

FOCUS on POCUS: Is it a Region of Interest for PT students?



Ruth M. Maher, PT, PhD, DPT

Professor, Department of Physical Therapy,
Philadelphia College of Osteopathic Medicine – Suwanee, Georgia

PURPOSE

Ultrasound imaging is not new to the physical therapy (PT) profession as it is used by some clinically and in research. The availability of portable ultrasound (US) has led to its increased use in musculoskeletal (MSK) practice at point of care (POCUS). Medical schools embrace its use in their curricula, however little hands-on exposure is included in entry level PT programs. The aims of this study were to access student perception regarding the introduction of a hands on US lab into an existing imaging course, whether there was perceived value and if exposure would prompt their interest in an elective course.

METHODS

Thirty-three 2nd year DPT students participated in a 2-hour didactic class which included US physics, nomenclature and applications prior to 4-hours of lab. The lab consisted of a brief orientation to the US units with integrated tablet display. A lab manual was provided with sample images and instructions on how to acquire static and dynamic cine-loops for a selection of superficial and deep structures which included upper extremity, trunk, and lumbo-pelvic regions. A faculty member provided practical demonstrations of each. Students completed an online survey to assess their experience. A 5-point Likert scale graded responses ranging from 5 (strongly agree) to 1 (strongly disagree) and 2 questions permitted free-text comments

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Figure 1. Lumbar L5
MF – Multifidi;
SP – Spinous process
TP – Transverse process

RESULTS

100% of respondents (97% response rate) agreed that US was an innovative tool that allowed them to observe musculoskeletal statically and during dynamic movement (Figs 1,3,4 & 5). At least 94% agreed that US stimulated their interest, enhanced their assessment skills of all structures imaged and the US units were easy to use. Free text comments were extremely supportive of US with many sharing how US improved their understanding of clinical anatomy during dynamic tasks. (Fig 2.) Furthermore, students requested further integration of US throughout the curriculum with most interested in an elective course.

