The seven-step palpation method: A proposal to improve palpation skills

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Abstract Palpation skills are fundamental in osteopathy because they affect clinical results. However, palpation is a complex task that requires the right combination of knowledge, skills, and attitude thus making it a real challenge to teach. This article describes a seven-step palpation method that promotes the development of palpation skills by gradually mastering their complexity. This innovative teaching approach is based on well-known cognitive and motor learning theories and addresses technical as well as perceptual considerations. For the last three years, the Seven-Step Palpation Method has been used at the Centre Ostéopathique du Québec. The advantages and challenges of its implementation are discussed along with the main issues of osteopathic palpation.

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Introduction

Palpation skills are the central component of osteopathic clinical practice. They are essential to correctly evaluate osteopathic dysfunctions and master treatment techniques. Furthermore, they ensure clinicians' efficiency since palpatory findings mainly determine the accuracy of clinical reasoning. Palpation is a complex task that requires many types of knowledge, motor skills, perceptual skills, and a therapeutic attitude. Like other apprenticeships, it is influenced by students' personal factors and the context in which it takes place. Palpation is also complex by nature since it is an open-ended task seeking for an undefined solution.
Considering their importance and complexity, improving palpation skills should be part of the aim of every osteopathic curriculum. However, teaching, and assessing palpation skills can be really challenging. Palpation processes are deeply connected to a person’s perception, and as such, to a bystander. Moreover, observation of skilled osteopaths has shown that very different ways are valid. Teachers should also be preoccupied by the low reliability of diagnostic palpation established by many osteopathic studies. It remains a serious problem for the credibility of osteopathy and directly concerns palpation skill teaching.

This article suggests a teaching method to optimize the development of palpation skills by gradually mastering their complexity. The current approach is based on well-known cognitive and motor learning theories and addresses technical as well as perceptual considerations. For the last three years, this teaching method has been implemented with a promising start at the Centre Ostéopathique du Québec.

Theoretical foundations

Case-load theory

The Case-Load Theory (CLT) offers useful guidelines to tackle the complexity of palpation tasks. The CLT states that the learning process of complex tasks can be hampered if the quantity of information outnumbers the integration capacity of the human brain. It is now well known that the working memory (WM) is capable of holding a maximum of seven elements or items of information at a time.

When a task is sufficiently repeated, different elements will be learned and treated as a single entity called a schema. A schema can be encoded in the long-term memory (LTM) and can be treated with varying degrees of automaticity as one element of knowledge by the WM. The LTM can handle an almost infinite number of information when they are organized in schemas. The number of schemas and their complexity depend mainly on the expertise level related to a specific field. The completion of a task using schemas will require fewer resources from the WM, so it will be possible to add more elements and/or to solve a problem with less effort and better results.

Many factors influence the formation of these schemas: scaffolding, feedback, the simple-to-complex sequencing of a task, and the presentation sequence of information. All these factors must be adapted to the expertise level of learners.

Motor skill learning theory

Palpation tasks can be divided into two distinct components: a motor component, in which the clinician acts on the patient’s tissues (the information travels from the clinician’s brain to the patient’s tissues) and a perceptual component, where the clinician feels the state of the tissues (the information travels from the patient’s tissues to the clinician’s brain).

Teaching the motor component of palpation tasks is supported by the motor skill learning theory. In the medical field, four factors have been shown to enhance motor skill learning:

1. Observation of a mentor or peer (including dyad practice) can improve learning;
2. External focus (directed on the movement’s effect) is more effective than internal focus (directed at the performer’s body movements) to promote automaticity in motor control and movement efficiency;
3. Feedback that positively influences learners’ motivation is the most effective.
4. Self-controlled practice is more efficient than externally controlled practice conditions.

Furthermore, the links between self-controlled practice, perceived self-efficacy, and the quality of learning have been well established in learning theories and for motor skill learning in osteopathy.

Learning complex motor skills can be simplified by reducing the cognitive load. Dividing the task in smaller parts helps novices because they are able to handle each part separately. Since an incorrect technique is difficult to change later on, ensuring the quality of motor skill learning at an early stage is preferable.

The proposed teaching method insists on external focus as well as self-controlled practice and divides motor tasks in smaller parts. It also provides opportunities for internal feedback.

Theoretical notions on the perceptual component

The perceptual component of palpation tasks is harder to define than the motor component. Because of its subjective nature, the perceptual
component never expresses an “objective reality” and remains, whatever we do, a personal, multimodal, and multidimensional experience. It varies according to many factors like: emotional state, cognitive factors, perceptual mechanisms and their dimensions (bottom-up/top-down), as well as the visualization process. Perceptual strategies rely on the type of information to collect and prior knowledge.

