

Increasing osteopathic manipulative treatment skills and confidence through mastery learning

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Several recent studies document the declining use of osteopathic manipulative treatment (OMT) in clinical practice. In this article, the authors contend that developing new teaching materials based on the mastery learning approach can augment time-tested methods of teaching OMT and help to stop or reverse this decline. The Spencer technique for shoulder manipulation is used to demonstrate the development and evaluation of OMT mastery learning materials. These materials could be developed as part of a progressive teaching sequence requiring increasing diagnostic acumen, palpatory skill, and therapeutic subtlety. Such a program could be used throughout osteopathic medical training and for continuing medical education to increase skills and confidence in the use of OMT.

(Key words: mastery learning, Spencer technique, osteopathic manipulative treatment, medical education)

Developing new teaching materials based on the theory of mastery learning can augment time-tested methods of teaching osteopathic manipulative treatment (OMT). The Spencer technique for shoulder manipulation was chosen to demonstrate this idea because it is a straightforward technique using gross motor skills and because it has 'broad application in diagnosis, treatment, and prognosis' for shoulder function.¹ Using the Spencer technique also provided students the opportunity to experience end-range motion characteristics, practice localization of motion according to perceived tissue resistance,

and follow a safe treatment sequence based on osteopathic principles early in their training. This technique is not intended to stand alone as a mastery learning technique, but to be an early component within a sequence of progressively more complex and demanding assessment and treatment skills—cognitive and palpatory.

Background

Results of recent studies indicate that use of OMT is declining in clinical practice.^{2,3} In a recent survey completed by more than 1000 osteopathic family physicians, only 6% of the respondents report-

ed using OMT on 50% or more of their patients; one third of the physicians used OMT on less than 5% of their patients.³ Many factors have contributed to decreasing use of OMT over the past several decades. Gevitz⁴ noted that osteopathic philosophy and OMT are not thoroughly integrated into the curricula of the profession's schools and colleges; several osteopathic educators have noted the lack of OMT training and role modeling provided during clinical training.^{5,6}

Despite these educational problems, 95% of the family physicians in the study by Johnson and associates³ described OMT as an efficacious treatment modality. However, a substantial percentage of the survey respondents indicated that one or more practical barriers limited their clinical use of OMT: lack of time (60%), other professional and practice interests (31%), poor reimbursement for OMT (26%), unsuitable physical facilities (26%), practice environment not supportive of OMT (23%), and lack of patient interest (16%). In addition, 22% of the physicians indicated lack of confidence in their OMT abilities, and 19% felt that they had insufficient OMT training. In written comments, many of the physicians criticized the lack of OMT integration during clerkship, internship, and residency training, and noted the shortage of postgraduate training opportunities suitable for busy practitioners.

Although the most prevalent barriers to use of OMT in clinical practice appear to be practical and political problems, lack of OMT skills or confidence and lack of continuity in OMT training are clearly important and addressable. Methods of learning OMT that could be more easily integrated throughout a curriculum, especially during clinical and postgraduate training, would be of great benefit to the profession. Mastery learning methods, with their independent learning and more focused use of instructor/clinician time, offer such an opportunity for easy integration.

Traditional OMT training methods

During the first 2 years of the curriculum at the Ohio University College of Osteo-

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pathic Medicine (OUCOM), osteopathic philosophy and OMT are taught through a series of lectures and hands-on laboratories. Laboratories usually begin with a diagnostic or therapeutic technique demonstration by the instructor. Students then work in pairs to practice the technique on each other, with roving instructors and lab assistants answering student questions during the sessions. These OMT laboratory sessions can efficiently train 25 to 50 students at one time, but the lack of individualized performance feedback leaves many students uncertain about their ability to perform OMT techniques correctly. Lab-based OMT training sessions are difficult to arrange during clinical clerkships or for postgraduate or continuing medical education training (unless an OMT rotation is included in the curriculum as described by Magnus and Gamber⁷). The following describes the theoretical rationale and practical application for mastery learning, which combines independent study with individualized feedback to provide a powerful and portable way to learn OMT skills.

Mastery learning

Drawing on concepts from behavioral psychology, the mastery learning approach to teaching was developed in the 1960s and 1970s to help as many students as possible to master a desired body of academic knowledge or skills.⁸ The four key components of mastery learning are as follows:

- ☐ Clear specification of desired learning outcomes (for example, as learning objectives describing initial position, movement, and criteria for completion of steps in an OMT technique);
- ☐ Careful development of detailed learning materials that closely match the learning objectives (for example, an OMT technique demonstration on videotape highlighting key points in the objectives);
- ☐ Self-paced learning that may include independent study and group-based methods; the learner studies and practices until he or she is confident of meeting the criteria specified in the objectives;
- ☐ Multiple opportunities to demonstrate achievement of the learning objectives,

with individualized corrective feedback. In mastery learning there is no stigma attached to receiving corrective feedback, studying or practicing more, and being retested to demonstrate accomplishment of the learning objectives within a specified time frame.

