

# Interrater Reliability in the Clinical Evaluation of Myofascial Trigger Points in Three Ankle Muscles

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## ABSTRACT

**Objective:** The purpose of this study was to evaluate interrater reliability in the diagnosis of myofascial trigger points (MTrPs) in the tibialis anterior, peroneus brevis, and extensor digitorum longus muscles.

**Methods:** A reliability research study was performed. Three physical therapists with clinical experience in myofascial pain functioned as raters and randomly and bilaterally evaluated the ankles of 40 subjects in the Madrid public health care system. The absence or presence of MTrPs, nodules in taut bands, patterns of referred pain, local twitch response (LTR), and jump-sign were evaluated.

**Results:** We calculated the pairwise interrater agreement and  $\kappa$ -value concordance of the presence or absence of trigger points (55%-85%;  $\kappa = 0.12$ -0.60), palpable nodules in taut bands (63%-90%;  $\kappa = 0.24$ -0.60), referred pain (63%-85%;  $\kappa = 0.20$ -0.54), and jump sign (62%-89%;  $\kappa = 0.15$ -0.72) in the 3 studied muscles. The LTR could only be evaluated in the tibialis anterior (43%-70%;  $\kappa = 0.05$ -0.21), and evaluation was not possible for the other muscles.

**Conclusions:** Three blinded raters were able to reach acceptable pairwise interrater agreement (percentage of agreement value  $\geq 70\%$ ) for the presence or absence of MTrPs and LTR in the tibialis anterior, as well as for nodules in taut bands, referred pain, and the jump sign for the extensor digitorum longus. The peroneus brevis showed a wide percentage of agreement value, ranging from 31% to 82%. The results of this study showed that expert raters can agree, with slight-to-moderate concordance, with regard to the clinical testing of muscle trigger points by direct palpation of the 3 muscles studied: the tibialis anterior, the extensor digitorum longus, and the peroneus brevis. Interrater reliability seems to be muscle dependent, especially with regard to the depth of the muscle. (*J Manipulative Physiol Ther* 2016;39:623-634)

**Key Indexing Terms:** *Myofascial Pain Syndromes; Trigger Points; Musculoskeletal Pain; Reproducibility of Results; Ankle; Lower Extremity*

## INTRODUCTION

Based on previous studies investigating myofascial pain in the upper extremity, trigger point diagnosis has shown good interrater reliability in shoulder pain. Lower limb pathologies, such as ankle and foot pain, are common in modern industrial

countries. Currently, approximately 8% of musculoskeletal pain consultations by general practitioners are related to foot and ankle problems.<sup>2</sup>

Indeed, painful lower extremity conditions include a high prevalence of myofascial trigger points (MTrPs).<sup>3,4</sup> Based on referred pain patterns, MTrPs may cause myofascial pain in the

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foot and contribute to foot and ankle complaints. Myofascial trigger points are hyperirritable spots near muscle motor endplate regions and innervation zones that are associated with palpable nodules located along taut bands of muscle tissue. They are related to sensory, motor, and autonomic conditions.<sup>5-8</sup>

Depending on pain recognition, there are two types of MTrPs.<sup>5-15</sup> In the first type, active MTrPs are related to spontaneous and continuous pain over time.<sup>9</sup> In the second type, latent MTrPs do not induce this spontaneous and continuous pain but may produce local or referred pain when direct pressure is applied to this point. They may also limit range of motion, as well as cause agonistic, antagonistic, and synergistic motor recruitment pattern alterations.<sup>10-15</sup> Nevertheless, both types show differences on electromyography, biochemistry, ultrasonography, thermography, and magnetic resonance elastography.<sup>16-21</sup>

Furthermore, allodynia, hyperalgesia, and referred pain from active and latent MTrPs might indicate an increase in the synaptic efficacy of central nervous system connections.<sup>22</sup> The intensity of MTrP pain and the referred pain pattern is described as being remote from the anatomical place of origin. A previous study established that referred pain may be elicited by palpation or dry needling in 53.9% of MTrPs.<sup>23</sup> For the exact location and regions near the MTrPs, referred pain is an appropriate and reliable sign to indicate active rather than latent MTrPs.<sup>24</sup>

