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How a Virtual Animal Anatomy atlas benefits from accessible design and will shape the future of anatomy education in extended realities (XR)

Christianne Magee, Colorado State University

Andrea Linton, Colorado State University

Taylor Snook, Perkins Access

Jennifer Sagalyn, Perkins Access

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Your Colorado State University speakers

Christianne Magee

Program Lead, Virtual Veterinary Educational Tools (VVET)
Associate Professor, Associate Head, Department of Biomedical Sciences , Colorado State University (CSU)

Andrea Linton

Lead Developer, Virtual Veterinary Educational Tools (VVET)
Instructional Technologist, Department of Biomedical Sciences, Colorado State University (CSU)

Your Perkins Access speakers

Taylor Snook

Senior Digital Accessibility Consultant, Perkins School for the Blind

Jennifer Sagalyn

Director of Strategic Partnerships, Perkins School for the Blind

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Agenda

- Snapshot of anatomical instruction and software
  - Warning: Cadaveric images
- Partnership origins
- How Virtual Animal Anatomy became more accessible
- Demo VR program
- Universal design in VR discussion

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Goals

- Gain an understanding of effective teaching tools
- Learn specific accessibility techniques for websites
- Discuss how accessibility helps all users
- Collaborate on innovative solutions for the future

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Virtual Animal Anatomy: History

Virtual Canine Anatomy

- **Version 1** : Head dissection and osteology only
  - **Linton A**, Schoenfeld-Tacher R, Whalen LR. 2005. Developing and implementing an assessment method to evaluate a virtual canine anatomy program. *J Vet Med Education* 32:249-54.
- **Version 3.0**: Full body dissection/osteology, neuroanatomy, radiology, surface anatomy
  - Transition to VAA, Research to Market (R2M) CSU program
  - **Linton A**, Garrett AC, Ivie KR, Jones JD, Martin JF, Delcambre JD, **Magee C**. 2022. Enhancing anatomical instruction: Impact of a virtual canine anatomy program on learning outcomes. *Anatomical Sciences Education*. 15:330-340.

No animals have been or will be harmed in the development of these tools.

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Virtual Animal Anatomy: History

- **Virtual Animal Anatomy (VAA) - software as a service**
  - **Virtual Canine Anatomy 3.0**
    - English, Spanish, Japanese
  - **Virtual Equine Anatomy 2.0**
    - limb and head dissection, osteology
    - English, Spanish
  - **Virtual Feline Anatomy 2.0**
    - limb and head dissection, osteology
  - **Virtual Bovine Anatomy 1.0**
    - limb dissection, osteology

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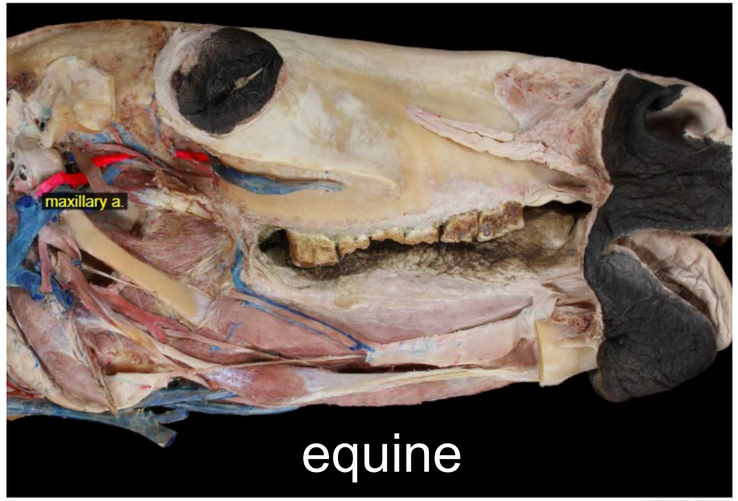
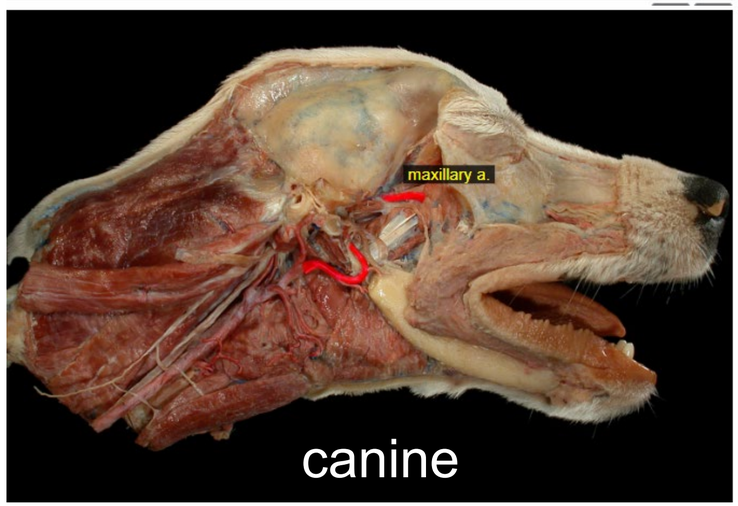
Development Considerations

