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## ORIGINAL ARTICLES

# First-Trimester Chiropractic Students' Reactions to a Multistation Teaching Format for Learning Adjustive Psychomotor Skills

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The development of task-specific psychomotor skills in the 1st-trimester chiropractic student is a process that should serve the student throughout his or her education and professional career. If relatedness is the key to motor learning, the challenge that the chiropractic student presents is that this student possesses essentially no relatable skills. Using the classical concept of Maslow's holism-dynamism within a multistation teaching format allows for a high-task, high-structure, dynamic, and fast-paced learning experience similar to the pace of a doctor's clinical practice. A 33-question Likert scale is used to evaluate course content, method, and organizational structure. Students were asked for feedback on class organization, subject matter presentation, and teacher performance. A review of pertinent educational literature was made and serves as a basis in discussing content, method, and structure, along with information gathered from the student course evaluation. Use of Maslow's classic educational concept of holism-dynamism combined with a multistation teaching format produces a dynamic educational setting that allows the chiropractic educator flexibility and the 1st-trimester chiropractic student a rewarding learning experience. (*The Journal of Chiropractic Education* 16(2): 107-113, 2002)

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## INTRODUCTION

One of the challenges of chiropractic education is to blend the didactic textbook knowledge with the manual skills necessary for the delivery of the chiropractic adjustment. Adjustive technique is a physical skill not unlike the skills necessary for success in the athletic arena (1). Skill development hinges on six qualities: speed, strength, endurance, flexibility, coordination, and psychological factors as they apply to learning (2-4). The development of a single activity or skill session to address all these qualities may prove to be an impossible task. Yet through the segmentation of a lesson plan with transitions from one phase to the next it is possible to address these skills specifically as they apply to chiropractic technique and clinical practice.

Relatedness is said to be the key to motor learning (3). The challenge that the 1st-trimester student presents is that this student possesses essentially no "relatable" skills with regards to the chiropractic adjustment. An example of a relatable skill would be teaching the golf swing to someone who already knew how to swing a baseball bat. Thus, the challenge for the chiropractic educator is to introduce or create what Maslow called a "manageable whole" (5) from which adjustive concepts and techniques can evolve. Manageable wholes are links in a learning chain. The golf swing can be broken down into addressing the ball, the back swing, the ball strike, and the follow-through. All these links (or manageable wholes) have their own teaching cues and must be executed sequentially for a successful golf shot.

Maslow's holism-dynamism concept (whole-phase-whole) can be applied to learning how to perform the chiropractic adjustment and its three basic components: a stance (i.e., toggle stance,

one- and two-line stances), a hand contact (i.e., pisiform, second metacarpophalangeal/radial knife edge, thenar/calcaneal), and an impulse (i.e., toggle recoils, pectoralis twitches, sustained toggles, push/pull impulses, and various body drops), the “manageable wholes” from which chiropractic technique will evolve. The introduction of these components is through a daily teaching plan that divides the 2-hour lab time into seven distinct teaching stations. This multistation format efficiently utilizes all instructors in both small and large group settings. For the student, this format presents both a physically and mentally challenging fast-paced learning experience.

Unguided learning is slow, wasteful, and often misleading (6). The development of chiropractic psychomotor skills presents a unique challenge for both the educator and the student. Detailed in this work is an effective method that introduces “manageable wholes” of basic chiropractic technique that develops a technical foundation from which future learning can evolve.

## MATERIALS AND METHODS

Lab class sizes ranged from 24 to 32 students with one lead instructor, one doctor assistant, and one upper-trimester teaching assistant. Lab classes were scheduled once per week for a 2-hour period. The class ran continuously with no breaks. Students’ preparation for class included being properly gowned, with speeder board (a small drop piece used for toggle recoils and extremity work), spine model, and course manual. Class began promptly on the hour with attendance taken.

### Learning Objectives

There were seven overriding learning objectives for the class:

1. The student will master bench table and drop table usage.
2. The student will be conversant in common chiropractic terminology and jargon (7,8).
3. The student will use the correct stances and demonstrate the proper ergonomics that prevent injury.
4. The student will be able to demonstrate simulated contact adjustments on the table and actual contact adjustments on the spine model.
5. The student will be able to demonstrate thrusts and impulses (pushes, pulls, upper and lower body drops, pectoralis twitches, toggle recoils, and sustained toggles) with their appropriate application

on either the table, the spine, the speeder board, or force application on a bathroom scale.

6. The student will exhibit technical excellence with the mock adjustments.
7. The student, through study and personal discipline, will develop pride, confidence, and competence in his or her abilities.

