

LIFE AFTER ULTRASOUND: Are We Speaking the Same (or a new) Language in Physical and Rehabilitation Medicine?

Interest in ultrasound (US) imaging and its utility in clinical practice among Physical and Rehabilitation Medicine (PRM) physicians is ever-increasing (1, 2). Similar to the development of new diagnostic and therapeutic skills, the use of US imaging provides a “new language” for our specialty.

Anatomically, we can now directly visualize different compartments and tissues of the musculoskeletal system. In contrast to classical knowledge, this provides better understanding of the condition of our patients (3). Now, the shape, thickness, length, and reciprocal relationships among nearby structures (which differ from person to person) are no longer the result of memory, but are a simple observation of the biological system. “Seeing is believing”, and factors that can be visualized can also be (semi)quantified (Fig. 1A) (4, 5).

In addition, visualization can be used for exploration of particular structures/pathologies in cases where surgery cannot be performed. For instance, an aberrant vessel inside an otherwise healthy nerve cannot be seen during surgery unless resection is performed. However, with US imaging this can conveniently and comparatively be done without harm to the patient (6). As such, we have started to talk about “virtual dissection”.

Secondly, real-time dynamic scanning provides a superior approach during patient examination. Observing the normal and pathological movements of a muscle, joint or tendon helps to integrate the com-

plex knowledge of biomechanical analysis with the clinical complaints (Video 1¹). A muscle herniating during contraction, a tendon/ligament being partially detached while moving, or a calcification impeding the joint motion, would definitely be explanatory enough when coupled with the onset of painful symptoms during assessment (Video 2¹) (7). At this stage, probe compression can also be used to precisely localize the pathology. Therefore, considering the fact that the US probe has become the “stethoscope” or the “sixth finger” of a physiatrist, we also speak about “sono-auscultation” or “sono-palpation”, “sono-Tinel” and “self-palpation” (Fig. 1B & C) (8).

Thirdly, the other useful philosophy pertaining to the utility of US in PRM is that once one is able to visualize a structure/pathology one can readily target it. Thus, the use of US-guidance for interventional physiatry has been increasing rapidly, and this issue also necessitates further terminologies (9). For instance, we are no longer discussing ordinary interventions, such as “shoulder injection” or “carpal tunnel injection”. In light of the initial US imaging (findings), we need to specify the details of the procedure; thus, we have started to use more descriptive wording, such as like “intralesional platelet-rich plasma injection for a

