

What Lies Beneath: Ultrasound Imaging brings Anatomy to life for Physical Therapy students



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INTRODUCTION

Many students find anatomy challenging to learn. While most learn via cadaver dissection this knowledge does not readily translate to gaining a clinical perspective or understanding the effects of dynamic musculoskeletal tasks on function. Consequently, it can be difficult for students to determine the contributions of deep musculature to various tasks since they cannot be palpated nor their function readily observed.

METHODS

Thirty-three 2nd year physical therapy (PT) students received a 2-hour didactic US class focused on US physics, nomenclature and applications prior to 4-hours of labs. The labs consisted of a brief orientation to the US units in addition to an illustrated lab manual with instructions on how to acquire static and dynamic cineloops for a selection of superficial and deep structures which included upper extremity, trunk, and lumbo-pelvic regions. (Fig. 1). Students then 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 – Multifidii;
SP – Spinous process
TP – Transverse process

SUMMARY

100% of respondents (97% response rate) agreed that US was an innovative tool that allowed them to observe musculoskeletal components of dynamic movement. (Figs 1,3 & 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.

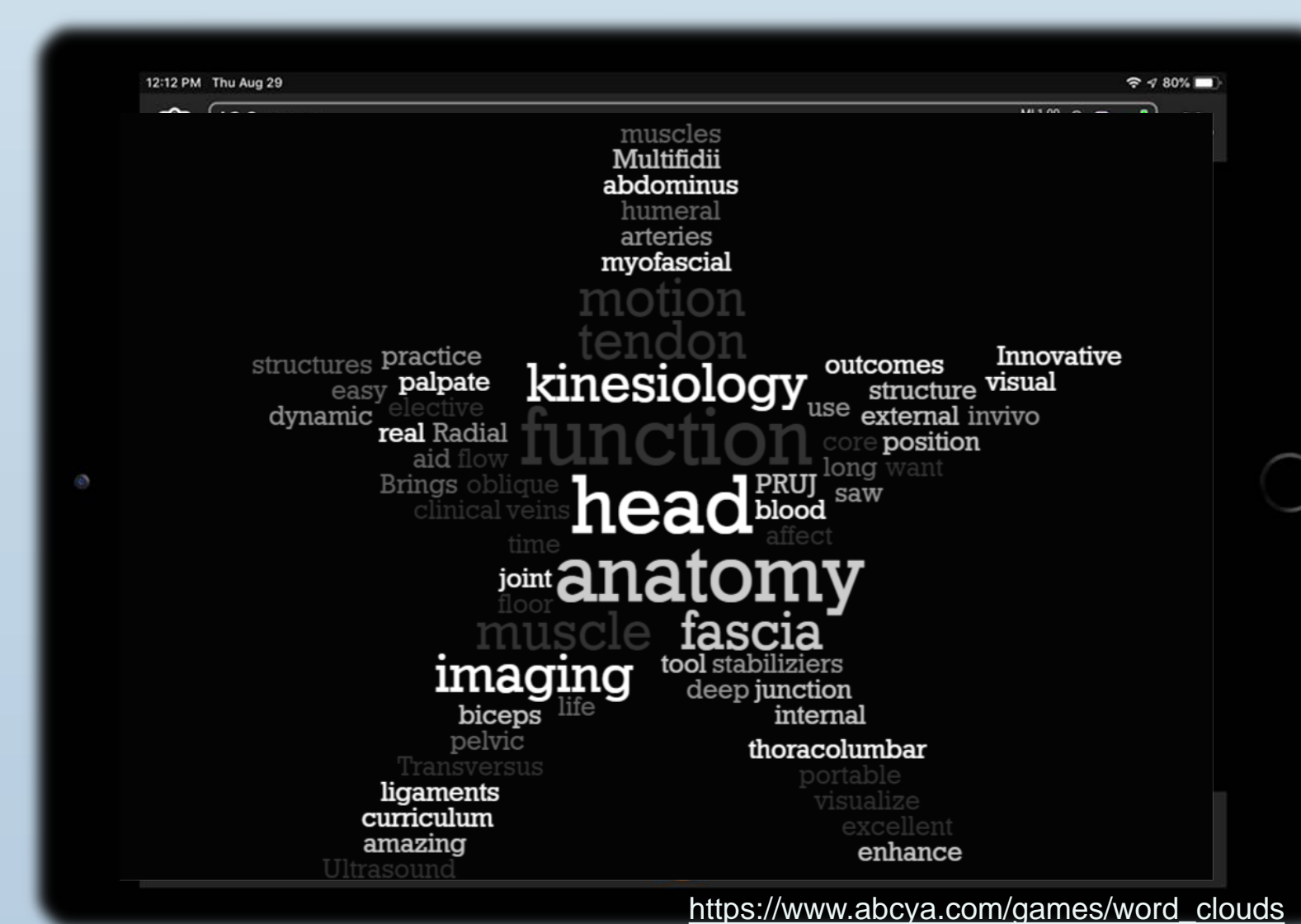


Figure 2. Photos of students during the lab; WORDLE summarizing free text comments from survey.

