Re: F Itza, D Zarza, J Salinas, F Teba, C Ximenez. Turn-amplitude analysis as a diagnostic test for myofascial syndrome in patients with chronic pelvic pain. Pain Res Manag 2015;20(2):96-100.

To the Editor:

We read the recent article by Itza et al (1) in the March/April issue of the *Journal* with great interest because it explored a very common clinical condition – myofascial pain syndrome (MPS). We agree with the authors that this condition can involve the presence of trigger points (TrPs); however, it remains to be established whether this condition is a 'regional pain neuromuscular disorder' or whether electromyography can diagnose it. The current literature does not (yet) provide sufficient evidence to support this claim. We also agree that there is no accepted gold standard test to confirm the presence of MPS.

With respect to the methodology of this particular study, the authors suggest that they are performing a validation study to establish turn-amplitude analysis (TAA) as a diagnostic test for MPS. However, there are several problems with this approach. First, because there is no accepted gold standard method for diagnosis against which to compare, demonstrating a difference between symptomatic and healthy controls may not be sufficient to establish the diagnostic utility of the test. A more convincing experimental design may be to measure the ability of the TAA to predict improvement in pain resulting from TrP-specific treatment.

Also, at present, making a diagnosis is challenging because there is no agreed on established method to clinically diagnose MPS. The number of criteria used in the literature (for research purposes) has changed over time, as described by Tough et al (2), Lucas et al (3) and Myburgh et al (4). Despite this, most clinicians agree that the following clinical criteria should be included: regional pain, taut band or TrP, and local twitch response. None of these were mentioned in the article by Itza et al (1). It would be quite difficult, clinically, to palpate for a taut band or TrP in the muscles the authors have cited as important for MPS causing chronic pelvic pain. For this reason, we propose the use of diagnostic musculoskeletal ultrasound to detect the presence of TrPs within the muscles of interest.

With regard to electrodiagnostic examinations, electromyography needle placement is of vital importance. The authors also do not describe their procedure for establishing needle placement within the suspect muscle. We suggest that this can be a source of potential significant error in the study results. Anatomical placement could be confirmed by musculoskeletal ultrasound in future studies. This is especially true for muscles, such as the levator ani, because landmarks for palpation-guided needle placement are limited. Also, test-retest reliability statistic would have also strengthened the study generalizability.

Another major issue is that the TAA test procedure can be technically challenging. Several questions arise from the article that make it difficult to reproduce the study. These include:

- How was the normal 'cloud' derived? This is muscle and age specific, and one cannot use a cloud from another muscle to apply to pelvic muscles.
- How long was the electromyography epoch used?
- What was defined as a turn (eg, 50 μV or 100 μV)?
- In Figure 3, the data collection is in an area of the graph with very high numbers of turns (ie, during strong contraction). Is the cloud valid in this area?
- How did the authors exclude electrical noise as a source of measurement?

We also believe that results of electromyograhic examination of the TrP by TAA remain questionable because there has been no reported study that provides pathophysiological correlation. We are unaware of other evidence pointing to a myopathic or neuropathic process within the TrP. Our review of the current literature does not provide any evidence for the presence of abnormalities within the motor unit itself or the recruitment pattern. Without the presence of a neurogenic or myopathic abnormality, one would not expect to observe an abnormality in the TAA. Therefore, the use of TAA for myofascial TrPs is questionable from a theoretical perspective.

Therefore, in conclusion, taking all of the above issues into consideration, we do not believe that there is yet sufficient evidence to suggest that TAA can be used as a diagnostic test for the detection of myofascial TrPs. A significant amount of further research is necessary in this clinically prevalent and important area of practice.

Dinesh Kumbhare MD MSc
Lawrence Robinson MD
Department of Medicine,
Division of Physical Medicine and Rehabilitation,
University of Toronto,
Toronto, Ontario

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The authors respond:

Dear colleagues:

First, thank you for your interest in our article. As everyone knows, when someone has a new idea or publishes new clinical research, it often generates some controversy.

Second, in response to your questions:

- How was the normal 'cloud' derived? This is muscle and age specific, and one cannot use a cloud from another muscle to apply to pelvic muscles.

The standard criteria has been described to interpret a normal 'cloud' to each body muscle and, of course, you can apply the same criteria to the pelvic muscles (1-3).

- How long was the electromyography epoch used?

It took 60 s to obtain the cloud.

- What was defined as a turn (eg, 50 μV or 100 μV)?

100 μV was used to define a turn.

- In Figure 3, the data collection is in an area of the graph with very high numbers of turns (ie, during strong contraction). Is the cloud valid in this area?

Of course, the cloud is valid in this area, but we did not ask patients for a strong contraction, on the contrary, we asked them to remain relaxed during the test.

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- How did the authors exclude electrical noise as a source of measurement?

The electromyographic signal that originates in the muscle is inevitably contaminated by various noise signals or artifacts. However, modern technology is substantially immune to some of these noises. These noise sources have frequency spectra that contaminate the low-frequency part of the electromyography frequency spectrum. There are many factors that must be taken into consideration when determining the appropriate filter specifications to remove these artifacts (4). In our study, we used two filters: a low-frequency filter (0.1 Hz) and a high-frequency filter (2 Hz).

Third, with respect to the methodology of our study, it is known that there is no gold standard, but we are seeking a way to achieve one. After deep reflection, we chose a case-control design. Of course, this type of design, like others, can have some bias and limitations (5,6).

Additionally, myofascial pain syndrome has been defined by Simons et al (7) as a regional pain syndrome characterized by muscle pain caused by myofascial TrPs (8). We have found several significative articles in the medical literature discussing this interesting topic.

Conversely, in our study, the electrical muscular activity was analyzed depending on different patterns (normal, myofascial and neuropathic), but not the specific diagnosis of the TrPs. However, we were not discussing clinical criteria; we were discussing neurophysiological findings (9,10).

Similarily, we would agree that ultrasound is useful for detecting the presence of TrPs within the muscles of interest, but we prefer using sonoelastography to detect them; however, this was not the objective of our study (11).

In regard to electromyography needle placement or insertion, it is not a problem for a clinical neurophysiologist expert. It is a basic procedure. There is a great atlas in which this procedure is well explained. This book is an anatomical guide for students and practitioners for electromyography, including neurologists and rehabilitation specialists. Photographs of each muscle in healthy subjects are displayed to enable the practitioner to identify the optimum site of electromyography needle insertion (12).

The test-retest, mentioned by our colleagues, would not have been necessarily useful in our study. The test-retest method assesses the external consistency of a test. Examples of appropriate tests include questionnaires and psychometric tests. This test-retest is particularly helpful in psychology and psychiatry fields. A typical assessment would involve giving participants the same test on two separate occasions. If the same or similar results are obtained, external reliability is established. A disadvantage of the test-retest method is that it takes a long time for results to be obtained (13).

In conclusion, it is a great opportunity to have a new tool to obtain accurate diagnoses in myofascial pain syndromes, especially in the pelvic floor; however, as previously mentioned "further studies are needed to confirm and reproduce these results".

Fernando Itza PhD
Pelvic Pain Clinic

Daniel Zarza PhD
The Cemtro Clinic, Neurophysiology Unit

Jesus Salinas PhD
San Carlos University Hospital, Urology Unit

Fernando Teba PhD
La Princesa University Hospital, Urology Unit

Carmen Ximenez PhD
College of Psychology at the Autonomous University of Madrid, Department of Biostatistics, Madrid, Spain

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