisenstein Johnson

Appendix E (Cont'd)
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Tuesday - July 25

10:20 - 11:10	OM 551	Physiology: Vestibular System	
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

Wednesday - July 26

8:00 - 8:50	Phar 521	NO CLASS	
9:10 - 11:10	OM 551	Physiology: Conditioning and Learning	Drs. Eisenstein, Johnson
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

Thursday - July 27

8:00 - 8:50	Phar 521	NO CLASS	
9:10 - 11:10	OM 551	Neurology: Auditory & Vestibular Dysfunctions	Dr. Jacobson
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Behavioral Science <u>or</u>	Staff
	OM 533	Clinical Science: Clinic Rotation	

Friday - July 28

8:00 - 8:50	Phar 521	NO CLASS	
9:10 - 10:00	OM 551	Biochemistry	Dr. Wells
10:20 - 12:10	OM 551	Orthopedics	Drs. Mandell, Swienckowski
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

FIRST YEAR
SEVENTH WEEK - FOURTH QUARTER
1972

<u>Monday - July 31</u>

8:00 - 8:50	Phar 521	General Anesthesia	Dr. Rech
9:10 - 10:00	OM 551	Physiology: Memory and Higher Intellectual Functions	Drs. Eisenstein Johnson
10:20 - 12:20	OM 551	Neurology: Other Cranial Nerve Problems	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	FCM 542	(S) Osteo. Exam.	Dr. Fiel

<u>Tuesday - August 1</u>

8:00 - 8:50	Phar 521	General Anesthesia (Cont'd)	Dr. Rech
9:10 - 11:10	OM 551	Radiology	Drs. Heagen Sheiner
11:30 - 12:20		Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

<u>Wednesday - August 2</u>

8:00 - 8:50	Phar 521	General Anesthesia (Cont'd)	Dr. Rech
9:10 - 10:00	OM 551	Neurology: Limbic System	Dr. Jacobson
10:20 - 11:10	OM 551	Microbiology: Gas Gangrene and Miscellaneous Problems	Dr. Black
11:30 - 12:20			
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

Thursday - August 3

8:00 - 8:50	Phar 521	CNS Depressants	Dr. Rech
9:10 - 11:10	OM 551	Focal Problems Conference	Dr. Jones Staff
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Situational Crises Introduction: Marital:Divorce <u>or</u>	Staff
	OM 533	Clinical Science: Clinic Rotation	

Friday - August 4

8:00 - 8:50	Phar 521	Tranquilizers	Dr. Rech
9:10 - 10:00	OM 551	Biochemistry	Dr. Wells
10:20 - 12:20	OM 551	Neurology: Epilepsy	Dr. Jacobson
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

FIRST YEAR
EIGHTH WEEK - FOURTH QUARTER
1972

Monday - August 7

8:00 - 8:50	Phar 521	Exam. II	Dr. Rech
9:10 - 10:00	OM 551	Neurology: Treatment of Epilepsy	Dr. Jacobson
10:20 - 11:10	OM 551	Neuropathology: Inflammation	Dr. Jones
11:30 - 12:20	OM 551	Microbiology: Bacterial Meningitis	Dr. Black
12:40 - 1:30			
1:50 - 5:00	FCM 542	VDC/FPC/OHC/Phy.Th.	Dr. Fiel

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<u>Tuesday - August 8</u>

8:00 - 8:50	Phar 521	Psychopharmacology	Dr. Rech
9:10 - 11:10	OM 551	Radiology	Drs. Heagen Sheiner
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

<u>Wednesday - August 9</u>

8:00 - 8:50	Phar 521	Psychomotor Stimulants	Dr. Rech
9:10 - 10:00	OM 551	Neuropathology: Trauma and Coma	Dr. Jones
10:20 - 11:10	OM 551	Microbiology: Syphillis of the CNS	Dr. Black
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	Staff

<u>Thursday - August 10</u>

8:00 - 8:50	Phar 521	Pain and Analgesia	Dr. Moore
9:10 - 11:10	OM 551	Focal Problems Clinical Conf.	Dr. Jones Staff
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Behavioral Science <u>or</u>	Staff
	OM 533	Clinical Science: Clinic Rotation	

<u>Friday - August 11</u>

8:00 - 8:50	Phar 521	Narcotic Analgesics	Dr. Moore
9:10 - 10:00	OM 551	Microbiology: Viral Encephalitis	Dr. Black

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<u>Friday - August 11</u>

10:20 - 12:20	OM 551	Orthopedics	Drs. Mandell Swienckowski
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

FIRST YEAR
NINTH WEEK - FOURTH QUARTER
1972

<u>Monday - August 14</u>

8:00 - 8:50	Phar 521	Methadone Program	Dr. Moore
9:10 - 10:00	OM 551	Microbiology: Viral Encephalitis (Cont'd)	Dr. Black
10:20 - 11:10	OM 551	Neuropathology: Cerebrovascular Disease & Trauma	Dr. Jones
11:30 - 12:20	OM 551	Neurology: Coma	Dr. Kornhiser
12:40 - 1:30			
1:50 - 5:00	FCM 542	VDC/FPC/OHC/Phy.Th.	Dr. Fiel

<u>Tuesday - August 15</u>

8:00 - 8:50	Phar 521	Non-narcotic Analgesics	Dr. Moore
9:10 - 11:10	OM 551	Radiology	Drs. Heagen Sheiner
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

Appendix E (Cont'd)
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<u>Wednesday - August 16</u>

8:00 - 8:50	Phar 521	Anti-rheumatic Drugs	Dr. Moore
9:10 - 10:00	OM 551	Neurology: CNS Infections	Dr. Kornhiser
10:20 - 11:10	OM 551	Neurology: Craniocerebral Trauma	Dr. Kornhiser
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinic	Staff

<u>Thursday - August 17</u>

8:00 - 8:50	Phar 521	Alcohol	Dr. Moore
9:10 - 11:10	OM 551	Focal Problems Clinical Conf.	Dr. Jones
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Science: Clinic Rotation <u>or</u>	
	FCM 523	Behavioral Science	Staff

<u>Friday - August 18</u>

8:00 - 8:50	Phar 521	Prin. of Renal Pharm.	Dr. Hook
9:10 - 10:00	OM 551	Neuropathology: Nervous System Tumors	Dr. Jones
10:20 - 12:20	OM 551	Neurology: Cerebrovascular Accidents	Dr. Kornhiser
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

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FIRST YEAR
TENTH WEEK - FOURTH QUARTER
1972

Monday - August 21

8:00 - 8:50	Phar 521	Diuretics	Dr. Hook
9:10 - 11:10	OM 551	Neurology: Cerebrovascular Accidents (Cont'd)	Dr. Kornhiser
11:30 - 12:20	OM 551	Neuropathology: Pediatric Neuropathology	Dr. Jones
12:40 - 1:30			
1:50 - 5:00	FCM 542	VDC/FPC/OHC/Phy.Th.	Dr. Fiel

Tuesday - August 22

8:00 - 8:50	Phar 521	Diuretics (Cont'd)	Dr. Hook
9:10 - 11:10	OM 551	Radiology	Drs. Heagen Sheiner
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 533	Clinical Sciences: Clinic Rotation or	
	FCM 523	Behavioral Science	Staff

Wednesday - August 23

8:00 - 8:50	Phar 521	Diuretics (Cont'd)	Dr. Hook
9:10 - 10:00	OM 551	Neurology: Headache	Dr. Kornhiser
10:20 - 11:10	OM 551	Neurology: Vertigo & Syncope	Dr. Kornhiser
11:30 - 12:20	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	OM 551	Neurology Clinics	

Appendix E (Cont'd)
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Thursday - August 24

8:00 - 8:50	Phar 521	Diuretics (Cont'd)	Dr. Hook
9:10 - 11:10	OM 551	Neurological Focal Problems	Dr. Jones
		Clinical Conference	Staff
11:30 - 12:40	OM 551	Elective Self-Study	
12:40 - 1:30			
1:50 - 5:00	FCM 523	Situational Crises: Death and Grief: Physical Illness or	Staff
	OM 533	Clinical Science: Clinic Rotation	

Friday - August 25

8:00 - 8:50	Phar 521	Review	Staff
9:10 - 10:00	OM 551	Neurology: Cerebrodegenerative Diseases	Drs. Kornhiser Jones
10:20 - 12:20	OM 551	Pediatric Neurology	Dr. Nigro
12:40 - 1:30			
1:50 - 5:00	FCM 542	Preceptors	Dr. Fiel

Friday - August 25 - Friday - September 1

Final Exams Begin

APPENDIX F

NEUROLOGICAL PRACTICAL EXAMINATION
OF
PSYCHOMOTOR TECHNIQUES AND SKILLS

GRADING FORM

APPENDIX F

NEUROLOGICAL PRACTICAL EXAMINATION OF PSYCHOMOTOR TECHNIQUES AND SKILLS

GRADING FORM

Each test will be evaluated in the three following areas:

A. Patient rapport with emphasis on accuracy of instructions given to patient before and during each test.
B. Proper positioning of patient.
C. Proper technique in performing the test.

Each of the above categories will be graded as follows:

1 = Excellent

2 = Adequate

3 = Fail

The three categories are combined for a total score. The total score represents the students psychomotor skill or technique in performing the various neurological tests.

ab
5/5/72

Appendix F (Cont'd)

STUDENT NAME ________________

PRACTICAL NEUROLOGICAL PSYCHOMOTOR TESTING

	Accuracy of Instructions	Positioning of Patient	Technique	TOTAL
	A	B	C	
PATELLAR (sitting)				
(lying)				
ACHILLES (sitting)				
(lying)				
(kneeling)				
BICEPS				
TRICEPS				
BRACHIORADIALIS				
HOFFMAN				
PLANTAR				
ANKLE CLONUS				
ABDOMINALS				
MUSCLE TONE (upper extremity)				

Appendix F (Cont'd)
Page 2

	Accuracy of Instructions	Positioning of Patient	Technique	TOTAL
	A	B	C	
MUSCLE STRENGTH				
MUSCLE STRENGTH				
MUSCLE STRENGTH				
VIBRATION				
PAIN (specific area)				
LIGHT TOUCH (specific area)				
POSITION SENSE				
STEREOGNOSIS				
CRANIAL NERVE				
CRANIAL NERVE				
CRANIAL NERVE				
CRANIAL NERVE				

Appendix F (Cont'd)
Page 3

	Accuracy of Instructions	Positioning of Patient	Technique	TOTAL
	A	B	C	
CEREBELLAR FUNCTION (upper extremity)				
(upper extremity)				
(lower extremity)				
(lower extremity)				
TOTAL SCORE				

APPENDIX G

AFFECTIVE TRAINING AIDS

APPENDIX G

AFFECTIVE TRAINING AIDS

PROCESS BEHAVIORS IN ESTABLISHING THE RELATIONSHIP, AND IN ELICITATION DURING HISTORY AND PHYSICAL

VERBAL

___ 1. Introduced himself.

___ 2. Used patient's name.

___ 3. Invited patient to sit down.

___ 4. Clearly explained the situation.

___ 5. Reflected patient's feeling regarding emotional attachments to presenting problem.

___ 6. Asked for specifics regarding nature of problem.

___ 7. Encouraged patient to speak freely and openly.

___ 8. Phrased questions simply and directly.

___ 9. Checked with patient to see if his questions were understood.

___10. Acknowledges patient's discomfort verbally.

___11. Explored leads.

___12. Used open-ended questions only.

NON-VERBAL

___ 1. Looked directly at patient.

___ 2. Student physically relaxed initially.

___ 3. Patient relaxed initially.

___ 4. Body movement encouraging.

___ 5. Facial gestures were encouraging, concerned, intense, approving of disclosure.

___ 6. Unhurried in manner.

___ 7. Patient at ease at end of interview.

Appendix G (Cont'd)
Page 2

___13. Used specific questions only.

___14. Used both specific and general questions.

___15. Answered patient's questions directly.

NOTE: Check behaviors observed.

Appendix G (Cont'd)
Page 3

TEN MOST IMPORTANT QUALITIES INHERENT
IN A DOCTOR-PATIENT RELATIONSHIP
AS EXPRESSED BY A FAMILY PHYSICIAN

1. Immediacy of relationship: Here I mean to give one's full attention and interest to the person at that moment in time. This should be the first step in any involvement. Perhaps a hand shake, touch, use of first name--eye-to-eye contact.

2. Self-Confidence: To portray to the patient your self-assurance in the situation. For example, come what may, if I don't have the answer, we can work it out together with the help of others.

3. Genuineness: To show sincerity, courtesy, warmth and respect for the patient as a person.

4. Empathy: To show understanding by putting yourself into the patient's "shoes." Try to consider all the extraneous variables which have impact on the patient's response to his illness.

5. Listening-Questioning or Facilitative: By open-ended questions and listening, to encourage the patient to move from general, to specific details.

6. Confrontation: Show your willingness to pursue the matters at hand in an aggressive but non-hostile manner. Facilitate direct confrontation of issues rather than passing them by or excepting them without clarification. While being honest about temporal limitations, do not give the impression of passing matters over without adequate attention.

7. Self-disclosure: Be prepared to take risks in the relationship by stating what you think you hear or what you think is the situation as you see it at this point in time, while not allowing previous personal emotions and experiences to influence the relationship.

8. Reassuring: Be quick to offer reassurance when the patient is attempting to enter into a sensitive and threatening area. Show the patient your thinking, when appropriate, on matters which you eliminate from the etiology, etc.

9. Gentleness: Carry out all procedures and exchanges in a manner which assures no unnecessary hurt, discomfort, or embarrassment to the patient.

10. Affective domain: Show and express willingness to handle and explore matters involving the affective (emotional) area as well as cognitive area.

NOTE: These behaviors will be displayed on a video tape of a physician-patient interaction.

Appendix G (Cont'd)
Page 5

A. Establishing and Maintaining a Working Relationship

During the interview, the student:

Effective Behaviors	Ineffective Behaviors
___appeared relaxed and comfortable with the patient after the first few minutes of the interview	___appeared ill at ease with the patient, as shown by such reactions as tremors, sweating, blocking, averting eye contact, shifting in chair, etc.
___seemed interested in the patient's problem (e.g., maintained eye contact, head nodding, "umhmm," etc.)	___seemed uninterested in the patient's problem (e.g., avoiding eye contact, did not respond verbally or non-verbally)
___expressed a realistic interest and willingness to help in the context of this interview	___did not express an interest in helping the patient
___demonstrated listening responses (i.e., indicates that he has understood the patient) e.g.,________________	___expressed an unrealistic interest in helping the patient
___responded to the patient's feeling tone openly and accurately e.g.,________________	___used only <u>ignoring</u> responses ___minimized or exaggerated the patient's feeling tone (i.e., avoided dealing with the intensity of what the patient was experiencing)
___was supportive when requested or when affect was expressed by the patient (i.e., communicates to the patient that you have heard and understood what he has been trying to tell you.)	___was reassuring (tells patient that "everything will be O.K." despite evidence to the contrary e.g., real loss of person, function, etc.)

Appendix G (Cont'd)
Page 6

___was non-supportive as evidenced by patient reaction (e.g., continued disagreement, changes topic, holds back feelings

How many effective behaviors were observed ___?

How many ineffective behaviors were observed ___?