- Programming language
  - Authorware-> Flash -> HTML5
- Copyright protection
- Distribution strategies
  - CD-ROM -> USB -> (free) -> LMS/LTI
- Program consistency with species variation
- Specimen variation within species

WARNING – CADAVERIC IMAGES





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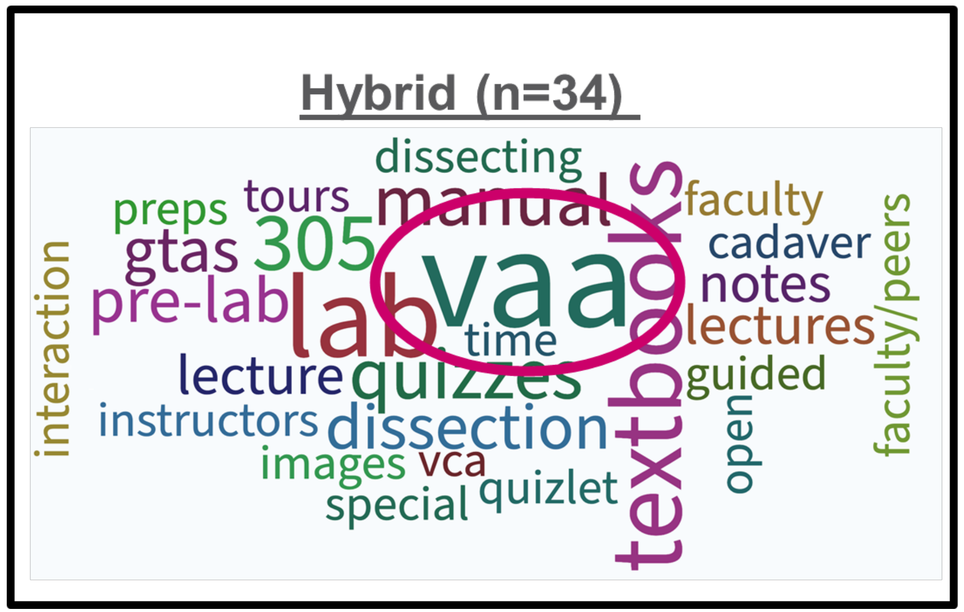
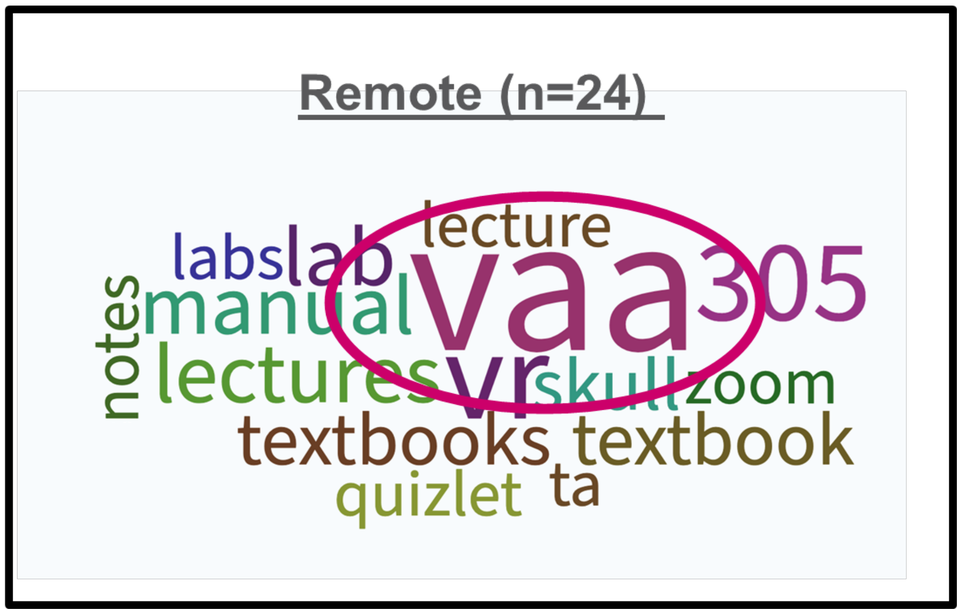
VAA and COVID-19

