

Introduction

Reported underpreparedness of undergraduate medical students to assess imaging and MSK pathology¹

Disconnect between proficiency in cadaver anatomy and radiologic anatomy

Module-based learning supported by literature²

Aims and Objectives

Research Question: *Can radiology in a module format be used to better teach medical students MSK anatomy and related orthopedic pathology?*

Goals:

1. Design modules that incorporate radiological images with gross anatomy images and anatomical illustrations to teach important anatomical relationships and high yield testable concepts.
2. Collect and analyze data from student usage and student assessment performance to determine how the learning resource improves students' proficiency in both written and practical anatomical examinations.

Methods

Module creation: 2 modules (upper limb and back/spine) created connecting 3D anatomy to radiographic anatomy and cross-sectional imaging through interactive interfaces, practice questions, and recall exercises.

Imaging used: Cross-sectional imaging (MRI/CT), XR, 3D CT Recon.

Other images used: Cross-sectional cadaver images, anatomy illustrations.

Study recruitment: voluntary participation from students enrolled in M2 MSK course.



What is the most likely diagnosis based on the image above?

- ANATOMY**
- cervical degenerative disk disease
 - cervical myelopathy
 - cervical disk herniation
 - cervical facet arthropathy
 - cervical spondylosis with osteophyte spur

Check

PATHOPHYSIOLOGY

what is the pathophysiology of the pathology shown in the previous question?

- fracture of cervical vertebrae
- herniation of disk into spinal canal
- inflammation of facet joint of vertebrae
- disc degeneration and vertebral joint degeneration

Check

CLINICAL DIAGNOSIS

what symptoms could the patient with cervical spondylosis present? (multiple options could be correct)

- cervical myelopathy
- cervical radiculopathy
- axial neck pain

Check

Results

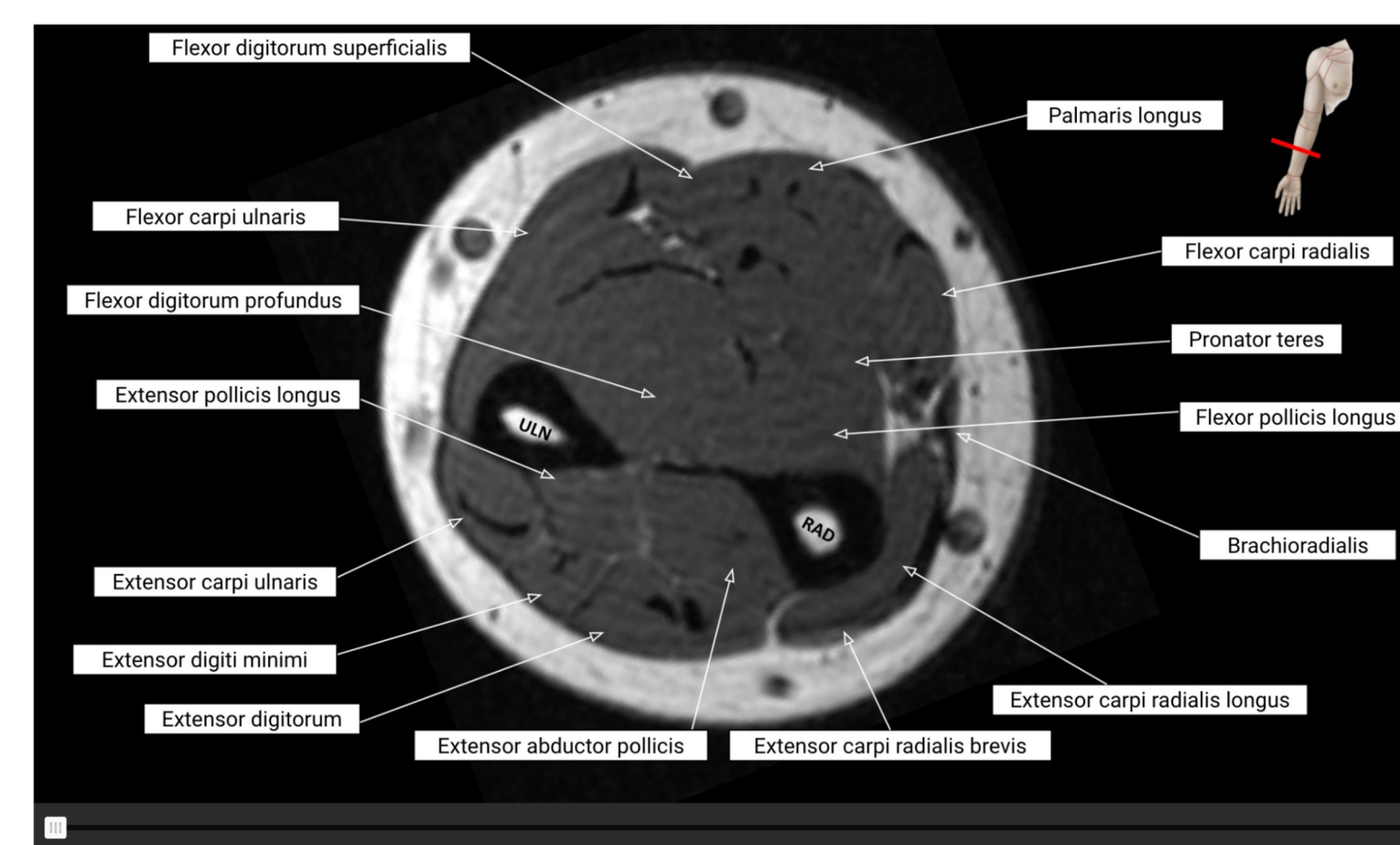
Module usage: 72 (62%) and 55 (45%) of 122 students used upper limb module and back/spine module respectively. High participation rate.

