

Original article

Myofascial trigger points in subjects presenting with mechanical neck pain: A blinded, controlled study

C. Fernández-de-las-Peñas*, C. Alonso-Blanco, J.C. Miangolarra

Department of Physical Therapy, Occupational Therapy, Physical Medicine and Rehabilitation, Universidad Rey Juan Carlos (URJC), Alcorcón, Spain

Received 12 November 2004; received in revised form 4 January 2006; accepted 3 February 2006

Abstract

The aim of this study was to describe the differences in the presence of myofascial trigger points (TrPs) in the upper trapezius, sternocleidomastoid, levator scapulae and suboccipital muscles between patients presenting with mechanical neck pain and control healthy subjects. Twenty subjects with mechanical neck pain and 20 matched healthy controls participated in this study. TrPs were identified, by an assessor blinded to the subjects' condition, when there was a hypersensible tender spot in a palpable taut band, local twitch response elicited by the snapping palpation of the taut band, and reproduction of the referred pain typical of each TrP. The mean number of TrPs present on each neck pain patient was 4.3 (SD: 0.9), of which 2.5 (SD: 1.3) were latent and 1.8 (SD: 0.8) were active TrPs. Control subjects also exhibited TrPs (mean: 2; SD: 0.8). All were latent TrPs. Differences in the number of TrPs between both study groups were significant for active TrPs ($P < 0.001$), but not for latent TrPs ($P > 0.5$). Moreover, differences in the distribution of TrPs within the analysed cervical muscles were also significant ($P < 0.01$) for all muscles except for both levator scapulae. All the examined muscles evoked referred pain patterns contributing to patients' symptoms. Active TrPs were more frequent in patients presenting with mechanical neck pain than in healthy subjects.

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Keywords: Mechanical neck pain; Myofascial trigger points; Myofascial pain; Blinded controlled study

1. Background

Mechanical neck pain affects 45–54% of the general population at some time during their lives and can result in severe disability (Côté et al., 1998). The exact pathology of mechanical neck pain is not clearly understood and has been purported to be related to various anatomical structures including, uncovertebral or intervertebral joints, neural tissues, discs, muscular disorders and ligaments (Simons et al., 1999; Maitland et al., 2000). Different authors often assume that mechanical neck pain is associated with muscular, joint

and neural impairments (Simons et al., 1999; Maitland et al., 2000). Soft tissue therapies and spinal manipulation/mobilization are manual therapies commonly used in the management of mechanical neck pain and associated impairments (Gross et al., 2002).

Simons et al. (1999) have claimed that myofascial trigger points (TrPs) from neck and shoulder muscles might play an important role in the genesis of mechanical neck pain. There are epidemiological studies suggesting that TrPs represent an important source of musculoskeletal disorder (Chaiamnuay et al., 1998). A TrP is a hyperirritable spot within a palpable taut band of a skeletal muscle that is painful on compression, stretch or overload of the affected tissues and that can give rise to a typical referred pain pattern (Simons et al., 1999). TrPs are typically located by the following physical examination findings: presence of a palpable taut band in a skeletal muscle, tender spot within the

*Corresponding author. César Fernández de las Peñas, Facultad de Ciencias de la Salud, Universidad Rey Juan Carlos, Avenida de Atenas s/n, 28922 Alcorcón Madrid, Spain. Tel.: + 34 91 488 88 84; fax: + 34 91 488 89 57.

E-mail addresses: cesarfdlp@yahoo.es, cesar.fernandez@urjc.es (C. Fernández-de-las-Peñas).

taut band, local twitch response provoked by snapping palpation of the TrP, and referred pain pattern (Simons et al., 1999). The formation of TrPs may result from a variety of factors, such as severe trauma, overuse, mechanical overload or psychological stress (Simons et al., 1999). Recent studies have hypothesized that the pathogenesis of TrPs results from injured or overloaded muscle fibres. This leads to involuntary shortening, loss of oxygen supply, loss of nutrient supply and increased metabolic demand on local tissues (Mense et al., 2000).