### Daily Teaching Plan

The learning objectives were accomplished with the consistent use of the Daily Teaching Plan (DTP). The DTP is a skeletal outline that promotes a consistent format from one class to the next. The makeup of the DTP is that of a multistation format with instruction taking place in both large and small group formats. Throughout the lab class students cycled through seven teaching stations, allowing for significant change and variety. The time schedule was consistently adhered to with flexible adaptation more the rule.

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|----------|--|
| :00–:05  | <i>Station 1:</i> Attendance, flexibility routine (large group)  |
| :05–:55  | Four small group stations (10–12 minutes each station, 6–8 students)<br><i>Station 2:</i> Conditioning—medicine ball exercises, hand grippers, brick-on-a-stick, drops on scales, balance work (Note: this station was the only nonsupervised station)<br><i>Station 3:</i> Old Technique Review—selected review of three to four previously learned techniques on speeder board, table, or spine model<br><i>Station 4:</i> X-ray Correlation or Technique Setups on spine model<br><i>Station 5:</i> New Technique Demonstration, Adjusting Concepts (introduction of manageable wholes) |
| :55–1:25 | <i>Station 6:</i> 30-Minute General Drill and Oral Quizzing (large group)  |
| 1:25–end | <i>Station 7:</i> Class Summary (large group) Homework Review and Book Reports Thought of the Day (time management, present time consciousness, stress management, etc.)   |

A skeletal outline of the DTP was in the students' manual. DTPs with daily specifics for each class were given to the DC assistant and the student teaching assistant.

### **Course Manual**

The students were required to purchase a course manual produced in-house and sold through the campus bookstore. The manual was designed to be inclusive, in that all material covered in the course was detailed within. The manual was designed for out-of-class review and study. It was broken down into a weekly chapter format with detailed descriptions of an adjustive technique with descriptions for doctor position, contact, line of drive, and thrust. Where appropriate, a picture detailed the action. Also included in the weekly chapter were the weekly homework assignments and the "Thought of the Day."

Other information in the manual included pictures and descriptions of table usage, hand contacts, chiropractic terminology, a skeletal model of the DTP, and pages detailing important chiropractic and biomechanical concepts (i.e., Meric Chart, Lovett Reactor System, closed kinetic chain of the lower extremity, listing methods, etc.). Finally there was a page listing the practical applications of all the moves (i.e., area of spine, contact point, patient position).

The manual has been revised as needed. The manual served as the final arbiter of exam or grading disputes. Adjustive move descriptions used on the exams came exactly from adjustive technique descriptions in the manual.

### **Test Procedures**

Test procedures and protocols were discussed prior to testing. Both the midterm and first quiz were done using the speeder board and the table to demonstrate proficiency with the moves. The second quiz and final exam were comprehensive. For these exams, the spine model was used to demonstrate the moves.

Students expected to be quizzed verbally on a daily basis as to the application of the moves. General criteria included patient positioning, line of drive, doctor stance, contact points on the spine, doctor's hand contact points, and thrust. This was done in a rapid-fire manner during the large group drill portion of the lab.

### **Teacher and Course Evaluation**

A 33-item, five-point Likert scale survey was used to evaluate student opinion of aspects of the course, including organization (the multistation format), teaching methodology (teaching pace, drill, large group and small group formats), and teacher performance (expectations, discipline, professionalism, etc.). Students were also given the opportunity for written comments. Participation was voluntary.

Response delineations ranged from a best/highest/strongly agree to a worst/lowest/strongly disagree. Delineation in this paper will use the strongly agree (SA), agree (A), neutral (Neut), disagree (D), and strongly disagree (SD). Nonresponses were recorded with a NR.

At the end of the evaluation survey the students were offered the opportunity to answer four general, open-ended questions such as, "What was the best. . . worst thing about the class?" "Suggestions for the manual?" "Suggestions for outside readings?" The evaluation was done anonymously on the day of the final exam. Likert scale results were recorded on a Scantron form. Comments were hand recorded. Tabulated results were posted for class perusal with the final grade postings.

## **RESULTS**

The response rate to the survey was 107/118 (91%). Six evaluation questions asked the students to agree or disagree or whether they liked or did not like the class organization. All six areas were graded in the strongly agree to agree category, with some 93% or above of the class respondents in accord. These results are detailed in Table 1.

Learning objectives were achieved as evidenced by the students' self-rated "technical proficiency" and judged against teacher's expectations. Written comments in the "Best thing about the course. . ." included "high expectations," "professional and hands-on," "learning how to apply moves," and "applicability of material." When asked to self-evaluate their psychomotor skills, 86% rated themselves as "technically proficient," 13% as "so-so," zero as "I'm lost," and one student (<1%) did not respond.