SUMMARY

Based on your assessment of the student's ability to establish and maintain a working relationship and the difficulties posed by this patient, rate the student on the following scale:

( ) Does not meet the objectives of this section satisfactorily

( ) Meets the objectives in the following manner:

- ( ) Marginally
- ( ) Clearly meets objective
- ( ) Meets objectives in outstanding manner

Examiner's Comments: ______________________________________

____

____

____

B. Data Elicitation

1. General

During the interview, the student:

Effective Behaviors	Ineffective Behaviors
___probed gently at relevant but sensitive areas (e.g., permits the patient to set the rate at which sensitive areas of concern are covered)	___avoided sensitive issues which could have been pursued in the context of this interview -or- ___proceeded with a lack of tact

Appendix G (Cont'd)
Page 7

Effective Behaviors	Ineffective Behaviors
___asked questions and made comments briefly and to the point	___rambled in long discourse; lectured to the patient
___used exploratory questions (i.e., encourages further discussion by the patient by use of open-ended questions) e.g.,________________________	___used only non-exploratory questions (e.g., questions requiring a yes or no response)
___asked questions about the patient's feelings	___dealt only with the factual, non-effective material presented by the patient
___asks questions which attempt to clarify patient concerns without interrupting the flow or direction of the interview (e.g., exploratory, open-ended questions)	___does not ask needed clarifying questions ___asks clarifying questions in such a manner as to disrupt the flow or direction of the interview
___gets not only presenting complaint, but also other major concerns (e.g., how he feels about his problems; how it has affected his life, etc.)	___gets only data on presenting complaint
___does not ignore or overlook physical complaints, but gets medical history in addition to mental status examinations	___ignores physical findings; does not obtain medical history

How many effective behaviors were observed ___?

How many ineffective behaviors were observed ___?

Appendix G (Cont'd)
Page 8

SUMMARY

Based on your assessment of the student's ability to elicit data <u>and</u> the difficulties posed by this patient, rate the student on the following scale:

( ) Does not meet the objectives of this section satisfactorily

( ) Meets the objectives in the following manner:

( ) Marginally

( ) Clearly meets objectives

( ) Meets objectives in an outstanding manner

Examiner's Comments: ______________________________________

____

____

____

APPENDIX H

VIDEO-TAPE SERIES ON PHYSICIAN BEHAVIOR

SCHEDULE AND SCRIPT

MICHIGAN STATE UNIVERSITY EAST LANSING · MICHIGAN 48823

COLLEGE OF OSTEOPATHIC MEDICINE · OFFICE OF THE DEAN · EAST FEE HALL

May 15, 1972

MEMORANDUM

TO: All First Year Students

FROM: Fred C. Tinning

SUBJECT: Elective Video-Tape Series for Clinical Sciences III and for Neurology on Physician Behavior

As discussed with the majority of you on an individual basis, I have been able to put together a series of video-tapes that will be of benefit to each of you in your clinical experience. This is on a voluntary basis and will be held Mondays from 3:00 p.m.-5:00 p.m. This schedule should allow everyone to attend. If you are at your preceptor on Mondays, come Fridays after your class with Dr. Fiel. The class will meet in the same room you have your class with Dr. Fiel (Rm. E200). We do not have to stay the full period. I have planned the tapes to last 1 hour and discussion will continue the next hour. The schedule of sessions is as follows:

May 15 and 19 - - - - - - Interpersonal relationship in a general physical examination and in pediatric examinations of patients with possible neurological problems.

<u>Objectives</u>:

1. To demonstrate the establishing of a relationship and in the elicitation of data between patients, physicians and family members.

2. To demonstrate the actual physical examination of an infant, a young child or an adult male. Use of physician psychomotor skills.

May 22 and 26 - - - - - - Detailed demonstration of a general examination and pulmonary examination.

Appendix H (Cont'd)
Page 2

Objectives:

To demonstate psychomotor skills and to discuss possible interactions.

June 2 and 5- - - - - - - - Detailed demonstration of cardiac and orthopedic examinations.

Objectives:

To demonstrate psychomotor skills and to discuss possible interactions.

June 5 and 9- - - - - - - - Detailed demonstration of head and neck and abdominal examinations.

Objectives:

To demonstrate psychomotor skills and to discuss possible interactions.

Appendix H (Cont'd)
Page 3

FILM SCRIPT FOR MODEL AFFECTIVE BEHAVIORS

SCRIPT I. <u>Pediatric Examination</u>

Doctor
Mother
8 week old infant - normal

<u>Case Problem</u>

Routine Check-up

OBJECTIVES:

1. To demonstrate the establishing of a relationship and the elicitation of data from the mother on the child's progress.

2. To demonstrate the actual physical examination of an infant. Psychomotor plus the dialogue of the relationship between mother and doctor.

SCRIPT II. <u>Pediatric Check-up</u>

Doctor
Mother
6 year old child

<u>Case Problem</u>

The child fell from her/his bike and hit her/his head. There is a small bump on the forehead. Mother and father just want to be reassured that the child is ok. Child has slight headache.

OBJECTIVES:

1. To demonstrate complete relationship between all parties and reassure mother and child that all is ok.

2. Demonstrate quick routine check-up.

Appendix H (Cont'd)
Page 4

SCRIPT III. Complete History and Physical

Doctor
Thirty year old male - Home Accident

Case Problem

Patient has hurt his head, lower back and abdomen. Perhaps a slight concussion. (Check general neurological signs.) He fell in the bathtub.

OBJECTIVES:

1. Demonstrate the establishment of relationship. Demonstrate how elicitation of information is accomplished. If possible, do a history and chief complaint interview.

2. Demonstrate psychomotor skills of doing a physical examination. Check neurological, check back and check abdomen as prime areas for examination.

APPENDIX I

MASTER CONTROL SHEET

(DATES OF TREATMENT TRAINING AND PRACTICAL FINAL EXAMINATION)

APPENDIX I

MASTER CONTROL SHEET

T_1 SIMULATED PATIENT CLINICAL TREATMENT	DATES OF TREATMENT TRAINING: Time 1			Time 2			Time 3			PRACTICAL FINAL EXAMINATION: Time 4 August - September						
	6/28	7/5	7/12	7/19 or 7/22	7/26 or 7/29	8/2 or 8/5	8/9	8/16	8/23	25	26	28	29	30	31	1
S 1		OK			OK			OK		R						
S 2	OK			OK			OK								R	
S 3		OK			OK			OK								R
S 4			OK			OK			OK		R					
S 5			OK			OK			OK					R		
S 6			OK			OK			OK							R
S 7			OK			OK			OK						R	
S 8		OK			OK			OK						R		
S 9	OK			OK			OK							R		
S 10	OK			OK			OK				R					
S 11		OK			OK			OK								R
S 12	OK			OK			OK								R	

Appendix I (Cont'd)
Page 2

T_2 REAL PATIENT CLINICAL TREATMENT	DATES OF TREATMENT TRAINING: Time 1			Time 2			Time 3			PRACTICAL FINAL EXAMINATION: Time 4, August - September						
	6/28	7/5	7/12	7/19 or 7/22	7/26 or 7/29	8/2 or 8/5	8/9	8/16	8/23	25	26	28	29	30	31	1
S 13			OK			OK			OK							R
S 14	OK			OK			OK				R					
S 15			OK			OK			OK					R		
S 16			OK			OK			OK		R					
S 17		OK			OK				OK							R
S 18	OK			OK			OK								R	
S 19	OK			OK			OK							R		
S 20	OK			OK			OK							R		
S 21		OK			OK			OK							R	
S 22		OK			OK			OK								R
S 23		OK			OK			OK		R						
S 24			OK			OK			OK						R	
INACTIVE CONTROL-- OSTEOPATHIC IC 1		OK			OK				OK	S						

Appendix I (Cont'd)
Page 3

INACTIVE CONTROL--OSTEOPATHIC	DATES OF TREATMENT TRAINING Time 1 6/28	7/5	7/12	Time 2 7/19 or 7/22	7/26 or 7/29	8/2 or 8/5	Time 3 8/9	8/16	8/23	PRACTICAL FINAL EXAMINATION Time 4 August - September 25	26	28	29	30	31	1
IC 2			OK			OK	OK			S						
IC 3		OK			OK			OK				S				
IC 4			OK			OK	OK					S				
IC 5			OK			OK			OK	S						
IC 6			OK			OK			OK			S				
IC 7		OK			OK			OK				R				
IC 8	OK			OK			OK						S			
IC 9			OK			OK			OK		S					
INACTIVE CONTROL--ALLOPATHIC																
IC 10	OK			OK			OK			S						
IC 11		OK			OK			OK		S						
IC 12		OK			OK			OK					R			
IC 13	OK			OK			OK				S					
IC 14			OK			OK			OK				R			

Note$_1$:

Required Material to be Turned in:

1. CE = Evaluation of Clinical Experience
2. PE = Patient Evaluation
3. NE = Neurological Examination
4. FSE = Formative Summative Evaluation

Note$_2$:

S = Simulated Patient
R = Real Patient

APPENDIX J

SIMULATED NEUROLOGICAL EVALUATION

HISTORY AND PHYSICAL EXAMINATION FORMS

SIMULATED CASE 1

Appendix J
Page 15, No. 1

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 6/28-7/5-7/12	**TYPE OF CASE:** Neurological
STUDENT: SIM Treatment	**PATIENT'S AGE:** 46
INSTRUCTOR: Drs. Jacobson, Jones, Kornhiser	**RACE:** C - Male

	Grade
1. **CHIEF COMPLAINT(S)** Leg weakness and numbness Pain in back	**Total points= 3**
2. **ONSET AND COURSE OF CHIEF COMPLAINT(S)** Leg weakness 6 weeks duration getting progressively worse. Some associated back pain past 2-3 weeks. Numbness in legs also noted past 2-3 weeks. Aspirin does not help pain too much nor is pain relieved by rest. Coughing aggravates pain. Also noted is moderate difficulty urinating past 6-7 months. Automobile accident 10 years ago with reported "whiplash" injury. Long history 7-8 years of bronchial congestion and cough. History of arthritis in hands 7-8 years. Aspirin helps some.	**Total points= 6**
3. **PAST HISTORY (Mother, Father, Wife, Siblings, Children)** **Endocrine Dysfunction** (Mother-Hypothyroid problem) **Cancer** ____ **Tuberculosis** ____ **Neurosis, Psychosis** ____ **Cardiovascular Disease** (Father-high blood pressure) **Other** ____	1

Appendix J (Cont'd)
Page 16, No. 1

	Grade
MEDICAL HISTORY	
Previous Hospitalization: For surgery below	1
Allergies: sulfa and codeine	1
Medications: aspirin for arthritis (off & on 7 years)	1
Accidents: fracture right arm when 13 Whiplash 6-7 years ago	1
Surgery: polyp in sigmoid removed from colon rectally 1970	1
Diseases: Meningitis as child Usual childhood diseases-mumps, measles	1
Habits: Smokes (no. of packs) (2+) Social drinker	1
SOCIAL HISTORY **(Work, Hobbies, Recreation)** MSU Professor - Sailing - Boating - Building and Gardening	1 **Total points= 9**
4. SYSTEMS REVIEW (if appropriate) **(Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)**	**Total points= 4**
Cardiovascular - Once had recorded high blood pressure. Respiratory - Cough 7-8 years. Neuromuscular - Weakness and numbness of legs. Skeletal - Pain in back and "arthritis" of hands Urinary - Difficulty urinating 6 months.	

Appendix J (Cont'd)
Page 17, No. 1

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera) Normal, no jaundice or discoloration	1
Physical Development (Asthenic, Obsese, etc.) Asthenic, normal nutrition	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ___________	
Rhythm ___________	
Murmurs ___________	
Neck Auscultation	
Bruits ___________	
Ophthalmoscopic (GRI-IV)	
Vessels ___________	
Disc ___________	
Retina ___________	
MENTAL STATUS:	1
State of Consciousness (check)	
_X_ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix J, (Cont'd)
Page 18, No. 1

	Grade
Speech and Language Function	
____ **Aphasic or dysphasic**	
____ **Dysarthric or anarthric**	

REFLEXES:

Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive) — Grade: 1

	Left	Right
Patellar	3	3
Biceps	1-2	1-2
Tricep	2	2
Brachioradial	2	2
Achilles	2-3	2-3

Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal) — Grade: 1

	Left	Right
Plantar	A	A
Babinski	P	P
Ankle Clonus	A	A
Abdominal	A	A
Hoffman	A	A

Appendix J (Cont'd)
Page 19, No. 1

Grade

SENSORY:
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction) — Grade: 1

	Response	Location
Vibration	A	toe to foot
Pinprick	A	legs and (T8-T9)
Light touch	A	torso up to nipple line
Position sense	Eq-A	toe
Stereognosis	N	

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations — Grade: 1

Yes ______ No X

Gait: Normal ____ Abnormal (describe also) X

Ataxic slightly wide based

Muscle Tone: Spastic ____ Flaccid ____

Rigid ______ Normal ____

Muscle Strength (indicate specific muscle weakness)

Leg muscle weakness (mild left leg only)

Appendix J (Cont'd)
Page 20, No. 1

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
__N_ Finger to nose	
__N_ Dysdiadochokinesia	
_A-E_ Tandem gait	
_A-E_ Heel to knee	
__N_ Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____ Spontaneous movements (describe)	
_____ Cog Wheel Rigidity	
_____ Mask like facies	
_____ Decreased eyeblinks	
_____ Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. All intact 7. All intact	
2. " 8. "	
3. " 9. "	
4. " 10. "	
5. " 11. "	
6. " 12. "	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____ Normal Neurological	
__X__ Abnormal Neurological	
_____ Equivocal	

Appendix J (Cont'd)
Page 21, No. 1

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
__X__ Motor	
__X__ Sensory	
_____ Mentation and Behavior	
3. Anatomical Location (check)	2
_____ Primary Muscle Dysfunction	
_____ Peripheral Nerve or Root Dysfunction	
__X__ Spinal Cord	
_____ Brain Stem	
_____ Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephal-opathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Myelopathy	Tumor
Arthritis (By history)	
Chronic Bronchitis (By history)	

Appendix J (Cont'd)
Page 22, No. 1

Grade

8. **DIFFERENTIAL DIAGNOSIS** (identify no more than three neuro-logical disorders) — **Total points= 5**

General Pathology Category:	Specific Type of Pathology:
Vascular	
Infectious	Granuloma (TB)
Traumatic	
Autoimmune	
Metabolic	
Inherited	
Neoplastic (or mass lesion)	Disc or metastatic tumor
Cardiac Dysfunction	
Degenerative or Demyelinating	
Others -Chest Path--	Emphysema, Tuberculosis
-Urinary Obstructive Pathology---	(Prostate)

9. **TESTS** (laboratory tests and other diagnostic procedures) — **Total points= 5**

Specific Neuro-diagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
Spine X-ray	Chest X-ray
Lumbar puncture	Urinary function tests (BUN Urinalysis Special X-ray studies)
Myelogram	CBC
	ESR
(3 points)	(2 points)

Appendix J (Cont'd)
Page 23, No. 1

Grade

10. THERAPY

Total points= 2

Specific	Supportive
Surgical Decompression	Analgesics for pain

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 2

Appendix J (Cont'd)
Page 15, No. 2

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 6/28-7/5-7/12
TYPE OF CASE: Neurological
STUDENT: SIM Treatment
PATIENT'S AGE: 53
INSTRUCTOR: Drs. Jacobson & Jones
RACE: C - Female

