Virtual Animal Anatomy: Introduction and Training

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Strategically scaffolding learning

To systematically build on students' experiences and knowledge as they are learning new skills
Bloom’s Taxonomy

Produce new original work or teach others
defense, assemble, construct, conjecture, develop, author, investigate

Justify a stand or decision
defend, appraise, argue, judge, select, support, value, critique

Draw connections among ideas
differentiate, organize, compare, contrast, examine, experiment

Use information in new situations
demonstrate, interpret, operate, sketch, implement

Explain ideas or concepts
describe, discuss, identify, recognize, select, classify

Recall facts and basic concepts
define, duplicate, list, memorize, repeat
Learner Preferences in Anatomy

Neel and Grindem, JVME 2010. DOI 10.3138/jvme.37.4.347
Virtual Animal Anatomy

• Virtual Canine Anatomy (VCA)
• Virtual Equine Anatomy (VEA)
• Virtual Bovine Anatomy (VBA)
• Virtual Feline Anatomy (VFA)
Teaching with the VCA

- Enhances student learning (Linton et al., 2005)
  - The accuracy and repeatability of the virtual cadaver experience, particularly outside of the laboratory environment, allows for greater flexibility in learning
  - Enhanced student control of learning sequence and pacing results in more self-directed learners

- Improves teaching efficacy*

- VCA page views correlates to student performance* 
  (*Magee, manuscript in preparation)
What does it take to get an ‘A’ in BMS305?

- High Grade (A, B) Students spent less time overall per week than Low Grade (C,D,F) Students; but they spent more time on Open Lab, Lecture Echoes, and the VCA
  - ‘A’ students spent significantly more time in Open Lab than the rest of the students in the class (4.5 vs. 2.9 h/wk)
  - ‘A’ students found written and video Tours and Open Lab time more helpful than ‘B’
  - ‘A’ students used all of the Virtual Anatomy Programs more than the rest of students before and after open lab each week, particularly use of the VCA before lab.

Johnson, Magee, Burns. 2015 “What is TILT “course quality”? What is TILT “assessment”? CSU PDI.
VCA Outcomes: Dissection

“Virtual Canine Anatomy Improves Teaching Efficacy and the Learning Ecology of Dissection” manuscript in preparation

Experimental Design

- Canine pelvic limb dissection, 3 h
- n=19 dissectors/group +/- VCA
- Teaching Assistant (TA) Visits
  - Number and duration of visits
  - Quiz at the end of the dissection

![Graph showing TA Visits, Total Time, and Quiz Score](chart.png)
Virtual Canine Anatomy

Sections

Head Directional Terms

Head Osteology

External Skull Features

Internal Skull Features

Mandible

Dentition

Dental Directional Terms
Larynx 1: Superficial Dissection

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Larynx 2: Superficial Dissection

m. thyrohyoides (cut)
m. digastricus
m. longus capitis
m. longus colli
m. masseter
m. mylohyoideus
m. omohyoides (cut)
m. scalenus
m. semispinalis capitis, m. splenius
m. serratus ventralis
m. sternocleidomastoideus (cut)
m. sternothyroideus
m. sternothyrohyoideus
m. thyrohyoides
m.m. intertransversarii

2nd cervical n.
3rd cervical n.
4th cervical n.
5th cervical n.
accessory n.
auriculopalpebral n.
cervical branch of the facial n.
common carotid a.
cranial thyroid v.
**m. thyrohyoideus**

G: lamina of thyroid cartilage
I: thyrohyoid bone
A: draw hyoid apparatus caudal
N: hypoglossal n.

**Larynx 2: Superficial Dissection**

- m. obliederomastoideus (cut)
- m. digastricus
- m. longissimus capitis
- m. longissimus cervicis
- m. longus capitis
- m. masteter
- m. mylohyoideus
- m. omohyoides (cut)
- m. scalenus
- m. semispinales capitis, m. complexus
- m. sternocleidomastoideus
- m. sternothyroides
- m. sternohyoides
- mm. sternocleidomastoidei

2nd cervical n.
3rd cervical n.
4th cervical n.
5th cervical n.
accessory n.
auricular branch of the facial n.
common carotid a.
cranial thyroid v.

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Features students (and faculty) love…

- Quizzes
  - Here’s a link to our exam/quiz questions with the VAA from 2019
    https://drive.google.com/open?id=1NsivfUYpF5QCThK-MkO4Bm9mPXsrGpdo

- "Next buttons"

- Search function

- Text description of features

- Zoom and rotate

- Dissection videos
The Future of Virtual Animal Anatomy

Video – too big for email
Thank you