Transition to online learning

- CSU Animal Anatomy
  - >200 students utilized VAA remotely for learning and assessments
- Free VAA COVID access March-July 2020: 148 schools, >12,000 students worldwide

Martin JF, Arnold OR, **Linton A**, Jones JD, Garrett AC, Mango DW, Juarez KA, Gloeckner G, **Magee C**. 2023. How Virtual Animal Anatomy Facilitated a Successful Transition to Online Instruction and Supported Student Learning During the Coronavirus Pandemic. *Anatomia, Histologia, Embryologia*. 52: 36-49.





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What’s a VPAT?

- **VPAT** = Voluntary Product Accessibility Template; Originally used to help federal agencies, now being used in many settings other than federal, including higher ed

Glossary

- **VPAT** = Voluntary Product Accessibility Template; Originally used to help federal agencies, now being used in many settings other than federal, including higher ed
- **ACR** = Accessibility Conformance Report; “VPAT” and “ACR” are often used interchangeably
- **WCAG** = Web Content Accessibility Guidelines; Internationally recognized accessibility standards; Can be applied to all digital content
- **VAA** = Virtual Animal Anatomy

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Unique challenges & solutions

The following slides contain images of animal dissection, which may be disturbing to some viewers.

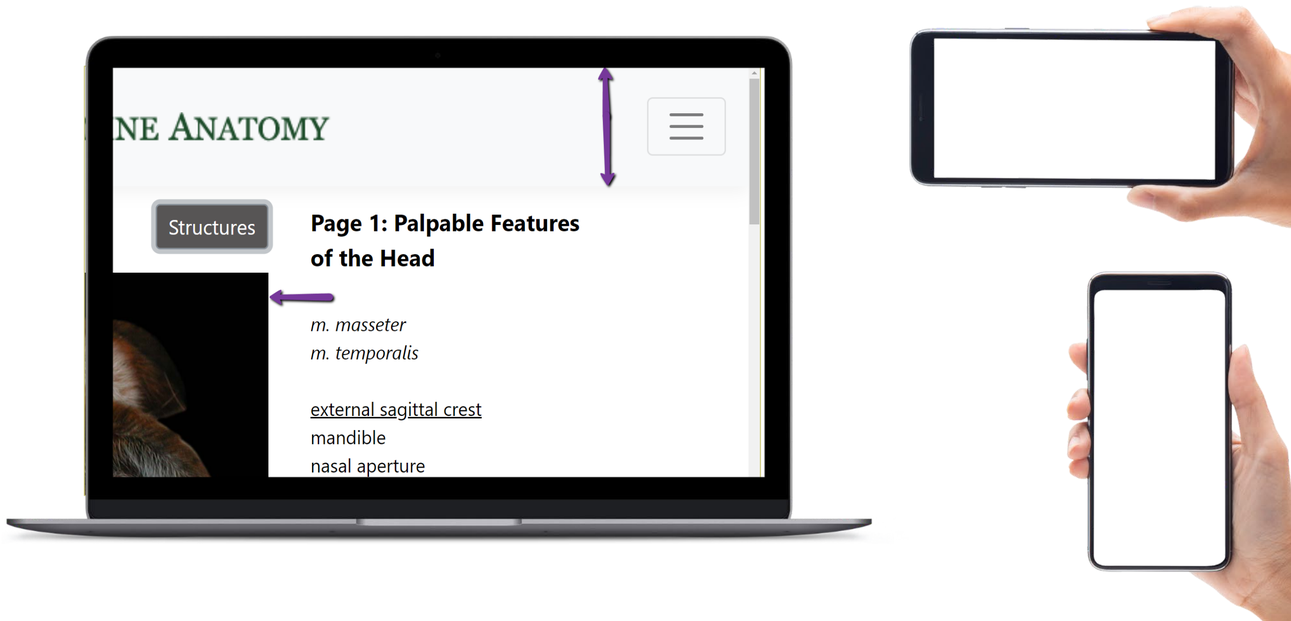
Challenge: Screen real estate

Barrier: Sticky headers, which remain fixed at the top of a webpage as users scroll; content that doesn't reflow to fit the screen size or orientation.

Why it's a problem: Particularly if large, may take up a substantial part of the visible area, forcing users to scroll more frequently to access the content.

Who it affects:

- People who are visually impaired
- People with low vision who use screen magnification or high zoom levels
- Non-mouse users
- People accessing content on phones and tablets; in portrait vs. landscape modes



