Bring Me To Life:
The Role of Fresh Tissue Dissection and Anatomic Body Painting in Anatomy Education

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Session 1031
Thursday October 17, 2013
2:00- 2:50 PM
Session Contents

• Anatomy in PA Education– the techniques and the challenges
• Why fresh tissue dissection?
• How we do fresh tissue dissection at Elon University
• Why anatomic body painting?
• How we do anatomic body painting at Elon University
• How can you do these things at your institution?
• Questions?
Session Goals
At the conclusion of this session, participants will be able to:

- Understand the concept of, and the advantages of, fresh tissue dissection as a tool in anatomy education
- Know how to obtain fresh tissue for anatomic dissection
- Know the definition of “anatomic body painting” and understand the difference between anatomic body painting and artistic body painting
- Be able to state at least two advantages of anatomic body painting as a resource in anatomy education
- Have at least two tangible resources to turn to in development of an anatomic body painting session for their anatomy programs
Anatomy in PA Education

Anatomy lab is:

- Clinically relevant!
- A visual and kinesthetic learning experience
- An excellent avenue for teaching problem solving skills
- A great way to teach and reinforce procedural skills
Anatomy in PA Education
anatomy lab also is:

- Expensive
- Time-consuming
- A pre-requisite for most PA programs
Anatomy in PA Education

The big question in anatomy education:

- **Average length** of a PA program: 27 months

- **Percentage of schools** with anatomy as a pre-requisite: 86.5%

The take-home message: Time is short, and our students have taken anatomy before—but it’s very important to the study of medicine.

- **The Big Question:** How should we teach it? How much should we emphasize it? What resources should we allot to it?

*25th Annual Report on Physician Assistant Educational Programs, 2008-2009*
Anatomy in a Physician Assistant Program

The answer: We agree that we should teach it in our programs.

Anatomy is taught at ≥ 93.2% of PA Programs*

*Physician Assistant Education Association 2010 Curriculum Survey results, July 12, 2012*
Anatomy in a Physician Assistant Program

The answer: we don’t agree on *how* to teach it.

Average Hours of Anatomy Instruction in PA Programs, 2010

<table>
<thead>
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<th></th>
<th>Mean # Hours</th>
<th>Standard Deviation</th>
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<td>lecture/Lab hours</td>
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<td>25</td>
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<tr>
<td>lab hours</td>
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Anatomy in a Physician Assistant Program
The answer: we don’t agree on the importance of *lab vs. lecture*.

Hours Spent on Anatomy Education—Range within responding PA Programs, 2010

![Bar chart showing hours spent on anatomy education in Physician Assistant Programs, with categories of lab hours, lecture hours, and lecture/lab hours. The chart includes high and low end # hours.](image-url)
Benefits and Drawbacks of a Human Donor Lab:

**Benefits**
- Beautiful, anatomically-correct structures
- Life size models
- Hands-on dissection
- Independent Study

**Drawbacks**
- Expensive setup
- Expensive maintenance
- Large time commitment
Human Donor Dissection Doesn’t Do Everything:

- Preserved tissue does not have the same texture as living (or recently-living) tissue
- Tissue does not move of its own volition (limits clinical correlation?)
- There’s only so much tissue to go around.
Virtual Dissection

The Benefits:
• After startup cost, these are relatively inexpensive
• Anatomy is beautifully clear
• Allow the student to work at his/her own pace

The Drawbacks:
• Anatomy is too beautifully clear?
• No hands-on component
• 3-D component may not be enough for full anatomic understanding

Bottom line:
A great supplement— but not “the whole package.”
Mammalian Fresh Tissue Dissection

- Frequently used on the high school, community college and undergraduate level

- Often used as part of a *comparative* A and P course

- However, in many mammalian organs the anatomy is >95% identical to human anatomy (similar enough to be used as valve transplant tissue)
Mammalian Fresh Tissue Dissection

Benefits:

- Very inexpensive
- Easily to procure
- Tissue ‘acts’ like recently-living, unembalmed human tissue
- Because of similarity to human tissue, clinical correlation is possible
- Great for independent exploration
- Can be frozen for several months prior to use
[hello PAEA Planners! This slide will incorporate video of me working with students who are dissecting a deer heart. The video is too big to upload! It will be embedded for my presentation.]
Especially useful organs:

