

Ultrasound Images of Groin Pain in the Athlete: A Pictorial Essay

Levent Özçakar, MD, Burkay Utku, MD

Chronic groin pain in the athlete is a common condition, with, at times, protracted recovery that leads to prolonged disability. There are soft-tissue and bony contributors to pain, with the mechanism of injury usually an acute or chronic overload of the hip adductor tendons, abdominal aponeurosis, hip joint, or symphysis pubis. The complexity of the regional anatomy often necessitates imaging modalities for precise diagnosis and prompt management. Imaging options include magnetic resonance imaging, computed tomography, nuclear bone scan, radiography, and ultrasound. In this report, we present a series of images that represent the value of musculoskeletal ultrasound in the diagnosis and treatment of groin pain in the athlete.

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During ultrasound examination of the groin (Figure 1), various pathologies that pertain to the tendons, muscles, and bones (ie, cortical irregularities, avulsions, hematomas, muscle and tendon disruptions) can be visualized (Figures 2-5). With concern to muscles, they will normally be visualized as a “starry sky” pattern on axial imaging, whereas the hyperechoic fibroadipose septa and the anechoic (black) muscular tissues will be seen as “veins on a leaf” on a longitudinal view. However, although early strains display focal increased echogenicity, ruptures can be visualized as discontinuing fibers, usually accompanied by a local hematoma (anechoic fluid). If the strain ensues at the myotendinous junction, retracted tendons might also be observed. In this regard, dynamic imaging of the muscle-tendon units would be noteworthy. The tendons appear as hyperechoic fibrillar structures on longitudinal imaging and as ovoid on axial imaging. Swollen (hypoechoic) or irregular tendons, sometimes with calcifications, can be seen in various tendinopathies. Further, Doppler ultrasonography might be a useful adjunct if inflammation is suspected (eg, tendinitis, tenosynovitis).

The pubic bone will normally be observed as a hyperechoic (white) line, with acoustic shadowing. The disruption of the integrity of the hyperechoic line can be referred to as a cortical irregularity, erosion, or avulsion according to the shape and extent of the disruption. Herein, although conventional radiographs may provide a better regional overview, ultrasound imaging with sonopalpation would indisputably be superior, especially for small lesions (Figure 6). The rest of this article comprises ultrasound images of exemplary cases (6 athletes with groin pain) and renders their pertinent pathologies (Figures 2-7).

L.Ö. Hacettepe Üniversitesi Tıp Fakültesi Hastaneleri Zemin Kat FTR AD, Sıhhiye, Ankara, Turkey. Address correspondence to: L.Ö.; e-mail: lozcakar@yahoo.com
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B.U. Department of Sports Medicine, Hacettepe University Medical School, Ankara, Turkey
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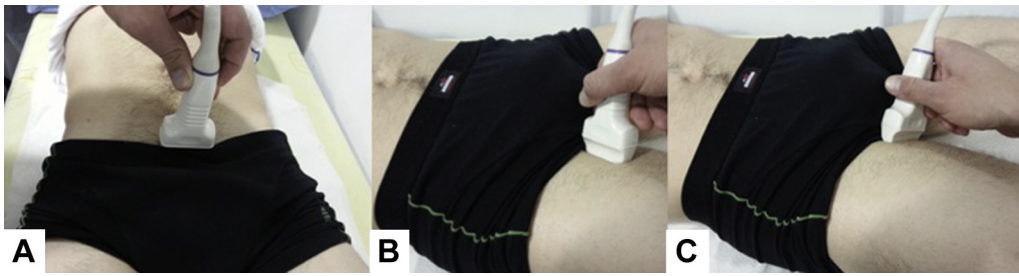


Figure 1. Photograph that shows common transducer positions for ultrasonographic evaluation of groin pain. Suprapubic axial view (A), longitudinal (B), and axial (C) views of adductor muscle origins. For the adductor muscles and their insertions, the transducer is initially positioned parallel to their long axes (infrapubic). For the rectus abdominis muscles and their insertions, it would be easier to start imaging axially (suprapubic) in either direction, from the proximal portion of the muscles to the pubic insertion or vice versa. According to the injury, the transducer can be moved from the pubic insertion distally to image the whole muscle body.

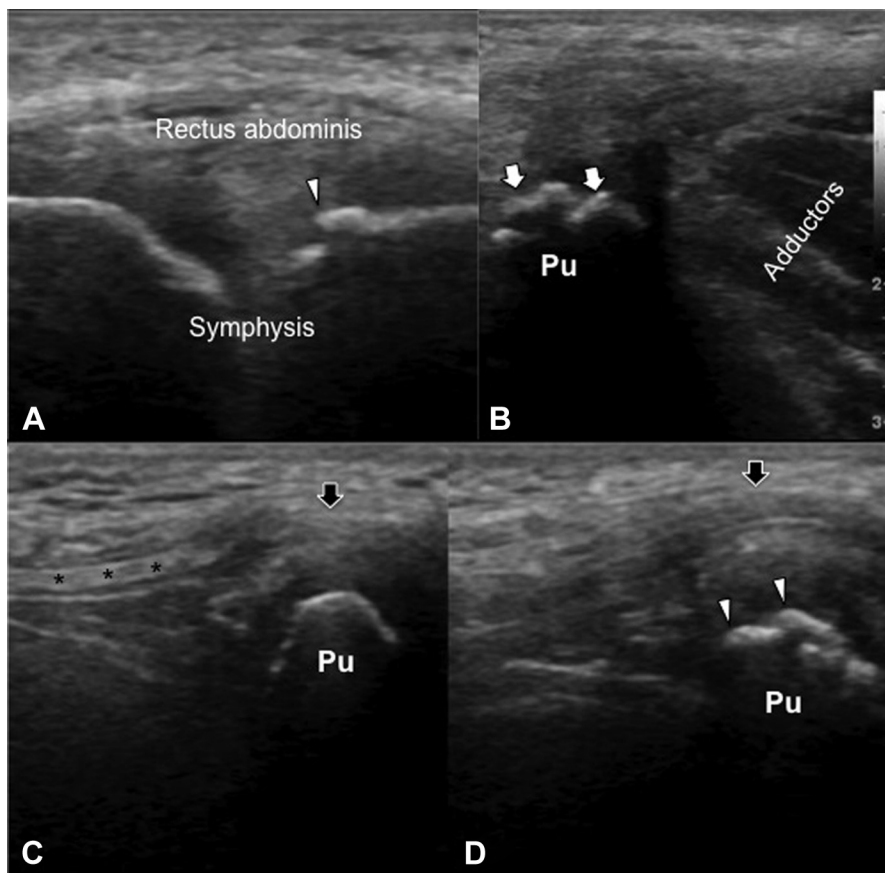


Figure 2. A 20-year-old male professional weight-lifter with groin pain (diagnosed as osteitis pubis). On ultrasound imaging (axial view), a small cortical irregularity (white arrowhead) was detected on the left side of the patient, whereas the transducer was localized on the rectus abdominis muscle attachment on the pubic bone (A). Infrapubic (longitudinal) imaging also revealed left-sided bony irregularities (white arrows) on the insertion of the adductor muscles (B). When compared with the asymptomatic side (C), suprapubic (longitudinal) imaging showed that the rectus abdominis muscle tendon was also irregular and thickened (black arrow), in addition to the cortical irregularities (white arrowheads) (D). Importantly, both areas were tender on sonopalpation. Black stars = a small portion of the rectus abdominis tendon; Pu = pubic bone.

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