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Original research

Analysis of chronic myofascial pain in the upper trapezius muscle of breast cancer survivors and women with neck pain

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ABSTRACT

Myofascial trigger points are present in dysfunctioning muscles and are associated with several diseases. However, the scientific literature has not established whether myofascial trigger points of differing etiologies have the same clinical characteristics. Thus, the objective of the present study was to compare the intensity of myofascial pain, catastrophizing, and the pressure pain threshold at myofascial trigger points among breast cancer survivors and women with neck pain. This was a cross-sectional study that included women over 18 years old complaining of myofascial pain in the upper trapezius muscle region for more than 90 days, equally divided into breast cancer survivors ($n = 30$) and those with neck pain ($n = 30$). For inclusion, the presence of a bilateral, active, and centrally located trigger point with mean distance from C7 to acromion in the upper trapezius was mandatory. The measures of assessment were: pain intensity, catastrophizing, and the pressure pain threshold at the myofascial trigger points. A significant difference was observed only when comparing pain intensity ($p < 0.001$) between the breast cancer survivors (median score: 8.00 points, first quartile: 7.00 points, third quartile: 8.75 points) and women with neck pain (median score: 2.50 points, first quartile: 2.00 points, third quartile: 4.00 points). No significant difference was found between groups in catastrophizing and pressure pain threshold. The conclusion of this study was that breast cancer survivors have a higher intensity of myofascial pain in the upper trapezius muscle when compared to patients with neck pain, which indicates the need for evaluation and a specific intervention for the myofascial dysfunction of these women.

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1. Introduction

Myofascial trigger points are pathological structures present in skeletal muscles and are related to sensory, motor, and autonomic changes (Bron and Dommerholt, 2012). They are defined as palpable nodules located in the taut band of a muscle. They also produce local and referred pain and may be active or latent (Ge and Arendt-Nielsen, 2011; Bron and Dommerholt, 2012). Moreover, metabolic (Larsson et al., 2008), vascular (Larsson et al., 1999), and

electromyographic changes (Zakharova-Luneva et al., 2012) can also be observed in these dysfunctioning tissues.

In pathophysiological terms, it is hypothesised that there is a metabolic impairment in this clinical condition, because the increase in muscular activity produces an increase in intramuscular pressure with subsequent mechanical compression of the blood vessels in the muscle; because of this, a series of cascading events are thought to occur, such as a reduction in the supply of oxygen and glucose, ineffective aerobic metabolism, activation of anaerobic metabolism for the formation of adenosine triphosphate, the buildup of lactic acid, a reduction in intramuscular hydrogenionic potential, a reduction in acetylcholinesterase activity and increased acetylcholine action, an increase in the concentration of intracellular calcium, stronger interactions between actin and myosin,

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inflammation, and muscle damage (Bron and Dommerholt, 2012; Moraska et al., 2013).

Myofascial trigger points are present in dysfunctioning muscles and are associated with several conditions such as temporomandibular disorder (Fernández-de-Las-Peñas et al., 2010), lower back pain (Iglesias-González et al., 2013), shoulder impingement syndrome (Delgado-Gil et al., 2015), and migraine (Tali et al., 2014), even affecting individuals with neck pain (Dibai-Filho et al., 2015) and breast cancer survivors (Cantarero-Villanueva et al., 2012). However, the scientific literature has not established whether myofascial trigger points from different underlying diseases have the same clinical characteristics.

The hypothesis of the present study is that the myofascial pain in breast cancer survivors produce more intense symptoms than in women with neck pain, due to a greater severity of disease and extent of the injury caused by the surgical and adjuvant treatment to which breast cancer survivors are subjected; the clinical approach commonly used for the treatment of these patients is based on surgical procedures that involve the muscles of the thorax, mainly the pectoralis major and minor. Moreover, depending on the aggressiveness of the neoplasia, local and systemic treatments such as radiotherapy and chemotherapy may be instituted (Cheville and Tchou, 2007). Given the above, the objective of the present study was to compare the intensity of myofascial pain, catastrophizing, and the pressure pain threshold at myofascial trigger points among breast cancer survivors and women with neck pain.

2. Methods

2.1. Research setup

This was a cross-sectional study in which a physiotherapist was responsible for recruiting patients, determining eligibility, diagnosing the myofascial trigger points, and performing pressure pain threshold evaluation. Another physiotherapist evaluated the pain intensity and catastrophizing. A third physiotherapist carried out data processing and analysis.

