Musculoskeletal Ultrasound
Cellulitis, Phlegmon, Ecthyma, Foreign Bodies and Fractures

It is commonly said that ultrasound is the stethoscope of the new century. Indeed, core emergency ultrasound applications – defined by Heller and Jehle's 1995 book Ultrasound in Emergency Medicine as pericardial tamponade, traumatic abdominal bleeding, abdominal aortic aneurysm, intrauterine pregnancy, gallstones, renal colic – are now taught to all emergency medicine residents. But now with these skills solidly within the our purview, we are branching out into other anatomic and pathological locales. One example is soft-tissue ultrasound for abscess: should I stick a scalpel blade in this now? A second is the use of ultrasound for diagnosing fractures: not as a substitute for x-rays, but for situations – battle, disasters, wilderness, in space – when x-rays are not available.

Soft-Tissue Ultrasound for Abscess/Cellulitis

- **Cellulitis**: Classic findings for cellulitis include anechoic reticulation (double arrows in Fig. 2). In simpler terms, one sees many small, irregular, mostly interconnected black areas throughout the cellulitis area. Compare with a nearby normal area for comparison.

- **Abscess**: With an abscess, one sees a large, more or less circular dark area. Occasionally the blackness is modified by bits of dark grey that may represent thicker pus (Fig. 3). Usually one will see bits of anechoic reticulation (cf. above) around the abscess. A hematoma (Fig. 4) will usually not show such reticulation around it, nor will one see dilated vessels.

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Fig. 1: Normal Elbow, Longitudinal (black arrows=ulnar collateral ligament, M/white arrows=medial epicondyle, U/arrowheads=ulna; d=distal.)

Fig. 2: Cellulitis, Dilated Lymphatics (longitudinal, dorsal foot)

Fig. 3: Thigh Abscess, Dilated Vessels

Fig. 4: Thigh Abscess, Dilated Vessels
• **Phlegmon/Ecthyma:** With these diffuse abscess-like infections – seen more frequently now with MRSA being so prevalent – one will see what looks like cellulitis but with many small (<1cm) pockets of anechoic fluid (pus).

**Foreign Body Localization**

Localizing soft-tissue foreign bodies by ultrasound is fairly straightforward. And, unlike soft-tissue radiography, ultrasound may be repeated at the bedside as often as needed, or even continuously as a foreign body is localized and removed.

**Ultrasound for Fractures**

There is very little data on the use of ultrasound for diagnosing fractures. Some studies are emerging, such as one that shows that ultrasound is not useful for diagnosing occult scaphoid fractures [Christiansen TG, et al. Diagnostic value of ultrasound in scaphoid fractures. Injury. 1991 Sep;22(5):397-9.]

There is one promising but still ongoing study by the military. At ClinicalTrials.gov: Diagnosing Extremity Fractures and/or Dislocations Using Ultrasound Presenting to the Emergency Department: Hypothesis: Can ultrasound be used as an accurate and effective method for determining the presence or absence of extremity fractures or dislocations? Is there a difference in amount of pain experienced prior to and after the ultrasound?

**Other Uses**

There are other uses of musculoskeletal ultrasound as well, as suggested by the problems with which patients present and the willingness of the emergency physician to use the ultrasound probe. A good example is examining the suddenly-swollen calf for evidence of an acute plantaris tendon rupture.

Today, the future of musculoskeletal ultrasound looks to be (1) to replace x-rays in ambulatory and disaster settings, where x-rays aren't available, and (2) to replace MRI, for example for flexor tenosynovitis of the hand. [Blakeley C, et al. Portable ultrasound diagnoses flexor tendon sheath infection. http://dx.doi.org/10.1016/j.injury.2008.04.021.]

**Fig. 4: Thigh Hematoma**

**Fig. 5: Cactus Thorns in Finger**
(arrows=thorns, arrowheads=bone)

**Fig. 6: Patella Fracture**

**Fig. 7: Plantaris Rupture:**
Longitudinal (L) and Transverse (R): hematoma between medial gastroc and soleus.

**Fig. 8: normal flexor tendon**

**Fig. 9: tenosynovitis**