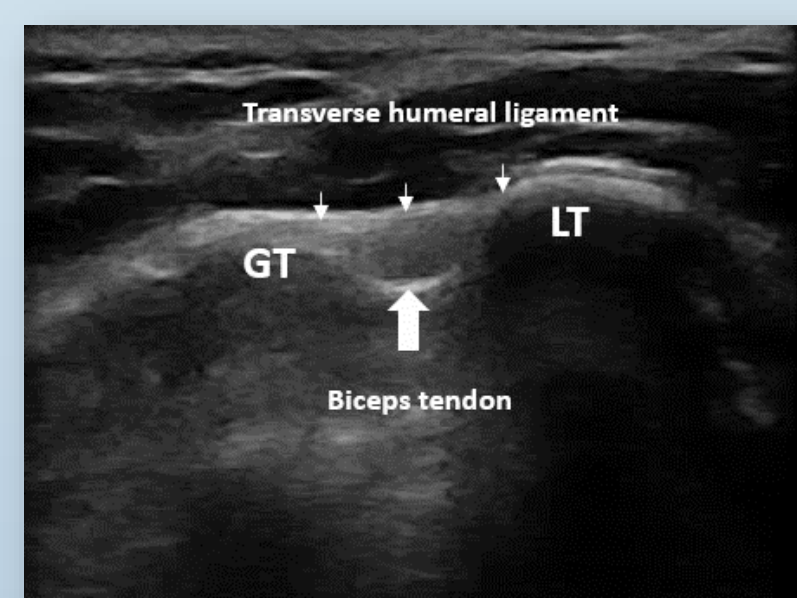


Figure 2. Glenohumeral ER/IR
GT – Greater tubercles; LT – Lesser tubercle

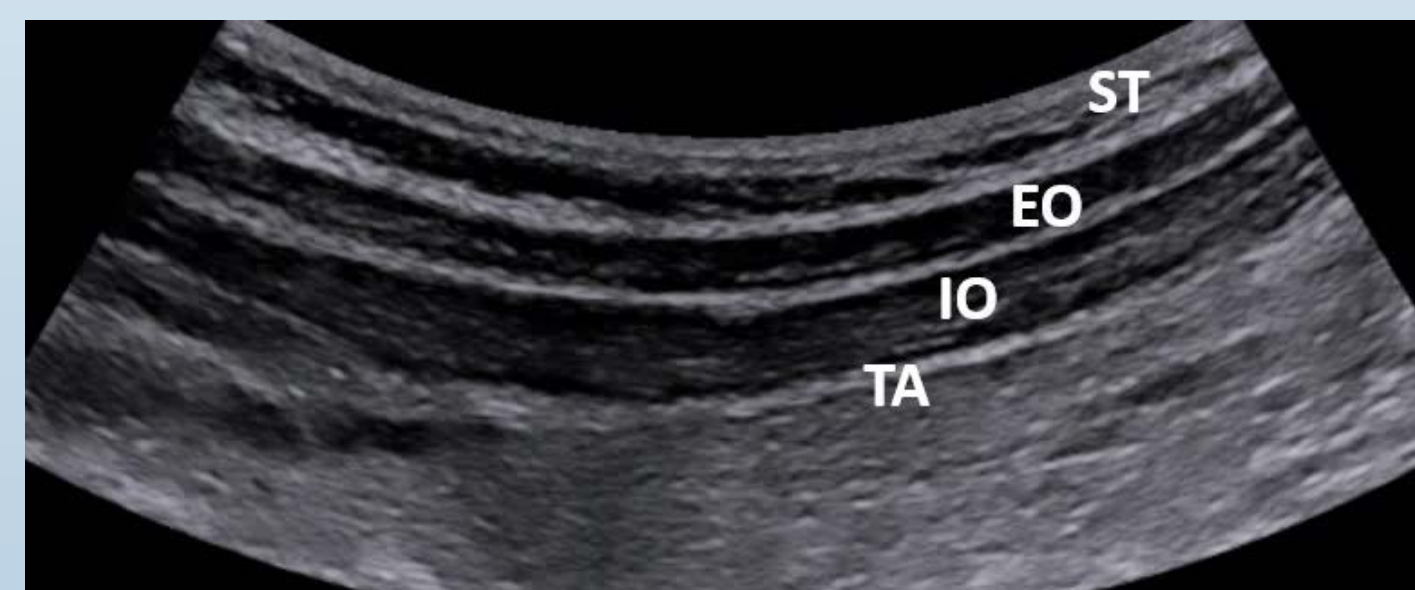
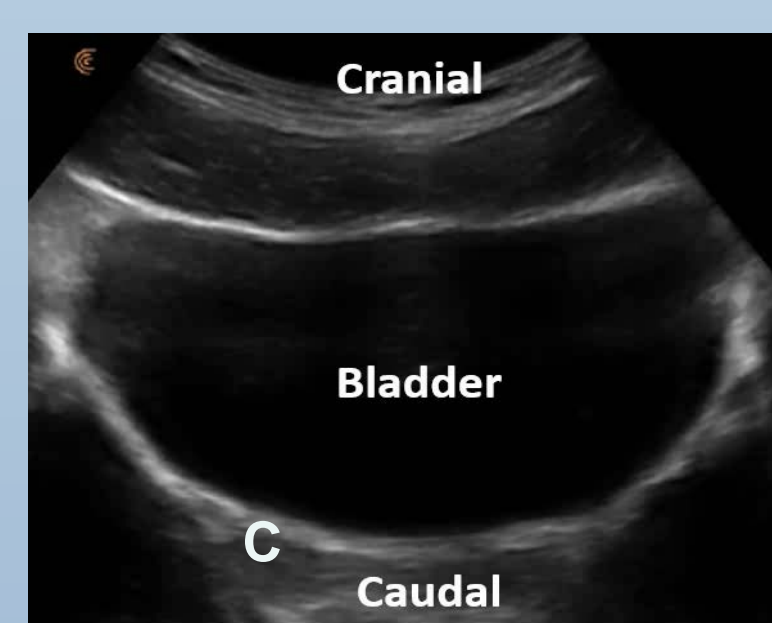
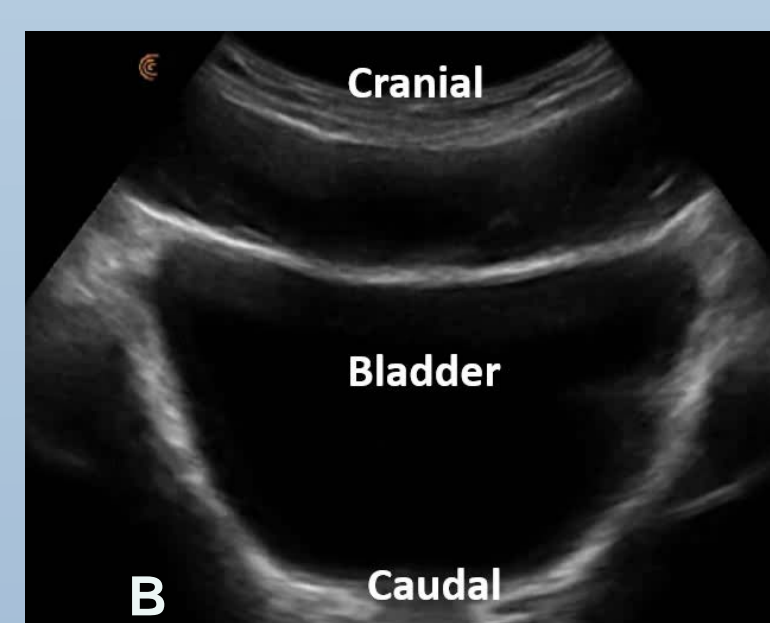
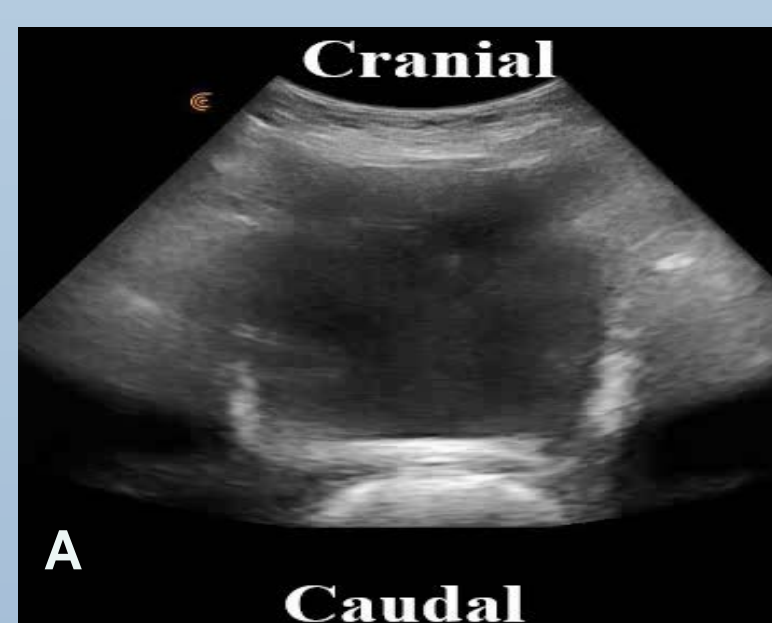