Many specific difficulties of the palpation perceptual component are addressed in the suggested palpation method.

The seven-step palpation method: P.A.L.P.A.T.E

This teaching approach is a systematic seven-step method. Those steps are always presented to students in the same order and can be remembered by the P.A.L.P.A.T.E acronym (Table 1). At the Centre Osteopathique du Québec, a handbook describing osteopathic palpation challenges and the seven steps of the palpation method was specifically written for students and is available during all technique classes.

The first goal of this approach is to automate the motor component of palpation tasks in order to free sufficient cognitive space for perceptual exploration. In technique classes, reasonable time should always be granted for the sole purpose of perceptual exploration so that students can learn to systematically search for as much information as possible to allow automation of perceptual exploration processes. When students are familiar with basic motor abilities and perceptual exploration, it is easier for them to focus on learning a technical move while applying osteopathic principles.

It is essential to introduce gradually the next difficulty level corresponding to students’ zone of proximal development. For each step, the type and quantity of directives as well as the precision required must vary according to the learners’ level of expertise. For example, for novices, the sixth step could be lengthier and even be the core learning of a practice session. However, for advanced students it could remain a shorter exploratory phase and quickly lead to tests and techniques planned for the class.

By addressing each component of the palpation task (motor component, perceptual component, and technical learning), this method also enables the use of free cognitive space to overcome the simple technical aspect of palpation and attain deeper readings of tissue response. Furthermore, the unused cognitive space could be devoted to decipher palpatory findings, an essential process of osteopathic problem solving. From experience, it could also be used to increase the number of structures that are simultaneously considered during a test or technique. Finally, it could be dedicated to identify unfamiliar situations that should trigger further analytical reasoning processes.

The Seven-Step Palpation Method aims at achieving greater autonomy for students training to enhance their learning process. Students can reproduce learning sequences, as often as they need, in a self-regulated environment and with useful internal feedback. These factors are essential because complex learning must be repeated many times and over a certain period to stimulate the cerebral reorganization required for long-term retention.

Specific directives must stimulate students to build explicit palpation reference frameworks for test results and treatment responses. Those opportunities to encode schemas in their long-term memory promotes the progressive development of palpation expertise.

It is crucial that the palpation method becomes a learning tool and not a rigid protocol to follow or

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additional data to learn. The project’s purpose would be greatly impaired if it increased the cognitive load of palpation skill learning instead of reducing it.29

The seven steps

Each step will be shortly described.

1 Position/Confortable positioning of the clinician: Practitioner’s discomfort must be avoided to ensure quality palpation. Even though this step seems obvious, students often impose considerable postural constraints on themselves.

2 Anatomy/3D anatomic visualization: Using an external focus (towards the movement effect) while executing the task can maximize motor skill learning.11 Therefore, instructors should urge students to study anatomy plates and models, so they will use a valid anatomic visualization as focus. Teachers should also adapt the complexity of the suggested mental image to learners’ level of expertise. For novice learners, the mental representation can be limited to the basic characteristics of the structure or articulation being palpated, but, for advanced students, it can be more complex and include, for example, its relation with adjacent structures and/or the movement axis.

3 Level/Depth of tissue contact: To ensure the technique’s efficacy, palpation should neither be too deep nor too superficial. The right depth is the one allowing the desirable movement (see step 5).

4 Purpose/Clear identification of intention: Since the cognitive load of the three first steps is already substantial, this step is crucial for novice learners. Students should explicitly express a precise intention and direct it towards the expected outcome on the tissue. They will then benefit from the learning experience by positively modifying the motor control required to achieve the desired action.30

The combination of step two, three, and four uses visualization principles, which have been proven successful to learn complex movement in sport, musical, and surgical fields.31–33 Furthermore, visualization techniques are efficient enough to result in cerebral reorganization.34 Therefore, they can be helpful in palpation skill learning. However, it is advisable to use them with caution since visualization abilities do not seem to be universal.35

5 Ascertain/Initiate motion with a relative point of reference: This method’s novel element is an essential step. Students should use an initial contact point to mobilize the structure to be tested or normalized while they monitor the effect of that motion on a relative point of reference. For instance, to evaluate the possible motion of the sacroiliac joint, the ilium is mobilized if, and only if, a proportional repercussion is felt on the sacrum. This self-validation process promotes self-controlled and self-regulated learning as well as internal feedback for each attempt. With simple accommodations, this step can be equally valuable for motility movement.

The first five steps of the palpation method involve motor learning characteristics.

