Extracorporeal Shock Wave Therapy (ESWT) for Trigger Points: A Diagnostic and Therapeutic Approach

Kalika, Lev(1)*[drlevkalika@gmail.com];**Bubnov, Rostyslav**(2)[dr.rbubnov@gmail.com];
(1)New York Dynamic Neuromuscular Rehabilitation &Physical Therapy, Rehab, New York, USA;
(2)Clinical hospital `Pheophania`, Ultrasound, Kyiv, Ukraine

Background:

Introduction

Myofascial pain syndrome (MPS) is a common musculoskeletal condition characterized by the presence of myofascial trigger points (TrPs), which cause localized and referred pain. Ultrasound (US) imaging is the gold standard for diagnosing TrPs and guiding targeted interventions [1]. While ESWT is primarily used as a therapeutic modality for myofascial pain, its ability to provoke a characteristic pain response suggests potential diagnostic value [2,3]. Dry needling under US guidance (DN-US) is currently the most effective method for TrP inactivation [1,3], with local twitch response (LTR) serving as a key confirmation marker.

Objective:

This study aims to evaluate the effectiveness of ESWT in identifying TrPs and its correlation with US-confirmed diagnosis and treatment outcomes.

Material & Methods:

Twenty consecutive patients with clinically suspected TrPs underwent ESWT in a diagnostic mode, targeting areas identified through clinical examination and pain localization. **The diagnostic and therapeutic approach of Bubnov [1] was applied**, incorporating: *Clinical assessment – Movement restriction and palpation-guided pain localization. US evaluation – Real-time visualization of TrPs. ESWT testing – Delivered in a diagnostic mode to assess characteristic pain referral patterns. DN-US intervention – Performed for TrP inactivation, with LTR as a confirmation marker. Post-treatment US assessment – To verify muscle fiber improvements and confirm accurate TrP targeting.*

Technical Note on ESWT Energy Application

We used a Storz Medical focused DUOLITH SD1 T-TOP Ultra device, applying low-energy focused shock waves in the range of **0.07–0.12 mJ/mm²** for precision targeting.

Results:

ESWT-evoked pain patterns strongly correlated with clinically suspected TrPs and US-confirmed diagnoses. A distinct acute response and referred pain pattern were observed in TrPs exposed to ESWT. DN-US confirmed correct targeting through LTR, followed by significant clinical improvement. Post-treatment US imaging demonstrated a reduction in TrP size and improved muscle fiber structure (figure).

Low-energy ESWT was particularly effective in differentiating pain originating from facet joint arthrosis and in precisely projecting trigger points in the multifidus muscle attached near the facet joints. This supports previous findings that **paravertebral muscle TrPs adjacent to facet joint arthrosis are preferred interventional targets [7]**.

In contrast, higher-energy ESWT (>0.15 mJ/mm²) tended to evoke less specific responses, often activating pain in adjacent or non-related muscle groups.

Thus, **low-energy focused ESWT can serve both diagnostic and therapeutic roles**, enabling targeted identification of trigger points and avoiding nonspecific stimulation of surrounding tissues.

Standardized protocols integrating ESWT, US imaging, and DN-US interventions should be developed to enhance precision in myofascial pain management.

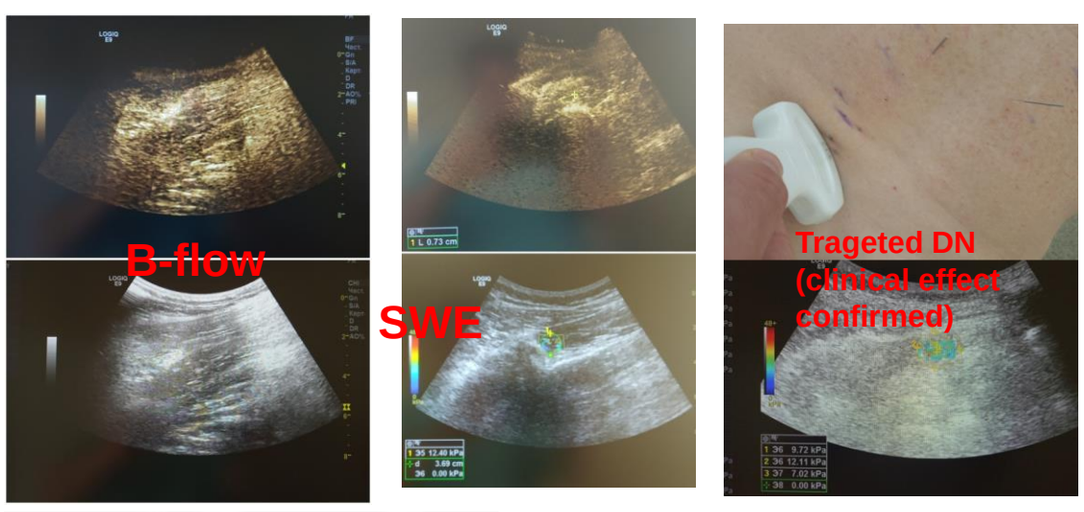
Method of validation[1] - Dry needling under ultrasound (US) guidance (DN-US)