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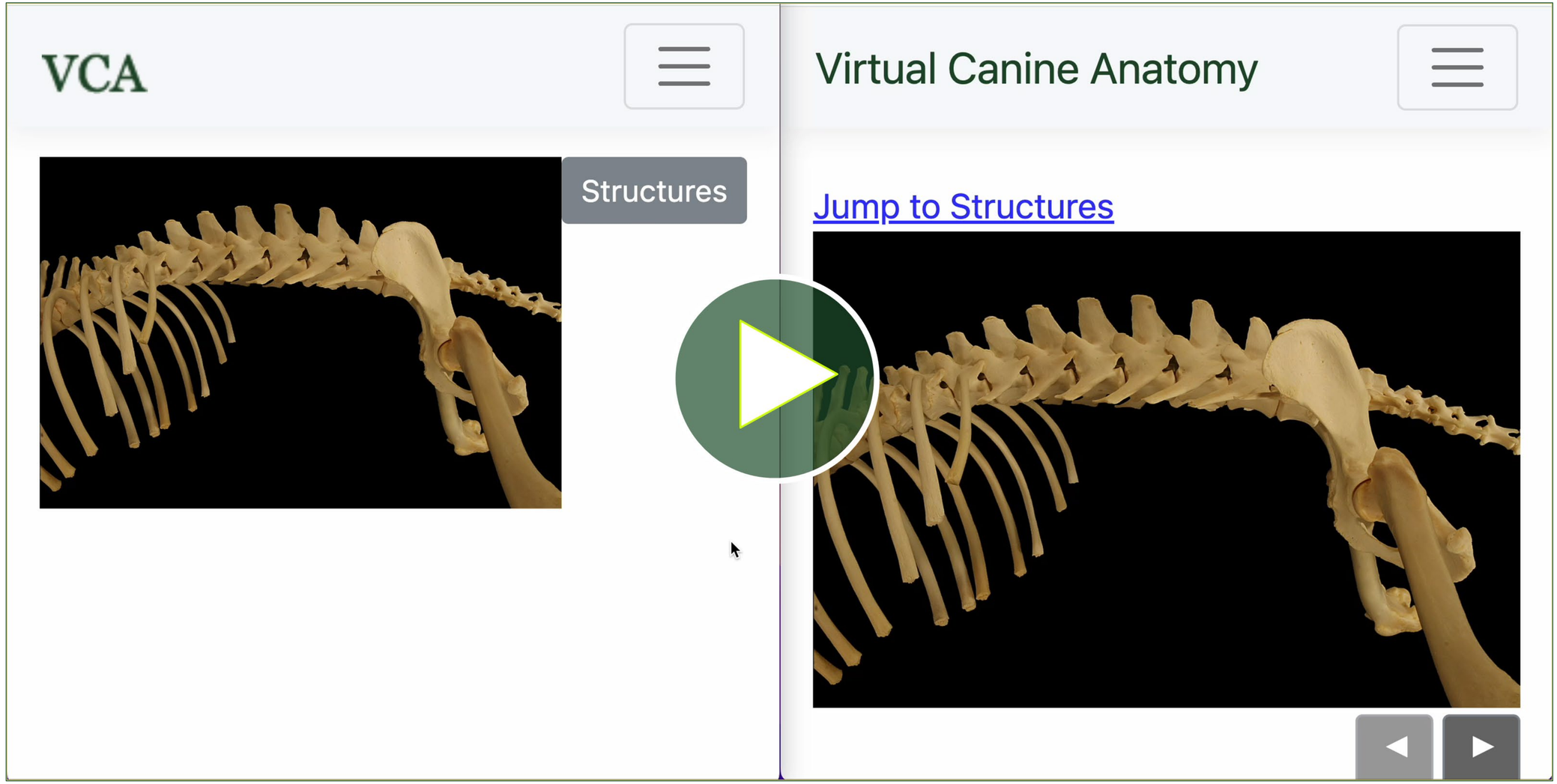
Demo of remediation



VAA Sticky Header and Structures Button Demo on YouTube [no audio]

Videos will be described as part of the live presentation

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Challenge: Anatomy shading

Barrier: Contrast between highlighted region and surrounding shading was not sufficient

Why it's a problem: Some users will have difficulty identifying the boundaries of the structure.

Who it affects:

- People who are visually impaired
- People with low vision
- People in environments with light glare
- People using outdated monitors or projectors
- Older audiences with diminished vision

