

## Tips and Tricks for Imaging Digits

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Using either of these two simple tricks can facilitate and enhance visualization of both finger and toe structures.

Clinicians familiar with point-of-care (POC) ultrasound know that structures such as the hands and feet require the use of the linear high-frequency transducer to obtain quality images. In reality, however, employing the standard technique (ie, applying gel to the probe surface and scanning the structure) can be challenging due to the uneven surfaces of the fingers and toes; therefore, obtaining good contact with

the transducer is harder than it may seem at first glance. Additionally, since these structures are superficial, they are usually seen on the top half of the ultrasound display, while the focal zone of most ultrasound machines is located in the middle of the display and is nonadjustable.

We describe two simple adjuncts to POC ultrasound that can assist in visualizing digital structures with greater ease and improved image resolution: the water bath<sup>1,2</sup> and standoff pad techniques.

### Water Bath Technique

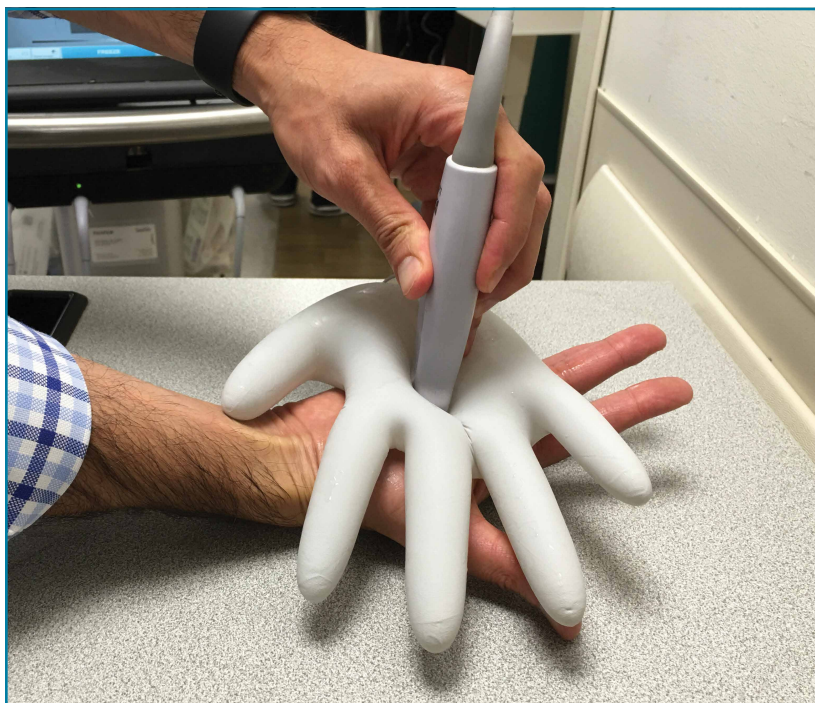
In the water bath technique, one fills a small basin with lukewarm water to a depth point where the extremity being studied (ie, hand or foot) is mostly—but not completely—submerged in the water bath. After the extremity is submerged, the high-frequency probe is then placed into the water bath (**Figure 1**). When employing this technique, the transducer does not need to make contact with the patient's skin. Since the water acts as an excellent conduction medium for sound waves, no ultrasound gel is required. For a video demonstrating the use of the water bath technique to evaluate the distal tip of the finger, view this article on the *Emergency Medicine* Web site at <http://www.emed-journal.com>.



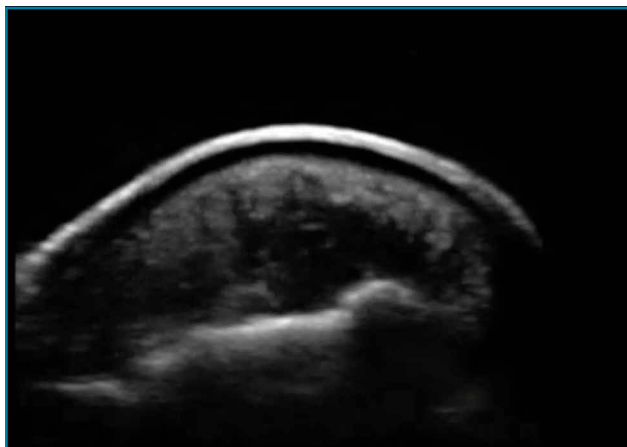
**Figure 1.** Ultrasound imaging of the hand using the water bath technique.