	Grade
1. CHIEF COMPLAINT(S) Pain in left arm Numbness in left arm Weakness in left arm	**Total points= 3**
2. ONSET AND COURSE OF CHIEF COMPLAINT(S) Weakness left arm slow and progressive over past 8 months. Some moderate pain tending to radiate down left arm noted past 5 months. Aspirin gives no notable relief. Also reports chronic superficial chest wall pain 5-6 years as well as low back pain and reported degenerative disc disease 7-8 years ago. Leg cramping 3-4 years. Also some memory loss past 2-3 years and chronic headache complaints past 10-15 years.	**Total points= 6**
3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) **Endocrine Dysfunction** (Mother-diabetes) **Cancer** _____ **Tuberculosis** _____ **Neurosis, Psychosis** (Mother-paranoid) **Cardiovascular Disease** (Father-high blood pressure & "stroke") **Other** _____ (Mother-arthritis)	1

Appendix J (Cont'd)
Page 16, No. 2

	Grade
MEDICAL HISTORY	
Previous Hospitalization: Surgery noted below	1
Allergies: (Tetracyclines) "Tetramycin"	1
Medications:	1
Accidents: Car accident 1969	1
Surgery: Hysterectomy 1964	1
Diseases: Usual childhood diseases Pneumonia 3-4 years	1
Habits: Alcohol socially	1
SOCIAL HISTORY (Work, Hobbies, Recreation) Gardening Music Bicycle Riding	1 **Total points= 9**
4. **SYSTEMS REVIEW (if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)**	**Total points= 4**
Cardiovascular - Chest pain Gynecolog-OB Hysterectomy Neuromuscular-1. cramping in legs at night 3-4 years 2. headache 3. memory loss 4. chest neuritis	

Appendix J (Cont'd)
Page 17, No. 2

		Grade
5. PHYSICAL EXAMINATION		
GENERAL APPEARANCE:	Coloration (Skin, Sclera) Normal ______ Physical Development (Asthenic, Obsese, etc.) Normal build and nutrition; asthenictype	1
GENERAL FINDINGS:		1
BP		
Cardiac Auscultation		
Rate ______		
Rhythm ______		
Murmurs ______		
Neck Auscultation		
Bruits ______		
Ophthalmoscopic (GRI-IV)		
Vessels ______		
Disc ______		
Retina ______		
MENTAL STATUS:		1
State of Consciousness (check)		
X Alert		
____ Unconscious or comatose		
____ Confused or obtunded		
____ Decerebrate or decorticate		

Appendix J (Cont'd)
Page 18, No. 2

Grade

Speech and Language Function

____ Aphasic or dysphasic

____ Dysarthric or anarthric

REFLEXES:

Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive) — Grade: 1

	Left	Right
Patellar	3	2
Biceps	1	2
Tricep	1	2
Brachioradial	1	2
Achilles	2	2

Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal) — Grade: 1

	Left	Right
Plantar	A	P
Babinski	P	A
Ankle Clonus	A	A
Abdominal	P	P
Hoffman	P	A

Appendix J (Cont'd)
Page 19, No. 2

Grade

SENSORY: 1
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction)

	Response	Location
Vibration	A	Left foot
Pinprick	A	Right leg
Light touch	A	Right leg
Position sense	N	
Stereognosis	N	

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations 1

Yes ______ No X_____

Gait: Normal X Abnormal (describe also)______

Muscle Tone: Spastic ____ Flaccid ___

Rigid ______ Normal X

Muscle Strength (indicate specific muscle weakness)

Weakness left arm and left leg

Appendix J (Cont'd)
Page 20, No. 2

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
N Finger to nose	
N Dysdiadochokinesia	
A-E Tandem gait	
N Heel to knee	
N Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____ Spontaneous movements (describe)	
_____ Cog Wheel Rigidity	
_____ Mask like facies	
_____ Decreased eyeblinks	
_____ Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. all within normal limits — 7. "	
2. " — 8. "	
3. " — 9. "	
4. " — 10. "	
5. " — 11. weakness in trapezius	
6. " — 12. "	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____ Normal Neurological	
X Abnormal Neurological	
_____ Equivocal	

Appendix J (Cont'd)
Page 21, No. 2

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
__X__Motor	
__X__Sensory	
__X__Mentation and Behavior	
3. Anatomical Location (check)	2
_____Primary Muscle Dysfunction	
__X__Peripheral Nerve or Root Dysfunction	
__X__Spinal Cord	
_____Brain Stem	
_____Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Radiculopathy & Myelopathy	Mass lesion (Tumor or cervical spondylosis)

Appendix J (Cont'd)
Page 22, No. 2

Grade ______

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders)

Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	
Infectious	Granuloma
Traumatic	
Autoimmune	
Metabolic	Diabetes (family history)
Inherited	
Neoplastic (or mass lesion)	(Cervical disc (soft) Spondylitis) (Tumor or cervical spondylosis)
Cardiac Dysfunction	
Degenerative or Demyelinating	Multiple Sclerosis? (Syringomyelia)
Others	Peripheral venous insufficiency with slight varicosities in legs

9. TESTS (laboratory tests and other diagnostic procedures)

Total points= 5

Specific Neurodiagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
Spine X-ray	CBC, FBS, 2HR PPBS GT & Curve,
Lumbar Puncture	ESR
(EMG (Nerve Conduction Times (Chronaxie Times	
Myelogram	

Appendix J (Cont'd)
Page 23, No. 2

	Grade
10. THERAPY	Total points= 2

Specific	Supportive
Surgical decompression	analgesics for pain

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 3

Appendix J (Cont'd)
Page 15 , No. 3

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 7/22-7/29-8/5 TYPE OF CASE: Neuro

STUDENT: SIM Treatment PATIENT'S AGE: 30

INSTRUCTOR: Dr. Kornhiser RACE: C - Male

Grade

1. CHIEF COMPLAINT(S) — Total points= 3

Unsteady walking
Weak hands

2. ONSET AND COURSE OF CHIEF COMPLAINT(S) — Total points= 6

Caucasian male reports having some difficulty and unsteadiness in walking for the past 6 months. This problem had a fairly rapid onset and has been becoming progressively worse with occasional periods of remission when the patient has been fairly symptom free. Ambulation has become significantly difficult in the past 2-3 weeks. The patient also has noted some weakness in both hands of moderate severity in the past 4-6 weeks. Additionally reported are some mild visual disturbances ("spots before the eyes") during the past 3-4 months. One episode of brief visual loss about 1 year ago was also recalled. The patient has additionally noted some occasional frontal and retroorbital cephalgia during the past year becoming slightly more notable in the past few months necessitating use of routine analgesics (i.e., aspirin, excedrin) when provide little relief.

3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) — 1

Endocrine Dysfunction	_____
Cancer	_____
Tuberculosis	_____
Neurosis, Psychosis	_____
Cardiovascular Disease	(Father) Died of heart attack
Other	_____

Appendix J (Cont'd)
Page 16, No. 3

	Grade
MEDICAL HISTORY	
Previous Hospitalization: As below	1
Allergies: Seasonal allergies	1
Medications: Aspirin	1
Accidents: Slipped in bathtub Car accident	1
Surgery: Appendix - 1967 Left Knee - 1959	1
Diseases: Mumps, measles (childhood)	1
Habits: No smoke, no drink	1
	1
SOCIAL HISTORY (Work, Hobbies, Recreation) Real estate salesman Baseball	Total points= 9
4. SYSTEMS REVIEW (if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, <u>Neuro-Muscular</u>) Respiratory - sinus Skeletal - Knee operation Elbow pain steroid injection Injured back	Total points= 4

Appendix J (Cont'd)
Page 17, No. 3

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera) Normal coloration ____ Physical Development (Asthenic, Obsese, etc.) Mesomorphic muscular ____	1
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ____________	
Rhythm __________	
Murmurs _________	
Neck Auscultation	
Bruits __________	
Ophthalmoscopic (GRI-IV)	
Vessels _________	
Disc ____________	
Retina __________	
MENTAL STATUS:	1
State of Consciousness (check)	
_X__ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix J (Cont'd)
Page 18, No. 3

	Grade
Speech and Language Function	
____ **Aphasic or dysphasic**	
____ **Dysarthric or anarthric**	

REFLEXES:

	Grade
Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive)	1

	Left	Right
Patellar	3	3
Biceps	3	3
Tricep	3	3
Brachioradial	3	3
Achilles	2-3	2-3

	Grade
Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal)	1

	Left	Right
Plantar	A	A
Babinski	P	P
Ankle Clonus	A	P
Abdominal	A	A
Hoffman	P	P

Appendix J (Cont'd)
Page 19, No. 3

Grade

SENSORY:
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction) — 1

	Response	Location
Vibration	A	legs (feet) R & L
Pinprick	N	
Light touch	N	
Position sense	A	legs (Large toes) R&L
Stereognosis	N	

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations — 1

Yes ______ No __X__

Gait: Normal ____ Abnormal (describe also) ______

Ataxic and wide based

Muscle Tone: Spastic ____ Flaccid ____

Rigid ______ Normal __X__

Muscle Strength (indicate specific muscle weakness)

No notable weakness except hands

Appendix J (Cont'd)
Page 20, No. 3

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
__A__ Finger to nose	
__A__ Dysdiadochokinesia	
__A__ Tandem gait	
__A__ Heel to knee	
__A__ Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____ Spontaneous movements (describe)	
_____ Cog Wheel Rigidity	
_____ Mask like facies	
_____ Decreased eyeblinks	
_____ Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. All intact except CII R L 7. _____	
2. Field deficit 8. _____	
3. _____ 9. _____	
4. _____ 10. _____	
5. _____ 11. _____	
6. _____ 12. _____	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____ Normal Neurological	
__X__ Abnormal Neurological	
_____ Equivocal	

Appendix J (Cont'd)
Page 21, No. 3

	Grade
2. **Assessment of Area of Neurological System Dysfunction (check)**	2
__X__ **Motor**	
__X__ **Sensory**	
_____ **Mentation and Behavior**	
3. Anatomical Location (check)	2
_____ **Primary Muscle Dysfunction**	
__X__ **Peripheral Nerve or Root Dysfunction** (optic nerve involvement)	
__X__ **Spinal Cord**	
__X__ **Brain Stem**	
_____ **Cerebral Hemispheres**	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Myelopathy; optic neuritis	Demyelinating disorder (Multiple Sclerosis)
Arthritis (by history)	Elbow & Knee

Appendix J (Cont'd)
Page 22, No. 3

Grade ______

8. **DIFFERENTIAL DIAGNOSIS** (identify no more than three neuro-logical disorders) — **Total points= 5**

General Pathology Category:	Specific Type of Pathology:
Vascular	______
Infectious	______
Traumatic	______
Autoimmune	______
Metabolic	______
Inherited	Spino cerebellar disease
Neoplastic (or mass lesion)	Tumor (Spinal canal, cerebellum, cervical disc)
Cardiac Dysfunction	______
Degenerative or Demyelinating	______
Others Systems	Arthritis (elbow)

9. **TESTS** (laboratory tests and other diagnostic procedures) — **Total points= 5**

Specific Neuro-diagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
EEG	CBC, Urinalysis
Brain Scan	ESR, RA Test
Lumbar Puncture ($\bar{c}$ protein or Immuno electrophoresis)	Chest X-ray
Visual Fields & Acuity	______
______	______
(4 points)	(1 point)

Appendix J (Cont'd)
Page 23, No. 3

	Grade
10. THERAPY	Total points= 2

Specific	Supportive
ACTH or Steroids	Diet
	Avoid hot baths
	Vitamins

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 4

Appendix J (Cont'd)
Page 15 , No. 4

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 7/22-7/29-8/5 TYPE OF CASE: Neurological

STUDENT: SIM Treatment PATIENT'S AGE: 32

INSTRUCTOR: Dr. Kornhiser RACE: C - Male

Grade

1. CHIEF COMPLAINT(S) — Total points= 3

Weakness right arm
Weakness right leg
Memory loss

2. ONSET AND COURSE OF CHIEF COMPLAINT(S) — Total points= 6

Five months ago the patient noted development of weakness of right arm and leg over period of 24 hours. This problem has become progressively worse since that time producing notable difficulty in walking and marked restriction of use of right upper extremity. Patient also reports that some numbness and tingling on the right side were noted about 2 months prior to the onset of weakness. During the past 2 months patient has been aware of some significant problems with memory. Patient reports having consulted two physicians and being told he had suffered a "small stroke." No additional complaints are elicited, other than awareness of increasing depression over present problem.

3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) — 1

Endocrine Dysfunction	(Mother-Diabetes)
Cancer	____
Tuberculosis	Wife
Neurosis, Psychosis	____
Cardiovascular Disease	____
Other	(Father-Asthma)

Appendix J (Cont'd)
Page 16, No. 4

	Grade
MEDICAL HISTORY	
Previous Hospitalization: Pneumonia (1969)	1
Allergies: Penicillin	1
Medications: Isoniazid (no vitamin supplement)	1
Accidents: Fall on back (1968)	1
Surgery: None reported	1
Diseases: Small pox (childhood) Pneumonia	1
Habits: Cigarettes (1 pack per day); Alcohol (socially)	1
	1
SOCIAL HISTORY (Work, Hobbies, Recreation)	Total points= 9
Graduate student MSU in research Enjoys shuttle badminton	
4. SYSTEMS REVIEW (if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, <u>Neuro</u>-<u>Muscular</u>)	Total points= 4
Gastro-intestinal - "upset stomach" Neuro-muscular - No headaches; see chief complaints Respiratory - Contact with TB	

Appendix J (Cont'd)
Page 17, No. 4

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera) Dark coloration, Sclera clear	1
Physical Development (Asthenic, Obsese, etc.) Muscular well-developed	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ______	
Rhythm ______	
Murmurs ______	
Neck Auscultation	
Bruits ______	
Ophthalmoscopic (GRI-IV)	
Vessels ______	
Disc ______	
Retina ______	
MENTAL STATUS:	1
State of Consciousness (check)	
X Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix J (Cont'd)
Page 18, No. 4

	Grade
Speech and Language Function	
____ **Aphasic or dysphasic**	
____ **Dysarthric or anarthric**	

REFLEXES:

Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive) — Grade: 1

	Left	Right
Patellar	2	3
Biceps	2	3
Tricep	2	3
Brachioradial	2	3
Achilles	2	2-3

Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal) — Grade: 1

	Left	Right
Plantar	P	A
Babinski	A	P
Ankle Clonus	A	P
Abdominal	P	P
Hoffman	A	P

Appendix J (Cont'd)
Page 19, No. 4

	Grade
SENSORY: (Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction)	1

	Response	Location
Vibration	N	
Pinprick	N	
Light touch	N	
Position sense	N	
Stereognosis	A-E	Rt. hand

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations — Grade: 1

Yes ______ No X

Gait: Normal ____ Abnormal (describe also) X

Hemiparetic gait with reduced right arm swing and flexion arm attitude: right leg slightly externally rotated.

Muscle Tone: Spastic ____ Flaccid x

Rigid ______ Normal ____

Muscle Strength (indicate specific muscle weakness)

Weakness right arm and hand (Marked)

Some weakness right leg and thigh.