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Demo of structure overlays

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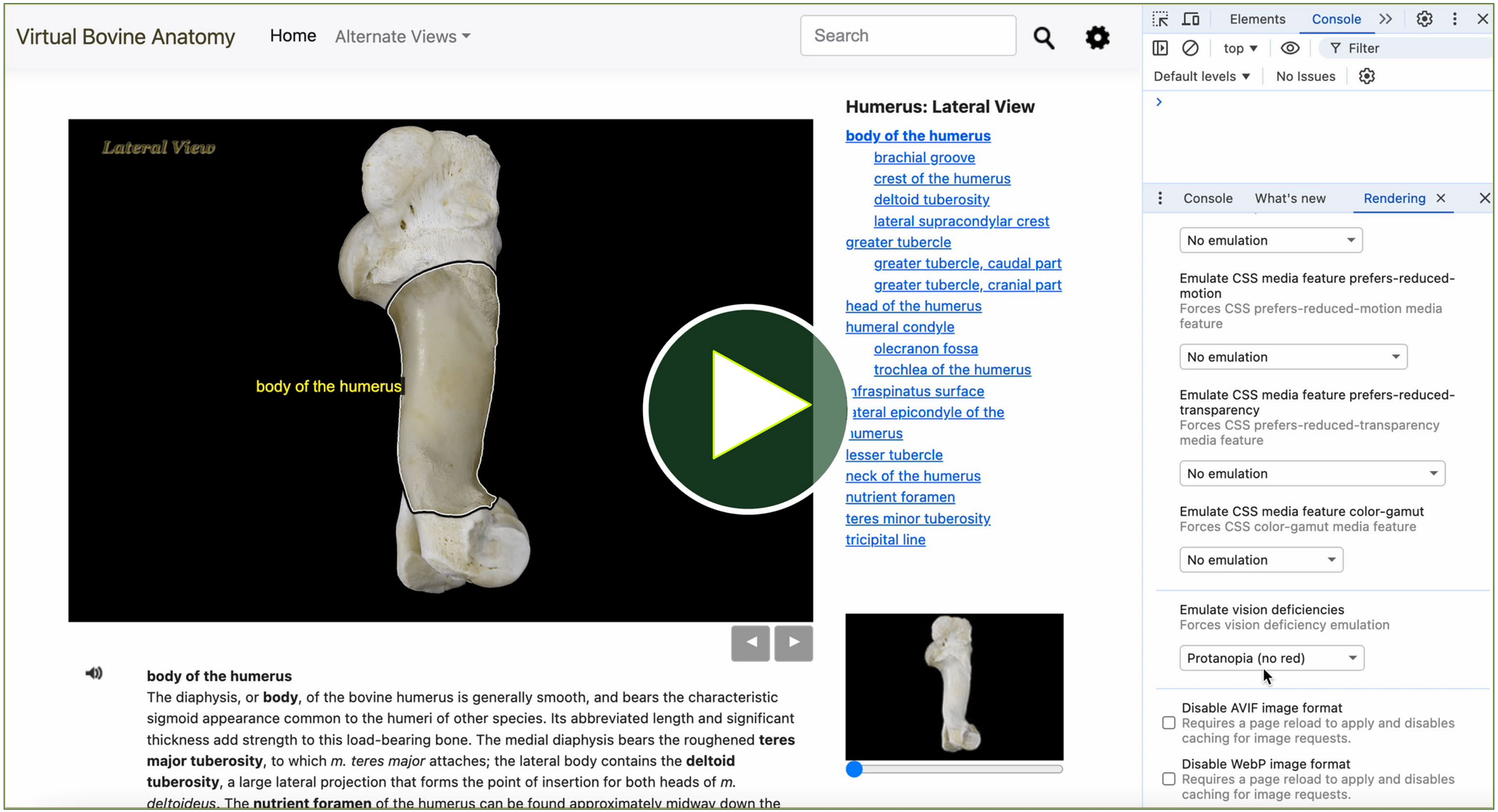
Demo of remediation



[VAA Structure Outline Demo on YouTube [no audio]]