- Heart – sheep, deer, pig, cow
- Eye – cow (because of its size)
- Kidney – deer, pig, sheep
Other useful organs:

- Cow Heart— the large size is impressive; coronary vessels show up well.
- Problem: typically cannot get these whole (FDA Law).
Other useful organs:

- Deer or Goat Eye— the size resembles human size
- Problem: it’s a bit of work for processor/ taxidermist to get them out.
How to Acquire Fresh Tissue:

- Meat processors
- Wholesale butchers
- Hunters
- Taxidermists
Check your local laws!

perms

- Dept of Agriculture/Consumer Services Laws
- Meat and Poultry Inspection Laws
  - In NC, butchers and processors cannot give you organs without this
- Your School’s Guidelines
  - You may find fresh tissue easier than preserved, as it falls under the same guidelines as “steak.”

NORTH CAROLINA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
Meat and Poultry Inspection Division
100 E. Jones St., Suite 100
Raleigh, NC 27603-1017
Phone: (919) 733-8436 Fax: (919) 733-0446
www.ncagr.gov/inspect/meat

PERMIT TO OBTAIN SPECIMENS FROM OFFICIAL ESTABLISHMENTS

Name and Address of Individual: [Blank]

The above applicant desires specimens from animals or poultry subject to approval of plant management as shown below:

Type of Material Desired: [Blank]

Note: Eating insects must be isolated from inspected meat specimens.

I certify that collection of above material(s) will be accomplished in such a manner as to prevent contamination handled by any meat or poultry products and must not interfere with plant operations or inspection procedures.

Signature of Collecting Specimens: [Blank]

All containers in which above material is removed from the plant must be labeled INEDIBLE PRODUCTS FOR EDUCATIONAL AND RESEARCH PURPOSES ONLY. The above materials must be transferred in sealed, leak-proof containers.

Name of Establishment(s) where specimens are to be obtained:

[Blank]

In authorizing this action, the Department assumes no responsibility or liability which might arise from exposure to this material. Your or your representative will be responsible for proper disposal of this material when you are finished with it.

PERMIT GRANTED TO REMOVE ABOVE SPECIMENS: September 7, 2012

[Signature]

Dr. Beth Yongue
Assistant State Director
Check your local laws!
Payment— at least in North Carolina:

- In most states, taxidermists may not accept cash for organs.
- For-hire meat processors may not take cash for organs belonging to a client’s animal.
- Edible organs may be charged for. In NC, a typical cost for beef heart is $1- $2 per pound.
Fresh vs. Preserved Tissue

The Eye:
When it’s unpreserved, tissues are more lifelike and lens is translucent.

Fresh vs. Preserved Tissue

The Heart:
When it’s unpreserved, tissues are more flexible, more compressible, and their color/consistency is more realistic.
Fresh vs. Preserved Tissue

The Heart:
When it’s unpreserved, tissues are more flexible, more compressible, and their color/consistency is more realistic.

Photos courtesy John Krieger, VanDamme Academy, Aliso Viejo, CA
Fresh Heart Dissection Activities
before the heart is even open:

- “Which side of the heart is the front? Where is the pulmonary artery and where is the aorta?” – 3D orientation

- “How can you prove this to yourself without cutting into this heart?” -- Problem Solving, deductive reasoning, application of knowledge base

- “Where do the coronaries originate? Which of those coronary openings leads to which vessel? How can you prove it?” – more problem solving and 3D relationships
Fresh Heart Dissection Activities
once the heart is open:

- See if their hypotheses from last slide are correct
- Look for differences in structure
  - Moderator band
  - Differences in coronary flow
Anatomic Body Painting
Origin of Anatomic Body Painting?

Body Painting originated as an art form centuries ago. It continues to be used as a form of artistic expression today.
At some point, anatomists who saw this art figured out that body painting could be an excellent teaching tool.
In the past, students in many institutions were trained in surface anatomy using cosmetic pencils. For many years this technique was an accepted method of teaching the correct organ projections and relations. Nevertheless, in most instances, the result was a complex unattractive interplay of lines, with little meaning for students and teachers... Our main objective was to challenge the students by improving the visibility of the results and, in doing so, stimulate them to perform their tasks and to learn from them... Inspired by the wide range of uses of body paint in the dramatic arts and glossy magazines, we considered an anatomical role for this product.

