

## **The Effectiveness of Ultrasound Feedback with Abdominal Visceral Palpation**

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This workshop is derived from Valerie MacLean's thesis research entitled "The Effectiveness of Ultrasound Feedback on Osteopathic Students' Abdominal Visceral Palpation Confidence: A Mixed Methods Study".

With a varied career in diagnostic imaging, neurodevelopment, sensory integration, education, and now as an Osteopathic Manual Practitioner, Valerie MacLean brings the knowledge base of these merged experiences. The incorporation of ultrasound feedback as a teaching tool within the palpation curriculum of osteopathic manual practitioners' schooling, may positively influence the development of some students, in their visceral abdominal palpation confidence and competence.

Abdominal visceral palpation, for an osteopathic student, can be compared to sitting in a canoe, gazing at the waves rippling across the lake surface. The lake surface is the interface between the water and the air. The effects of the wind upon the surface of the water can be observed. If one dips vision below the lake surface, penetrating through the water-air interface, one can now view the lake bottom, the fish swimming alongside the canoe, and the submerged aquatic vegetation. At the exact level of the water-air interface, we have the illusion we are viewing the boundary, the two dimensional surface. When one dips vision below the water-air interface, a whole new wet three dimensional world exists. Students new to abdominal osteopathic palpation may feel their vision stops at the skin surface. The structure and nuances of the world below the skin surface is unclear, seemingly the abdominal black box of mystery. These students are, as yet, unable to visualize what is living in the depths below the skin. Only when students have acquired the abilities to dip down, sink into the abdominal visceral world, live in the depth of their visual imagery, are they able to visualize it, and palpate it.

Osteopathic visceral palpation is a foundational skill. The objective of this study was to introduce a technology based immediate visual feedback system - a portable ultrasound machine, as a one-time hands-on experiential learning modality to the osteopathic student.

This quasi-experimental mixed methods study was designed to answer the research question: "How do osteopathic students at the CCO respond to the introduction of ultrasound guided palpation in learning visceral palpation?" The data analysis indicated that there was a greater than 75% positive impact in confidence, from ultrasound guided palpation by this group of subjects, on one time point during their studies.

The participants were twenty-one, fifth year osteopathic students, at the Toronto Campus of The Canadian College of Osteopathy, during a non-palpation based course. Participants viewed an introductory video, then were scheduled for a four module Kinesthetic Ultrasound Workshop. First, each participant was guided by a sonographer through a hand-over-hand module. Second, an independent exploration module was performed, guided by a sonographer. Third, the participant became the model,

and further explored visual/tactile learning, while viewing the monitor. Fourth, the paired subjects participated in an untimed, non-directed palpation.

This study included quantitative and qualitative components. In the quantitative section, three surveys were used: an impact survey, measurements of confidence, and a learning objectives inventory. The impact survey included quantitative and qualitative sections, and featured a five-point Likert scale and an open-ended question. The quantitative section posed ten questions analyzing the validity of the ultrasound experiential learning modality. The qualitative section polled participants' perception of the experience as a learning tool. Measurements of palpation confidence using a VAS (Visual Analog Scale) were obtained at three points during the experiential learning modality. A baseline measurement was recorded; a second was obtained after the experiential workshop; and a third after their post intervention palpation. A learning objectives inventory was also obtained to tabulate anatomical features seen and experienced, and the correlation between the vestibular, tactile, proprioceptive and visual sensory experiences. The two ultrasonographers were also interviewed.

Using ultrasound feedback as a learning tool targets two learning challenges for Osteopathic Manual Practitioner abdominal visceral training. The viscera lacks skeletal landmarks, and has less tissue texture differences. Both factors afford little feedback when learning visceral palpation, as students build anatomical imagery and spatial relationships.

The reviewed literature was used to develop this study's methodology with a focus to enhance osteopathic palpation confidence development. Combining the knowledge bases of ultrasound in medical education, teaching osteopathic palpation, multisensory educational experiences and conducting a kinesthetic ultrasound experience provided the groundwork for this study's hypothesis and research question. The goal of the study is to provide statistical evidence for incorporation of ultrasound into the learning experience of osteopathic students. Incorporation of ultrasound as a teaching tool for osteopathic palpation instruction is a new concept. Through the analysis of the results, the use of ultrasound guided learning may be warranted as a valuable educational tool for students of osteopathic manual therapy.