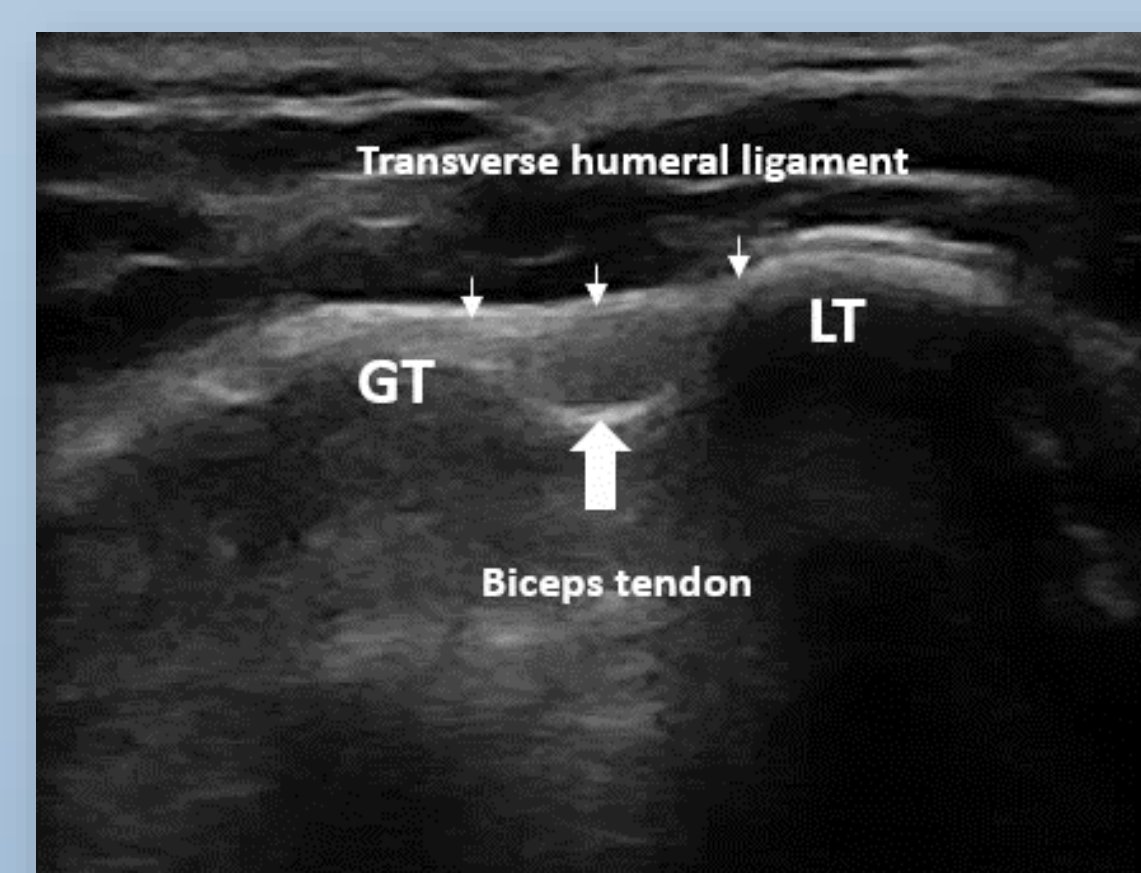


Figure 3. Glenohumeral ER/IR
GT – Greater tubercles; LT – Lesser tubercle



Figure 4. Deep abdominal muscles
ST – Subcutaneous tissue; EO – External abdominal oblique;
IO – Internal abdominal oblique; TA – Transversus Abdominis

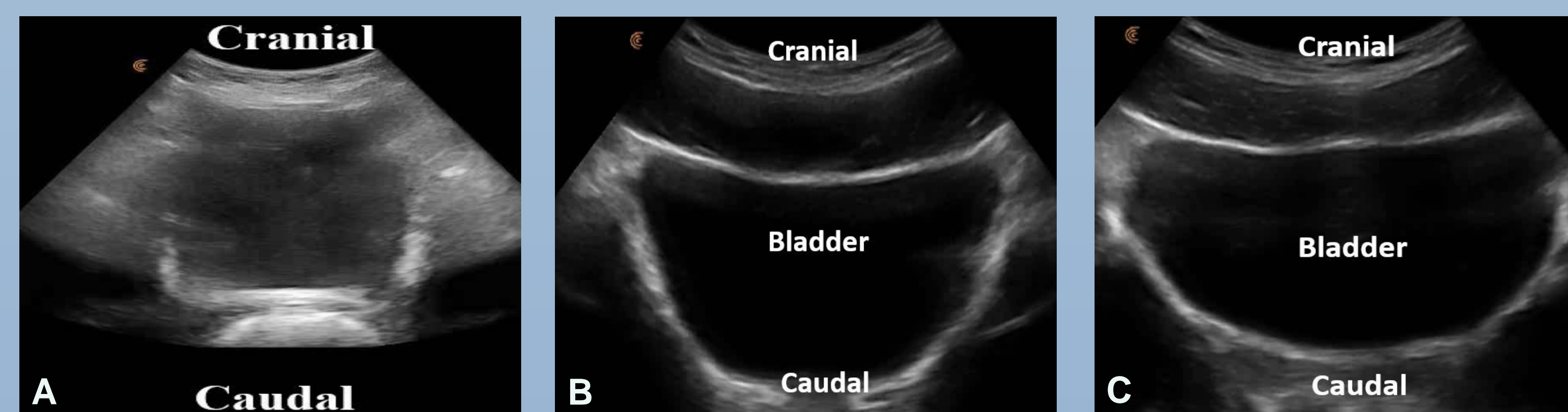


Figure 3. Bladder and pelvic floor:
Students observed the effects of: A - pelvic floor contractions; B – laughing, and C - coughing on the pelvic floor and bladder base.

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US brings anatomy to life and underlines the clinical relevance of why students are learning it. PT students embrace it, are actively engaged in the classroom and would like to integrate it into clinical practice. US is a powerful supplement to didactic and lab experiences for PT students by providing them a visible tool to observe structures dynamically. Additionally, the in vivo effects of various manual therapy techniques such as joint mobilizations are observed in real time. Students can also view how other factors such as posture, adipose and painful activities can affect muscle and joint function. These effects may not be appreciated by observation or palpation.

CONCLUSION

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