Appendix J (Cont'd)
Page 20, No. 4

Grade

CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal) — 1

A-E Finger to nose

A Dysdiadochokinesia

A-E Tandem gait

A-E Heel to knee

Probably due to pyramidal weakness and to cerebellar dysfunction

N Romberg

EXTRAPYRAMIDAL (check appropriate headings) — 1

____ Spontaneous movements (describe)

____ Cog Wheel Rigidity

____ Mask like facies

____ Decreased eyeblinks

X Loss of arm swing

CRANIAL NERVES: (indicate nerves checked and if pathology present.) — 1

1. All within normal limits	7. "
2. "	8. "
3. "	9. "
4. "	10. "
5. "	11. "
6. "	12. "

Total points= 10

6. SUMMARY

1. General Results: (check) — 1

____ Normal Neurological

X Abnormal Neurological

____ Equivocal

Appendix J (Cont'd)
Page 21, No. 4

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
__x__ Motor	
__x__ Sensory	
__x__ Mentation and Behavior	
3. Anatomical Location (check)	2
_____ Primary Muscle Dysfunction	
_____ Peripheral Nerve or Root Dysfunction	
_____ Spinal Cord	
_____ Brain Stem	
__x__ Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Encephalopathy	Cerebral Neoplasm

Appendix J (Cont'd)
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Grade

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders) — Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	Cerebral Thrombosis (Middle cerebral artery or secondary to internal carotid obstruction)
Infectious	TB Granuloma
Traumatic	
Autoimmune	
Metabolic	Diabetes Mellitus (predisposing to early cerebral vascular disease)
Inherited	
Neoplastic (or mass lesion)	
Cardiac Dysfunction	
Degenerative or Demyelinating	
Others Systems	Pulmonary Tuberculosis Chronic Gastritis, Gastric or Duodenal Ulcer

9. TESTS (laboratory tests and other diagnostic procedures) — Total points= 5

Specific Neuro-diagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
Skull X-rays	
Lumbar Puncture	CBC ESR
EEG: Brain Scan	FBS, 2 Hr. PPNS, GTC
Echoencephalogram	Chest X-ray
Ophthalmodynamometry	
Cerebral Angiogram and/or Pneumoencephalogram	
(4 points)	(1 point)

Appendix J (Cont'd)
Page 23, No. 4

	Grade
10. THERAPY	Total points= 2

Specific	Supportive
Craniotomy	Physical Therapy
Chemotherapy (?)	

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 5

Appendix J (Cont'd)
Page 15, No. 5

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 8/9-8/16-8/23 TYPE OF CASE: Neurological

STUDENT: SIM Treatment PATIENT'S AGE: 36

INSTRUCTOR: Dr. Jacobson RACE: C - Female

	Grade
1. CHIEF COMPLAINT(S) Visual Disturbances Headaches (9 months)	Total points= 3
2. ONSET AND COURSE OF CHIEF COMPLAINT(S) Patient was seen because of major complaints of visual disturbances during the past five months with some headaches of 9 months duration. Patient reported that this difficulty began by appearing as double vision with intermittent occurrences of spots before the eyes. The patient did consult an optometrist for corrective lenses which did not appear to produce any significant improvement. The patient's problem has been intermittent but has gotten somewhat progressively worse over the five-month period. Associated with this difficulty has been headaches which appear to be somewhat throbbing in character and occur intermittently. For the latter difficulty the patient has taken aspirin and other routine analgesics, which have produced little relief. The patient also reports in retrospect some weakness in both hands-associated numbness that has been present during the past two months. (Continued on attached sheet)	Total points= 6
3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) Endocrine Dysfunction Thyroid (Mother) Cancer _____ Tuberculosis _____ Neurosis, Psychosis _____ Cardiovascular Disease HBP (Father) Other Gallbladder (Mother)	1

Appendix J (Cont'd)
Page 15, No. 5

2. ONSET AND COURSE OF CHIEF COMPLAINT(S) (Cont'd)

The latter problem does not appear to be particularly notable but the patient has been aware that she has occasionally been dropping objects which is not a usual occurrence. Additional questioning reveals that the patient has also noted some dizziness occurring intermittently during the past four months; as well as some distinct urinary frequency also present during the same period of time. History of accident 9 months ago with head trauma.

Appendix J (Cont'd)
Page 16, No. 5

	Grade
MEDICAL HISTORY	
Previous Hospitalization: Breast Biopsy (1970)	1
Allergies: "Hay Fever"	1
Medications: Aspirin Antihist	1
Accidents: Car accident (1971)	1
Surgery: Breast Biopsy Suture Forehead	1
Diseases: Chicken Pox Measles	1
Habits: Smokes (1 1/2 pkg) Drinks socially	1
	1
SOCIAL HISTORY (Work, Hobbies, Recreation) Graduate student Teaching Travel	Total points= 9
4. SYSTEMS REVIEW (if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular) OM Gyn - Breast Biopsy GV - Urinary GI - Epigastric distress, anorexia, nausea Neuro-Muscular - C.C.	Total points= 4

Appendix J (Cont'd)
Page 17, No. 5

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera)	1
Normal Pallor	
Physical Development (Asthenic, Obsese, etc.)	
Normal build	
Varicosities - Legs General Asthenictype	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ____________	
Rhythm __________	
Murmurs __________	
Neck Auscultation	
Bruits __________	
Ophthalmoscopic (GRI-IV)	
Vessels __________	
Disc ____________	
Retina __________	
MENTAL STATUS:	1
State of Consciousness (check)	
X Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix J (Cont'd)
Page 18, No. 5

	Grade
Speech and Language Function	
____ Aphasic or dysphasic	
____ Dysarthric or anarthric	
REFLEXES:	
Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive)	1
Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal)	1

	Left	Right
Patellar	3	3
Biceps	3	3
Tricep	3	3
Brachioradial	3	3
Achilles	2-3	2-3

	Left	Right
Plantar	A	A
Babinski	P	P
Ankle Clonus	A	A
Abdominal	A	A
Hoffman	P	P

Appendix J (Cont'd)
Page 19, No. 5

	Grade
SENSORY: (Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction)	1

	Response	Location
Vibration	out	Rt & Lt feet below knee
Pinprick	out	Rt & Lt arms, Rt. to elbow-Lt. to shoulder
Light touch	out	Rt & Lt arms, Rt. to elbow-Lt. to shoulder
Position sense	N	N
Stereognosis	N	N

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations — Grade: 1

Yes ______ No __X__

Gait: Normal __X__ Abnormal (describe also) ______

____

Muscle Tone: Spastic ____ Flaccid ____

Rigid ______ Normal __X__

Muscle Strength (indicate specific muscle weakness)

Very slight hand weakness

____

____

____

____

Appendix J (Cont'd)
Page 20, No. 5

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
A-E Finger to nose	
N Dysdiadochokinesia	
N Tandem gait	
N Heel to knee	
N Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____ Spontaneous movements (describe)	
_____ Cog Wheel Rigidity	
_____ Mask like facies	
_____ Decreased eyeblinks	
_____ Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. All within normal limits 7. "	
2. " 8. "	
3. " 9. "	
4. " 10. "	
5. " 11. "	
6. " 12. "	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____ Normal Neurological	
X Abnormal Neurological	
_____ Equivocal	

Appendix J (Cont'd)
Page 21, No. 5

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
__x__ Motor	
__x__ Sensory	
_____ Mentation and Behavior	
3. Anatomical Location (check)	2
_____ Primary Muscle Dysfunction	
__2__ Peripheral Nerve or Root Dysfunction	
__1__ Spinal Cord	
__1__ Brain Stem	
__2__ Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Myelopathy (Demyelination)	Multiple Sclerosis
Encephalopathy Periph.	
Neuropathy (C-II)	

Appendix J (Cont'd)
Page 22, No. 5

Grade ______

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders)

Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	Brain Stem Infarction
Infectious	
Traumatic	Cervical Disc; Post-Traumatic Syndrome
Autoimmune	
Metabolic	Diabetes
Inherited	
Neoplastic (or mass lesion)	Intracranial Tumor
Cardiac Dysfunction	
Degenerative or Demyelinating	Posterolateral Sclerosis (PA or gastric absorption deficit)
Others	Chronic Gastritis, ulcer

9. TESTS (laboratory tests and other diagnostic procedures)

Total points= 5

Specific Neuro-diagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
EEG, Skull X-ray, Cervical Spine X-ray	CBC, FBS, 2 Hr. PPBS, GTC
Lumbar Puncture with Globulin	ESR, Schillings B_{12}
Brain Scan	GI Studies Chest X-ray
Visual Fields and Acuity	
(3 points)	(1 point)

Appendix J (Cont'd)
Page 23, No. 5

Grade

10. THERAPY

Total points= 2

Specific	Supportive
ACTH or Steroids	Vitamins
	No hot baths

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 6

Appendix J (Cont'd)
Page 15 No. 6

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 8/9-8/16-8/23 TYPE OF CASE: Neurological

STUDENT: SIM Treatment PATIENT'S AGE: 27

INSTRUCTOR: Dr. Jacobson RACE: C - Male

Grade

1. CHIEF COMPLAINT(S) — Total points= 3

Back pain (six weeks duration) with Right Thigh Radiation

2. ONSET AND COURSE OF CHIEF COMPLAINT(S) — Total points= 6

The patient was seen because of severe back pain for the past six weeks. Pain evidently was initiated while the patient was performing some stretching and lifting maneuvers at home at which time he feels he greatly "strained" his back. The patient also has noted some numbness and tingling on the right anterior thigh with some occasional pain radiation that tends to be noted in the same area. The patient has found that rest seems to help his discomfort and is greatly aggravated by exercise. Heat, hot baths and Ben-Gay have all afforded negligible relief. The patient has also utilized aspirin and other common analgesics without success. He reports, in addition, having seen a chiropractor several days following the onset of discomfort but noted no distinct relief following manipulative procedures.

3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) — 1

Endocrine Dysfunction ______
Cancer ______
Tuberculosis ______
Neurosis, Psychosis ______
Cardiovascular Disease HBP (grandmother)
Other Rheumatoid Arthritis

Appendix J (Cont'd)
Page 16, No. 6

	Grade
MEDICAL HISTORY	
Previous Hospitalization: Tonsils (1955) Bronchial cyst (1958-60)	1
Allergies: Seasonal Hay Fever plus several food allergies	1
Medications: Antihistamine Aspirin - Excedrin- Ben-Gay	1
Accidents: Fractures (1964-63-62-59-61)	1
Surgery: See Previous Hospitalization	1
Diseases: Measles Mumps Chicken Pox	1
Habits: Drinks socially	1
	1
SOCIAL HISTORY **(Work, Hobbies, Recreation)** Fork-lift Driver Guns Hunting Fishing	**Total points= 9**
4. SYSTEMS REVIEW **(if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)**	**Total points= 4**
Neuromuscular - (see fractures) Respiratory - Foods GI - Stomach discomfort ("queasy")	

Appendix J (Cont'd)
Page 17, No. 6

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera) No Pallor ____	1
Physical Development (Asthenic, Obsese, etc.) Medium build - good muscular build and development ____	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ____	
Rhythm ____	
Murmurs ____	
Neck Auscultation	
Bruits ____	
Ophthalmoscopic (GRI-IV)	
Vessels ____	
Disc ____	
Retina ____	
MENTAL STATUS:	1
State of Consciousness (check)	
_X_ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix J (Cont'd)
Page 18, No. 6

Grade

Speech and Language Function

____ Aphasic or dysphasic

____ Dysarthric or anarthric

REFLEXES:

Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive) 1

	Left	Right
Patellar	2	0
Biceps	0-1	0-1
Tricep	0-1	0-1
Brachioradial	0-1	0-1
Achilles	2	2

Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal) 1

	Left	Right
Plantar	A-E	A-E
Babinski	A	A
Ankle Clonus	A	A
Abdominal	P	P
Hoffman	A	A

Appendix J (Cont'd)
Page 19, No. 6

Grade

SENSORY:
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction) — Grade: 1

	Response	Location
Vibration	N	
Pinprick	A	Anterior thigh to below knee on Rt.
Light touch	A	"
Position sense	N	
Stereognosis	N	

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations — Grade: 1

Yes ______ No X

Gait: Normal X **Abnormal** (describe also) ______

______

Muscle Tone: Spastic ____ Flaccid ___

Rigid ______ Normal X

Muscle Strength (indicate specific muscle weakness)

Femoral Nerve Stretch (Eliah's)

Laseques (back pain no radiation on right)

Weakness Rt. quadrups

Appendix J (Cont'd)
Page 20, No. 6

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
__N__ Finger to nose	
__N__ Dysdiadochokinesia	
__N__ Tandem gait	
__N__ Heel to knee	
__N__ Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____ Spontaneous movements (describe)	
_____ Cog Wheel Rigidity	
_____ Mask like facies	
_____ Decreased eyeblinks	
_____ Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. All within normal limits 7. "	
2. " 8. "	
3. " 9. "	
4. " 10. "	
5. " 11. "	
6. " 12. "	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____ Normal Neurological	
__X__ Abnormal Neurological	
_____ Equivocal	

Appendix J (Cont'd)
Page 21, No. 6

Grade

2. Assessment of Area of Neurological System Dysfunction (check) — 2

 x Motor

 x Sensory

 ___ Mentation and Behavior

3. Anatomical Location (check) — 2

 ___ Primary Muscle Dysfunction

 X Peripheral Nerve or Root Dysfunction

 ___ Spinal Cord

 ___ Brain Stem

 ___ Cerebral Hemispheres

Total points= 5

7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)

Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Radiculopathy	Lumbar Disc Herniation

Appendix J (Cont'd)
Page 22, No. 6

Grade ______

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders)

Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	
Infectious	
Traumatic	
Autoimmune	
Metabolic	Diabetes
Inherited	
Neoplastic (or mass lesion)	Tumor of Lumbar Spine
Cardiac Dysfunction	
Degenerative or Demyelinating	
Others	Nerve Entrapment

9. TESTS (laboratory tests and other diagnostic procedures)

Total points= 5

Specific Neurodiagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
Lumbar Spine X-rays	
EMG and nerve conduction studies	CBC/FBS/2 Hr. PPBS/ESR
Lumbar Puncture and Myelogram	

Appendix J (Cont'd)
Page 23, No. 6

Grade

10. THERAPY

Total points= 2

Specific	Supportive
Pelvic Traction	Analgesics
Bed Rest	Muscle relaxant
Surgery if necessary	

COMMENTS

Note: All Practical Exams **have maximum score** of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 7

Appendix J (Cont'd)
Page 15, No. 7

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 8/9-8/16-8/23 **TYPE OF CASE:** Neurological

STUDENT: SIM Treatment **PATIENT'S AGE:** 38

INSTRUCTOR: Dr. Jacobson **RACE:** C - Male

Grade

1. CHIEF COMPLAINT(S) — **Total points= 3**

Neck pain with some radiation down right arm and associated numbness and weakness - approximately three months duration

2. ONSET AND COURSE OF CHIEF COMPLAINT(S) — **Total points= 6**

The patient was seen in the office noting neck pain with some distinct radiation down the right arm as well as some associated numbness most evidenced in the thumb and index finger of the right hand and some minimal weakness in right-hand function. This discomfort apparently began with an automobile accident three months ago at which time the patient's car was struck in the rear, and the patient apparently suffered a "whiplash" injury. In addition, the patient's head struck the front windshield and he suffered some severe contusions of the forehead. The patient also reports some dizziness and cephalgia which were present at the onset of this discomfort, but appear to be resolving during the last three months, but still cause periodic discomfort. The patient also notes a good deal of associated anxiety and tension since his accident. Analgesic medication has given little relief from his discomfort, and the patient apparently is also*

3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) — 1

Endocrine Dysfunction	Diabetes
Cancer	
Tuberculosis	
Neurosis, Psychosis	Epilepsy
Cardiovascular Disease	HBP
Other	

*being treated with tranquilizers prescribed by a physician who has been examining him since the accident.

