Intuitive Judgement in the Context of Osteopathic Clinical Reasoning

Torsten Liem, MSc Ost, MSc Paed Ost

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Address correspondence to Torsten Liem, MSc Ost, MSc Paed Ost, Osteopathie Schule Deutschland, Mexikoring 19, 22297 Hamburg, Germany.

E-mail:
tliem@osteopathie-schule.de

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Previous research into osteopathic clinical and diagnostic decision making suggests that reasoning is commonly based on highly analytical as well as intuitive processes. According to the dual-process theory, the intuitive and analytical processing that leads to decision making is equally important in diagnostic reasoning. This article aims to explore the underlying and influencing factors that may lead to the development and reliability of intuition in clinical decision making generally and in osteopathic clinical reasoning specifically. Practical suggestions are given on how to encourage the development of intuition within the context of osteopathic teaching and practice.

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Clinical reasoning has commonly been acknowledged as the essential element for competent autonomous health care practice.[1] As part of the clinical reasoning process, health care practitioners (eg, osteopathic and allopathic physicians, osteopaths [foreign-trained practitioners of osteopathy], nurses, manual therapy providers) use a series of cognitive processes to gather and synthesize information about a patient, form a diagnosis, and develop and implement management strategies.[2] The diagnostic reasoning part of the clinical reasoning process is related to a specific clinical presentation or problem and considers associated pain mechanisms, tissue pathology, and contributing factors.[3] In the dual-process theory, the nonanalytical (intuitive) and analytical processes that take place are based on 2 different systems of judgement and decision making.[3-6]

System 1 is based on intuitive, automatic, and rapid judgements that are highly dependent on contextual cues, such as familiar clinical problems, that enable practitioners to automatically recognize patterns of dysfunction.[3,5,7] Pattern recognition is the most common form of these intuitive processes, allowing practitioners to formulate diagnostic hypotheses rapidly when encountering a patient for the first time.[8,9] It is described as a cognitive process that matches information from a stimulus with information retrieved from memory,[10] with perception and memory being the 2 most crucial processes involved in intuition.[11]

System 2 is based on an analytical, conscious, and slow mode of processing. In the clinical setting, it is often used when the clinical signs and symptoms associated with the patient presentation are not easily recognized.[3,8] Judgements are typically made by hypotheticodeductive reasoning,[3,8] in which diagnostic hypotheses are proposed, tested, and either verified or rejected.[9,12]

Pattern recognition and hypotheticodeductive reasoning are the foundations of the intuitive and the analytical systems, respectively.[9,13] Research suggests that both the intuitive and analytical systems are equally important in the reasoning process; they are interwoven and have strengths and weaknesses.[10,14,15] Both reasoning strategies are well recognized and used in various health care professions, including physiotherapy[16,17] and allopathic medicine.[18,19] However, research on clinical and diagnostic reasoning in osteopathic medicine and osteopathy (manipulative care provided by foreign-trained osteopaths) is scarce. In the present article, I focus on osteopathy and osteopaths.

Reasoning for experienced osteopaths is seen along a continuum from technical rationality, which encompasses a practitioner-centered biomedical and biomechanical approach, to professional artistry, which uses a patient-centered holistic approach.[20] Some studies have shown that experienced osteopaths mainly adopt both hypotheticodeductive and pattern recognition approaches as part of their diagnostic reasoning, depending on the "perceived level of complexity and degree of familiarity of the patient presentation."[21,22] However, Esteves[23] reported that in experimental studies, osteopaths' diagnostic judgments are influenced mainly by intuitive processing, whereas osteopathy students primarily rely on analytical processing using vision and haptics. Furthermore, osteopathy students reaching the end of their professional training generally demonstrated more analytical decision making than students at the start of their professional training, without differences in reflective thinking. This finding supports the notion that deductive reasoning may be more promoted within osteopathic education than inductive reasoning.[24]

Intuitive judgement in the context of osteopathic clinical reasoning and practice, however, has hardly been explored to date. A literature review[25] using historical and recently published books and electronic databases to explore the relevance of intuition in osteopathy highlighted that intuition per se has only been summarized or briefly mentioned as part of advice or suggestions for diagnosis and therapy. Sidler[25] concludes that intuition, given its relevance for decision making in osteopathy, has astonishingly only marginally been cited within both the early and current osteopathic literature. Possible reasons could be that intuition may be seen as a relatively complex matter, that research within osteopathy is lacking, that intuition is a low-level evidence topic because it is dependent on individual practitioners, or that intuition is seen as subjective evidence, which may not correspond with evidence-based practice.[25] To understand and recognize the nature and importance of intuition within osteopathy and its implications for osteopathic education and practice, Sidler recommends further discussion.[25]

The present article aims to expand on this call by introducing the concept of intuition with a brief overview of some of the underlying factors that may lead to intuitive judgement. I also outline possible teaching and learning strategies to develop and improve intuitive processes in the context of osteopathic clinical reasoning. Because the literature and concepts cited in this article are not exhaustive, potential discussion points are also identified for further investigation or debate.

