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## MANUAL THERAPY

# Cross friction algometry (CFA): Comparison of pressure pain thresholds between patients with chronic non-specific low back pain and healthy subjects



Andre Farasyn, PhD PT DO\*, Bert Lassat, MSc PT

Vrije Universiteit Brussel (VUB), Faculty of Physical Education & Rehabilitation Sciences, Laarbeeklaan 103, BE 1090 Brussels, Belgium

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### KEYWORDS

Algometry;  
Cross-friction  
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**Summary** Palpation is widely used to assess muscular sensitivity in clinical settings but still remains a subjective evaluation. This cross-sectional study assessed a newly developed cross-friction algometry making palpation measurable. The objective was to investigate the reliability of pressure pain thresholds obtained using Cross-Friction Algometry (CFA-PPTs) measured at the level of Erector spinae and Gluteus maximus central muscle parts, and to compare the CFA-PPTs between patients with chronic nonspecific low back pain (nCLBP) and matching healthy subjects.

**Participants:** Patients presenting nCLBP to GP's and send into a Pain Center and healthy subjects recruited via university ad valvas & flyers distribution.

**Outcome measures:** 30 patients with nCLBP were measured for cross-friction algometry. Other evaluations consisted of the Visual Analogue Scale (VAS) and the Oswestry Disability Index (ODI).

**Results:** The inter- and intra-reliability were tested and found to be sufficient. The mean CFA-PPT values of the Erector spinae at levels T8, T10, L1 & L3 and the Gluteus maximus of the nCLBP group were significantly lower ( $p \leq 0.001$ ) when compared to the CFA-PPT values of the healthy group. The greatest difference (–58%) was found at L1 Erector spinae level and at the superior part of the Gluteus maximus measuring point (–59%). Within the group of patients with nCLBP it was surprising to notice that there was no significant correlation between all the reference points measured using CFA-PPTs and the outcomes of the VAS and ODI scores.

**Conclusions:** With the aid of CFA, the importance of local muscular disorder in the lumbar part of the Erector spinae and Gluteus maximus in patients with nCLBP is obviously demonstrated, but also reveals the very large inter-individual differences in muscular fibrosis sensitivity and/

\* Corresponding author. Tel.: +32 2 447 45 29.

E-mail address: [andre.farasyn@vub.ac.be](mailto:andre.farasyn@vub.ac.be) (A. Farasyn).

or pain behavior in daily life. This possibly re-opens the debate on which influences can be put forward as the most important: the central or the peripheral sensitization system.

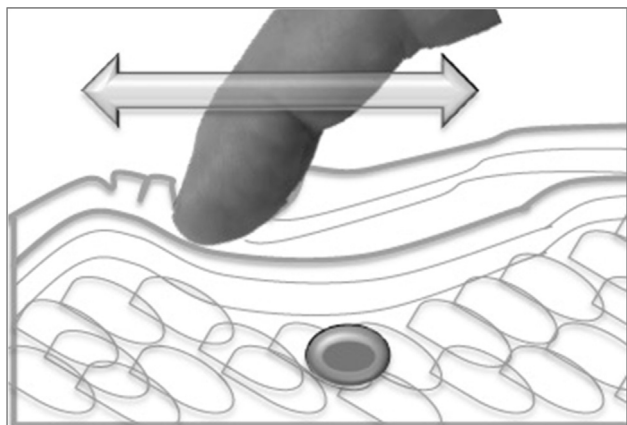
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## Introduction

Myofascial trigger points, also known simply as trigger points (TrPts), are described as hyperirritable spots in the fascia surrounding skeletal muscle. They are associated with palpable nodules in taut bands of muscle fibers (Travell and Simons, 1999). A latent trigger point does not cause spontaneous pain, but may restrict movement or cause muscle weakness. The patient presenting with muscle restrictions or weakness may become aware of pain originating from a latent trigger point only when pressure is applied directly over the point (Bron and Dommerholt, 2012; Gerwin, 2014). Frequently, specific palpation techniques are used to elicit pain by manual pressure on affected anatomical structures such as muscles. These maneuvers are important for diagnostic clinical reasoning and manual treatments. There are only a few laboratory or imaging tests available that can confirm the presence of a TrPt (Mense, 1993; Dommerholt et al., 2015). The latter are clinically identified through either a flat palpation technique in which a clinician applies finger or thumb pressure to the muscle against underlying muscle hardenings or cross-friction palpation technique in which a particular muscle is palpated (Travell and Simons, 1999; Gerwin, 2014) (Fig. 1).