-Op Den Akker et al, 2002
Origin of Anatomic Body Painting
Norway

“There is no absolute necessity for nudity, but a friendly and professional atmosphere helps many students over the threshold.”

-Op Den Akker et al, 2002

We probably need a different modesty threshold in the United States.
"The teaching of human anatomy has had to respond to significant changes in medical curricula, and it behooves anatomists to devise alternative strategies to effectively facilitate learning of the discipline by medical students in an integrated, applied, relevant, and contextual framework. In many medical schools, the lack of cadaver dissection as the primary method of learning is driving changes to more varied and novel learning and teaching methodologies…On the basis of our experience and student feedback, we strongly advocate the use of body painting as an adjunct to surface anatomy and clinical skills teaching classes."

-McMenamin, 2008
“Essentially we’re using a three-dimensional canvas in the shape of the body... you can paint the muscles on and bring them to life.”

--Professor Paul McMenamin, University of Western Australia
Students chose from a list of “paint topics”
• Materials provided
• 45 minutes paint time
## Origin of Anatomic Body Painting

The Australian Experience

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<th>Question</th>
<th>% Strongly disagree</th>
<th>% Disagree</th>
<th>% Neither</th>
<th>% Agree</th>
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<td>I found the face painting session enjoyable</td>
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<td>12</td>
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Origin of Anatomic Body Painting
The British Experience

Gabrielle Finn—

Uses body painting in the UK at University of Durham

Has published a suggested set of guidelines for successful anatomic body painting sessions.
Anatomic Body Painting
“Twelve Tips”

1. Consents, info sheets
2. Intro session with a demo
3. Instruction sheets
4. Paints, pots and brushes
5. Dignity and comfort
6. Attire
7. Group size
8. Mirrors
9. Time
10. Not everyone has to be a canvas
11. Clinical skills and surface anatomy
12. Post session photos and evals

Anatomic Body Painting
featured guidelines

- Give plenty of advance notice about paint sessions!

- Give clear guidelines as to how much clothing can be removed and by whom (clinical skills guidelines typically work well)

- Know your students’ comfort levels with being painters and with being canvases. Do not force any student into a role that makes him/her uncomfortable

- Encourage clinical correlation while painting (palpation of landmarks, performance of diagnostic maneuvers, assessment of pulses, etc)
Anatomic Body Painting
suggested guidelines

- Allow ample time for the process to occur (2.5-3 hours is a good window: 15 min instructions, 1-1.5 hours for painting, 30-45 min for presentations)

- Give clear “go” and “stop” times for painting and for post-paint presentations

- Give a clear painting topic, but allow freedom as to what surrounding structures are included

- Encourage students to incorporate pathologies IF they can explain the pathology.
Anatomic Body Painting
products and supplies

- Choose a hypoallergenic, washable, bright paint.
- Many online sources for theater-quality body paints (your performing arts program may have recommendations)
- Can order refills for colors you’ll use more (red)
- Have many brush options available
- Have anatomy atlases and computers available
- Consider holding session near the human donor (cadaver) lab (temperature concerns?)
Body Painting Sessions
Body Painting Sessions
Body Painting Sessions

neck
Body Painting Sessions

neck
Body Painting Sessions
extremities
Body Painting Sessions

extremities
Body Painting Sessions
presentations

- Students present as a group
- “Share the love” of knowledge with peers: more learning than just one’s own topic
- Accountability for obtaining a knowledgebase (even if there’s no grade attached)
Body Painting Presentations

- Communicating knowledge= another way to reinforce knowledge
- Who knows best what students have trouble with? Other students.
Hello friends at PAEA! -- On this slide I will have my video embedded. However, it’s too long to upload if I put it in now. You can preview the video by clicking the hyperlink that is attached to the pic below. Thank you!
Student Comments

- I LOVED doing the body painting! It really helped me study and was a super fun way to study. I liked the new way of doing anatomy.

- I think the major impact is the color because I’m extremely sensitive to color and I use that a lot in learning.

- It was great painting abnormalities on. It gave me an appreciation of where I’d find the abnormality in a patient.

- It is useful because it is a form of interactive learning and I find that I retain information much better.

- The actual physical act of painting helps you to remember whatever you’re painting.
Questions?
1. Mei Liang, Steven Lane, 25th Annual Report on Physician Assistant Educational Programs (Preliminary Data, 2008-2009) (presentation),