Despite the lack of an MTrP gold standard and the wide variability of diagnostic criteria, palpation by clinicians is a frequently used method to diagnose myofascial pain in both clinical practice and research studies.<sup>25-27</sup> With regard to the diagnosis of myofascial pain syndrome, most reliable diagnostic procedures to determine MTrPs are identification of a taut band at the pincer or snapping palpation of a point of maximal tenderness at finger palpation within the band and reproduction of spontaneous pain.<sup>25</sup> The application of dry needling at MTrPs after identifying their location by manual palpation, compared with dry needling outside of MTrPs in the same muscle, alleviates pain and improves functionality.<sup>28</sup>

Hence, information on the intra- and interrater reliability of MTrP palpation techniques is important with regard to the inclusion of myofascial pain as a reliable clinical diagnosis. Published clinical trials have reported wide reliability, at a moderate to good level, in testing different body segments through MTrP palpation.<sup>29-35</sup> The intrarater (95% confidence interval 0.30-0.91) and interrater ( $\kappa = 0.63$ ) reliability of experienced physiotherapists in locating MTrPs have shown a moderate-to-high correlation.<sup>36,37</sup> However, high-quality methodologic studies are needed to establish the reliability of manual trigger point palpation in new locations and conditions.<sup>38</sup>

Currently, studies on leg MTrPs with regard to prevalence and the reliability of diagnostic palpation criteria have increased.<sup>3,4</sup> On the one hand, latent MTrPs are frequent in the triceps surae (13%-30%), and for each specific diagnostic criterion, taut bands are most common in the right gastrocnemius medialis (81%), and tender spots are most

common in the left gastrocnemius medialis (52%). A local twitch response (LTR; 0.5%) was only found in the left gastrocnemius medialis.<sup>4</sup> A lower medial longitudinal arch is linked with a higher prevalence of latent MTrPs in the flexor digitorum longus, tibialis anterior, and vastus medialis, making the intrarater reliability of taut bands and tender spots the most reliable diagnostic criterion.<sup>3</sup>

Indeed, dry needling in MTrPs may positively affect their relationship to ankle conditions.<sup>39,40</sup> Dry needling in the lateral peroneus MTrPs, combined with a proprioceptive/strengthening exercise program, alleviates pain and improves function 1 month after treatment in participants with ankle instability.<sup>39</sup> Dry needling may also be an effective treatment for plantar heel pain.<sup>40</sup>

Thus, the main reasons for the current research study are the lack of interrater reliability studies on lower limb muscles, especially with regard to ankle pain; the societal impact of ankle and foot pain, which compose 8% of musculoskeletal complaints; and myofascial pain syndrome association.<sup>2-4,39,40</sup> The aim of the study was to investigate the interrater reliability of diagnosing the presence of MTrPs and to analyze each criterion proposed by Bron et al.<sup>1</sup> in 3 lower limb muscles (the tibialis anterior, the peroneus brevis, and the extensor digitorum longus), which were selected because of their referred pain pattern in the ankle.<sup>5,39</sup>

## METHODS

### Subjects

After referral by their physician, patients were recruited to a physical therapy unit of the Madrid public health care system (SERMAS; Colmenar Viejo, Madrid, Spain). Inclusion criteria were unilateral or bilateral chronic ankle referred pain for more than 6 months and age between 18 and 75 years. We accepted participants without ankle pain (participants with other conditions different from the exclusion criteria were recruited from the health care system) in an attempt to control rater bias. On the basis of a prior study on interexaminer reliability, the sample size was determined to be 40 subjects.<sup>1</sup>

Exclusion criteria were the presence of rheumatologic, neurologic, metabolic, or internal diseases, as well as acute disease criteria, such as sprains, radiculopathy, and recent foot or ankle trauma (<1 month recent acute injury).<sup>1</sup> Participants in this trial were unacquainted with the raters (were not previous or current patients). An explanation of the study was given to all participants, and they subsequently signed consent forms.

The study was approved by the Research and Ethics Committee of the Universidad da Coruña, Spain (file number CE 06/2014). All parents and/or legal guardians gave their informed consent for the minors included in the study. Ethical standards in human experimentation contained in the WMA Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine, the UNESCO Universal Declaration on the Human Genome and Human Rights, and those of the relevant national bodies and institutions were observed at all times.

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