Appendix J (Cont'd)
Page 16, No. 7

	Grade
MEDICAL HISTORY	
Previous Hospitalization: Fractured skull (1952) Open reduction elbow (1955)	1
Allergies: None	1
Medications: Valium Darvon compound	1
Accidents: Car accident (6 months ago) Kicked in the head (1952) Motorcycle accident (1956) Trampoline - elbow dislocation & fracture (1955)	1
Surgery: Appendectomy (1968) Open reduction left elbow	1
Diseases: Measles - Chicken Pox	1
Habits: Smokes (1 pkg per day)	1
	1
SOCIAL HISTORY (Work, Hobbies, Recreation) Accountant Water ski Tennis	**Total points= 9**
4. **SYSTEMS REVIEW** (if appropriate) **(Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)**	**Total points= 4**
Neuromuscular - Fractured skull Right shoulder Left elbow Left knee	

Appendix J (Cont'd)
Page 17, No. 7

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: **Coloration (Skin, Sclera)** No abnormal pigmentation or jaundice	1
Physical Development (Asthenic, Obsese, etc.) Normal	
Muscle development	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ____________	
Rhythm __________	
Murmurs _________	
Neck Auscultation	
Bruits __________	
Ophthalmoscopic **(GRI-IV)**	
Vessels _________	
Disc ____________	
Retina __________	
MENTAL STATUS:	1
State of Consciousness (check)	
_X_ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Page 18

	Grade
Speech and Language Function	
____ Aphasic or dysphasic	
____ Dysarthric or anarthric	
REFLEXES:	
Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive)	1
Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal)	1

Deep Tendon:

	Left	Right
Patellar	2	2
Biceps	2	0
Tricep	2	1
Brachioradial	0-1	0-1
Achilles	2	2

Pathological or Superficial:

	Left	Right
Plantar	P	P
Babinski	A	A
Ankle Clonus	A	A
Abdominal	P	P
Hoffman	A	A

Appendix J (Cont'd)
Page 19, No. 7

Grade

SENSORY: — Grade: 1
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction)

	Response	Location
Vibration	N	
Pinprick	A	Rt. thumb& index finger
Light touch	A	"
Position sense	N	
Stereognosis	N	

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations — Grade: 1

Yes X RT. **No** ______

Gait: **Normal** X **Abnormal (describe also)** ______

____

Muscle Tone: Spastic ____ **Flaccid** ____

Rigid ______ **Normal** X

Muscle Strength (indicate specific muscle weakness)

Left - slight limitation of elbow flexion

____

Right - Biceps and triceps weakness

____

____

Appendix J (Cont'd)
Page 20, No. 7

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
__N__Finger to nose	
__N__Dysdiadochokinesia	
__N__Tandem gait	
__N__Heel to knee	
__N__Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____Spontaneous movements (describe)	
_____Cog Wheel Rigidity	
_____Mask like facies	
_____Decreased eyeblinks	
_____Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. All within normal limits 7. "	
2. " 8. "	
3. " 9. "	
4. " 10. "	
5. " 11. "	
6. " 12. "	Total points= 10

6. SUMMARY

1. General Results: (check)	1
_____Normal Neurological	
__X__Abnormal Neurological	
_____Equivocal	

Appendix J (Cont'd)
Page 21, No. 7

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
__X__ Motor	
__X__ Sensory	
_____ Mentation and Behavior	
3. Anatomical Location (check)	2
_____ Primary Muscle Dysfunction	
__X__ Peripheral Nerve or Root Dysfunction	
_____ Spinal Cord	
_____ Brain Stem	
_____ Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Radiculopathy	Cervical Disc
Arthropathy	Traumatic Arthritis

Appendix J (Cont'd)
Page 22, No. 7

Grade

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders)

Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	Thoracic Outlet Syndrome
Infectious	
Traumatic	Ruptured Disc
Autoimmune	
Metabolic	Diabetes
Inherited	
Neoplastic (or mass lesion)	Tumor
Cardiac Dysfunction	
Degenerative or Demyelinating	Cervical Spondylosis
Others	Carpal Tunnel

9. TESTS (laboratory tests and other diagnostic procedures)

Total points= 5

Specific Neuro-diagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
	Chest X-ray
Cervical Spine X-ray	CBC, ESR, FBS, 2 Hr. PPBS,
EMG	GTC, VA
Nerve Conduction	
Lumbar puncture and myelogram	

Appendix J (Cont'd)
Page 23, No. 7

10. THERAPY		Grade
Specific	**Supportive**	Total points= 2
Cervical Traction	Analgesics	
Surgery for cervical decompression (laminectomy with fusion)	Muscle relaxant	

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

SIMULATED CASE 8

Appendix J (Cont'd)
Page 15, No. 8

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: Summer 1972 8/9-8/16-8/23 **TYPE OF CASE:** Neurological

STUDENT: SIM Treatment **PATIENT'S AGE:** 29

INSTRUCTOR: Dr. Jacobson **RACE:** C - Male

Grade

1. CHIEF COMPLAINT(S) — **Total points= 3**

Headaches (three (3) months duration)
Dizziness

2. ONSET AND COURSE OF CHIEF COMPLAINT(S) — **Total points= 6**

This patient was seen because of a primary complaint of severe generalized cephalgia for the past three months. The pain appears to be constant and throbbing and appears to be becoming progressively worse over this period of time. The onset is associated with a motorcycle accident three months ago when the patient suffered head trauma. Skull X-rays at that time were negative but the patient did suffer a "rib separation". No additional abnormal diagnostic findings were reported. The patient has also noted a good deal of dizziness during this period of time but this appears to be improving in recent weeks. The patient has also been aware, in the last three to four weeks, of tingling and numbness of the right side of the body. Additionally reported, in the past two weeks are some visual difficulties that are described as blurring or double vision. The patient also notes that he has a good deal of trouble concentrating on*

3. PAST HISTORY (Mother, Father, Wife, Siblings, Children) — 1

Endocrine Dysfunction Diabetes (grandfather)
Cancer ______
Tuberculosis ______
Neurosis, Psychosis ______
Cardiovascular Disease MI (Father)
Other ______

*things recently and appears to be occasionally forgetful. Increased irritability has also been noted within the past few months which the patient attributes to the constant headaches and discomfort he has had.

Appendix J (Cont'd)
Page 16, No. 8

	Grade
MEDICAL HISTORY	
Previous Hospitalization: None	1
Allergies: None	1
Medications: Aspirin and Darvon	1
Accidents: Present accident (1972) Three months ago	1
Surgery: None	1
Diseases: Chicken Pox - Measles	1
Habits: Coffee (20 cups per day)	1
	1
SOCIAL HISTORY **(Work, Hobbies, Recreation)** Construction work - Engineering Survey - Motorcycle Hunt - Fish	**Total points= 9**
4. SYSTEMS REVIEW **(if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)**	**Total points= 4**
GI - Epigast pain, occasional nausea Neuromuscular - (Rib separation)	

Appendix J (Cont'd)
Page 17, No. 8

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera)	1
No pallor or Icterus	
Physical Development (Asthenic, Obsese, etc.)	
Medium built -	
Muscular - well developed	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ____________	
Rhythm ____________	
Murmurs ____________	
Neck Auscultation	
Bruits ____________	
Ophthalmoscopic (GRI-IV)	
Vessels ____________	
Disc ____________	
Retina ____________	
MENTAL STATUS:	1
State of Consciousness (check)	
_x_ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix J (Cont'd)
Page 18, No. 8

	Grade
Speech and Language Function	
____ Aphasic or dysphasic	
____ Dysarthric or anarthric	

REFLEXES:

Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive) — Grade: 1

	Left	**Right**
Patellar	1-2	3
Biceps	1-2	1-2
Tricep	1-2	1-2
Brachioradial	1-2	1-2
Achilles	1-2	1-2

Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal) — Grade: 1

	Left	**Right**
Plantar	P	A
Babinski	A	P
Ankle Clonus	A	A
Abdominal	P	P
Hoffman	A	A

Appendix J (Cont'd)
Page 19, No. 8

	Grade
SENSORY: (Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction)	1

	Response	Location
Vibration	N	N
Pinprick	N	N
Light touch	N	N
Position sense	A	Rt. hand
Stereognosis	A	Rt. hand

	Grade
MUSCLE FUNCTION AND GAIT: (check appropriate headings)	
Fasiculations	1

Yes ______ No __X__

Gait: Normal __X__ Abnormal (describe also) ______

____

Muscle Tone: Spastic ____ Flaccid ___

Rigid ______ Normal __X__

Muscle Strength (indicate specific muscle weakness)

None

Appendix J (Cont'd)
Page 20, No. 8

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
__N__ Finger to nose	
__N__ Dysdiadochokinesia	
__N__ Tandem gait	
__N__ Heel to knee	
__N__ Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____ Spontaneous movements (describe)	
_____ Cog Wheel Rigidity	
_____ Mask like facies	
_____ Decreased eyeblinks	
_____ Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1. All within normal limits 7. "	
2. " 8. "	
3. " 9. "	
4. " 10. "	
5. " 11. "	
6. " 12. "	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____ Normal Neurological	
__X__ Abnormal Neurological	
_____ Equivocal	

Appendix J (cont'd)
Page 21, No. 8

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
__X__ Motor	
__X__ Sensory	
_____ Mentation and Behavior	
3. Anatomical Location (check)	2
_____ Primary Muscle Dysfunction	
_____ Peripheral Nerve or Root Dysfunction	
_____ Spinal Cord	
_____ Brain Stem	
_X 1_ Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
Encephalopathy	Sub-dural

Appendix J (Cont'd)
Page 22, No. 8

Grade

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders)

Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	Aneurysm
Infectious	
Traumatic	Skull and/or cervical spine fracture
Autoimmune	
Metabolic	
Inherited	
Neoplastic (or mass lesion)	Tumor
Cardiac Dysfunction	
Degenerative or Demyelinating	
Others	Chronic gastritis - ulcer

9. TESTS (laboratory tests and other diagnostic procedures)

Total points= 5

Specific Neurodiagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
EEG, Skull X-ray	CBC, ESR, FBS, GTT
Brain Scan, Cervical	Chest X-ray UA
Spine X-rays, Lumbar puncture	
Echoencephalogram	
Angiogram	

Appendix J (Cont'd)
Page 23, No. 8

Grade

Total points= 2

10. THERAPY

Specific	**Supportive**
Craniotomy	Physical Therapy

COMMENTS

Note: **All Practical Exams have maximum score of 54 points.**
All Exams are standardized on a 54 point basis.

APPENDIX K

CLINIC ROTATION SCHEDULE

APPENDIX K

(REVISED)

CLINIC ROTATION SCHEDULE

FIRST YEAR CLASS

SUMMER QUARTER 1972

PROGRAM COORDINATORS:

LAWRENCE E. JACOBSON, D.O.
ACTING CHAIRMAN

FRED C. TINNING
ADMINISTRATIVE ASSISTANT

DEPARTMENT OF OSTEOPATHIC MEDICINE

Appendix K (Cont'd)
Page 2

GENERAL INSTRUCTIONS

1. Students will wear clinic uniforms at all clinic meetings. Uniform requirements will be white lab type jacket, white pants, white shoes, shirt (any color) with collar and tie, and identification plate.

2. All clinic services will meet at 1:30 p.m., unless otherwise indicated.

3. 100% attendance is mandatory at all clinics. If any student cannot attend any clinic, the following must be notified:

    a. Office of the Department of Osteopathic Medicine

    b. Individual in charge of the clinic.

4. All students are required to turn in the evaluation material of their clinical experience no later than one day after the clinical experience. This is required for Medicine, Pediatrics, and Neurology Clinics. The preceptor experiences are to be cleared with Family Medicine.

Appendix K (Cont'd)
Page 3

STUDENT NUMBER	TUESDAY June 20	WEDNESDAY June 21	THURSDAY June 22
1	Dr. Kutinsky(MPE)Med.	NEUROLOGICAL TESTING LABORATORY ROOM 200 FEE HALL	
2	Dr. Kutinsky(MPE)Med.		
3	Dr. Kutinsky(MPE)Med.		
4	Dr. Kutinsky(MPE)Med.		
5	Dr. Woodruff(FOH)Med.		
6	Dr. Woodruff(FOH)Med.		
7	Dr. Woodruff(FOH)Med.		
8	Dr. Woodruff(FOH)Med.		
9	Dr. Jamieson(Off.)Med.		
10	Dr. Jamieson(Off.)Med.		
11	Dr. Jamieson(Off.)Med.		
12	Dr. Jamieson(Off.)Med.		
13			Dr. Stanzler(FOH)Med.
14			Dr. Stanzler(FOH)Med.
15			Dr. Stanzler(FOH)Med.
16			Dr. Stanzler(FOH)Med.
17			Dr. Shillinglaw(LGH)Med.
18			Dr. Shillinglaw(LGH)Med.
19			Dr. Shillinglaw(LGH)Med.
20			Dr. Shillinglaw(LGH)Med.
21			Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23			Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25	Dr. Zarins (FOH) Peds.		
26	Dr. Zarins (FOH) Peds.		
27	Dr. Zarins (FOH) Peds.		
28			Dr. Wagner (GROH) Peds.
29			Dr. Wagner (GROH) Peds.
30	Dr. Robins (LGH) Peds.		
31	Dr. Cottrille(GROH)Peds.		
32	Dr. Robins (LGH) Peds.		
33	Dr. Robins (LGH) Peds.		
34	Dr. Cottrille(GROH)Peds.		
35	Dr. Cottrille(GROH)Peds.		
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Appendix K (Cont'd)
Page 4

STUDENT NUMBER	TUESDAY June 27	WEDNESDAY June 28	THURSDAY June 29
1	Dr. Kutinsky(MPE)Med.	Dr. Calkins (Neur.)	
2	Dr. Kutinsky(MPE)Med.		
3	Dr. Kutinsky(MPE)Med.		
4	Dr. Kutinsky(MPE)Med.		
5	Dr. Woodruff(FOH)Med.	Dr. Calkins (Neur.)	
6	Dr. Woodruff(FOH)Med.		
7	Dr. Woodruff(FOH)Med.		
8	Dr. Woodruff(FOH)Med.		
9	Dr. Jamieson(Off.)Med.		
10	Dr. Jamieson(Off.)Med.		
11	Dr. Jamieson(Off.)Med.	Det. Clinic A (Neur)	
12	Dr. Jamieson(Off.)Med.		
13		Det. Clinic A (Neur)	Dr. Stanzler(FOH)Med.
14			Dr. Stanzler(FOH)Med.
15			Dr. Stanzler(FOH)Med.
16		Dr. Jacobson (Neur.)	Dr. Stanzler(FOH)Med.
17		Dr. Jacobson (Neur.)	Dr. Shillinglaw(LGH)Med.
18			Dr. Shillinglaw(LGH)Med.
19			Dr. Shillinglaw(LGH)Med.
20		Det. Clinic A (Neur)	Dr. Shillinglaw(LGH)Med.
21		Dr. Jacobson (Neur.)	Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23			Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25	Dr. Zarins (FOH) Peds.		
26	Dr. Zarins (FOH) Peds.		
27	Dr. Zarins (FOH) Peds.		
28		Dr. Jacobson (Neur.)	Dr. Wagner(GROH)Peds.
29			Dr. Wagner(GROH)Peds.
30	Dr. Robins(LGH)Peds		
31	Dr. Cottrille(GROH)Peds.		
32	Dr. Robins(LGH)Peds.	Det. Clinic A (Neur)	
33	Dr. Robins(LGH)Peds.		
34	Dr. Cottrille(GROH)Ped.		
35	Dr. Cottrille(GROH)Ped.		
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Appendix K (Cont'd)
Page 5

