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Isolated Fracture of the Greater Tuberosity

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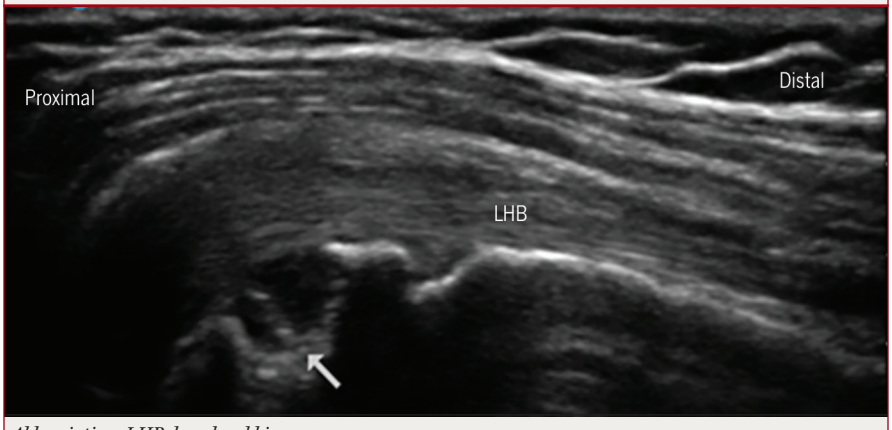
Case Presentation

A 59-year-old woman who worked as a horse trainer tripped and fell into a fence, forcing her right arm into external rotation and horizontal abduction. Upon impact, she felt immediate shoulder pain. One week later, she tripped at home and landed on the posterior aspect of her shoulder. She sought care from a chiropractor and had minimal improvement over 3 weeks. She then self-referred to physical therapy. The patient reported a score of 6/10 to 7/10 on the numeric pain-rating scale, and her shoulder pain had been constant since the initial injury. She was unable to train horses and had difficulty dressing.

Active movement increased the patient's pain and was limited to 30° of shoulder flexion and abduction. Passive range of motion was limited in flexion (90°), abduction (60°), and external rotation at the side of her body (21°). Neurovascular screening was symmetrical in bilateral upper extremities. Manual muscle testing for external rotation was 3–/5 and for internal rotation was 4/5. The patient had a positive modified (performed at the end of available passive motion) drop-arm sign. Focal tenderness was present at the proximal bicipital (long head) tendon and distal insertion of the infraspinatus.

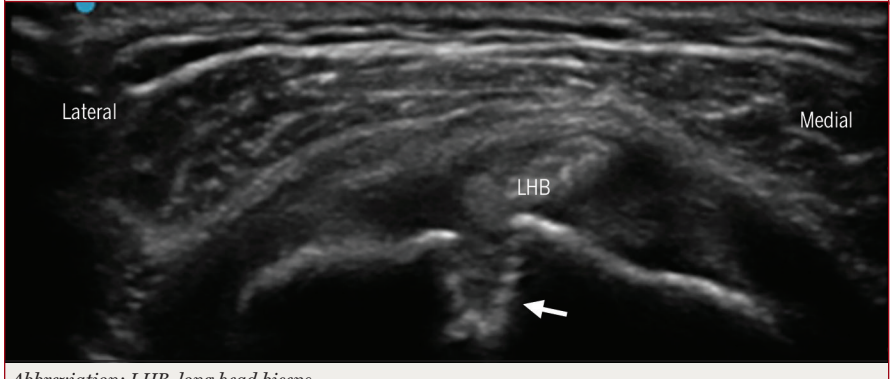
To further assess the patient, a musculoskeletal ultrasound was completed by the physical therapist. A cortical defect of the right greater tuberosity (**FIGURES 1** and **2**) and partial tears of the right subscapularis and supraspinatus tendons were visualized. The patient was referred back to her chiropractor for radiographs, which showed a minimally displaced fracture of the greater tuberosity (**FIGURES 3** and **4**).[3] The patient's right shoulder was immobilized in a sling, and she was referred to an orthopaedic surgeon.

FIGURE 1
Long axis–view diagnostic ultrasound of the LHB tendon, using a linear probe of 5 to 16 MHz in frequency, showing a cortical defect (arrow) of the greater tuberosity.



Abbreviation: LHB, long head biceps.

FIGURE 2
Short axis–view diagnostic ultrasound of the LHB tendon, using a linear probe of 5 to 16 MHz in frequency, showing the fracture site (arrow) with the overlying LHB tendon.



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Learning Point

Proximal humerus fractures affect 73 per 100 000 individuals and represent 4% of all fractures seen in orthopaedic clinics,[1] of which 14% to 20% are isolated fractures of the greater tuberosity.[4,5] In this case, musculoskeletal ultrasound provided a cost-efficient means of identifying the soft tissue and bony injury, leading to appropriate referral, definitive diagnosis, and an appropriate treatment plan and referral.[4-6] ■

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FIGURE 3
Anteroposterior external rotation radiograph of the right shoulder showing a fracture of the greater tuberosity.

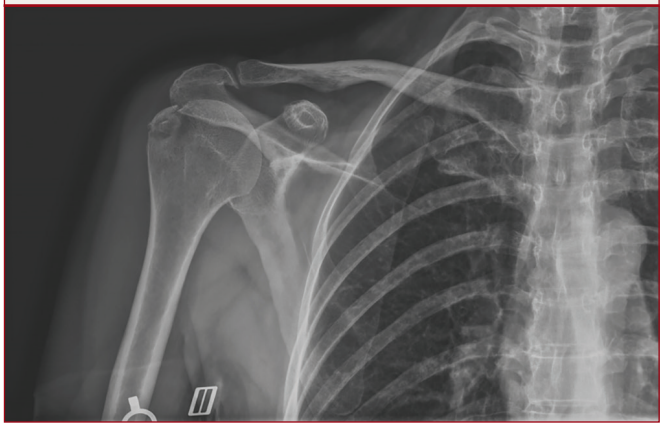

FIGURE 4
Anteroposterior glenoid (Grashey view) radiograph of the right shoulder showing a fracture of the greater tuberosity.

DECISION PATHWAY
At the time of treatment planning for this patient in the state of Washington, physical therapists could perform musculoskeletal ultrasound but were not allowed to refer directly to a radiologist for radiographs or advanced imaging.

Exam findings	Initial imaging	Additional imaging	Outcome
• **Health care provider:** physical therapist • **Impairments:** unable to train or saddle horses, lift a wheelbarrow, or raise her arm overhead, and had difficulty dressing • **Differential diagnosis:** rotator cuff tear, fracture, labral tear, subacromial impingement, bursitis, adhesive capsulitis	• **Imaging modality:** ultrasound • **Support:** there is a strong level of evidence supporting musculoskeletal ultrasound for full-thickness and partial-thickness cuff tears[6]	• **Imaging modality:** radiography • **Support:** there is a strong level of evidence supporting radiographs for greater tuberosity fractures (ACR AC for traumatic shoulder pain, variant 1: initial imaging)[2]	• **Diagnosis:** fracture of the greater tuberosity • **Treatment:** referral • **Outcome:** unknown

Abbreviation: ACR AC, American College of Radiology Appropriateness Criteria.

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