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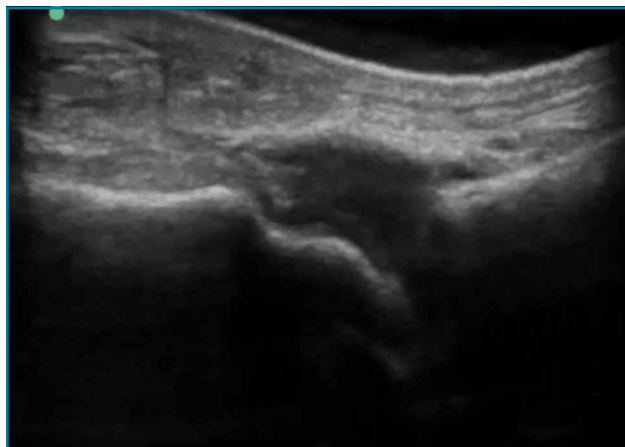
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**Figure 2.** Ultrasound imaging of the hand using the standoff pad technique with a water-filled latex glove.



**Figure 3.** Ultrasound image of the finger using the water bath technique demonstrates a felon in the palmar aspect of the fingertip.



**Figure 4.** Ultrasound image of the foot using the water bath technique demonstrates metatarsophalangeal joint effusion.

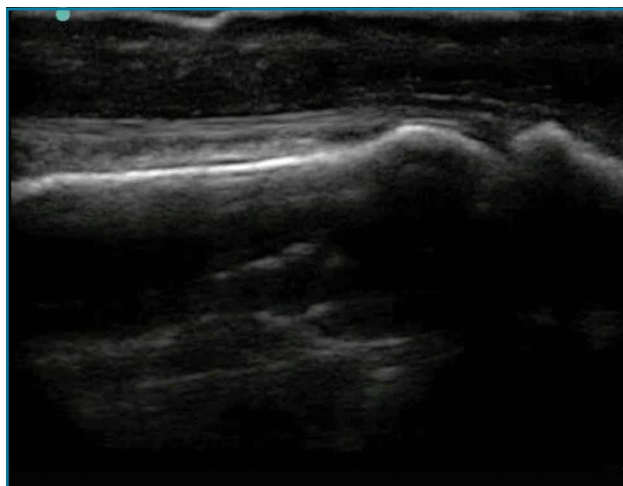
### Standoff Pad

Another technique that enhances POC imaging of the digits involves a standoff pad. A variety of commercially available standoff pads can be used for this technique. Alternatively, the clinician can easily create a standoff pad using supplies that are readily available in the ED. One such method is to fill a latex glove with water, tie

off the filled glove, and place it on top of the extremity to be imaged (**Figure 2**). The water in the glove will facilitate sound-wave transmission.

### Pathology

The water bath and standoff pad techniques can facilitate visualization of several pathologies, including



**Figure 5.** Ultrasound image of the finger using the water bath technique demonstrates the flexor tendon of the long (middle) finger.

felons (**Figure 3**), flexor tenosynovitis, phalangeal and metacarpal/metatarsal fractures, and interphalangeal, metacarpophalangeal, and metatarsophalangeal joint effusions (**Figure 4**). In addition, these techniques also assist in visualizing digit tendons to evaluate for tears in these structures (**Figure 5**).

### Summary

Point-of-care ultrasound imaging to evaluate superficial body parts such as hands or feet can be challenging due to the irregular shape and uneven surface of these struc-

tures. The employment of adjuncts such as the water bath or standoff pad techniques can mitigate these challenges, facilitating the acquisition of high-resolution images and providing easier identification of pathology.

### References

1. Krishnamurthy R, Yoo JH, Thapa M, Callahan MJ. Water-bath method for sonographic evaluation of superficial structures of the extremities in children. *Pediatr Radiol.* 2013;4(Suppl 1):S41-S47. DOI:10.1007/s00247-012-2592-y.
2. Jeong HY, Krishnamurthy R. 1012: Water-bath method for sonographic evaluation of superficial structures of the extremities. *Ultrasound Med Biol.* 2009;35(8):S101-S102. doi:10.1016/j.ultrasmedbio.2009.06.394.