Assessment performance: Students who used upper limb module scored 2.9 pts higher ($p=0.046$) on final MSK course exam.

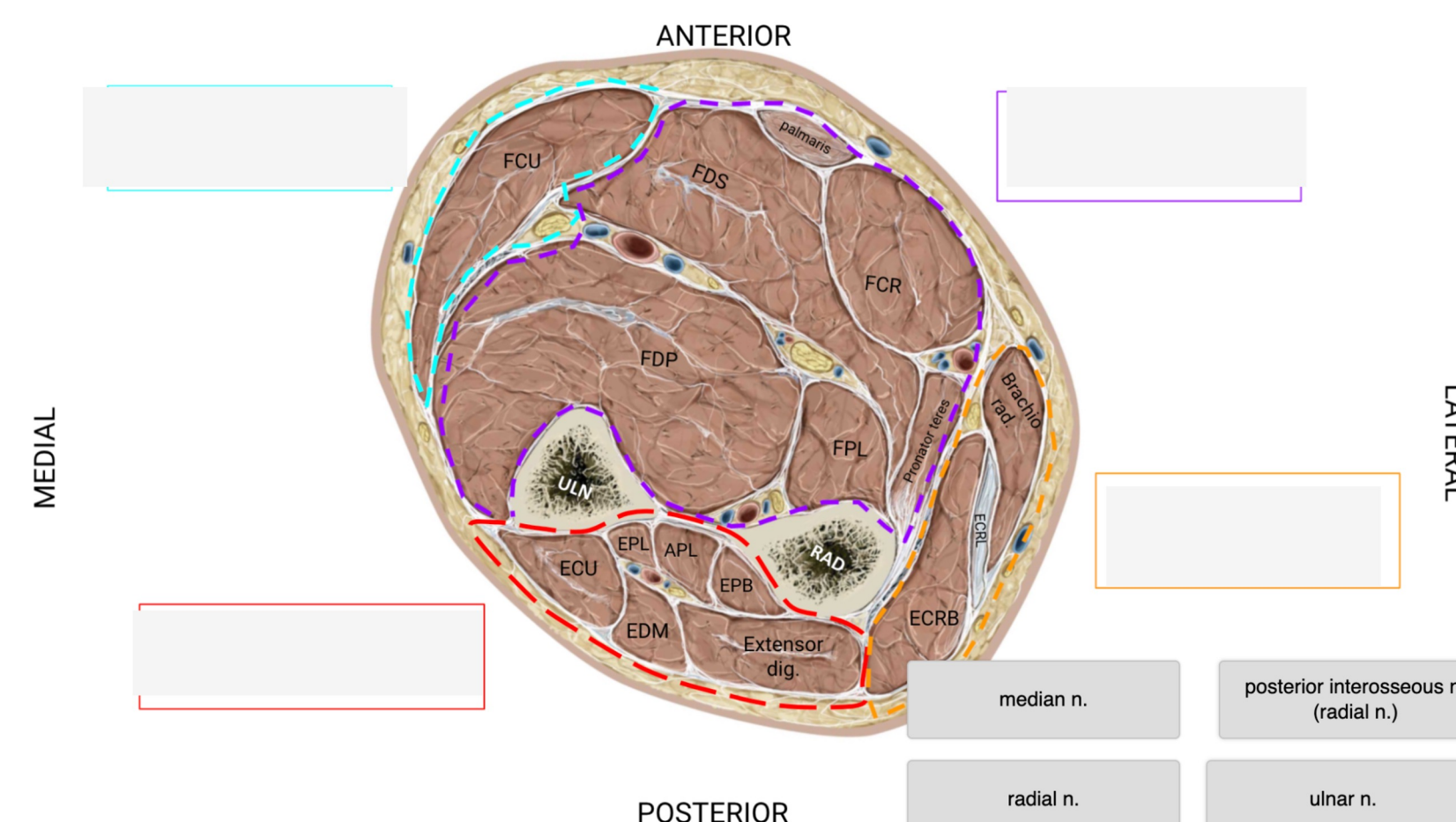
Pending data collection:

- One more year of MSK course data
- Subjective feedback on perceived efficacy
- Performance on assessment items relating to specifically upper limb and back/spine

Use the slider to see the cross sectional anatomy at the mid forearm



Drag the correct nerve to the region it innervates.



