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Muscle Architecture Assessment: Strengths, Shortcomings and New Frontiers of in Vivo Imaging Techniques.

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Abstract

Skeletal muscle structural assembly (and its remodeling in response to loading-unloading states) can be investigated macroscopically by assessing muscle architecture, described as fascicle geometric disposition within the muscle. Over recent decades, various medical imaging techniques have

been developed to facilitate the in vivo assessment of muscle architecture. However, the main advantages and limitations of these methodologies have been fragmentally discussed. In the present article, the main techniques used for the evaluation of muscle architecture are presented: conventional B-mode ultrasonography, extended-field-of-view ultrasound, 3D ultrasound and magnetic resonance imaging-based diffusion tensor imaging. By critically discussing potentials and shortcomings of each methodology, we aim to provide readers with an overview of both established and new techniques for the in vivo assessment of muscle architecture. This review may serve as decision guidance facilitating

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One year in review 2018: ultrasonography in rheumatoid arthritis and psoriatic arthritis.

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Abstract

Ultrasound is playing an increasingly important role in the differential diagnosis and monitoring of rheumatoid arthritis (RA) and psoriatic arthritis (PsA). This technique is more sensitive and specific than clinical examination to detect active synovitis, and the identification of specific synovitis patterns enable differentiation of PsA from RA and other entities. Ultrasound verified inflammation changes along with clinical improvement during therapy, and ultrasound was shown to predict future clinical and structural outcomes thus complementing the clinical risk assessment of patients. In the present review, we summarised the scientific evidence published in 2017 focussing on the use of ultrasonography for clinically relevant and pragmatic aspects of diagnosis and management of RA and PsA.

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Compliance assessment and flip-angle measurement of the median nerve: sonographic tools for carpal tunnel syndrome assessment?

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Abstract

Objectives To assess the diagnostic performance of median nerve (MN) flip-angle measurements, deformation during wrist flexion [transit deformation coefficient (TDC)], during compression [compression deformation coefficient (CDC)] and fascicular freedom to potentially identify fibrotic MN changes in patients with carpal tunnel syndrome (CTS).

Methods This prospective study was performed with institutional review board approval; all participants provided oral and written informed consent. Wrists in 21 healthy participants and 29 patients with CTS were examined by ultrasound. MN movement during wrist flexion, MN deformation during transition over the flexor tendons (TDC) and during controlled compression (CDC) as well as fascicular freedom were assessed. Diagnostic properties of these parameters were calculated and com-

pared to clinical findings and cross-section area measurements (Δ CSA).

Results Low flip angles were associated with high Δ CSA at a receiver-operator characteristics area under the curve (AUC) of 0.62 (0.51–0.74). TDC [AUC, 0.83 (0.73–0.92), 76.3% (59.8–88.6%) sensitivity, 88.5% (76.6–95.7%) specificity], restricted fascicular movement [AUC, 0.86 (0.78–0.94), 89.5% (75.2–97.1%) sensitivity, 80.8% (67.5–90.4%) specificity] and compression-based CDC [AUC, 0.97 (0.94–1.00), 82.1% (66.5–92.5%) sensitivity, 94.2% (84.1–98.8%) specificity] demonstrated substantial diagnostic power (95% confidence intervals in parentheses).

Conclusions Fascicular mobility, TDC and CDC show substantial diagnostic power and may offer insights into the underlying pathophysiology of CTS.

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Ultrasound Guidance for Pleural-Catheter Placement.

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The video by Peris et al. (April 5 issue) illustrates their technique for pleural-catheter placement. On the basis of our experience with more than 5400 ultrasound-guided pleural-catheter placements over the past 10 years, we highly recommend a different approach. We strongly advocate the use of the “in-plane” ultrasound technique for real-time visualization of the needle during local anesthesia and catheter placement. Locating the needle tip in a transverse “out-of-plane” technique, as suggested in the text that corresponds with the video by Peris and colleagues, implies a high risk of misjudgment, since the interventionalist may mistake any cross section of the needle with the needle tip.

In ultrasound-guided pleural-catheter placement, no skin marker should be used, since it may interfere with asepsis. Local anesthesia should be applied with the use of ultrasound guidance to precisely anesthetize the skin and the parietal pleura. Also, the parietal pleura should be punctured with the use of a pointed stylet to reduce trauma. In addition, permanent in-plane ultrasound guidance allows the interventionalist to safely puncture fluid collections smaller than 1.5 cm (e. g., in patients with a septated empyema). Finally, stepwise pleural drainage is mandatory to avoid expansion pulmonary edema.