

Basic Skills Qualification Musculoskeletal Ultrasound I

Evaluation Process

Prior to seeking BSQ certification, a resident should be confident in their skills. The "Basic Skills Qualification" is printed and given to the supervising physician, where after, the resident performs the procedure under direct observation of the supervising physician. The competency assessment is completed by the supervising physician with their signature and given back to the resident. The resident then returns the competency assessment to the Academic Coordinator.

Resident: _____



	Competent	Needs Work
Understands, and can select/apply:		
-appropriate program selection		
-appropriate transducer selection		
-appropriate frequency selection		
-appropriate depth selection		
-appropriate focal zone selection and positioning		
-appropriate brightness selection		
-appropriate choice of map		
-appropriate use of compound harmonic imaging		
-transducer handling		

Faculty: _____

Date: _____

Explanation

Program

Ultrasound machines are packaged with a collection of factory settings or 'programs' which vary from body part or type of imaging. Additionally, user settings can be saved as protocols. The first step is to choose the appropriate program - in our current use, 'MSK' and one of its sub-programs.

Transducer

Transducers are built for specific purposes - linear probes for high definition, curvilinear probes for deeper tissues, sector probes with small footprints to avoid rib etc. In most instances, MSK will exploit linear probes for their high definition, but not invariably. For example, the hip may be sufficiently deep to require a curvilinear probe.

Frequency selection

The higher the frequency, the shorter the wavelength. (Basic physics). The shorter the wavelength, the higher the resolution - or ability to distinguish two echoes as separate rather than one. However, the higher the frequency, the more it is attenuated by passage through tissue - a trade-off. Consequently, the highest frequency compatible with tissue transmission and depth is usually selected.

Depth selection

The best resolution is usually in the image mid-field. In fact, in machines that minimize operator adjustment such as Sonosite, this is the rule. Consequently, the depth should be adjusted to place the area of interest at mid-depth.

Focal zone and positioning

The generated ultrasound beam is not of uniform thickness but is electronically manipulated to have a narrow waist or focal zone. This zone should be placed at the point of maximum interest. Multiple focal zones can be placed, although there may be disadvantages with this, discussed later.

Brightness

This is an important consideration. Experts insist on low ambient light levels although this may be inconvenient. It is said that beginners invariably 'over-boost' the image.

Map choice

The brightness key allows for two map choices which is a matter of personal preference.

Compound harmonic imaging (CHI)

Tissue reflects signals at twice the sending frequency. For example, if the transmit beam has a frequency of 2 megahertz, it will be returned at 4 megahertz. When harmonic imaging is enabled, the probe listens at twice the frequency. This gives improved imaging, but sometimes worsens the deepest images. Trial and error will be helpful.

Transducer handling

This is critical, particularly in musculoskeletal imaging, where the incident beam should be 90 degrees, with a tolerance of about 3 degrees on either side. Lack of insonence cause anisotropy, discussed later, and is a common cause of image artifact. Transducer should be held in a "pen type" grip, and the ulnar border of the hand, or ulnar two fingers, should rest on the skin for stability.