Conclusions

Integrating MSK concepts with imaging in module format can help students to learn MSK anatomy and orthopaedic concepts at own pace

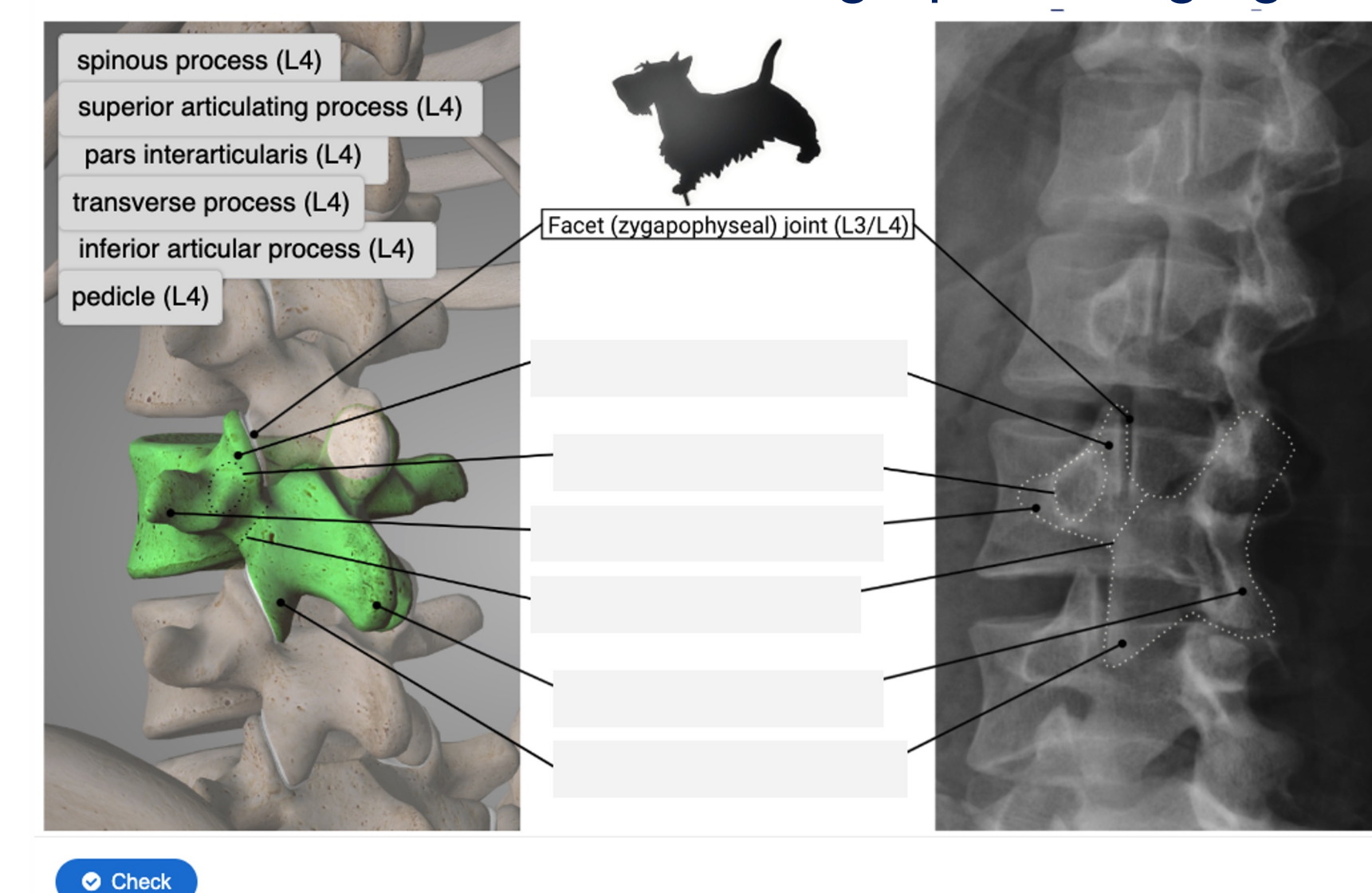
Increasing exposure to cross-sectional imaging alongside traditional anatomy instruction can help with transition into clinical clerkships

More data to be collected

Limitations: Completion of only one of two modules shown statistical improvement.

Connecting 3D anatomy to radiographic imaging

Oblique XR & The Scotty Dog



References

1. Heptonstall NB, Ali T, Mankad K. Integrating Radiology and Anatomy Teaching in Medical Education in the UK--The Evidence, Current Trends, and Future Scope. *Acad Radiol.* 2016;23(4):521-526. doi:10.1016/j.acra.2015.12.010
2. Kumar PA, Jothi R, Mathivanan D. Self-directed learning modules of CT scan images to improve students' perception of gross anatomy. *Educ Health (Abingdon).* 2016;29(2):152-155. doi:10.4103/1357-6283.188778

Acknowledgements

Special thanks to Dr. Sayf Al-katib, Beaumont Health, for providing radiologic images.

Illustrative anatomy from Thieme Illustrator.