Advocates of mastery learning claim that it enables "75 to 90 percent of the students to achieve to the same high level as the top 25% learning under typical group-based instructional methods."⁸ Mastery learning can result in higher student effort, more efficient learning, and increased student interest in the subject. Prior to this study, mastery learning methods had been effectively applied to teaching a variety of academic course topics⁹ as well as the development of psychomotor skills in sports such as basketball.¹⁰ Its application is broad-ranging and shows promise with regard to OMT.

A mastery learning approach to OMT training can have several major benefits:

- ☐ More time spent between labs practicing OMT skills. Otherwise, OMT may be practiced only sporadically based on the demands of other curricular topics and courses.
- ☐ Attainment of a more consistent, higher level of OMT skill accompanied by higher confidence to apply what students have learned. Research has shown that higher confidence or "self-efficacy"¹¹ to correctly perform a skill is predictive of whether a person uses the skill and persists in its application, even under challenging conditions.
- ☐ Development of a habit of lifelong learning through independent study of OMT. As OMT is a safe form of treatment,¹² many techniques can be safely practiced without close supervision if adequate learning materials and guidelines are provided.
- ☐ Increased one-to-one communication between faculty and students concerning the evaluation of OMT skills.
- ☐ Increased availability of experienced teachers of OMT through the creation of independent study materials based on their technique demonstrations.
- ☐ Development of independent study materials that could be used during clinical and postgraduate training to increase

continuity in OMT training throughout an osteopathic physician's medical education and career.

Spencer technique

The Spencer technique is a standardized sequence of shoulder treatments that has evolved over the past 80 years into a method that is useful for diagnosis, treatment, and assessing prognosis.^{1,13} Dr Patriquin has provided an excellent historical perspective.¹ The Spencer technique is taught in some form in most osteopathic colleges. At OUCOM, the steps of the Spencer technique are taught in combination with preparatory techniques developed by Angus Cathie, DO, to be performed in the following sequence:

- Prone shoulder preparatory technique (Cathie)
- Supine shoulder preparatory technique (Cathie)
- Spencer sequence of shoulder treatment:
 - ☐ Preface treatment with traction and compression ("pumping")
 - Shoulder flexion and extension, elbow flexed
 - Shoulder flexion and extension, elbow extended
 - Shoulder abduction, elbow flexed
 - Shoulder abduction, elbow extended
 - Shoulder adduction with external rotation
 - Shoulder abduction with internal rotation
 - ☐ Repeat traction and compression "pumping"

These steps can be clearly described for the slow, careful performance of a safe technique designed to minimize discomfort to the patient while testing and treating every aspect of shoulder mobility. The Spencer sequence lends itself to an independent study, mastery learning approach fairly early in the osteopathic curriculum because it is a straightforward gross motor technique. Its inherent advantages include the following:

- It provides an opportunity for beginning students to assess and treat end-range motion characteristics without the potential for injury present when similar cervical assessment and treatment is performed by a novice.

■ It allows practice with localization of motion according to perceived tissue resistance.

■ It presents a logical, progressive sequence with osteopathic principles at its core.

The Spencer technique is not intended to stand alone as a mastery learning technique, but to be an early component within a sequence of progressively more complex and demanding assessment and treatment skills—cognitive and palpatory. Such a sequence could lead to more integration and more individual confidence in OMT abilities.

Development of materials

Drs Patriquin and Mann developed a handout in 1990 that clearly specified the patient position, operator position, movements, and criteria for completion of each step in the Spencer sequence. This three-page handout provided both students and faculty with a checklist for correct performance of the sequence. The steps of the Spencer technique were performed with the patient in lateral recumbent position. This was the first element described. Then each step was described using several statements specifying the operator's actions. For example, step three (shoulder abduction—elbow flexed) was described as follows:

■ Position patient's arm in abduction (90°) with elbow flexed; operator grasps patient's elbow or forearm using hand closest to patient's feet; other hand compresses the scapula and clavicle (shoulder girdle) against the thorax.

■ Move patient's arm through full clockwise circumduction slowly, firmly (using neither compression nor traction), repeating several times to gain range of motion (ROM).

■ Move patient's arm through full counterclockwise circumduction slowly, firmly (using neither compression nor traction), repeating several times to gain ROM.

A videotape was prepared to illustrate the correct performance of the Spencer sequence. The first part of the 16-minute tape was a brief interview between Dr Patriquin and a patient with adhesive capsulitis in one shoulder that

was due to an old but severe injury after an accidental fall. Dr Patriquin then performed the entire Spencer sequence on the patient, which was shown in subjective perspective (over Dr Patriquin's shoulder) to demonstrate the steps as seen by the operator. Audio narration and video stills were used to "freeze" the action as needed to highlight key points of the technique as described in the handout.