STUDENT NUMBER	TUESDAY July 4	WEDNESDAY July 5	THURSDAY July 6
1	HOLIDAY		
2		Det. Clinic A (Neur)	
3			
4			
5			
6			
7			
8		Dr. Jacobson (Neur.)	
9		Det. Clinic A (Neur)	
10			
11			
12			
13			Dr. Stanzler(FOH)Med.
14			Dr. Stanzler(FOH)Med.
15		Dr. Jacobson (Neur.)	Dr. Stanzler(FOH)Med.
16			Dr. Stanzler(FOH)Med.
17			Dr. Shillinglaw(LGH)Med.
18			Dr. Shillinglaw(LGH)Med.
19		Dr. Jacobson (Neur.)	Dr. Shillinglaw(LGH)Med.
20			Dr. Shillinglaw(LGH)Med.
21			Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23		Det. Clinic A (Neur)	Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25			
26		Dr. Jacobson (Neur.)	
27		Det. Clinic B	
28			Dr. Wagner (GROH) Peds.
29		Dr. Calkins (Neur.)	Dr. Wagner (GROH) Peds.
30		Det. Clinic B	
31		Det. Clinic A	
32			
33		Dr. Calkins (Neur.)	
34			
35			
36			

Appendix K (Cont'd)
Page 6

STUDENT NUMBER	TUESDAY July 11	WEDNESDAY July 12	THURSDAY July 13
1	Dr. Kutinsky (MPE) Med.		
2	Dr. Kutinsky (MPE) Med.		
3	Dr. Kutinsky (MPE) Med.	Det. Clinic A (Neur)	
4	Dr. Kutinsky (MPE) Med.		
5	Dr. Woodruff (FOH) Med.		
6	Dr. Woodruff (FOH) Med.	Det. Clinic A (Neur)	
7	Dr. Woodruff (FOH) Med.	Dr. Calkins (Neur.)	
8	Dr. Woodruff (FOH) Med.		
9	Dr. Jamieson (Off) Med.		
10	Dr. Jamieson (Off) Med.	Det. Clinic C	
11	Dr. Jamieson (Off) Med.		
12	Dr. Jamieson (Off) Med.	Det. Clinic B	
13			Dr. Stanzler (FOH) Med.
14		Dr. Jacobson (Neur.)	Dr. Stanzler (FOH) Med.
15			Dr. Stanzler (FOH) Med.
16			Dr. Stanzler (FOH) Med.
17			Dr. Shillinglaw(LGH)Med.
18		Dr. Jacobson (Neur.)	Dr. Shillinglaw(LGH)Med.
19			Dr. Shillinglaw(LGH)Med.
20			Dr. Shillinglaw(LGH)Med.
21			Dr. Lyne (LGH) Med.
22		Det. Clinic A (Neur)	Dr. Lyne (LGH) Med.
23			Dr. Lyne (LGH) Med.
24		Dr. Jacobson (Neur.)	Dr. Lyne (LGH) Med.
25	Dr. Zarins (FOH) Peds.	Det. Clinic A (Neur)	
26	Dr. Zarins (FOH) Peds.		
27	Dr. Zarins (FOH) Peds.		
28			Dr. Wagner (GROH) Peds.
29			Dr. Wagner (GROH) Peds.
30	Dr. Robins (LGH) Peds.		
31	Dr. Cottrille (GROH) Ped.		
32	Dr. Robins (LGH) Peds.		
33	Dr. Robins (LGH) Peds.		
34	Dr. Cottrille (GROH) Ped.	Det. Clinic B	
35	Dr. Cottrille (GROH) Ped.	Dr. Jacobson (Neur.)	
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Appendix K (Cont'd)
Page 7

STUDENT NUMBER	TUESDAY July 18	WEDNESDAY July 19	THURSDAY July 20
1	Dr. Kutinsky (MPE) Med.	Dr. Calkins (Neur.)	
2	Dr. Kutinsky (MPE) Med.		
3	Dr. Kutinsky (MPE) Med.		
4	Dr. Kutinsky (MPE) Med.		
5	Dr. Woodruff (FOH) Med.	Dr. Calkins (Neur.)	
6	Dr. Woodruff (FOH) Med.		
7	Dr. Woodruff (FOH) Med.		
8	Dr. Woodruff (FOH) Med.		
9	Dr. Jamieson (Off) Med.		
10	Dr. Jamieson (Off) Med.		
11	Dr. Jamieson (Off) Med.	Det. Clinic A (Neur)	
12	Dr. Jamieson (Off) Med.		
13		Det. Clinic A (Neur)	Dr. Stanzler (FOH) Med.
14			Dr. Stanzler (FOH) Med.
15			Dr. Stanzler (FOH) Med.
16		Dr. Jacobson (Neur.)	Dr. Stanzler (FOH) Med.
17		Dr. Jacobson (Neur.)	Dr. Shillinglaw(LGH)Med.
18			Dr. Shillinglaw(LGH)Med.
19			Dr. Shillinglaw(LGH)Med.
20		Det. Clinic A (Neur)	Dr. Shillinglaw(LGH)Med.
21		Dr. Jacobson (Neur.)	Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23			Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25	Dr. Zarins (FOH) Peds.		
26	Dr. Zarins (FOH) Peds.		
27	Dr. Zarins (FOH) Peds.		
28		Dr. Jacobson (Neur.)	
29			
30	Dr. Robins (LGH) Peds.		
31	Dr. Cottrille (GROH) Peds		
32	Dr. Robins (LGH) Peds.	Det. Clinic A (Neur)	
33	Dr. Robins (LGH) Peds.		
34	Dr. Cottrille (GROH) Ped		
35	Dr. Cottrille (GROH) Ped		
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Appendix K (Cont'd)
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STUDENT NUMBER	TUESDAY July 25	WEDNESDAY July 26	THURSDAY July 27
1	Dr. Kutinsky (MPE) Med.		
2	Dr. Kutinsky (MPE) Med.	Det. Clinic A (Neur)	
3	Dr. Kutinsky (MPE) Med.		
4	Dr. Kutinsky (MPE) Med.		
5	Dr. Woodruff (FOH) Med.		
6	Dr. Woodruff (FOH) Med.		
7	Dr. Woodruff (FOH) Med.		
8	Dr. Woodruff (FOH) Med.	Dr. Jacobson (Neur.)	
9	Dr. Jamieson (Off) Med.	Det. Clinic A (Neur)	
10	Dr. Jamieson (Off) Med.		
11	Dr. Jamieson (Off) Med.		
12	Dr. Jamieson (Off) Med.		
13			Dr. Wagner (GROH) Peds.
14			Dr. Wagner (GROH) Peds.
15		Dr. Jacobson (Neur.)	Dr. Wagner (GROH) Peds.
16			
17	Dr. Robins (LGH) Peds		
18	Dr. Robins (LGH) Peds		
19		Dr. Jacobson (Neur.)	Dr. Wagner (GROH) Peds.
20			
21			Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23		Det. Clinic A (Neur)	Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25			
26		Dr. Jacobson (Neur.)	
27		Det. Clinic B	
28			Dr. Shillinglaw(LGH)Med.
29		Dr. Calkins (Neur.)	Dr. Shillinglaw(LGH)Med.
30		Det. Clinic B	Dr. Shillinglaw(LGH)Med.
31		Det. Clinic A	
32			Dr. Stanzler (FOH) Med.
33		Dr. Calkins (Neur.)	Dr. Shillinglaw(LGH)Med.
34			Dr. Stanzler (FOH) Med.
35			Dr. Stanzler (FOH) Med.
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Appendix K (Cont'd)
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STUDENT NUMBER	TUESDAY August 1	WEDNESDAY August 2	THURSDAY August 3
1	Dr. Zarins (FOH) Peds		
2	Dr. Zarins (FOH) Peds		
3	Dr. Zarins (FOH) Peds	Det. Clinic A (Neur)	
4	Dr. Cottrille (GROH) Ped		
5	Dr. Woodruff (FOH) Med.		
6	Dr. Woodruff (FOH) Med.	Det. Clinic A (Neur)	
7	Dr. Woodruff (FOH) Med.	Dr. Calkins (Neur.)	
8	Dr. Woodruff (FOH) Med.		
9	Dr. Jamieson (Off) Med.		
10	Dr. Jamieson (Off) Med.	Det. Clinic C	
11	Dr. Jamieson (Off) Med.		
12	Dr. Jamieson (Off) Med.	Det. Clinic B	
13			Dr. Wagner (GROH) Peds.
14		Dr. Jacobson (Neur.)	Dr. Wagner (GROH) Peds.
15			Dr. Wagner (GROH) Peds.
16	Dr. Cottrille (GROH) Ped		
17	Dr. Robins (LGH) Peds.		
18	Dr. Robins (LGH) Peds.	Dr. Jacobson (Neur.)	
19			Dr. Wagner (GROH) Peds.
20	Dr. Cottrille (GROH) Ped		
21			Dr. Lyne (LGH) Med.
22		Det. Clinic A (Neur)	Dr. Lyne (LGH) Med.
23			Dr. Lyne (LGH) Med.
24		Dr. Jacobson (Neur.)	Dr. Lyne (LGH) Med.
25	Dr. Kutinsky (MPE) Med.	Det. Clinic A (Neur)	
26	Dr. Kutinsky (MPE) Med.		
27	Dr. Kutinsky (MPE) Med.		
28			Dr. Shillinglaw(LGH)Med.
29			Dr. Shillinglaw(LGH)Med.
30			Dr. Shillinglaw(LGH)Med.
31	Dr. Kutinsky (MPE) Med.		
32			Dr. Stanzler (FOH) Med.
33			Dr. Shillinglaw(LGH)Med.
34		Det. Clinic B	Dr. Stanzler (FOH) Med.
35		Dr. Jacobson (Neur.)	Dr. Stanzler (FOH) Med.
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Appendix K (Cont'd)
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STUDENT NUMBER	TUESDAY August 8	WEDNESDAY August 9	THURSDAY August 10
1	Dr. Zarins (FOH) Peds.	Dr. Calkins (Neur.)	
2	Dr. Zarins (FOH) Peds.		
3	Dr. Zarins (FOH) Peds.		
4	Dr. Cottrille(GROH) Ped		
5	Dr. Woodruff (FOH) Med.	Dr. Calkins (Neur.)	
6	Dr. Woodruff (FOH) Med.		
7	Dr. Woodruff (FOH) Med.		
8	Dr. Woodruff (FOH) Med.		
9	Dr. Jamieson (Off) Med.		
10	Dr. Jamieson (Off) Med.		
11	Dr. Jamieson (Off) Med.	Det. Clinic A (Neur)	
12	Dr. Jamieson (Off) Med.		
13		Det. Clinic A (Neur)	Dr. Wagner (GROH) Peds.
14			Dr. Wagner (GROH) Peds.
15			Dr. Wagner (GROH) Peds.
16	Dr. Cottrille (GROH) Ped.	Dr. Jacobson (Neur.)	
17	Dr. Robins (LGH) Peds.	Dr. Jacobson (Neur.)	
18	Dr. Robins (LGH) Peds.		
19			Dr. Wagner (GROH) Peds.
20	Dr. Cottrille (GROH) Ped.	Det. Clinic A (Neur.)	
21		Dr. Jacobson (Neur.)	Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23			Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25	Dr. Kutinsky (MPE) Med.		
26	Dr. Kutinsky (MPE) Med.		
27	Dr. Kutinsky (MPE) Med.		
28		Dr. Jacobson (Neur.)	Dr. Shillinglaw(LGH)Med.
29			Dr. Shillinglaw(LGH)Med.
30			Dr. Shillinglaw(LGH)Med.
31	Dr. Kutinsky (MPE) Med.		
32		Det. Clinic A (Neur)	Dr. Stanzler (FOH) Med.
33			Dr. Shillinglaw(LGH)Med.
34			Dr. Stanzler (FOH) Med.
35			Dr. Stanzler (FOH) Med.
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Appendix K (Cont'd)
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STUDENT NUMBER	TUESDAY August 15	WEDNESDAY August 16	THURSDAY August 17
1	Dr. Zarins (FOH) Peds.		
2	Dr. Zarins (FOH) Peds.	Det. Clinic A (Neur)	
3	Dr. Zarins (FOH) Peds.		
4	Dr. Cottrille (GROH) Ped.		
5	Dr. Woodruff (FOH) Med.		
6	Dr. Woodruff (FOH) Med.		
7	Dr. Woodruff (FOH) Med.		
8	Dr. Woodruff (FOH) Med.	Dr. Jacobson (Neur.)	
9	Dr. Jamieson (Off) Med.	Det. Clinic A (Neur)	
10	Dr. Jamieson (Off) Med.		
11	Dr. Jamieson (Off) Med.		
12	Dr. Jamieson (Off) Med.		
13			Dr. Wagner (GROH) Peds.
14			Dr. Wagner (GROH) Peds.
15		Dr. Jacobson (Neur.)	Dr. Wagner (GROH) Peds.
16	Dr. Cottrille (GROH) Ped.		
17	Dr. Robins (LGH) Peds.		
18	Dr. Robins (LGH) Peds.		
19		Dr. Jacobson (Neur.)	Dr. Wagner (GROH) Peds.
20	Dr. Cottrille (GROH) Ped.		
21			Dr. Lyne (LGH) Med.
22			Dr. Lyne (LGH) Med.
23		Det. Clinic A (Neur)	Dr. Lyne (LGH) Med.
24			Dr. Lyne (LGH) Med.
25	Dr. Kutinsky (MPE) Med.		
26	Dr. Kutinsky (MPE) Med.	Dr. Jacobson (Neur.)	
27	Dr. Kutinsky (MPE) Med.	Det. Clinic B	
28			Dr. Shillinglaw(LGH)Med.
29		Dr. Calkins (Neur.)	Dr. Shillinglaw(LGH)Med.
30		Det. Clinic B	Dr. Shillinglaw(LGH)Med.
31	Dr. Kutinsky (MPE) Med.	Det. Clinic A	
32			Dr. Stanzler (FOH) Med.
33		Dr. Calkins (Neur.)	Dr. Shillinglaw(LGH)Med.
34			Dr. Stanzler (FOH) Med.
35			Dr. Stanzler (FOH) Med.
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Appendix K (Cont'd)
Page 12

STUDENT NUMBER	TUESDAY August 22	WEDNESDAY August 23	THURSDAY August 24
1	Dr. Zarins (FOH) Peds.		
2	Dr. Zarins (FOH) Peds.		
3	Dr. Zarins (FOH) Peds.	Det. Clinic A (Neur)	
4	Dr. Cottrille (GROH) Ped.		
5	Dr. Woodruff (FOH) Med.		
6	Dr. Woodruff (FOH) Med.	Det. Clinic A (Neur)	
7	Dr. Woodruff (FOH) Med.	Dr. Calkins (Neur.)	
8	Dr. Woodruff (FOH) Med.		
9	Dr. Jamieson (Off) Med.		
10	Dr. Jamieson (Off) Med.	Det. Clinic C	
11	Dr. Jamieson (Off) Med.		
12	Dr. Jamieson (Off) Med.	Det. Clinic B	
13			
14		Dr. Jacobson (Neur.)	
15			
16	Dr. Cottrille (GROH) Ped.		
17			
18		Dr. Jacobson (Neur.)	
19	Dr. Cottrille (GROH) Ped.		
20			
21			
22		Det. Clinic A (Neur)	
23			
24		Dr. Jacobson (Neur.)	
25	Dr. Kutinsky (MPE) Med.	Det. Clinic A (Neur)	
26	Dr. Kutinsky (MPE) Med.		
27	Dr. Kutinsky (MPE) Med.		
28			Dr. Shillinglaw(LGH)Med.
29			Dr. Shillinglaw(LGH)Med.
30			Dr. Shillinglaw(LGH)Med.
31	Dr. Kutinsky (MPE) Med.		
32			Dr. Stanzler (FOH) Med.
33			Dr. Shillinglaw(LGH)Med.
34		Det. Clinic B	Dr. Stanzler (FOH) Med.
35		Dr. Jacobson (Neur.)	Dr. Stanzler (FOH) Med.
36			

Appendix K (Cont'd)
Page 13

DR. CALKINS' HUMAN MEDICINE - NEUROLOGY CLINIC

STUDENT NUMBER	June 28	July 19	August 9
1-A	Dr. Calkins	Dr. Calkins	Dr. Calkins
2-A	Dr. Calkins	Dr. Calkins	Dr. Calkins
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13	July 5	July 26	August 16
14-A	Dr. Calkins	Dr. Calkins	Dr. Calkins
15-A	Dr. Calkins	Dr. Calkins	Dr. Calkins
16			
17			
18			
19			
20			
21			
22			
23	July 12	August 2	August 23
24-A	Dr. Calkins	Dr. Calkins	Dr. Calkins
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			

HUMAN MEDICINE STUDENTS ONLY

APPENDIX L

FINAL EXAMINATION SCHEDULE

MICHIGAN STATE UNIVERSITY EAST LANSING · MICHIGAN 48823

COLLEGE OF OSTEOPATHIC MEDICINE · EAST FEE HALL

DEPARTMENT OF OSTEOPATHIC MEDICINE

August 8, 1972

MEMORANDUM

TO: All First Year Students

FROM: Dr. Jacobson and Fred Tinning

SUBJECT: Final Examination Schedule

Attached is the finalized schedule for your Basic and Clinical examination, the Pharmacology exam and most important, the individual Practical Neurological Exam Schedule. You are aware of the times scheduled for your Basic and Clinical and for Pharmacology as this was cleared with your Class President, Mr. Bedecs. The practical examination in Neurology will run approximately 1 1/2 hours for each student.