Intuition and Its Role in Diagnostic Reasoning

Over the past 8 decades, several attempts to define the phenomenon of intuition have been made. Several authors maintain that intuition is not a short cut on the way to becoming an expert, but rather an expression and privilege of being an expert.[26-29] Hodgkinson et al[30] view the process of intuiting as a complex set of affective, somatic, and cognitive processes that are interrelated but have no apparent deliberate or rational thought.[30] The difficulties in formulating a concise definition may reflect the depth of the multilayered processes that underlie this concept. However, Hodgkinson et al[30] concluded that Dane and Pratt[31] captured "the essence of intuitive processing" with the following definition: "affectively charged judgements that arise through rapid, nonconscious, and holistic associations."

The majority of a practitioner's decisions or actions are based on automated, intuitive reasoning.[5,9,32] However, within the context of diagnostic reasoning, intuitive and analytical processes are not seen as mutually exclusive.[9,33] It is highly likely that both forms contribute to the final decisions reached in all cases (both for novices and experts).[34] In fact, adopting purely analytical or intuitive strategies may lead to lower diagnostic performance than using a combination of both processes.[9,35]

Within the osteopathic context, it is not uncommon to find students who report that their instructors are occasionally unable to explain their clinical findings and decision-making process. These instructors' decisions are primarily based on clinical intuition.[36] Experienced practitioners are able to formulate their diagnosis efficiently, rapidly, and unconsciously by way of pattern recognition, which is primarily based on implicit (unconscious) processes.[18,37,38]

Implicit Learning and Tacit Knowledge as a Basis for Implicit Memory

Memory is the ability to store and recall knowledge.[39(p668)] With explicit memory, a person can consciously remember previous situations and events. With implicit memory, knowledge from a previous event is available, but the person cannot remember it.[39(p673),40] The formation of implicit memory is a slow process; it takes time and a lot of repetition. Explicit memory can convert into implicit memory (or automated explicit knowledge) through constant repetition, resulting in improved performance of the given activities.[39(p681)] This may be one reason why experts are often not able to explain the reasoning behind their actions.[38,41]

Tacit knowledge and implicit learning contribute to the knowledge pool from which a person draws when making intuitive judgements.[30] Compared with explicit knowledge, which is formalized, expressed, encoded, and easy to communicate,[42,43] tacit knowledge is largely based on experience and refers to intuitive, hard-to-communicate knowledge.[44] Tacit knowledge is often context dependent, personal, and deeply rooted in action, commitment, and involvement.[45] Implicit learning is an unconscious process in gaining abstract or tacit knowledge, and it requires personal experience and many repetitions.[39(p681)] Collecting this information corresponds to a learning process that occurs automatically, silently, and effortlessly (ie, "learning by doing"). This knowledge cannot be recalled consciously.[40,46,47(p80)]

Implicit Perception

Generally, not all information that enters the central nervous system is also present in the conscious[47-49]; most stimuli are processed unconsciously.[47,50] Kihlstrom[46(p19)] defined implicit perception as the processing of stimuli that cannot be consciously perceived, as the intensity of duration of the stimulus is too short, the stimuli are masked, or the person is distracted. Thus, experience, thinking, or action is affected, without or regardless of the conscious perception.[46(p19)]

The existence and nature of unconscious perceptual effects has been controversial.[51-54] Merikle et al[55] suggest that stimulus information can be perceived even when there is no awareness of perceiving. Sidler[26] argues that unconscious perceptual processes can influence the perception and behavior of the palpating osteopath; hence, a particular "feeling" can instantly occur to the osteopath. In particular situations, a seemingly brief and subtle touch can be the basis for a decision.[26,56]

Implicit Thinking

In conscious thinking, a person's attention is directed toward the thought content. In unconscious thinking, the person performs thinking activities without directing the attention to the thought content. These implicit thought processes run automatically and without effort.[47(p80),49,50,57] After some time, intuition in the conscious may emerge.