2.2. Ethical aspects and recruitment

The study was approved by the Research Ethics Committee of the Clinics Hospital of the Medical School of Ribeirão Preto of the University of São Paulo, under opinion number 475918/2013. The recruitment of neck pain subjects to participate of this study occurred through verbal invitation and publicity, using posters, radio, and social media. Breast cancer survivors were verbally invited, or contacted through phone calls from the Center of Teaching, Research, and Care for the Rehabilitation of Mastectomized Women of the Ribeirão Preto School of Nursing at the University of São Paulo (SP, Brazil). All volunteers validated their participation in the study by signing a consent form.

The recruitment of women with neck pain took place in the city of Ribeirão Preto (SP, Brazil). Subjects were over 18 years old, complained of myofascial pain in the cervical region for more than 90 days (Walker et al., 2008), and had a score in the Neck Disability Index (NDI) of ≥ 5 points (Vernon and Mior, 1991; Cook et al., 2006). The exclusion criteria used in this study were as follows: history of head, face, or neck surgery; trauma in the neck, cervical disc herniation, or degenerative diseases of the spine; physical therapy in the previous three months; use of an analgesic, anti-inflammatory, or muscle relaxant in the previous week; the presence of systemic diseases; or a medical diagnosis of fibromyalgia.

The breast cancer survivors included women were those who were receiving follow up at the Center of Teaching, Research, and

Care for the Rehabilitation of Mastectomized Women, who were over 18 years old and complaining of myofascial pain in the upper trapezius muscle region for more than 90 days. The patients had previously undergone treatment for breast cancer (surgery, chemotherapy, and/or radiation therapy) that was completed at least six months prior. In addition to the criteria for exclusion from the group with neck pain, the presence of metastasis or recurrence of breast cancer and bilateral mastectomy were also added.

2.3. Diagnosis of the myofascial trigger points

In addition to the above eligibility criteria, both the women with neck pain and the breast cancer survivors had to have an active myofascial trigger point in the upper trapezius muscle, located at a mean distance from C7 to the acromion and diagnosed according to the criteria established by Simons et al. (1999) and Gerwin et al. (1997): the presence of a taut band in the skeletal muscle, the presence of a hypersensitive point within the taut band, local contraction in response to palpation of the taut band, and reproduction of the referred pain due to compression of up to 2.5 kg/cm² on the trigger point (Ziaiefar et al., 2014). It should be pointed out that these diagnostic criteria for the myofascial trigger points have acceptable levels of reliability, with kappa values of 0.36–0.88 (Gerwin et al., 1997). The physiotherapist responsible for the diagnosis of the myofascial trigger points had eight years of experience with myofascial pain at that time and had received previous training, for a period of three months, with the tools employed in the present study.

2.4. Assessment procedures

The sample was evaluated in a reserved room conducted by a physiotherapist and the assessments were carried out in person using hard copy.

2.5. Numeric Rating Scale (NRS)

This is a simple scale, of easy measurement, and validated for the Portuguese language (Ferreira-Valente et al., 2011). It consists of a sequence of numbers, 0 to 10, in which the value 0 represents “no pain” and the numeral 10 represents “worst pain imaginable.” In this way, the volunteers rated their pain intensity in the upper trapezius muscle region based on these parameters.

2.6. Pain-Related Self-Statement Scale (PRSS)

This scale was used to evaluate the catastrophic thoughts based on cognitive concepts and automatic thoughts present in individuals with chronic pain, which was developed by Flor et al. (1993) and adapted and validated for the Brazilian population by Sardá Junior et al. (2008). The scale consists of nine items, rated by a Likert scale ranging from 0 to 5 points, with the words “seldom” and “almost always” at the ends. The total score was the sum of the items divided by the number of items answered, and the minimum score could be 0 and the maximum 5. There were no cutoff points and higher scores indicated a greater presence of catastrophic thoughts.

2.7. Algometry

An algometer (model PTR-300, Instrutherm, São Paulo, SP, Brazil) was used to measure the pressure pain threshold. To do this, the volunteers sat in a chair with the torso upright, the back fully supported, feet flat on the floor, and hands resting on the legs. A previously trained examiner positioned the tip of the algometer

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