¹<https://doi.org/10.2340/16501977-2527>

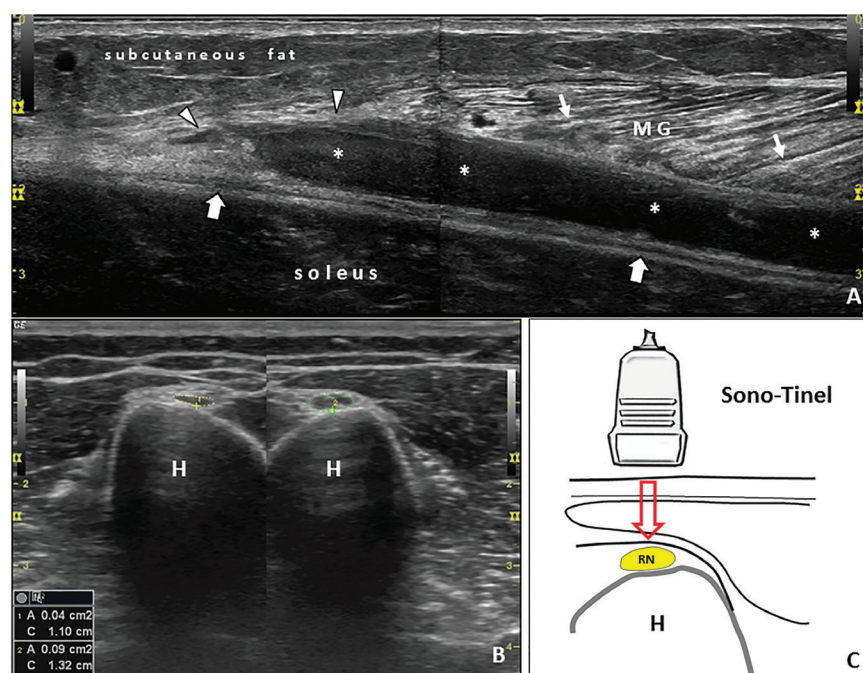


Fig. 1. (A) “Seeing the pathology after history-taking and physical examination”. Split-screen panoramic imaging of the calf shows a strain lesion at the myotendinous junction (arrowheads) of the medial head of the gastrocnemius muscle (GM); “tennis leg”. A widespread haematoma (asterisks) is seen between the layers of the intermuscular fascia (thick arrows). Note that the muscle fibres are relatively spread, i.e. with normal pennate architecture (thin arrows). (B) “Sono-palpation” and (C) “Sono-Tinel”. Using the probe for palpating on/nearby the painful area indisputably helps the physician “complete” the physical examination and provides further insight as regards the underlying problem. Yet, a positive “sono-palpation”, coupled with the presence of an abnormal ultrasonographic finding, is invaluable for precise diagnosis. In this comparative short-axis imaging (B), radial nerve cross-sectional area measurements are seen in exactly the area the patient described a positive “sono-Tinel” (C), i.e. pain or dysaesthesia on probe compression. The nerve is significantly swollen at the spiral groove level and the clinical diagnosis of “Saturday night palsy” is promptly confirmed. MG: medial gastrocnemius; H: humerus; RN: radial nerve.

bursal-side partial thickness incomplete tear of the supraspinatus tendon” or “hydrodissection of the median nerve from the flexor retinaculum using the ulnar-side in-plane approach”, respectively (Video 3¹). In short, for US-guided interventions, we need to clarify the exact lesion, the precise target and the prompt injectate and technique (10). This raises the question of whether we will still use the same (or a new) language after US has been widely welcomed into PRM.

REFERENCES

1. Imamura M, Özçakar L, Fregni F, Hsing WT, Battistella LR. Exploring a long-term global approach for musculoskeletal ultrasound training: WORLD-MUSCULUS. *J Rehabil Med* 2012; 44: 991–992.
2. Akkaya N, Ulaşlı AM, Özçakar L. Use of musculoskeletal ultrasound in clinical studies in physiatry: the “stethoscope” is also becoming the “pen”. *J Rehabil Med* 2013; 45: 701–702.
3. Malas FU, Kara M, Kaymak B, Akıncı A, Özçakar L. Ultrasonographic evaluation in symptomatic knee osteoarthritis: clinical and radiological correlation. *Int J Rheum Dis* 2014; 17: 536–540.
4. Tok F, Özçakar L, Safaz İ, Alaca R. Effects of botulinum toxin-A on the muscle architecture of stroke patients: an ultrasonographic study. *J Rehabil Med* 2011; 43: 1016–1019.
5. Ulug N, Yılmaz OT, Kara M, Özçakar L. Effects of pilates and yoga in patients with chronic neck pain: a sonographic study. *J Rehabil Med* 2018; 50: 80–85.
6. Ata AM, Onat ŞŞ, Özçakar L. Ultrasound imaging for diagnosis and follow-up of persistent median artery thrombosis. *Muscle Nerve* 2016; 53:152–154.
7. Dughbaj M, Shehab D, Özçakar L. Dynamic ultrasound imaging for quadriceps tendon impingement in a patient with anterior knee pain. *Pain Med* 2017; 18: 2047–2048.
8. Özçakar L, Ata AM, Kaymak B, Evans S, Kara M. One step further in ‘sono-palpatation’ during ultrasound imaging: ‘Self-palpatation’. *Pain Med* 2018; 19: 411.
9. Özçakar L, Onat ŞŞ, Gürçay E, Kara M. Are blind injections ethical or historical? Think twice with ultrasound imaging. *Am J Phys Med Rehabil* 2016; 95: 158–160.
10. Gürçay E, Ata AM, Özçakar L. Ultrasound-guided planar fascia injections: where are you putting the gas or steroids? *Pain Med* 2018 2018 Oct 4. doi: 10.1093/pm/pny190. [Epub ahead of print].

Accepted Jan 30, 2019; Epub ahead of print Feb 15, 2019

Levent Özçakar, MD¹ and Vincenzo Ricci, MD²

From the ¹Hacettepe University Medical School, Department of Physical and Rehabilitation Medicine, Ankara, Turkey and ²IRCCS Rizzoli Orthopaedic Institute, Department of Biomedical and Neuromotor Science, Physical and Rehabilitation

Medicine Unit, Bologna, Italy

E-mail: vincenzo.ricci58@gmail.com