The Effect of Integrating Ultrasound Imaging into Osteopathic Medical Student Palpation Training


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ABSTRACT

Ultrasound imaging is a form of growing technology in clinical use, and has shown promising results when introduced into pre-clinical medical education. This randomized-controlled study was performed to determine whether the integration of ultrasound imaging will improve osteopathic medical students’ ability to locate specific shoulder anatomical landmarks. 64 subjects were recruited, signed informed consent and were randomized to one of two groups: with or without exposure to ultrasound device. Both groups were taught about structural and surface anatomy of the shoulder, and given time to practice their skills palpating the specified landmarks. Those in the ultrasound group were given instruction on sonography and how to use it to find landmarks. Following the didactic sessions, subjects in both groups were administered a post-sessional practical examination in which they were asked to locate each landmark. Upon analysis using independent samples t-test, subjects in the ultrasound group more accurately palpated the landmarks with a significant difference in palpation of the biceps tendon (p=0.024). These results indicate that there may be a role for the integration of ultrasound into pre-clinical curricula to improve the accuracy of palpation in osteopathic medical students.

BACKGROUND

The physical examination is a fundamental skill for all physicians, yet recent research has shown a steady decline in physical examination proficiency amongst clinicians.1 One component of the structural exam is the assessment of the shoulder. Although shoulder pain is a common complaint, studies show that physicians’ accuracy in locating anatomical landmarks of the shoulder is dismal.2

There is a need for improved anatomical identification skills and this should start at the pre-clinical level. The growing use of ultrasound in clinical practice shows a necessity for its integration into medical education, but may be particularly useful in the osteopathic manipulative medicine curriculum as it may allow students to better identify and palpate anatomical and musculoskeletal landmarks.3

OBJECTIVE

To determine whether the use of ultrasound as an educational supplement will improve osteopathic medical students’ ability to identify and palpate specific anatomic landmarks of the shoulder.

METHODS

- Randomized-controlled trial, IRB approval obtained 12/8/2014 by NYITCOM (IRB #BHS-1079).
- Subjects who had any prior experience utilizing and interpreting ultrasound diagnostic imaging and who were previously trained as foreign physicians or healthcare professionals were excluded from this study.
- Both groups were given a tutorial on anatomic landmarks and palpation of the shoulder, specifically the biceps tendon within the bicipital groove, supraspinatus tendon, coracoid process, and T1 transverse process.
- Both groups had designated time for palpation practice. See Figure 2.
- Group 1 (Control group): Palpation practice alone, no ultrasound.
- Group 2 (Experimental group): Ultrasound tutorial, palpation practice.
- Subjects in both groups were administered a post-sessional practical examination in which they were asked to locate the 4 landmarks specified above.
- Findings were confirmed by an ultrasound-trained radiologist.
- SPSS was used to run an independent samples t-test to compare the mean distance palpated from each landmark between the two groups.

RESULTS

Table 1: Mean distance palpated from each landmark. Statistically significant result p<0.05.

Table 2: Total number of subjects: 64
- The mean distance palpated from the long head of the biceps tendon within the bicipital groove was 62.9 mm in Group 1 and 41.4 mm in Group 2. This was statistically significant.
- The mean distance palpated from the supraspinatus tendon was 43.6 mm in Group 1 and 37.4 mm in Group 2. This was statistically significant.
- The mean distance palpated from the coracoid process was 12.7 mm in Group 1 and 11.6 mm in Group 2. This was not statistically significant.
- The mean distance palpated from T1 transverse process was 8.5 mm in Group 1 and 6.3 mm in Group 2. This was not statistically significant.

CONCLUSION

The results of this study indicate that the average distance from the landmark, as palpated by the subjects, was higher in the group without exposure to ultrasound than the group with exposure to ultrasound. Therefore, there may be a role for the integration of ultrasound into pre-clinical curricula. To our knowledge, this is the first study to explore the effects of integrating ultrasound into palpatory training for first year osteopathic medical students.

Strengths

The subjects were first year osteopathic medical students who had no previous experience with musculoskeletal ultrasound and little exposure to palpation.

Limitations

This is a small sample size. Also, this was not a part of the standard curriculum, so there may have been some difference in the level of engagement of the participating subjects. Additionally, we did not test baseline knowledge of anatomical landmarks with a practical examination.

Future Research

Subsequent studies could explore the use of ultrasound in other anatomical areas and the effects of more intensive ultrasound training. The improvement in palpatory accuracy demonstrated here is a promising start to integrating the use of ultrasound into pre-clinical medical education. Future research in training students to use ultrasound imaging in conjunction with palpation may help to improve current standards on how to teach anatomical landmarks and develop palpatory skills.

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REFERENCES

3. 3D4Medical. Essential Anatomy (Version 5.0.3) [Mobile Application Software].

Figure 1: Anatomic landmarks of the shoulder palpated by subjects in this study.3

Figure 2: Above: Protocol flow chart

Figure 3: Subjects engaged in palpation and ultrasound practice

Figure 4: Mean distance palpated from each landmark.