Ultrasound – Musculoskeletal (MSK) Evaluation of Tendon Rupture in the Emergency Department

PURPOSE:

To evaluate for Achilles tendon tear, Quadriceps tendon tear, Biceps tendon tear in the Emergency Department

SCOPE:

Applies to all MSK ultrasound studies performed in the emergency and urgent care departments:

- UT Southwestern William P. Clements Jr. University Hospital and Clinics, Imaging Services (UTSW Radiology)
- Parkland Health (Hospital and Clinics), Department of Radiology (PHHS Radiology)

ORDERABLE:

- UTSW - US LOWER EXTREMITY SOFT TISSUE RIGHT OR LEFT (Limited eval)
- UTSW - US UPPER EXTREMITY SOFT TISSUE RIGHT OR LEFT (Limited eval)
- UTSW & PHHS - US LOWER EXTREMITY JOINT RIGHT OR LEFT (Complete eval)
- UTSW & PHHS - US UPPER EXTREMITY JOING RIGHT OR LEFT (Complete eval)

INDICATIONS:

- Signs or symptoms of tendon rupture/injury
- Prior history of tendon rupture/injury

CONTRAINDICATIONS:

- No absolute contraindications

EQUIPMENT:

- Linear transducer with a frequency range of 9-18 MHz that allows for optimal penetration and resolution depending on patient's body habitus
- Curvilinear transducer with a frequency range of 3-9 MHz that allows for appropriate penetration and resolution depending on patient's body habitus

PATIENT PREPARATION:

- None

EXAMINATION:

GENERAL GUIDELINES:

Prior to bringing patient to ultrasound department for exam, ensure order is appropriate for targeted (limited) emergent evaluation of Achilles, Quadriceps, or Biceps tendon rupture. If necessary, direct ED/urgent care providers to call the radiologist for guidance.

Ensure the provider understands that complete joint ultrasound imaging is available as a routine, scheduled outpatient exam and performed by sonographers trained to perform MSK ultrasounds.

EXAM INITIATION:

- Introduce yourself to the patient/family
- Verify patient identity using patient name and DOB
- Explain test
- Obtain patient history including symptoms. Enter and store data page
- Place the patient in an appropriate position depending on the examination to be completed.
    - **Achilles tendon rupture:** patient prone, with foot hanging off the table end. (If unable to lay prone, decubitus position with the affected side up.)
    - **Quadriceps tendon rupture:** place patient comfortably supine or sitting with knee extended or slightly flexed with a towel underneath.
    - **Biceps tendon rupture:** start with patient in a sitting position with head raised on the stretcher and arm extended.

TECHNICAL CONSIDERATIONS:

- Re-check laterality (right vs. Left) at the beginning of the exam.
- Ask patient to point to the area of maximum discomfort.
- Review any relevant prior imaging.
- For tendon tears or ruptures:
    - Specify probe placement: transverse, longitudinal, LAX (long axis), or SAX (short axis).
    - Specify laterality: right or left.
    - Specify location: anterior, posterior, medial, lateral, dorsal, volar, plantar.
    - Specify body part: e.g. Achilles tendon, Quadriceps tendon, Biceps tendon
    - Examples: transverse right dorsal wrist, long left lateral proximal forearm, transverse right anterior distal thigh, long right Achilles tendon, long left quadriceps tendon.

DOCUMENTATION:

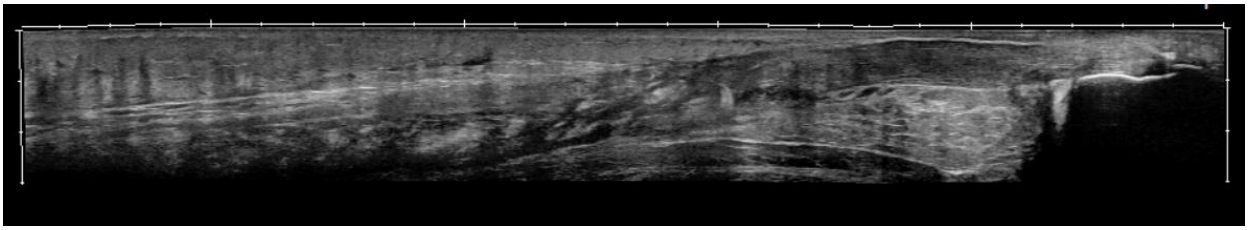
- For Achilles, Quadriceps or Biceps tendons:
    - Specify imaged joint and laterality
    - Image the entire tendon in transverse and longitudinal orientations.
    - For Biceps tendon, images should be labeled as Proximal (shoulder), Mid (muscle), Distal (elbow).
    - If a tear is detected, include the following:
- Image measurements: measurement of the tendon gap, and distance from the bony attachment.
        - Compression cine clip and static image to differentiate from partial or complete tear/rupture.
    - Include panoramic image of the entire tendon. Include:
        - Achilles tendon - Calcaneus
        - Quadriceps tendon - Patella
- Proximal biceps tendon - Humeral head
        - Distal biceps tendon - Radial tuberosity
    - Include images with and without color/power Doppler of the tendon and area of tear/rupture, if present.
    - Include cine clips in longitudinal and transverse:

        - Above to below the abnormality
        - Medial and lateral to the abnormality
    - In shoulder and other joints, save an image with notation of sonographic palpable abnormality or pain/tenderness site.
- Data page(s) if applicable.