The extensive literature on the topic of implicit thinking indicates that more adequate decisions are reached if (1) the explicit thinking is distracted from the task to

be solved and (2) the unconscious is given time to deal with the implicit thought processes.[48(p25),49(p79),50,57] Dijksterhuis and Nordgren[50] point to a number of studies that show that people make better decisions if they are distracted for some time before making a decision, compared with those who have to decide immediately. This observation is consistent with "sleeping on it"—often the solution is clear the next morning without the person consciously thinking about it. This phenomenon is probably based on implicit thinking, that after a so-called incubation period an intuition is produced.[50] According to Dijksterhuis and Nordgren,[50] however, the ideal amount of time to permit the rise of adequate intuitions is unknown. Also, this unconscious thought theory has come under scrutiny by some authors who were unable to replicate the originally described effects.[58,59]

Influences in Reliability of Intuition

Research in the field of medicine has shown that pattern recognition strategies often lead to the same decisions as those made analytically, with responses generated by the intuitive system not being better than those by the analytical system, and with both systems being equally prone to error.[34,35] However, additional factors that could influence the effectiveness of and introduce bias into the intuitive system were identified.[9]

Affections and Emotions in the Patient-Practitioner Encounter

Considerable disagreement exists regarding whether emotions are an important aspect of intuition.[60,61] Some authors suggest that affections may have a direct influence on intuitive thinking[60,62] or that intuitive processes may be facilitated by emotions.[60,63] The reliability of intuitive responses may be influenced by the emotional state of the practitioner toward his or her patients.[9,64] Hence, it may be unrealistic to consider that diagnostic reasoning relies only on objective judgements without emotions.[9,64] For example, a practitioner's lack of clinical empathy, an essential element of quality care,[65,66] can substantially influence medical decision making in that practitioners may underappreciate a patient's needs, leading to suboptimal decisions regarding management and care.[67] Within the context of osteopathic patient-centered care, a few studies[68-70] found that empathy in osteopathic medical students grows or does not decline during progression through training. However, one study[71] suggested that empathy among osteopathic medical students does decline.

Contextual Influences

The relevance and quality of cues, more than quantity, seem to have an influence on the effectiveness of the intuitive reasoning process.[9,72] Irrelevant information, such as profession of a patient or over- or underappreciation of contextual cues (eg, laboratory results that may or may not be directly linked to the case presented) may be involved in pattern recognition and could lead to diagnostic errors.[9,72]

Time, Environment, and Nature of Feedback

Pelaccia et al[9] point out that the environment in which intuition can develop and feedback is given is important to the aspect of reliability. Environments in which a student is given immediate, appropriate, and unambiguous feedback can lead to appropriate development of intuition.[9]

Strategies for Developing Intuition in Osteopathic Clinical Reasoning

Recent research suggests that professional osteopathic eduction may encourage analytical or deductive reasoning in the form of "rules, procedures and facts that must be learned and understood at a high level before they are applied clinically,"[24] and that inductive reasoning and actively open-minded thinking may develop after graduation.[20,24] Nevertheless, as outlined in the following paragraphs, several authors have suggested approaches within the teaching context that may help students develop the skills for system 1 reasoning and may pave the way for a more reliable and predictable

development of intuitive reasoning and judgement in clinical practice. This section also highlights additional approaches that could be applied by qualified practitioners in their day-to-day clinical practice. However, these approaches represent suggestions and thoughts; whether they will help practitioners develop or improve intuitive judgement must be investigated in future research.

Emphasizing Implicit Factors

Multiple Case Studies to Gain Tacit Knowledge

From an osteopathic standpoint, to encourage implicit learning processes, Sidler[38] recommends that students perform hands-on therapy as often as possible; therefore, using real patients for examinations and application of osteopathy should be an integral part of the curriculum. Furthermore, by repeatedly applying knowledge or performing techniques, the corresponding activities become partly implicitly available.[38] Sidler[26,73] comments on the need to increase, deepen, and often recall the implicit knowledge, which could be a problem-oriented learning and teaching style.

By the individual analysis of clinical issues, the student will acquire explicit knowledge, which in later clinical situations may be recalled as implicit knowledge.[74] Multiple and varied clinical case studies may allow students to develop their intuition through constructions of patterns embedded in their long-term memory.[9] Typical presentation should be explored first, followed by uncommon presentations.[9,75-77] For osteopaths in clinical practice, it may be helpful to retrospectively and consciously analyze and critically evaluate their clinical experience based on case reviews and supervision hours.

Divided Attention to Encourage Implicit Thinking

One hypothesis that could be investigated further is that during the palpatory approach, an attitude of divided attention could help the unconscious to think implicitly and thereby develop solutions for complex problems of interrelating tissue influences.[73] Divided attention in this case means that an attempt is made to focus on the palpating structure to be addressed and at the same time to perceive the space (eg, thinking of one's feet while palpating a patient's neck).[78] At the beginning of the educational training and learning new approaches, the practitioner's attention should be as undivided and targeted (skill-focused) as possible to the sensorimotor skills set to be studied. More experienced osteopaths could potentially reduce their ability to palpate if they focus their attention solely on the palpatory approach and then improve their palpatory results upon application of divided attention.[73]

For osteopaths in clinical practice, how can one make time during the application of osteopathic techniques to create ideal conditions for implicit thinking and intuitions to arise? Sidler[73] proposes, for example, that time used during medical history taking would be the incubation period for implicit thinking, and the subsequent physical examination would be a basis for creation of intuitions. It may be helpful to schedule regular breaks after every 2 to 3 hours of work with patients to allow practitioners to physically and mentally divert from clinical practice and patient encounters, whereby intuitions to the previously treated patients may unconsciously emerge.