Students were also asked to assess their teacher's expectations of them. Strong agreement that there were appropriate expectations of students was expressed by 85%, 12% agreed that expectations were appropriate, 1.8% were neutral, zero disagreed or

**Table 1. Student Assessment of Course Organization**

	SA	A	Neut	D	SD	NR
Organization and format of 30-minute drill	66.3%	27.1	5.6	<1	0	0
Organization and format of quizzes	70.0	26.1	3.7	0	0	0
Organization and format of midterm/final	66.3	28.9	3.7	0	<1	0
Organization of class	90.6	7.4	<1	0	0	<1
Preparation for class	94.3	2.8	<1	0	0	1.8
Use of class time	88.7	9.3	<1	0	0	<1

**Table 2. Student Assessment of Individual Course Stations**

	SA	A	Neut	D	SD	NR
Flexibility routine	41.1%	46.7	9.3	2.8	0	0
Conditioning station	50.0	41.6	7.4	0	<1	0
X-ray station/spine setups	47.6	34.5	15.8	1.8	0	0
New technique demo	77.5	21.4	<1	0	0	0
Old technique review	75.7	17.7	3.7	<1	0	2.8
Class summary/thought of day	64.4	28.0	5.6	<1	0	<1
30-Minute drill	66.3	27.1	5.6	<1	0	0

**Table 3. Student Assessment of Course Manual**

	SA	A	Neut	D	SD	NR
Description of moves	48.5%	39.2	11.2	0	<1	0
Format of manual	63.5	29.9	6.5	0	0	0
Thought of the day/class summary	59.2	34.2	3.7	<1	<1	<1
Listed homework assignments	66.6	22.2	7.4	1.85	1.85	0

strongly disagreed, and one student (<1%) did not respond.

Numerous questions on the evaluation asked the students to rate the effectiveness of the various stations of the daily teaching plan individually. Collectively the effectiveness of the DTP was noted in the organization section (above). Results of student rating of effectiveness for individual stations is shown in Table 2.

Yet another section of the survey instrument allowed the student to comment on the clarity, organization, and usefulness of the course manual as a teaching tool. Results of this portion of the survey are shown in Table 3.

Direct evaluation of the lead instructor as to his or her ability to effectively deliver and/or manage various aspects of the course provides valuable

feedback, as it is the combination of “surrounding issues” that blend to create an environment that either promotes or inhibits learning (6). Students were asked to assess the lead instructor with regard to organization, punctuality, preparation, expectation of students, use of class time, professionalism, knowledge of subject matter, clarity of presentation, and enthusiasm. These results are provided in Table 4.

## DISCUSSION

While the cliché “many roads lead to Rome” still applies to educational methodology (1,9–11) in this time of accelerated learning, the straightest and most well planned route may be the wiser choice. Through

**Table 4. Student Assessment of Lead Instructor**

	SA	A	Neut	D	SD	NR
Organization	90.6%	7.4	<1	0	0	<1
Punctuality	93.4	3.7	<1	0	0	1.8
Preparation	94.4	2.8	<1	0	0	1.8
Expectation of students	85.3	11.9	1.8	0	0	<1
Use of class time	88.7	9.3	<1	0	0	<1
Professionalism	91.6	5.5	<1	0	0	1.8
Knowledge of subject matter	90.6	7.4	<1	0	0	<1
Clarity of presentation	81.3	14.9	2.8	0	0	<1
Enthusiasm	88.6	8.4	1.8	0	0	<1

the application of Abraham Maslow's classical "whole-phase-whole" approach to learning presented in a multistation teaching format, fundamental psychomotor patterns for the chiropractic techniques are established, first in the small group station format, then refined over time. A second, equally important lesson is that the student "learns how to learn." With the ability to categorize future challenges (i.e., new technique variations) into a recognized stance, hand contact, and a thrust, the student can quickly relate old with new, known with unknown, and similarities with differences.

The primary goal of learning should be the assigned task. With students' self-assessed "technical proficiency" rating at 85%, few would argue that the goal was not achieved. But more important "concomitant factors" are also achieved.

