Ultrasound Basics and the 13 Point Shoulder Exam

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Ultrasound Basics (7 slides) Shoulder Orientation 13 Point Shoulder Exam

What Are Ultrasound Advantages?

Images muscle, soft tissue, and bone
surfaces Provides dynamic, "live"
images
No known long term side
effects Portable, relatively
inexpensive

High spatial resolution (1mm) with high frequency transducers

Effective visualization of the postsurgical rotator cuff - not

What Are Ultrasound Disadvantages?

Can't see "thru" bone or gas

Relatively limited depth of

penetration Operator dependent

imaging modality

Hardware dependent imaging

modality. No scout image as with

Basic US Concept

Higher frequency transducers

Better resolution, less

penetration

Lower frequency transducers

Worse resolution, better penetration

How Does Ultrasound Work?

The US wave is partially reflected when it hits a density change in the body

The amount of the reflection depends on the density difference (impedance difference)

Large density difference - large reflection, "bright

echo" Small density difference - small reflection,

"grayer"



How Does Ultrasound Work?

Anisotropy If the problection of the boot held with the surface parallel to the tendon, US reflection is not back towards the probe and the tendon appears falsely hypoechoic.

This hypoechoic appearance is eliminated with proper transducer orientation (realignment)



Needle Guidance

Basic Ultrasound

Vocabulary Hyperechoic - "whiter signal"

Hyperechoic - "whiter signal" Hypoechoic – "darker signal" Anechoic – "no signal", black



Anisotropy

Structures appear more <u>hypoechoic</u> if the transducer is not perpendicular to the structure being examined





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The 13 Point Exam

Point 1: Transverse biceps tendon in the bicipital groove (axial) Point 2: Longitudinal biceps tendon (sagittal) Point 3: Longitudinal subscapularis tendon (axial) Point 4: Transverse subscapularis (sagittal) Point 5: Longitudinal coracoid and subscapularis (axial) Point 6: Longitudinal anterior supraspinatus (coronal) Point 7: Longitudinal posterior supraspinatus (coronal) Point 8: Transverse anterior supraspinatus (coronal) Point 8: Transverse anterior (axial) Point fraggitual) in the binfraggiventies posterior (axial) Point fraggitual) in the binfraggiventies posterior (axial) Point fraggitual) (sagittal)

Point 122. Protos for indragramical and a viewallagic joint in (databath) (axial)

.....) = corresponding MRI orientation







Point 3 - Subscapularis tendon (axial/long axis view)



Point 4 - Subscapularis tendon (sagittal/short axis view)





<text><image><image>



The 13 Point Shoulder Exam

The next 4 points cover the lateral shoulder

Point 6: Longitudinal anterior *supraspinatus* (coronal) Point 7: Longitudinal posterior *supraspinatus* (coronal) Point 8: Transverse anterior *supraspinatus* (sagittal) Point 9: Transverse posterior *supraspinatus* (sagittal) Main Structure: supraspinatus tendon

(.....) = corresponding MRI orientation ©2020 Don Buford, MD, RMSK

Point 6 & 7 - Supraspinatus tendon (coronal/long axis view)



Patient positioning

Hand as posterior as possible on hip, pointing straight ahead

Elbow as adducted as comfortable

Transducer position

Transducer aligned parallel to line connecting contralateral shoulder to ipsilateral hip (red line on image)



Point 7 - Posterior Supraspinatus tendon (coronal/long axis view)



Live Point 6 - Anterior Supraspinatus tendon (coronal/longitudinal view)





Point 6 - Anterior Supraspinatus tendon (coronal/longitudinal view)



Point 8 & 9 - Supraspinatus tendon (sagittal/short axis view)



Patient positioning

Hand as posterior as possible on hip, pointing straight ahead

Elbow as adducted as comfortable

Transducer position

Transducer aligned parallel to line connecting ipsilateral shoulder to contralateral hip (red line on image)

Point 8 - Anterior Supraspinatus tendon (sagittal/short axis view)



Point 9 - Posterior Supraspinatus tendon (sagittal/short axis view)



MI 0.7 TIS 0.6

OM/C/3/H/TV3 Gn 55 DR 63 Depth 3 cm 28 Hz

The 13 Point Shoulder Exam

The next 3 points cover the posterior shoulder

Point 10: Axial, long axis infraspinatus (axial) Point 11: Sagittal short axis infraspinatus (sagittal) Point 12: Posterior glenohumeral joint (axial)

Main Structures: infraspinatus tendon, glenohumeral joint

(.....) = corresponding MRI orientation ©2020 Don Buford, MD, RMSK

Point 10 -12 Infraspinatus tendon

Patient positioning

Hand resting on inner thigh Elbow flexed 90 degrees

Transducer position

Point 10 & 12 Transducer aligned parallel and inferior to scapular spine

Point 11 Transducer aligned vertically inferior to scapular spine



Point 11 - Infraspinatus tendon (axial/long axis view)











Summary

Have a routine exam protocol Standardizes scanning Simplifies documentation Improves diagnostic sensitivity Improves image guidance