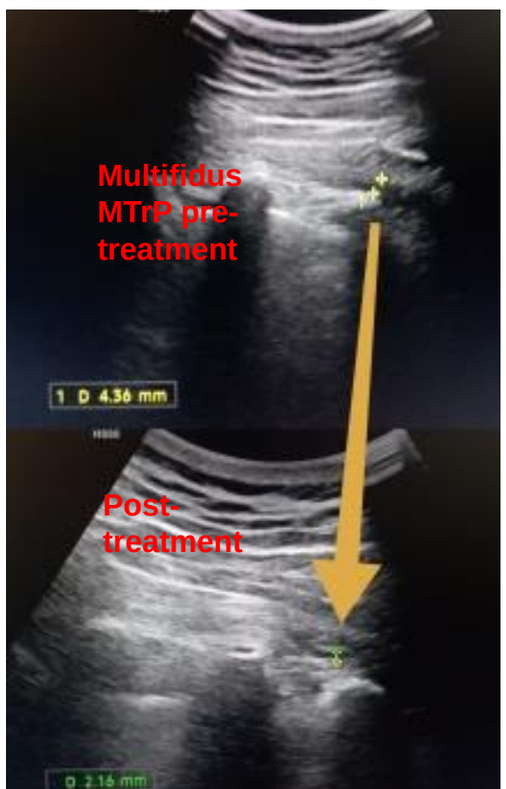
To perform dry needling under ultrasound guidance, several steps are involved:

1. The trigger point is identified by palpation - this means feeling for the tight or nodular area in the muscle that is causing the pain.
2. Other physical examination tests may be used to further confirm the location of the trigger point.
3. Once the trigger point is identified, an ultrasound is used to visualize the area in order to guide the placement of the acupuncture needle.
4. The acupuncture needle is inserted into the trigger point and held in place until a local twitch response is elicited, which can be a sign of the muscle relaxing.
5. After the needle is removed, the area is checked again with ultrasound to confirm that the trigger point has been successfully treated.
6. Pain levels are assessed before and after the procedure using a visual analog scale.

While this method can be effective for treating trigger points, it requires specialized equipment and training, and may not be necessary for all cases of trigger point pain.

Trigger points –
hypoechoic [1], hypovascularized [1,6], stiff [3]





Post-treatment US assessment. Acute LBP. Active, small-sized (2–5 mm), with strong Local Twitch Response (LTR) immediately inactivated by US-DN - size decreased from 4 to 2 mm. Immediate symptom relief and functional recovery

Conclusions –takeaway:

- Low-energy focused ESWT is precise in localizing TrPs.
- ESWT-evoked pain patterns correlate with US findings and DN-US confirmation.
- ESWT may serve as both a **diagnostic adjunct and therapeutic option** in myofascial pain.

References

1. Bubnov RV. *Evidence-based pain management: is* the concept of integrative medicine applicable? EPMA J. 2012;3(1):13. https://doi.org/10.1186/1878-5085-3-13
2. Kalika L, Bubnov R. *Targeted ultrasound-guided shockwave therapy of low back pain using focused, defocused, and radial shockwave.* Neuromodulation. 2022;25(7):S339. doi: 10.1016/j.neurom.2022.08.408.
3. Bubnov R, Kalika L. *Comparative study of dry needling under ultrasound guidance and extracorporeal shock wave therapy for myofascial pain and spasticity management.* Movement Disorders. 2019;34:S557.
4. Bubnov R. *Ultrasound-guided dry needling effects on the architecture of multifidus muscles in the lumbar region: A prospective study*. J Neurol Sci. 2023;455(suppl):122192. https://doi.org/10.1016/j.jns.2023.122192
5. Bubnov R, Kalika L. *Shear wave sonoelastography is effective in detecting myofascial trigger points and spasticity*. Movement disorders. 2020; 34(S1):1289.
6. Bubnov R. *Contrast-enhanced ultrasound evaluation of muscle trigger point vascularity: Clinical relevance and potential applications*. Journal of the Neurological Sciences 2023, 455(suppl):121964. https://doi.org/10.1016/j.jns.2023.121964
7. Bubnov R, Kalika L, Pilecki Z, et al. *PARAVERTEBRAL MUSCLES TRIGGER POINTS ATTACHED TO FACET JOINTS ARTHROSIS ARE PREFERRED TARGETS FOR ULTRASOUND-GUIDED INTERVENTION TO TREAT LOW BACK PAIN*. Annals of the Rheumatic Diseases 2023;82:2005. https://doi.org/10.1136/annrheumdis-2023-eular.13