The examination will be held at St. Lawrence Mental Health Clinic at Oakland and Logan Streets in Lansing. The Mental Health facility building is behind the hospital. You are to report to the reception desk and they will tell you how to proceed.

Upon completing your practical examination, which is to be video-taped, you will be given approximately 1 1/2 hours to complete the write-up according to your own assessment of the case. You will be allowed resource material in the preparation of your case write-up. However, it is suggested that you hold this material to a minimum.

There will be no changes in individual times assigned for the practical exam. You will not be aware of the video-taping as the camera is hidden. The main objective in video-taping is to provide each of you an opportunity next quarter, to review in detail your own individual tape and how you performed a neurological examination. This will be one of the most beneficial learning experiences of your new career.

If you have any questions, please see one of us.

Remember the schedule is fixed and you are only allowed a minimum of material in writing up your case.

Thank you.

erh
encl

Appendix L (Cont'd)

FIRST YEAR FINAL EXAM SCHEDULE

(Basic and Clinical -- Pharmacology -- Individual Practical Neurological)

	8:00-9:15	9:30-11:00	11:15-12:30	12:45-2:00	2:15-3:30	3:45-5:00	5:15-6:30
Friday, Aug. 25	IC 1	S Ss 1	R Ss 1	IC 2	IC 3	IC 4	IC 5
Saturday, Aug. 26	IC 6	IC 7	R Ss 2	S Ss 2	S Ss 3	R Ss 3	
Monday, Aug. 28	(BASIC AND CLINICAL SCIENCE EXAMINATION IN NEUROMUSCULAR SYSTEM)			IC 8	IC 9	IC 10	IC 11
Tuesday, Aug. 29	PHARMACOLOGY EXAM			IC 12	IC 13	IC 14	
Wednesday, Aug. 30	S Ss 4	R Ss 4	R Ss 5	S Ss 5	S Ss 6	R Ss 6	
Thursday, Aug. 31	R Ss 7	S Ss 7	S Ss 8	R Ss 8	R Ss 9	S Ss 9	
Friday, Sept. 1	R Ss 10	S Ss 10	S Ss 11	R Ss 11	S Ss 12	R Ss 12	

Note: IC 1-14 refers to the Inactive Control Students in the Neurological Systems Unit and not in the experiment.

R Ss 1-12 and S Ss 1-12 refers to the experimental subjects randomly paired for the final examination.

APPENDIX M

FINAL EXAMINATION PACKET

Form 1
Page 1

APPENDIX M

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

NEUROLOGICAL EVALUATION
HISTORY AND PHYSICAL EXAM

DATE: ____________________ TYPE OF CASE: ____________________

STUDENT: ____________________ PATIENT'S AGE: ____________________

INSTRUCTOR: ____________________ RACE: ____________________

	Grade
1. CHIEF COMPLAINT(S)	Total points= 3
2. ONSET AND COURSE OF CHIEF COMPLAINT(S)	Total points= 6
3. PAST HISTORY (Mother, Father, Wife, Siblings, Children)	1

Endocrine Dysfunction ______
Cancer ______
Tuberculosis ______
Neurosis, Psychosis ______
Cardiovascular Disease ______
Other ______

Appendix M (Cont'd)
Form 1, Page 2

	Grade
MEDICAL HISTORY	
Previous Hospitalization:	1
Allergies:	1
Medications:	1
Accidents:	1
Surgery:	1
Diseases:	1
Habits:	1
SOCIAL HISTORY (Work, Hobbies, Recreation)	1 Total points= 9
4. SYSTEMS REVIEW (if appropriate) (Gynecological, Obstetrical, Gastro-intestinal, Genito-urinary, Cardio-vascular, Respiratory, Metabolic, Neuro-Muscular)	Total points= 4

Appendix M (Cont'd)
Form 1, Page 3

	Grade
5. PHYSICAL EXAMINATION	
GENERAL APPEARANCE: Coloration (Skin, Sclera) ________	1
Physical Development (Asthenic, Obsese, etc.) ________ ________	
GENERAL FINDINGS:	1
BP	
Cardiac Auscultation	
Rate ________	
Rhythm ________	
Murmurs ________	
Neck Auscultation	
Bruits ________	
Ophthalmoscopic (GRI-IV)	
Vessels ________	
Disc ________	
Retina ________	
MENTAL STATUS:	1
State of Consciousness (check)	
____ Alert	
____ Unconscious or comatose	
____ Confused or obtunded	
____ Decerebrate or decorticate	

Appendix M (Cont'd)
Form 1, Page 4

	Grade
Speech and Language Function	
____ Aphasic or dysphasic	
____ Dysarthric or anarthric	

REFLEXES:

Deep Tendon (Designate 0-Absent, 1-Hypoactive, 2-Normal, 3-Hyperactive) — Grade: 1

	Left	Right
Patellar		
Biceps		
Tricep		
Brachioradial		
Achilles		

Pathological or Superficial (Indicate A-Absent, P-Present, E-Equivocal) — Grade: 1

	Left	Right
Plantar		
Babinski		
Ankle Clonus		
Abdominal		
Hoffman		

Appendix M (Cont'd)
Form 1, Page 5

Grade

SENSORY: 1
(Indicate A-Abnormal:Hypoactive or Hyperactive Responsive, N-Normal, E-Equivocal Dysfunction)

	Response	Location
Vibration		
Pinprick		
Light touch		
Position sense		
Stereognosis		

MUSCLE FUNCTION AND GAIT: (check appropriate headings)

Fasiculations 1

Yes ______ No ______

Gait: Normal ____ Abnormal (describe also) ______

____

Muscle Tone: Spastic ____ Flaccid ___

Rigid ______ Normal ____

Muscle Strength (indicate specific muscle weakness)

____

____

____

____

____

Appendix M (Cont'd)
Form 1, Page 6

	Grade
CEREBELLAR AND DORSAL COLUMN FUNCTIONS (indicate N-Normal, A-Abnormal, E-Equivocal)	1
_____Finger to nose	
_____Dysdiadochokinesia	
_____Tandem gait	
_____Heel to knee	
_____Romberg	
EXTRAPYRAMIDAL (check appropriate headings)	1
_____Spontaneous movements (describe)	
_____Cog Wheel Rigidity	
_____Mask like facies	
_____Decreased eyeblinks	
_____Loss of arm swing	
CRANIAL NERVES: (indicate nerves checked and if pathology present.)	1
1.__________ 7.__________	
2.__________ 8.__________	
3.__________ 9.__________	
4.__________ 10.__________	
5.__________ 11.__________	
6.__________ 12.__________	Total points= 10
6. SUMMARY	
1. General Results: (check)	1
_____Normal Neurological	
_____Abnormal Neurological	
_____Equivocal	

Appendix M (Cont'd)
Form 1, Page 7

	Grade
2. Assessment of Area of Neurological System Dysfunction (check)	2
_____Motor	
_____Sensory	
_____Mentation and Behavior	
3. Anatomical Location (check)	2
_____Primary Muscle Dysfunction	
_____Peripheral Nerve or Root Dysfunction	
_____Spinal Cord	
_____Brain Stem	
_____Cerebral Hemispheres	Total points= 5
7. PROVISIONAL OR WORKING DIAGNOSIS(ES) (include all systems)	Total points= 5

Categorical Diagnosis (neuropathy, encephalopathy, etc.)	Specific (tumor, cerebral hemorrhage, etc.)
____________________	____________________
____________________	____________________
____________________	____________________

Appendix M (Cont'd)
Form 1, Page 8

Grade ________

8. DIFFERENTIAL DIAGNOSIS (identify no more than three neurological disorders)

Total points= 5

General Pathology Category:	Specific Type of Pathology:
Vascular	________
Infectious	________
Traumatic	________
Autoimmune	________
Metabolic	________
Inherited	________
Neoplastic (or mass lesion)	________
Cardiac Dysfunction	________
Degenerative or Demyelinating	________
Others	________

9. TESTS (laboratory tests and other diagnostic procedures)

Total points= 5

Specific Neurodiagnostic Tests (EEG, lumbar puncture, etc.)	General Lab. (CBC, urinalysis, etc.)
________	________
________	________
________	________
________	________
________	________
________	________

Appendix M (Cont'd)
Form 1, Page 9

Grade

Total points=
2

10. THERAPY

Specific	Supportive

COMMENTS

Note: All Practical Exams have maximum score of 54 points.
All Exams are standardized on a 54 point basis.

Appendix M (Cont'd)
Form 2, Page 1

MICHIGAN STATE UNIVERSITY
COLLEGE OF OSTEOPATHIC MEDICINE

INSTRUCTOR'S CLINICAL COMPETENCY FORMATIVE AND SUMMATIVE EVALUATION RATING SCALE FOR PATIENT NEUROLOGICAL HISTORY AND PHYSICAL EXAMINATION

Student's Name_______________ Date_______________

Examining Physician_______________ Hospital or Clinic_______________

CRITERION		FACTOR
Data Required	Data Completed	THE STUDENT HAS UNDER:
3		1. Chief Complaint(s):
		A. Clearly and briefly identified the correct number of problems or chief complaints.
6		2. Onset and Course of Chief Complaints:
		A. Described the onset and course in an organized and coherent manner.
		1. Onset
		2. Duration
		3. Location
		4. Severity
		5. Course of previous treatment
		6. General symptoms or other descriptive characteristics
9		3. Past History:
		A. How many significant factors necessary to demonstrate a neuro patient history and physical did the student identify?

Appendix M (Cont'd)
Form 2, Page 2

CRITERION		FACTOR
Data Required	Data Completed	THE STUDENT HAS UNDER:
		B. How many significant factors, which the student identified, do you consider to be extremely vital points contributing to the diagnosis and management of the patient's case?
4		4. Systems Review:
		A. How many significant factors necessary to demonstrate a complete review of the systems did the student identify?
		B. How many significant factors, which the student identified, do you consider to be extremely vital in the diagnostic work-up of the patient's case?
10		5. Physical Examination:
		A. How many significant physical findings, either normal or abnormal, necessary to demonstrate a neurological physical examination did the student identify?
		B. How many critical physical findings, which the student elicited, do you consider to be extremely vital in the diagnostic work-up of the patient's case?
5		6. Summary:
		A. General Results: (check)
		1. Normal Neurological
		2. Abnormal Neurological
		3. Equivocal
		B. Assessment of Area of Neurological System Dysfunction
		1. Motor
		2. Sensory
		3. Mentation and Behavior

Appendix M (Cont'd)
Form 2, Page 3

CRITERION Data Required	 Data Completed	FACTOR THE STUDENT HAS UNDER:
		C. Anatomical Location
		1. Primary Muscle Dysfunction
		2. Peripheral Nerve or Root Dysfunction
		3. Spinal Cord
		4. Brain Stem
		5. Cerebral Hemispheres
5		7. Working or Provisional Diagnosis:
		A. How many appropriate diagnosis necessary to demonstrate problem solving, clinical judgment and decision making, did the student identify?
		B. How many appropriate diagnostic considerations necessary to demonstrate a working diagnosis did the student identify?
		C. How many provisional considerations necessary to demonstrate effective problem solving did the student identify?
5		8. Differential Diagnosis:
		A. How many appropriate differential diagnostic considerations necessary to demonstrate problem solving, clinical judgment and decision making did the student identify?
		B. How many considerations, which the student identified, do you consider to be extremely vital in contributing to an appropriate or realistic differential diagnosis in the patient's case?
5		9. Laboratory Tests and Other Diagnostic Procedures:
		A. How many appropriate tests or procedures necessary to demonstrate the ability in utilizing clinical laboratory data critical to the diagnosis of this case did the student identify?

Appendix M (Cont'd)
Form 2, Page 4

CRITERION Data Required	CRITERION Data Completed	FACTOR THE STUDENT HAS UNDER:
		B. How many diagnostic tests or laboratory procedures, which the student identified, do you consider to be extremely critical in reaching a final diagnosis in the patient's case?
2		10. Therapy and Treatment:
		A. How many critical or primary forms of treatment or therapy necessary to demonstrate clinical judgment did the student identify?
		B. How many types of supportive therapy or treatment of a more secondary nature are necessary to demonstrate clinical judgment did the student identify?
		C. How many forms of therapy or treatment, which the student recommended, do you consider to be extremely critical to the patient's case?
		11. Grading:
54		Total number of criterion required:
		Total number of criterion completed:

A. In your ratings above as a clinical instructor, has the student on the neurological patient history and physical examination, demonstrated performance of a minimum pass level or above. This level must be established by the criterion developed for the patient's case being examined?
Yes__________ No__________

Appendix M (Cont'd)
Form 2, Page 5

B. Based on the objective rating of factors just completed, what is your final examination rating?

(1) Excellent [ ]
(2) Good [ ]
(3) Fair [ ]
(4) Poor [ ]

<u>COMMENTS:</u>

____
Clinical Instructor's Signature

Appendix M (Cont'd)
Form 3, Page 1

FINAL ASSESSMENT OF EXPERIENCES IN NEUROLOGY TRAINING

INTRODUCTION: The following questions are being asked in an effort to determine your feelings about the effects of various training experiences on your performance during the entire course and in the Final Practical Clinical Examination.

Your responses to the questions asked before and after the Final Practical Clinical Examination will in no way affect your grade. Your response, however, will assist in improving the course in Neurology.