In general, (standard) perpendicular pressure algometry has been found to be efficient and reliable in the exploration of physio-pathological mechanisms involved in muscle pain syndromes such as Fibromyalgia (FMS) and Myofascial pain syndromes (MPS) (Fischer, 1997, 1998; Vanderweeen et al., 1998; Giesbrecht and Battie, 2005).

The combination of cross-friction palpation and using a pressure algometer, give us the opportunity to develop a new method of cross-friction algometry (CFA). It was introduced in clinical examination on one hand to measure



**Figure 1** Cross-friction palpation technique in which a particular muscle nodule is palpated with a finger.

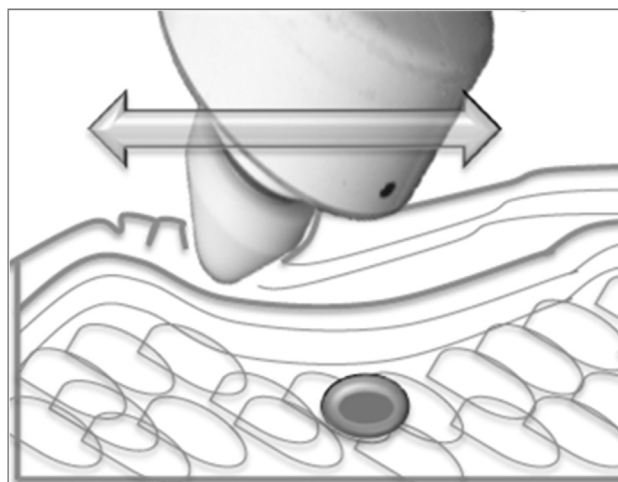
the pressure pain threshold (PPT) of a found TrPt in a muscle (Fig. 2) (Mense, 1993; Pöntinen, 1998; Farasyn and Meeusen, 2003) and on the other hand, to measure the PPT provoking an area of referred pain through CFA executed on a superficial sensitive nerve entrapped in nodular thickenings of a muscle (Farasyn et al., 2008).

Normally, non-specific low back pain (nLBP) or “simple backache” is defined as a LBP that is not attributed to any recognizable pathology like nerve root pain and serious spinal pathologies such as an infection, tumor, osteoporosis, rheumatoid arthritis, fracture, or inflammation. In other words, nLBP is a diagnosis of exclusion (Oostendorp et al., 2004; Verkerk et al., 2015; Koes et al., 2010). Some studies focus mainly on the imaging and neurophysiological aspects, other studies more on psycho-social aspects of nCLBP (Hallegraeff et al., 2012; Froud et al., 2014; Miedema et al., 2014). Important quantitative data on the effect of echography, postural control and the electromyographic (EMG) activity of trunk muscles are available which have some sensitivity with respect to nCLBP status (Danneels et al., 2000; Dankaerts et al., 2006; Mazis, 2014; Miura and Sakuraba, 2014; Van Damme et al., 2014).

The aim of this cross-sectional study was to evaluate this new algometric method of cross-friction algometry by verifying the reliability and making a comparison of CFA-PPTs measured on the Erector spinae and Gluteus maximus muscles, between patients with nCLBP and healthy subjects.

## Materials and methods

Patients were identified as subjects with nCLBP by GPs and sent consecutively to a Myopain Center Ghent, and healthy



**Figure 2** Cross-friction palpation technique in which a particular muscle nodule is palpated with the aid of an electric algometer (Gilles & Penny, U.K.).

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