

Ultrasound in Undergraduate Medical Education: Talking Points

What is your school's structure?

- ✓ Traditional course-based didactics versus integrated/organ-system-based
- ✓ What is your affiliation with the medical school?
 - Is there a department of Emergency Medicine at the medical school?
 - Is there a required EM clerkship?
 - Is EM active in teaching other topics/subjects already?
- ✓ What are the logistics of student didactics and clinical rotations?
 - Didactics centralized or spread out, mainly large- or small-group formats; clerkships centralized or geographically separated
- ✓ Will there be "curricular reform" at your school anytime soon?
- ✓ What are unique considerations/foci of your school/program?

What is your goal?

- ✓ Complementary teaching of complex anatomic relationships (ie, rotator cuff, cardiac)
- ✓ Complementary teaching of physical exam (ie, aortic or thyroid palpation, GU exam, cardiac auscultation)
- ✓ Integration of anatomy, physiology, pathology, and medical decision-making (ie, ACEP core applications with an added emphasis on anatomy/physiology)
- ✓ "Stanford 25" physical exam skills list: bedside ultrasound is #25, and teaching of at least 15 of the other 24 can be augmented using ultrasound
- ✓ Help students explore and reinforce concepts covered in anatomy and physiology and pathology, enhancing learning by using multiple modalities (gross dissection, textbooks, physical exam, and ultrasound)

Challenges frequently faced:

- ✓ No place in an already crowded curriculum
- ✓ Students will not develop physical exam skills
- ✓ What to do when you find pathology in students
- ✓ Just more technology between the doctor and patient
- ✓ Lack of proven educational value of ultrasound
- ✓ Faculty too inadequately trained in ultrasound to teach
- ✓ Inadequate resources to invest in a new curriculum (machines, models, etc)

Evidence base of ultrasound in medical education:

- ✓ Mainly descriptions of curriculum and experience
- ✓ Paucity of research-based outcomes
 - Plethora of positive student feedback
 - Significant face validity
- ❖ Does integrating ultrasound into undergraduate medical education:
 - Improve student scores on anatomy and physiology exams?
 - Increase the likelihood that they will use it to reach more accurate, timely, and cost-effective diagnoses and guide high-risk, invasive procedures?
 - Which question is more important, and what is our goal...

Why not just teach during residency?

- ✓ Moore CL, Copel JA, "Point of Care Ultrasonography," *New England Journal of Medicine* 2011; 364:749-57.
- ✓ Nearly all specialties are using bedside ultrasound already, and its use is constantly expanding. This is (or is becoming) a core skill for physicians.
- ✓ Rather than teaching fundamentals, during residency you should concentrate more on pathology and time-sensitive information that directly guides clinical management.

Strategy:

- ✓ Look for small windows where ultrasound can be integrated
- ✓ Areas where course and clerkship directors are most receptive
- ✓ Integrate with gross anatomy, physiology, and physical exam
- ✓ Start small, do a good job, then expand
- ✓ Don't try to teach everything all at once
- ✓ Longitudinal integration is much more effective, and enhances learning and long-term retention
- ✓ Keep student:faculty ratio low (ideally 5:1 or less)
- ✓ Gather student feedback to drive further opportunities
- ✓ Students can drive the process! MS-1 and MS-2 comments:
 - "I feel it has been the most practical clinical training I have had thus far in medical school."
 - "This is what keeps me motivated while doing the basic science courses. I would love to have more opportunity to use this to reinforce my anatomy while getting hands-on use with equipment I will be using later in my career."
- ✓ Find allies within the medical school to champion its integration
 - *Must* have faculty from multiple *specialties* at your institution; also consider multiple *facilities*, if feasible
 - Advantages of junior versus senior faculty
 - Medical school dean (bring your ultrasound machine and medical student!)
 - Grand rounds speakers – ultrasound topics
 - Take advantage of the simulation center
 - Consider involvement of other health professionals (PA, NP, techs)
 - Many of these "allies" will also become your instructors

Teaching formats and considerations:

- ✓ Mandatory versus elective student participation
 - Can you handle the entire class at once?
 - Consider beginning with elective participation to gather experience, instructors, educational curriculum, feedback (students and faculty) – and you can limit the number of participants
- ✓ Didactic classroom lectures versus web-based learning modules
- ✓ Mandatory hands-on laboratory sessions; open ultrasound practice sessions
- ✓ Interest groups (EM, radiology, and surgery easily integrate)

Resources (machines, models, and instructors):

- ✓ machine: purchase; borrow from ED, clinics, sim center, radiology, vendors
- ✓ models: medical students, phantoms, paid models, simulators
- ✓ instructors:
 - specialists: EM, radiology, cardiology, OBGYN, surgeons, critical care
 - residents: EM or radiology (esp during their U/S rotations)
 - peer-to-peer: interested MS-2 students volunteer for extra training, then serve as assistant instructors
 - medical school faculty: train them as instructors (quid pro quo)

“Sell it to the dean”

- ✓ Admissions: an ultrasound program can separate your school from the competition
- ✓ Student satisfaction: all deans want students to be happy with their education
- ✓ Grants: education, quality, patient safety, best practices, rural areas
- ✓ Potential for CME courses: source of revenue, build referral base, offer courses to alumni, etc.
- ✓ Patents and Licenses: ultrasound technology, teaching materials, simulation, phantoms
- ✓ Donors: ultrasound is very attractive to donors

Resources:

- ACEP guidelines (mainly for MS-4 EM U/S electives)
- SUSME
- WINFOCUS
- www.sonoguide.com

Closing thoughts:

- ✓ If ultrasound is integrated in a longitudinal manner, then it can become more than just a teaching tool, but also a clinical tool that can be integrated into daily practice.
- ✓ Ultrasound has applications across almost all specialties – it is a core clinical skill for physicians.
- ✓ Exposing medical students early and longitudinally to ultrasound builds a widespread foundation of knowledge in ultrasound, and allows residency training to focus on applications that directly affect patient care, cost, and safety.
- ✓ Medical schools are realizing that they need to teach ultrasound, or be left behind.

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