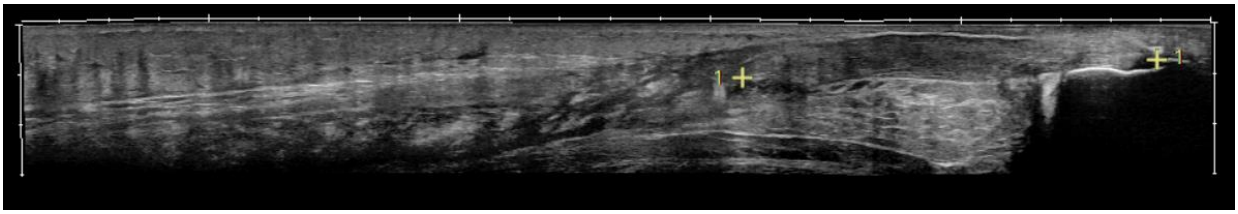
PROCESSING:

- Review examination images and data.
- Export all images to PACS.
- Document relevant history, prior imaging, and any study limitations.

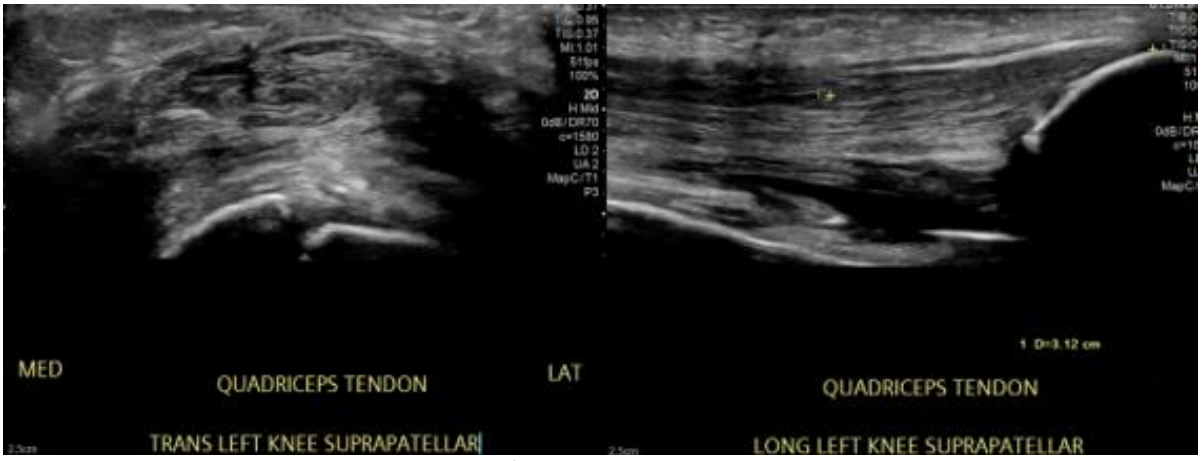
APPENDIX:



Panoramic longitudinal view of a complete rupture of the Achilles tendon.



Panoramic longitudinal view of a measurement from the calcaneal insertion to Achilles tendon rupture.



Transverse and longitudinal view of a partial/intrasubstance tear of the quadriceps tendon with measurement from patella.

REFERENCES:

- (2023), The AIUM Practice Parameter for the Performance of the Musculoskeletal Ultrasound Examination. J Ultrasound Med, 42: E23-E35. https://doi.org/10.1002/jum.16228.
- American College of Radiology. ACR–SPR–SRU Practice Parameter for the Performance and Interpretation of Diagnostic Ultrasound Examinations. Available at: https://www.acr.org/-/media/ACR/Files/Practice-Parameters/US-Perf-Interpret.pdf. Accessed December 2, 2020.

CHANGE HISTORY:

DATE:	SUBMITTED BY: (NAME, TITLE)	APPROVED BY: (NAME, TITLE)	SUMMARY:
4/8/2022	Dr. Oganes Ashikyan, MSK radiologist	Dr. Avneesh Chhabra, MSK Medical Director	Submission
5/4/2022	Surekha Patel, MS, RDMS, RVT, RT	Dr. Oganes Ashikyan, MSK radiologist	Revisions
7/27/2026	Matthew Carrigan, RDMS, RVT, RMSKS	Dr. Avneesh Chhabra, MSK Medical Director	Revisions and A11y Updated heading styles for the protocol template, Parkland orderables added.