Implementation: first mastery learning version

The Spencer mastery sequence began in fall of 1990 with second-year OUCOM students and early in 1991 with first-year students. Dr Patriquin lectured on shoulder anatomy, pathologic features, and treatment. Students were then given the Spencer sequence handout and told to check out a copy of the videotape from the learning resources center and practice the sequence on a partner before coming to the lab session a few days later. Students were told that they would perform the technique on a faculty member or OMT teaching assistant in the lab and receive individualized feedback. There would be no penalty if repeated cycles of practice and feedback were needed to achieve correct performance of the entire sequence.

Ninety second-year students (the entire class) performed the Spencer sequence using eight instructors/evaluators during 4 hours of lab time. Only two second-year students had to repeat the sequence after instructor feedback, and their errors were easily corrected. Forty-six students (51%) responded to the subsequent survey as part of the course evaluation. On a scale of 1 (poor) to 5 (excellent), student mean ratings of the clarity and usefulness of the handouts and videotape for learning the Spencer sequence were 4.4 and 4.6, respectively. Usefulness of the instructor evaluation to ensure correct performance received a 4.7 mean rating. Students reported that they practiced the Spencer sequence an average of 67 minutes (range, 5 minutes to 4 hours) before coming to the lab session for evaluation. Students' written comments indicated that the method used to teach the Spencer technique was helpful and that the

method should be expanded to include other techniques.

Having more than one opportunity to demonstrate mastery of the sequence (if needed) reduced student anxiety in the lab. However, students requested that we distribute the handouts more than 2 days before the lab and that the lab not be scheduled on the same day as any other "tests." Only three or four of the first-year students required more than one evaluation attempt to demonstrate mastery of the Spencer sequence. (The 1991 first-year student survey results could not be located.)

Second mastery learning version

Based on student suggestions from the 1990-1991 sequence, line drawings were added to the handout to show the patient and operator positions for each step in the Spencer sequence. Other changes were also made to the Spencer mastery sequence conducted with first-year students in February 1998. The Spencer sequence was demonstrated by the instructor during a traditional osteopathic principles and practices lab without a period for in-lab student practice. After the lab, students were expected to practice using the handouts and videotape. When they felt confident of mastery, they were to schedule an individual appointment with one of eight instructors to perform the sequence on the instructor and receive feedback. This preserved lab time for other purposes and allowed one-on-one evaluation outside of class, at the expense of additional time spent by the instructors. As few students voluntarily made evaluation appointments in the first 3 weeks, all students were assigned appointment times. With three appointments per instructor per week, all 100 students were individually evaluated over a 1-month period. The time commitment per instructor was no more than 1 half hour per week. In schools with double the enrollment, the time commitment would only represent 1 hour per week for a month, assuming the same number of instructors.

Only one first-year student required corrective feedback to demonstrate mastery of the Spencer sequence. Sixty-seven

students responded to the course evaluation survey covering the handouts, videotape, and instructor evaluation (means of 4.4, 4.6, and 4.6, respectively, on the 1 to 5 scale described previously). The first-year students practiced the Spencer sequence an average of 2 hours (range, 15 minutes to 6 hours) before the evaluation appointment with the instructor.

The same procedure was implemented in winter of 1999. Again, only one student required corrective feedback to demonstrate mastery of the Spencer sequence. The course evaluation survey covering the handouts, videotape, and instructor evaluation showed similarly high marks (means of 4.0, 4.5, and 4.6; standard deviations of 0.8, 0.6, and 0.6, respectively). These first-year students practiced the Spencer sequence an average of 72 minutes (range, 5 minutes to 5 hours) before the evaluation appointment with the instructor. For 1999, we calculated the median minutes of practice (60 minutes), which was lower than the mean due to a positively skewed distribution, that is, a few students practiced 3 to 5 hours. One of the investigators in the 1999 study handed a questionnaire to each student immediately after the mastery demonstration was completed with a request to complete it. The questionnaire was collected upon completion, which improved the response rate considerably (93%).

The eight instructors (six faculty and two student fellows) who served as evaluators were also surveyed. All faculty thought the individual student evaluations were useful (mean, 4.5) and worth the time commitment (mean, 4.3), and student performance was rated as good to excellent (mean, 4.3).

Discussion

This article describes one means for improved student integration of osteopathic principles and practice, particularly if carried beyond a single technique application and into the third and fourth clinical years. As such, it has implications, on a modest—but significant—level, for the future expression of our osteopathic identity and should be of

immediate interest to the large group of osteopathic physicians involved in teaching as academicians and clinical preceptors. The mastery learning approach is relevant to all osteopathic physicians concerned with the foundation of our profession and its improvement through our future, our students.