Therapeutic Inner Attitude to Improve Implicit Perception

Another avenue to explore would be whether favorable conditions can be created to improve implicit perception and, correspondingly, increase intuitions. For example, I believe it might be helpful for osteopaths to take on a certain therapeutic inner attitude, which may be achieved by inner individual or subjective approaches in tissue palpation, such as the following:

- **Phenomenologically**, what feelings and associations arise while applying palpation? In this approach, a phenomenological discourse of the osteopath's own subjective experience takes place.
- **Structurally**, which patterns can be discovered in a palpatory approach (recurrent feelings, associations)? In this approach, the osteopath may make links

Table.
Intuition and Perceptual Training in Diagnostic Palpation[80,81]

Level	Perception State	Practitioner Characteristics
1. I-in-me	Perceptions are compared with past experiences	Practitioner is anchored in routine and patterns from his or her own past; seeks confirmation for tried and tested ways of diagnosis and management; little room for experimentation and novelty
2. I-in-it	Open to new ideas; scientific curiosity; discovery of uniqueness in patients and interest in individual cases	Practitioner becomes open and inquisitive and tries to be objective; prepared to exceed his or her personal boundaries and limitations to learn something new; novelty and divergent points of view are seen as potentially enriching
3. I-in-you	Empathetic perception from the viewpoint of another person	Practitioner moves out of his or her own limited frame of reference and attempts to see the world through the patient's eyes; practitioner's mind and heart are opened, begins to empathize with the patient and go beyond him- or herself, which may bring radical new insights
4. I-in-now	Intuition; time-related perception	Practitioner begins to perceive the fullness of information, which is presented at each moment of perception; this state allows for evolution and enables innovation at all levels; relies upon and trusts intuition

between certain tissue processes, inner associations, or perceptions of tissue qualities and psychological phenomena.

On an intersubjective level, this exercise may create a broad and solid basis for observation and objective character. A method of reflection, for example, would be to keep a diary about the practitioner's own phenomenological and structural impressions of palpation. The evaluation of such a diary over time would reveal patterns and rules of the practitioner's own perception of palpation. In this way, the osteopath will become aware of inner subjective structures, such as recurring sensation patterns, mental and emotional patterns, and associations during palpation.

Improving Reliability of Intuition

Rapid Feedback in a Learning-Friendly Environment

To receive feedback on aspects of intuitive reasoning, students should let their instructors know about their intuition during the patient encounter.[9] The current medical curriculum encourages analytical thinking largely based on extensive case history taking and examination, before a diagnosis is formed and presented to instructors. This approach may lead to a lower level of performance.[9,35] Direct supervision may be useful to explore the intuitive thoughts of the students from the instructor's side and to observe whether the student is using a targeted clinical examination according to the intuitive assumptions.[9]

Immediate feedback should actively be sought by students from their instructors to improve the development of intuition and problem-solving.[9,79] Osteopathy students should also be encouraged to explore their findings on their own, free from judgement by instructors and peers.[36]

Becoming Aware of Contextual and Clinical Cues

Instructors should encourage students to identify the information used to obtain the intuitive feeling as soon as possible during the patient encounter, which may help increase awareness of contextual and clinical cues. Instructors can then assess those responses and give useful feedback on inappropriate use or overemphasis on some cues.[9]

Esteves[36] points out that osteopathic instructors should examine patients in collaboration with students

and, rather than imposing their own models of diagnosis, should engage in discussion about the nature and reliability of the sensory experiences of students. Further, instructors should create a learning environment in which students can develop their ability to use their sensory skills in a clinical examination context until it becomes "internalized as an independent achievement."[36]

Exploring Affections and Emotions

To become aware of affections and emotions that may accompany the patient encounter, I suggest using Scharmer's recommendations on perceptual training.[80,81] This training schedule consists of 4 levels, which can be applied gradually in the process of diagnostic palpation by osteopaths and other manual practitioners (**Table**).

Conclusion

Understanding the nature of intuitive processes in diagnostic and clinical decision making, in general and in osteopathy, has implications for the education and teaching of future osteopaths as well as clinical practice. The development and reliability of intuition during the patient-practitioner encounter could potentially be facilitated by acknowledging and taking implicit and influencing factors into account and embedding them into day-to-day practice. Suggestions for potential teaching and learning strategies, both for osteopathy students and practitioners, may support the awareness and development of intuitive processes in clinical decision making.

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