Ultrasound in Medical Education: Past, Present, Future

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Declaration

- Sonosim Inc.
The Past

• Ultrasound education in the past
• Typically consisted of exposure on radiology rotation
• An ultrasound zealots experience:
• Ultrasound in anatomy and physiology circa 1991? No
The Past

- The only exposure was watching films being read
- Occasionally sneak in a peak at the scanning room and maybe watch a technologist scan
- Isolated experience listening to radiologist read out studies
- Asked to leave once specialty plans announced
- Given a shove when US in the ED mentioned
The Past

- A difficult environment to see US and living anatomy, only still images
- No correlation to actual live patient or their condition, findings, examination
The Past: Us in the clinical years

- Exposure on emergency medicine rotations
- One elective rotation in ultrasound in the country in 1997 for residents, none for students
- For most, self education and theft of knowledge from others
The Past: The Resident Years

- Only place to get education in the past, was residency, maybe
- In 1995 few have machines and fewer teach their residents
- Scattered on west-coast a few on east-coast
- My residency US director: “US had no place in emergency medicine training”

- Means of self education:
  - Scan and hope
  - Scan and run
  - Scan and compare
  - Scan and peak
  - Scan and poke
  - Read and try to scan
  - Watch and fail to scan
  - Scan and imagine
The Past: The Resident Years

- One elective rotation in US in 1997
- One fellowship for clinician, in EM
- Entered it in 1998
- Breadth of field, not so much
- Little research, few publications, one proposed US curriculum, but for residents in EM
The Past: Medical Students

• Started elective for any 3rd or 4th year student in emergency ultrasound, 2001
• One taker
• Show and tell in gross anatomy in circa 2003
• Nothing like the present
The Present

• Multiple clinical rotations in ultrasound for medical students
• Anatomy and physiology integrating US
• Up to 16 medical schools with 4 year curriculum in place or about to start
• National meetings on topics
The Present

- SUSME link to PubMed
- US in medical education: 1169 articles (not all on medical students)
- Articles from 2014 abound on first page
- Massive change from 5 years ago, less than 100 hits on PubMed
The Present Challenges

• We face multiple challenge in the way of ultrasound spread
• Resources (nothing news)
• Introducing a new modality to a wide range of specialties and topics in medical school
The Present Rewards

• A new common language
• Anatomy and emergency medicine has rarely communicated so much
The Future

• Nice ornament
• Integration throughout medical education
• Clearly, the start of ultrasound education should match the start of education in medical school, from the first day
• Anatomy and physiology is a great time to learn ultrasound
• Then, incorporate anatomy and physiology knowledge into clinical years
• Inversely, US makes learning anatomy and physiology much easier for many students
• Makes both come of life
The Future

• Unclear that current hand held machines are the long term answer
• Many limitations, as show in this image
• Real time sharing of live video will be required
The Future

• Screen sharing can be accomplished through a variety of solutions
• The impact of ubiquitous ultrasound use in medical education will be significant
• From learning anatomy to physiology and integrating with clinical settings, all will be changed for ever
The Future: Labor Force

• A shortage of teachers is likely to exist for another generation
• As we are seeing now, a solution will be simulation
• From physical phantoms to CGI simulators and actual 3-D and 4-D ultrasound volumes, simulation augments the workforce and provides efficient teaching opportunities
A Fundamental Change in Learning
A Fundamental Change in Learning
Summary

• Few innovations in modern times have changed medical education more
• The stethoscope does not come close
• Crosses specialty lines and year
• Challenges remain and are the same as always, plus new ones (teaching the teachers)