Figure 3. Deep abdominal muscles
ST – Subcutaneous tissue; EO – External abdominal oblique;
IO - Internal abdominal oblique; TA - Transversus Abdominis



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Figure 4. Bladder and pelvic floor:
Students observed the effects of: **A** - pelvic floor contractions; **B** – laughing, and **C** - coughing on the pelvic floor and bladder base.

CONCLUSION

Students embraced their introduction to POCUS, were actively engaged in the classroom and would like to integrate it into clinical practice. Additionally, POCUS is a powerful supplement to didactic and lab experiences for PT students by providing them a visible tool to observe structures statically and dynamically thus bringing anatomy to life. In vivo effects of manual therapy techniques such as joint mobilizations can also be observed in real time with US. Additionally, students can see how other factors such as posture, adipose and painful activities can affect muscle and joint function. These effects may not be appreciated by observation, palpation or static imaging modalities.

CLINICAL RELEVANCE

A benefit of US is the lack of associated contraindications to its use and cost savings compared to MRI. While healthcare policies can restrict physical therapists from ordering MSK imaging there seems to be none for POCUS. In fact, the American Institute of Ultrasound in Medicine (AIUM) welcomes PT members with many presenting educational opportunities. However, the main barrier to increasing POCUS use in PT appears to be lack of training.

REFERENCES

- Sederberg M, Liem B, Tarkhan A, Gesse T, LaCourse M, Latzka E. Brief Ultrasound-Aided Teaching to Improve the Accuracy and Confidence of Resident Musculoskeletal Palpation. *Journal of Injury, Function and Rehabilitation*. 2020; 12: 391-396.
- Ivanusic J, Cowie B, Barrington M. Undergraduate student perceptions of the use of ultrasonography in the study of "living anatomy". *Anat Sci Educ*. 2010;3:318–322.
- Teichgräber UK, Meyer JM, Poulsen Nautrup C, von Rautenfeld DB. Ultrasound anatomy: a practical teaching system in human gross anatomy. *Med Educ*. 1996;30:296–298.
- Stringer MD, Duncan LJ, Samalia L. Using real-time ultrasound to teach living anatomy: an alternative model for large classes. *N Z Med J*. 2012;125 (1361);37-45.
- Larivière C, Gagnon D, De Oliveira E Jr, Henry SM, Mecheri H, Dumas JP. Ultrasound measures of the lumbar multifidus effect of task and transducer position on reliability. *PMR*. 2013;5(8):678-687.
- Whittaker J. Abdominal ultrasound imaging of pelvic floor muscle function in individuals with low back pain. *J Manual Ther*. 2004;12 (1): 44-49.
- Whittaker JL, Thompson JA, Teyhen DS, Hodges P. Rehabilitative ultrasound imaging of pelvic floor muscle function. *J Orthop Sports Phys Ther*. 2007;37(8):487-498.
- Swamy M, Searle RF. Anatomy teaching with portable ultrasound to medical students. *BMC Med Educ*. 2012; 12: 99–99.
- Brown B, Adhikari S, Marx J, et al. Introduction of ultrasound into gross anatomy curriculum: perceptions of medical students. *J Emerg Med*. 2012; 43: 1098–1102.
- Woods R, Wisniewski SJ, Lueders DR, Pittelkow TP, Larson DR, Finnoff JT. Can ultrasound be used to improve the palpation skills of physicians in training? A Prospective Study. *PM R*. 2018; 10:730–737.
- Mehta P, Rand EB, Visco CJ, Wyss J. Resident Accuracy of Musculoskeletal Palpation With Ultrasound Verification. *J Ultrasound Med*. 2018; 37: 1719-1724
- Rho ME, Chu SK, Yang A, Hameed F, Lin CY, Hurh PJ. Resident Accuracy of Joint Line Palpation Using Ultrasound Verification. *PM&R*. 2014; 6: 920-925

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Thanks to Clarius who provided several loaner handheld portable wireless ultrasound units and tablets to use in our labs. www.clarius.com



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