Faculty and students expressed a high degree of satisfaction with the mastery approach to learning the Spencer OMT sequence. The self-paced mastery approach allowed students complete control of the amount of time they wished to practice the sequence before the evaluation. They used the handout and videotape to practice from 5 minutes to 6 hours. As expected, first-year students practiced on average almost twice as much as the second-year students before the evaluation. Given more experience with OMT and mastery learning, students would become more accurate and efficient in practicing to achieve mastery. Few OUCOM students required corrective feedback to achieve mastery of the steps of the Spencer sequence, and students appreciated the individualized feedback from an instructor.

The mastery learning method cannot substitute for dedicated lab time focused on palpatory skill development, nor can it substitute for the practiced application of osteopathic principles under clinical supervision. However, it provides a powerful tool for gaining confidence in safe, easily described OMT skills such as the Spencer technique, with the potential for a progression into the more complex and demanding aspects of osteopathic diagnosis and treatment. Mastery learning provides an efficient means for ensuring a high level of competence for every student participating in OMT training.

Mastery learning for OMT skills could easily be integrated into clinical and postgraduate training to increase the use of OMT. Results of the study by Johnson and colleagues³ indicated that almost all osteopathic family physicians believe that OMT is effective, but at least one fifth of them lack OMT skills and confidence. If these physicians could be provided with efficient and effective OMT training, the use of OMT in their

practices would increase. Busy physicians and students in clinical training could use mastery learning materials to practice OMT for several short sessions at their convenience and schedule an evaluation with an osteopathic physician familiar with the techniques to receive individualized feedback. Through the efforts of the Educational Council on Osteopathic Principles (ECOP) or other coordinating group, osteopathic physicians could develop high-quality mastery learning materials for a wide range of OMT skills. Such collaboratively developed materials could be used throughout undergraduate and graduate osteopathic medical training and for continuing medical education to increase skills and confidence in the use of OMT.

Confidence in one's skills is essential for use of those skills under challenging clinical or educational conditions. Mastery learning methods produce high levels of skill and confidence in learners. These methods cannot address the other practical (for example, time) constraints placed on the use of OMT in the clinical setting; however, a clinician who knows what needs to be done osteopathically and knows how to accomplish that efficiently and effectively is more likely to overcome such constraints. Based on the success of the Spencer project, OUCOM is planning to develop mastery learning materials for the structural screening examination and for other OMT skill areas. The development of OMT mastery learning materials should be part of the osteopathic profession's strategy to increase the use of OMT in the clinical practice of current and future osteopathic physicians.

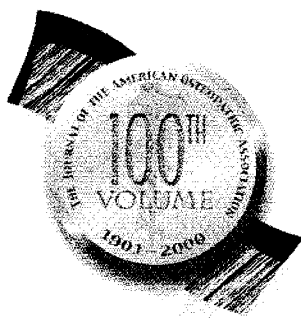
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Medical education

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Osteopathic methods and the great flu pandemic of 1917-1918

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The great influenza pandemic of 1917-1918 has been legend in osteopathic lore. The outbreak killed almost 1.5 times as many people worldwide in 6 months as did the entire World War I in more than 4 years (10 million versus 7.5 million, and some sources put the death toll of the pandemic at closer to 20 million). In terms of numbers of people who died in the outbreak, the 1917-1918 pandemic made the great Bubonic Plague look like a virtual piker in comparison. The medical community had had some experience with such an epidemic in the 1889-1890 flu epidemic, but it had obviously not been successful in finding a solution.

The osteopathic medical community treated patients with influenza and its more potent sequela, pneumonia, with various forms of manipulative treatment, rest, and hydration. After the death sweep had abated, the leaders of the profession surveyed osteopathic practitioners nationwide regarding their experiences with treatment. The results showed that patients treated by osteopathic physicians according to osteopathic principles had a death rate of 0.5%, whereas medically treated patients had an average 6% death rate (up to 27% in Boston). Patients with pneumonia under osteopathic care had a death rate of less than 10%, as opposed to 33% of medically treated cases. These statistics are certainly startling and can, of course be biased, by many factors. However, even allowing for some bias in favor of the osteopathic medical community, it is apparent that osteopathic methods were highly effective in the epidemic.

The first reprint in this month's issue is an editorial by C.P. McConnell, DO, written late in the epidemic. McConnell recounts his experience with treating patients with "grippe" or influenza and pneumonia. He outlines his methods of treatment as well as indications and contraindications for various modalities. He is explicit in his descriptions of treatment methods and what to expect. It is clear that he was using several types of soft tissue, muscle-relaxing techniques as well as techniques designed to move fluids. The editorial shows a remarkable degree of insight about physiologic principles that are much better understood now than then.

The second article, by George Riley, DO, was written shortly after the end of the outbreak and just after the war ended. He contrasts the two disasters and enumerates the