Although previous studies have investigated the prevalence of TrPs in benign chronic headaches (Jaeger, 1989; Marcus et al., 1999), we were unable to locate any study in the peer-reviewed literature analysing the prevalence of TrPs in the cervical musculature (levator scapulae, sternocleidomastoid, upper trapezius muscle). These TrPs have the potential to refer pain contributing to neck and shoulder symptoms in patients presenting with mechanical neck pain. Our aim was to describe the differences in the presence of TrPs in the upper trapezius, sternocleidomastoid, levator scapulae and suboccipital muscles between subjects with mechanical neck pain and healthy controls. In addition, we examined the possible correlation in the presence of TrPs among the aforementioned muscles.

2. Material and methods

2.1. Subjects

Twenty subjects presenting with mechanical neck pain for at least 4 months and 20 healthy age- and sex-matched controls without neck pain during the prior 6 months participated in this study from January to September of 2004. For the purpose of this study, mechanical neck pain was defined as generalized neck and/or shoulder pain with mechanical characteristics including: symptoms provoked by maintained neck postures or by movement, or by palpation of the cervical muscles. Patients were excluded if they exhibited any of the following: (1) diagnosis of fibromyalgia syndrome according to the American College of Rheumatology (Wolfe et al., 1990); (2) previous history of a whiplash injury; (3) history of cervical spine surgery; (4) diagnosis of cervical radiculopathy or myelopathy determined by their primary care physician; or (5) therapeutic intervention for myofascial pain within the past month before the study. The health status of all patients was clinically stable, without current symptoms of any other concomitant chronic disease. The clinical history for each patient was solicited from their primary care physician to assess the exclusion criteria and to check the presence of “red flags”, i.e. infection, malignancy. Subjects with neck pain were examined on days in which the

neck pain intensity was less than four points on a 10-cm horizontal visual analogue scale. This study was supervised by the Department of Physical Therapy, Occupational Therapy, Physical Medicine and Rehabilitation of the Universidad Rey Juan Carlos. The research project was approved by the local human research committee of the Universidad Rey Juan Carlos. All subjects signed an informed consent prior to their inclusion.

2.2. Procedure

Subjects were examined for TrPs by an assessor who had more than 4 years experience in TrPs diagnosis, and who was blinded to the subjects' condition. The diagnosis of the TrP was performed following the latter five diagnostic criteria described by Simons et al. (1999) and by Gerwin et al. (1997): (1) presence of a palpable taut band in a skeletal muscle; (2) presence of a hypersensible tender spot in the taut band; (3) local twitch response elicited by the snapping palpation of the taut band; (4) reproduction of the typical referred pain pattern of the TrP in response to compression; and (5) spontaneous presence of the typical referred pain pattern and/or patient recognition of the referred pain as familiar. If the first four criteria were satisfied the TrP was considered to be latent. If all of the aforementioned criteria were present the TrP was considered to be active (Gerwin et al., 1997; Simons et al., 1999). Tender points were also diagnosed when subjects reported local tenderness but they did not report referred pain to compression and/or overload of the affected tissues, so minimum criteria for TrP diagnosis were not fulfilled (Gerwin et al., 1997; Simons et al., 1999).

In criteria four and five, pressure on the TrP was assessed using a Pressure Threshold Meter (PTM). The assessor applied continuous pressure approximately at a rate of 1 kg/cm²/seg until 2.5 kg/cm². A PTM distributed by “Pain Diagnosis and Rehabilitation” commercial home (233 East Shore Road, Suite 108, Great Neck, New York 11023) was used in this study. The PTM consists on a rubber disk with 1 cm² surface. The rubber disk is connected to a pressure pole inserting into a gauge which records pressure in kilograms (kg). Pressure measurements are expressed in kg/cm². The range of pressure is between 0 and 10 kg/cm² recording values each 0.1 kg. Previous papers reported an intra-examiner (I.C.C.) reliability of the PTM ranging from 0.6 to 0.97, and an inter-examiner reliability (I.C.C.) ranging from 0.4 to 0.98 (Takala, 1990; Levoska, 1993). Pressure thresholds lower than 3 kg, are considered abnormal (Fischer, 1996). Fig. 1 details the location and the referred pain patterns evoked by TrPs in the examined cervical muscles based on the comprehensive research performed by Simons et al. (1999).

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