6 Tweaking/Fine-tuning of the five previous steps and perceptual exploration: The sixth step is a turning point. This step eases the use of the previous steps and is a great opportunity for repetition. However, students should not use their newly-acquired motor automatisms simply for repetition purposes but also for the exploration of different perceptual paths by successively and systematically directing their focus on the quantitative components of motion (amplitude, asymmetry, and dysfunction intensity) as well as the qualitative components (tissue surface, sensibility, reaction to touch (defense or happiness), tissue textural changes, density, elasticity, heat, vitality, etc.). According to learners’ level of expertise, this step could be lengthier for novices than for advanced students. At this point, the goal is not to find right or wrong answers. In fact, it is sometimes useful to enable wrong interpretations.30,36 Allowing students to share their different visions or representations at the end of technique sessions can enhance their experience. Since the perceptual component is personal, multimodal, and multidimensional, the words used to describe a palpation experiment can be very different from one person to another and therefore can be complementary and not necessarily contradictory.37

7 Evaluate or normalize/Apply technique parameters: The seventh step exploits the abilities acquired in the first six steps to facilitate learning of the curriculum tests and techniques. To increase internal feedback for advanced students, this step could also include the comparison of the tissue’s state before and after normalization.
Discussion

The principal author of this article initially used this seven-step palpation method in cranial technique classes. It was quickly concluded that the number of repetitions required (many hundreds) was too important to be assumed by only one teacher. Moreover, to enhance their palpation skills, students need to apply the same method consistently. It then became essential to implement the Seven-Step Palpation Method for technique classes in all osteopathic fields (craniosacral, parietal, soft tissue, and visceral).

In the last three years, the use of this teaching method in more than half the technique classes of the Centre Ostéopathique du Québec led to the following observations.

The first advantage was to rally the teaching staff towards a common project and stimulate collaboration between teachers and clinical instructors. This kind of synergy promotes the development of students’ general competence. However, this method presents some challenges for teachers. They must drastically modify time distribution of practice sessions. They also have to adapt the way they teach techniques because they need to factor in, attention focus, identification of main and relative reference points, as well as variable utilization of palpation method steps (type/quantity of instructions and adaptation to expertise level). To assist them, a handbook describing the application and possible uses of the palpation method was written. Workshops were also organized during teacher meetings.

Additionally, multiple informal observations were made since the implementation of the Seven-Step Palpation Method showing sufficient positive effects on students’ palpation skills to justify maintaining the project at a larger scale. For example, students seemed more confident and, as predicted, demanded less external validation in technique classes. They understood more clearly the stakes of palpation and the importance of repeating each technical movement. They stayed focused for longer periods in practice sessions and have shown more interest in the palpation process itself rather than in its final result alone. Some of the higher-level students, who were not systematically exposed to this palpation method and who had major difficulties developing palpation skills, showed interest for this new learning tool in individual follow-ups and have, for the majority, greatly improved their technical performance afterward.

Beyond these observations, it would be useful to validate the effects of the Seven-Step Palpation Method on the two main issues of osteopathic palpation: reliability of palpatory diagnostic and assessment of palpation processes.

Firstly, it has been shown that inter-observer reliability rises following a period of consensus training. In certain circumstances, the reliability gain can be maintained and improved over time. Since it is intrinsically personal, the perceptual component of palpation might be the one that needs to be specified the most. The standardization of every dimension of palpation tasks might not be necessary or even desirable. The precise, comprehensive, and systematic identification of osteopathic dysfunction characteristics (quantitative and qualitative) as well as the constant incentive to build palpation reference frameworks might help to enhance reliability.

Secondly, the assessment of palpation processes is a major pedagogical challenge. The development of extensive palpation reference frameworks might also contribute to alleviate this issue. The imperceptible nature of palpation processes could be compared to the hidden portion of clinical reasoning. In medicine, it has been shown that the outcomes of clinical reasoning can be estimated according to practitioner’s capacity to represent the clinical problem with semantic qualifiers. By analogy, it would be interesting to determine if the value of palpation processes can be linked to the number of relevant qualifiers that students select from their reference frameworks in order to describe their palpatory findings.

Conclusion

The implementation of this systematic teaching method, based on well established cognitive, motor, and perceptual theories, seems a valid way to help students gradually master the complexity of palpation skills required in osteopathy. However, future studies will be needed to objectively confirm the impact of implementing the Seven-Step Palpation Method. In future months, data will be collected to evaluate the improvement of students’ palpation skills and to assess more objectively if the use of this approach in an osteopathic curriculum can provide viable solutions for palpation teaching challenges.

Authors contribution statement

AA conceived the seven-step method and wrote the first draft of the manuscript. KG wrote the final version. All authors improved the palpation
method as well as edited and approved the final version of the manuscript.

Conflict of interest statement

The authors declare that they have no competing interests.

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