PART I Please complete the following:

PRE-TEST

1. Compare the importance or unimportance of the Lecture/Lab sessions and the importance or unimportance of the Clinical Experiences sessions with regard to the development of your skills in the following areas:

A. Medical knowledge necessary to conduct a successful neurological examination -

Lecture/Lab	Important	1	2	3	4	5	6	7	Unimportant
Clinical Experience	Important	1	2	3	4	5	6	7	Unimportant

B. Patient interviewing (i.e. establishing a relationship and eliciting patient history, onset, chief complaints) skills necessary in completing a neurological history -

Lecture/Lab	Important	1	2	3	4	5	6	7	Unimportant
Clinical Experience	Important	1	2	3	4	5	6	7	Unimportant

Appendix M (Cont'd)
Form 3, Page 2

C. Physical examination skills and techniques (Psychomotor) necessary to elicit normal and abnormal neurological findings -

Lecture/Lab	Important	1	2	3	4	5	6	7	Unimportant
Clinical Experience	Important	1	2	3	4	5	6	7	Unimportant

D. Developing self-confidence in conducting a complete neurological examination -

Lecture/Lab	Important	1	2	3	4	5	6	7	Unimportant
Clinical Experience	Important	1	2	3	4	5	6	7	Unimportant

E. Arriving at an accurate provisional and differential diagnosis -

Lecture/Lab	Important	1	2	3	4	5	6	7	Unimportant
Clinical Experience	Important	1	2	3	4	5	6	7	Unimportant

2. How confident do you feel in your ability to perform a complete neurological evaluation in this final practical clinical examination?

Very confident	1	2	3	4	5	6	7	No confidence

3. A. How would you describe the Final Practical Clinical Examination you are about to take?

Useful	1	2	3	4	5	6	7	Useless
Meaningful	1	2	3	4	5	6	7	Meaningless
Important	1	2	3	4	5	6	7	Unimportant
Realistic	1	2	3	4	5	6	7	Artificial
Successful	1	2	3	4	5	6	7	Unsuccessful

Appendix M (Cont'd)
Form 3, Page 3

B. How would you describe your feelings about yourself now before taking the Final Practical Clinical Examination?

Secure	1	2	3	4	5	6	7	Insecure
Successful	1	2	3	4	5	6	7	Unsuccessful
Calm	1	2	3	4	5	6	7	Anxious
Pleasant	1	2	3	4	5	6	7	Unpleasant
Competent	1	2	3	4	5	6	7	Incompetent

4. On my performance rating on the final neurological examination, I expect to obtain the following score: (Data complete vs. data required)

_________ (A) 90-100 Excellent

_________ (B) 89-80 Good

_________ (C) 79-70 Fair

_________ (D) 69-60 Poor

_________ (E) Below 60 Inadequate

5. I expect to obtain the following performance score on the physical examination section of the final evaluation with skills and techniques (Psychomotor) necessary to eliciting normal or abnormal neurological findings:

(A) Excellent ________

(B) Adequate ________

(C) Fail ________

6. On establishing interpersonal relationships and in eliciting data from the patient, my physician behavior will be rated as:

________ (A) Highly effective physician behavior

________ (B) Average physician behavior

________ (C) Ineffective physician behavior

____
Student's Name

Appendix M (Cont'd)
Form 4, Page 5

PART II

POST-TEST

1. Now that you have completed the final practical neurological examination, please complete the following: (Please read each section before marking)

A. How would you describe the Final Practical Clinical Examination you have just taken?

Useful	1	2	3	4	5	6	7	Useless
Meaningful	1	2	3	4	5	6	7	Meaningless
Important	1	2	3	4	5	6	7	Unimportant
Realistic	1	2	3	4	5	6	7	Artificial
Successful	1	2	3	4	5	6	7	Unsuccessful

B. How would you describe your feelings about yourself now that you have taken the Final Practical Clinical Examination?

Secure	1	2	3	4	5	6	7	Insecure
Successful	1	2	3	4	5	6	7	Unsuccessful
Calm	1	2	3	4	5	6	7	Anxious
Pleasant	1	2	3	4	5	6	7	Unpleasant
Competent	1	2	3	4	5	6	7	Incompetent

2. I feel my total performance rating on the final neurological examination was:

   __________ (A) 90-100 Excellent

   __________ (B) 89-80 Good

   __________ (C) 79-70 Fair

   __________ (D) 69-60 Poor

   __________ (E) Below 60 Inadequate

3. I feel my performance score on the physical examination section of the final evaluation dealing with the skills and techniques (Psychomotor) necessary to elicit normal or abnormal neurological findings was:

   __________ (A) Excellent (1)

   __________ (B) Adequate (2)

   __________ (C) Fail (3)

4. On establishing interpersonal relationships and in eliciting data from the patient, my behavior as a physician was:

   __________ (A) Highly effective physician behavior

   __________ (B) Average effective physician behavior

   __________ (C) Ineffective physician behavior

Appendix M (Cont'd)
Form 4, Page 7

5. I felt that my performance on the final practical clinical exam was:

Much better than expected 1 2 3 4 5 6 7 Much worse than expected

6. If you did worse than expected, please answer the following:

A. My clinical experience did not prepare me for the examination.

Agree 1 2 3 4 5 6 7 Disagree

B. Switching instructional settings to St. Lawrence Hospital for the final evaluation bothered me.

Agree 1 2 3 4 5 6 7 Disagree

C. My previous experient with patients did not prepare me to deal with the patient I was given for the final examination.

Agree 1 2 3 4 5 6 7 Disagree

7. In general, are you satisfied that your practical clinical training experience part of the course provided you with all the skills and abilities necessary for completing the practical neurological final examination?

Highly satisfied 1 2 3 4 5 6 7 Dissatisfied

8. Specifically, are you satisfied that your practical clinical training experience part of the course provided you with the hands-on skills and techniques (Psychomotor) necessary in completing the practical neurological final examination?

Highly satisfied 1 2 3 4 5 6 7 Dissatisfied

Appendix M (Cont'd)
Form 4, Page 8

9. Specifically, are you satisfied that your practical clinical training experience part of the course provided you with the medical knowledge necessary in completing the practical neurological final examination?

Highly satisfied 1 2 3 4 5 6 7 Dissatisfied

10. Specifically, are you satisfied that your clinical training experience provided you with the opportunity for the development of appropriate affective physician behavior? (The ability to relate effectively)

Highly satisfied 1 2 3 4 5 6 7 Dissatisfied

11. Specifically, are you satisfied with the feedback you received from your clinical training experience?

Highly satisfied 1 2 3 4 5 6 7 Dissatisfied

12. I would prefer the practical clinical training experience I was assigned to in this course in neurology over other clinical experiences I have had in my first year.

Prefer 1 2 3 4 5 6 7 Do not prefer

13. As part of your practical clinical education, would you like to receive training (or additional training) using simulated patients?

______ Yes

______ No

____
Student's Name

Appendix M (Cont'd)
Form 5

NEUROLOGICAL HISTORY

AND

PHYSICAL ASSESSMENT

Name: ____________________

Date: ____________________

Location: ____________________

Examiners: ____________________

Fred C. Tinning

Affective-Cognitive Rating

1972

Appendix M (Cont'd)
Form 5, Page 2

I. Establishing and Maintaining a Working Relationship

During the interview, the student:

A. appeared relaxed and comfortable with the patient after the first few minutes of the interview.	1	2	3	4	5	6	7	appeared ill at ease with the patient, as shown by such reactions as tremors, sweating, blocking, averting eye contact, shifting in chair, etc.
B. seemed interested in the patient's problem (e.g., maintained eye contact, head nodding, "umhmm", etc.).	1	2	3	4	5	6	7	seemed uninterested in the patient's problem (e.g., avoiding eye contact, did not respond verbally or nonverbally).
C. expressed a realistic interest and willingness to help in the context of this interview.	1	2	3	4	5	6	7	did not express an interest in helping the patient or expressed an unrealistic interest in helping the patient.
D. demonstrated listening responses (i.e., indicates that he has understood the patient).	1	2	3	4	5	6	7	used only ignoring responses.
E. responded to the patient's feeling tone openly and accurately.	1	2	3	4	5	6	7	avoided dealing with the intensity feeling tone of what the patient was experiencing.

Appendix M (Cont'd)
Form 5, Page 3

F. was supportive when requested or when affect was expressed by the patient (i.e., communicates to the patient that you have heard and understood what he has been trying to tell you).	1	2	3	4	5	6	7	was reassuring (tells patient that "everything will be O.K." despite evidence to the contrary, e.g., real loss of person function, etc.) or was non-supportive as evidenced by patient reaction (e.g., continued disagreement, changes topic, holds back feelings).
G. responded to the patient's physical needs.	1	2	3	4	5	6	7	ignored or did not respond to the patient's physical needs.
H. responded to the patient's emotional needs.	1	2	3	4	5	6	7	ignored or did not respond to the patient's emotional needs.

II. <u>Data Elicitation</u>

During the interview, the student:

A. probed gently at relevant but sensitive areas (e.g., permits the patient to set the rate at which sensitive areas of concern are covered.)	1	2	3	4	5	6	7	avoided sensitive issues which could have been pursued in the context of this interview.

Appendix M (Cont'd)
Form 5, Page 4

B. proceeded with tact in dealing with sensitive areas.	1	2	3	4	5	6	7	proceeded with a lack of tact in dealing with sensitive areas.
C. asked questions and made comments briefly and to the point.	1	2	3	4	5	6	7	rambled in long discourse; lectured to the patient.
D. used only exploratory questions (i.e., encourages further discussion by the patient by use of open-ended questions).	1	2	3	4 (Scale adjusted)	5	6	7	used only non-exploratory questions (e.g., questions requiring a yes or no response).
E. dealt <u>only</u> with affective material presented by patients asking questions about the patient's feelings.	1	2	3	4 (Scale adjusted)	5	6	7	dealt <u>only</u> with the factual, non-affective material presented by the patient.
F. asks questions which attempt to clarify patient concerns.	1	2	3	4	5	6	7	does not ask needed clarifying questions.
G. asks questions without interrupting the flow of direction of the interview.	1	2	3	4	5	6	7	asks clarifying questions in such a manner as to disrupt the flow or direction of the interview.

Appendix M (Cont'd)
Form 5, Page 5

H. gets not only presenting (chief) complaint, but also how the problem has affected the patients life.	1	2	3	4	5	6	7	does not get data on how presenting problem affects patient.
I. obtains data related to physical concerns of patient.	1	2	3	4	5	6	7	ignores physical findings.
J. obtains a systematic medical history of the onset and course of chief complaints.	1	2	3	4	5	6	7	does not obtain a systematic medical history.

III. <u>Rater's Assessment of Interview Difficulty</u>

Rate the difficulty of the interview on the following scale:

patient posed considerable difficulties.	1	2	3	4	5	6	7	patient was very easy to interview.

IV. <u>Effective and Ineffective Behaviors</u>

1. What behavior listed do you feel was most effective?

____

Appendix M (Cont'd)
Form 5, Page 6

2. What behavior listed do you feel was least effective?

____

3. If others, list ....

____________________ ______________________

____________________ ______________________

Appendix M (Cont'd)
Form 6

NEUROLOGICAL PRACTICAL EXAMINATION
OF
PSYCHOMOTOR TECHNIQUES AND SKILLS

GRADING FORM

Each test will be evaluated in the three following areas:

A. Patient rapport with emphasis on accuracy of instructions given to patient before and during each test.
B. Proper positioning of patient.
C. Proper technique in performing the test.

Each of the above categories will be graded as follows:

1 = Excellent

2 = Adequate

3 = Fail

The three categories are combined for a total score. The total score represents the students psychomotor skill or technique in performing the various neurological tests.

ab
5/5/72

Appendix M (Cont'd)
Form 6, Page 2

STUDENT NAME ______________

PRACTICAL NEUROLOGICAL PSYCHOMOTOR TESTING

	Accuracy of Instructions	Positioning of Patient	Technique	TOTAL
	A	B	C	
PATELLAR (sitting)				
(lying)				
ACHILLES (sitting)				
(lying)				
(kneeling)				
BICEPS				
TRICEPS				
BRACHIORADIALIS				
HOFFMAN				
PLANTAR				
ANKLE CLONUS				
ABDOMINALS				
MUSCLE TONE (upper extremity)				

Appendix M (Cont'd)
Form 6, Page 3

	Accuracy of Instructions	Positioning of Patient	Technique	TOTAL
	A	B	C	
MUSCLE STRENGTH				
MUSCLE STRENGTH				
MUSCLE STRENGTH				
VIBRATION				
PAIN (specific area)				
LIGHT TOUCH (specific area)				
POSITION SENSE				
STEREOGNOSIS				
CRANIAL NERVE				
CRANIAL NERVE				
CRANIAL NERVE				
CRANIAL NERVE				

Appendix M (Cont'd)
Form 6, Page 4

	Accuracy of Instructions	Positioning of Patient	Technique	TOTAL
	A	B	C	
CEREBELLAR FUNCTION (upper extremity)				
(upper extremity)				
(lower extremity)				
(lower extremity)				
TOTAL SCORE				

Appendix M (Cont'd)
Form 7

PATIENT AND SIMULATOR RATING

I. In the history and physical examination just completed, I felt that the Doctor doing the examination was:

(A-Cog)

1	2	3	4	5
Competent (Very Bright)		Average (Knew What He Was Doing)		Incompetent (Did Not Know What He Was Doing)

(B-Aff)

1	2	3	4	5
Secure (Very Relaxed and Confident)		Average (Reasonably Relaxed)		Insecure (Puzzled and Hesitant)

(C-Aff)

1	2	3	4	5
Very Interested (Paid Attention To Me Genuinelly Warm and Anxious to Help)		Reasonably Interested (Seemed Interested In Me and Tried to Help)		Very Uninterested (Seemed Cool Indifferent - Not Caring to Help)

II. During the physical examination, the Doctor was:

(D-PM)

1	2	3	4	5
Very Gentle	Reasonably Gentle	Careful	A Little Rough	Very Rough

STUDENT NAME ____________________

Appendix M (Cont'd)
Form 8

MICHIGAN STATE UNIVERSITY

COLLEGE OF OSTEOPATHIC MEDICINE

Gentlemen:

I, ______________________________
(Name)

a patient of Dr. Richard Calkins
(Doctor)

do hereby consent to having my Neurological History & Examination recorded on television tape by the College of Osteopathic Medicine's Clinical Affairs Office, Michigan State University. I understand that this recording is for the express purpose of medical education through the College of Osteopathic Medicine, Michigan State University.

I further understand that the making of this recording is in performance of the clinical examination for medical students only. This consent has been fully explained to me, and I am in agreement with its intent and purpose.

I further authorize my physician, the College of Osteopathic Medicine of Michigan State University to retain, preserve and use this recording for scientific or teaching purposes or to dispose of it at their convenience.

____
Signature of Patient

____
Date

____
Witness

Appendix M (Cont'd)

ST. LAWRENCE HOSPITAL
Lansing, Michigan

CONSENT TO PHOTOGRAPHY AND/OR INTERVIEW

I, ______________________________, do hereby give my
Patient Name, Parent, Legal Guardian

consent for ____________________ to be (mark out items
Name of Patient

not applicable to this consent) videotaped, filmed, photographed and/or interviewed and audiotaped by

______________________________ for the purpose of
Name of Photographer and/or Interviewer

____

____

____

I also consent to the use or publication of such (mark out items not applicable to the consent) photographs and/or interviews for the purpose stated above.

Signed ____________________ / Date ____________

Witness ____________________ Relationship to Patient ____________________