Videos will be described as part of the live presentation

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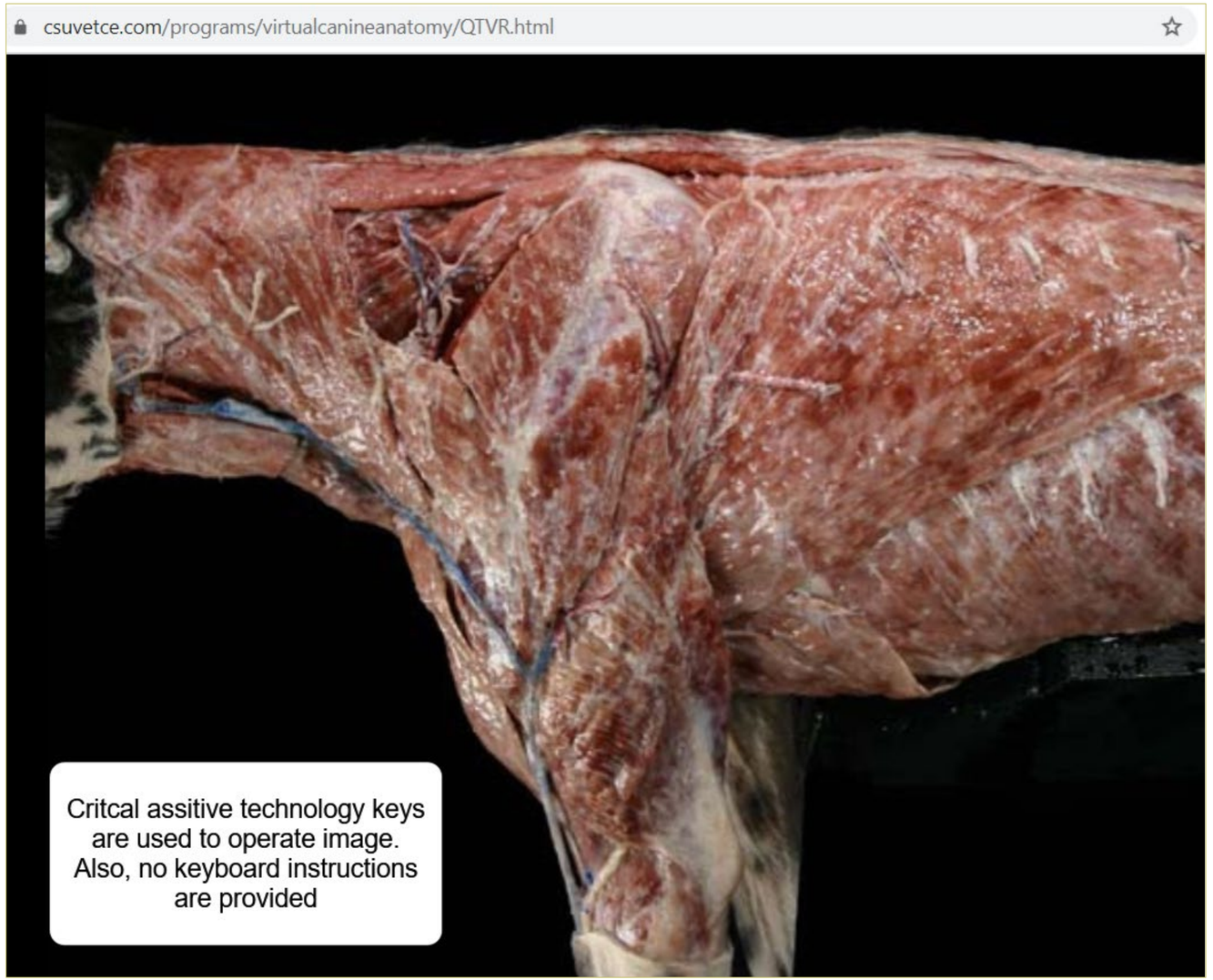
Challenge: Mouse dependencies / keyboard shortcuts



Barrier: Interface caters to mouse interaction; keyboard shortcuts are available but not defined.

Why it's a problem: Shortcut keys can interfere with assistive technology users by conflicting with the keyboard commands needed for navigation and control.

Who it affects:

- All non-mouse users
- Users with physical or motor disabilities.

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Demo of previous version

VAA Previous Rotatable Object Demo on YouTube [no audio]