It is the concomitant factors of learning (the task, the teacher, life, thinking, planning, self-reliance, pride, humility, habits, and emotional control) that increase or decrease insights and interests in learning and education strengthening or weakening the resolve and developing attitudes of confidence in one's ability to improve. (6)

This area of concomitant learning and the examples of discipline, presentation method, and class structure may prove to be an area rich for retrospective study as the student transforms to intern and in the later stages of his or her formal chiropractic education. The challenge for the chiropractic technique instructor teaching first-trimester students is to introduce "manageable wholes" from which future adjustive concepts and techniques will evolve. The use of a multistation format with a consistent daily teaching plan addresses the introduction and establishment of manageable wholes through course content, method, and structure.

The use of a multistation format offers several advantages for both the teacher and student. Moving from large group to small group and back again or,

in the case of the "circuit training," small group to small group presents a change of teaching pace and venue. Using the DTP as an activity template gives structure to the class, and the class station changes represent intermediate familiar destinations, and the process of education becomes a familiar journey, allowing students to focus energies on learning rather than the distraction of boredom or anxiety of uncertainty.

While the vast majority of students positively viewed the multistation teaching format, several written comments noted that the class was "stressful" or that the teachers "fed my anxiety levels." It is unclear whether this situation was due to lack of preparation on the part of the student, a flaw in the presentation, or the attitude of the teacher. Presence of a learning disability may have fostered these feelings. Further study in this area may be warranted. Individual physical deficits such as grip strength, poor eye-hand coordination, or lack of the kinesthetic sense may also negatively influence a student's success and appreciation for the class. These areas were not addressed in the survey and may also present another area that would present revealing results upon study.

Finally, to the casual observer, the regimentation and continual drilling may only represent "mindless" activities not consistent with the multifactorial requirements of a future chiropractic physician. One could counter this observation with the fact that the continual drilling, both physically and mentally, forces the student to focus literally and figuratively on the task at hand, developing a pace of cognitive thought consistent with clinical practice.

Introduction of the course content as manageable wholes must be in fact just that—manageable. The tendency to overteach must be avoided (6,12). It is the clearly presented but "vaguely grasped whole" through which the student will come to a higher level

of understanding. Clearly stated objectives clarify the long-term goals for all involved, and although the steps to the goal may be unclear, these objectives at least offer the student the thought that there is an “end” to be achieved. The production and periodic updating and refinement of supporting materials (i.e., the course manual) serve to clarify the learning objectives while at the same time providing an active study aid for the student while away from the supervised class.

Improvement necessitates change and creates understanding at a higher level. Education is one method of creating this change. Consistent with the concept of manageable wholes implicitly presented within the multistation format is the notion of change (6). While few authors have addressed this teaching strategy, it blends with Maslow’s manageable wholes. The manageable whole is learned, then mastered, then reintegrated into a larger whole, leading to change and adaptation and understanding at a higher level.

The multistation format allows for creative use of the classroom. Small group movement from station to station allows for new perspectives by the students. Equally important is that it utilizes the knowledge base of the teaching assistants who offer a different perspective and delivery cadence that minimizes the daily teaching plan from becoming routine. Small groups with close supervision allow for directed efforts with guided discovery. While the teacher is “close by,” the teacher is not “ever present” as the student struggles with initial attempts to refine “vaguely grasped wholes” that evolve through personal trial and error and occasional teacher feedback.

The general intent of the daily teaching plan is to offer a consistent presentation of high task behaviors or specifically designed psychomotor skills in the four small group stations and the general 30-minute drill session. With “no time to waste” within these teaching stations, “teachable moments” are sought like precious gems. Because of the frequent movement, the student is forced to “think on his or her feet” both figuratively and literally. Attentiveness and alertness to the task at hand becomes the tone and tenor of the class.

Finally, the daily teaching plan necessitates exacting preparedness on the part of the teacher. For the whole process to work, there must be a smooth flow between the old and the new—an established whole and a new phase. With planning and sequential development, these goals can be achieved.

## CONCLUSION

The development of chiropractic psychomotor skills by the chiropractic educator is a daunting task. The application of proven techniques from both the athletic arena and classic 20th century educational thought can be combined to create an accelerated learning method for today’s chiropractic student.

The attention to course content, class time structure, and teaching presentation method allows the lead instructor the necessary variables to create a dynamic learning environment that is challenging yet enjoyable. Attention to manageable wholes and teachable moments forces the educator to create a comprehensive educational plan that streamlines administrative organization while at the same time increasing material sensibility.

Clear objectives, familiar situations, and activities lead to increased learner interest. The multistation format approach to psychomotor skills development leads to self-described levels of proficiency. It is the successful mastery of new and unfamiliar material that will lay the foundation of an “I can do this” mentality toward chiropractic technique. And it is an “I can do this” mentality that will fuel the light of future discovery.

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