Videos will be described as part of the live presentation

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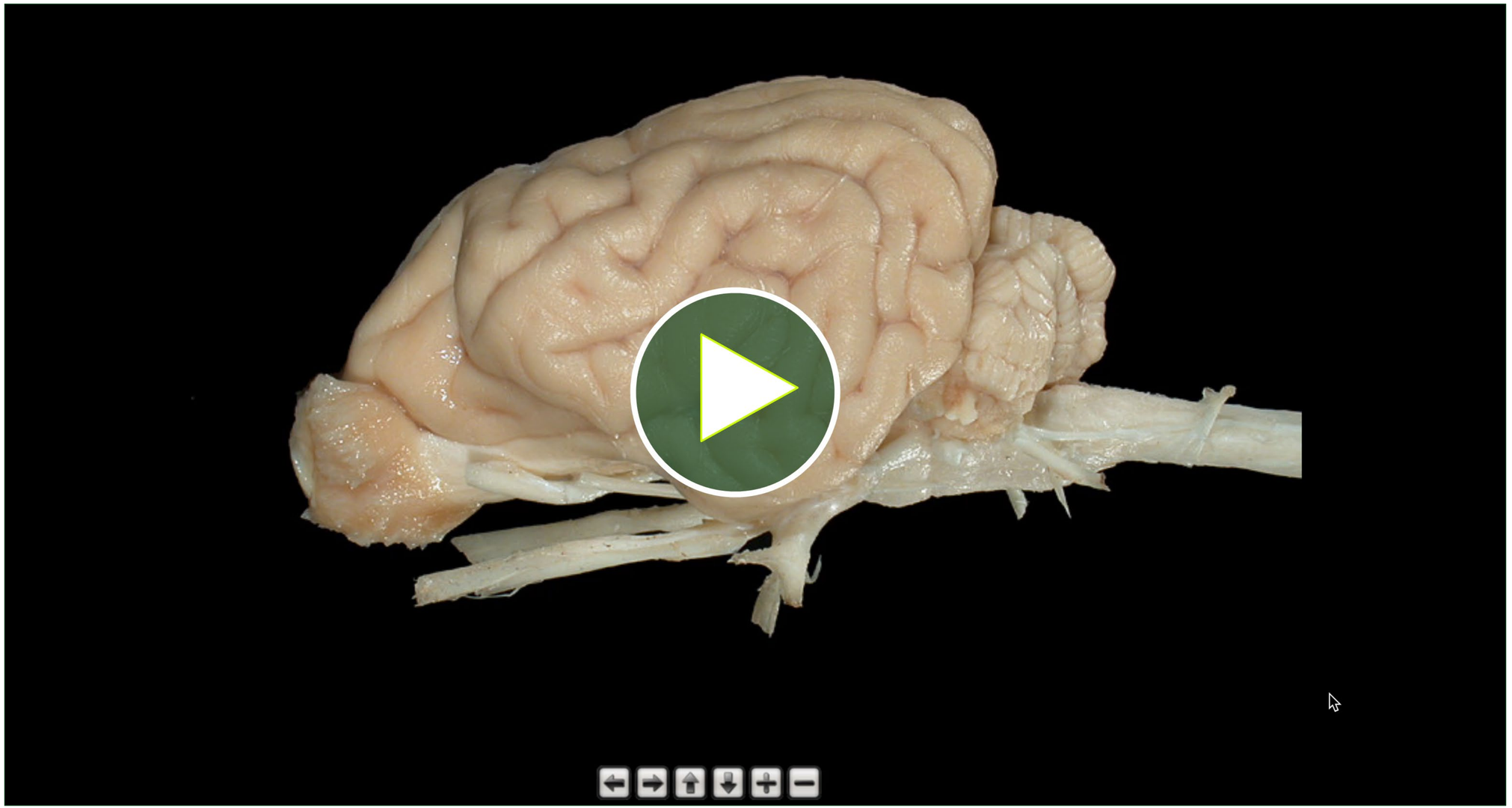
Demo of remediation



VAA New Rotatable Object Demo on YouTube [no audio]

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Discussion: Accessibility in VR

- Visual
- Hearing
- Physical
- Cognitive
- Social
- Environmental

Please share your thoughts with us!

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VAA on Quest

[VAA VR Demo on YouTube [no audio]]

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Discussion and demo time (~15 min.)

Please share your thoughts with us!

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Thank you

We welcome your thoughts and appreciate you sharing

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