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Neck disability is associated with masticatory myofascial pain and regional muscle sensitivity

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ABSTRACT

Objective: The primary aims of this study are to compare neck disability in masticatory myofascial pain subjects versus asymptomatic controls, and to evaluate the correlation between neck disability and muscle pain.

Design: Two groups composed this case–control study: a symptomatic group comprised of 27 subjects diagnosed with masticatory myofascial pain, as determined by the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), and a control group comprised of 28 asymptomatic subjects. The collected variables were pain intensity (visual analogue scale), pressure pain threshold of the temporomandibular joint, anterior temporalis, masseter, sternocleidomastoid muscle, upper trapezius and Achilles tendon (digital dynamometer, kgf/cm^2), and neck disability (Neck Disability Index). Statistical analysis included Student's *t*-test and the Pearson product-moment correlation coefficient (5% significance level and 95% confidence interval).

Results: The symptomatic group showed greater neck disability with a mean (SD) of 11.8 (7), as compared with 2.8 (2.4) for the asymptomatic group ($p < 0.05$). A negative correlation was found between neck disability and pressure pain threshold of the anterior temporalis ($r = -0.4$, 95% CI −0.6 to −0.15, $p = 0.002$), the sternocleidomastoid ($r = -0.35$, 95% CI −0.56 to −0.09, $p = 0.007$) and the upper trapezius ($r = -0.37$, 95% CI −0.58 to −0.12, $p = 0.005$).

Conclusion: Our results reinforced the clinical interconnection between masticatory and cervical structures, insofar as subjects with masticatory myofascial pain reported greater neck disability, which, in turn, was correlated with regional muscle sensitivity.

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1. Introduction

Musculoskeletal disorders often affect an individual's quality of life.[1,2] A partial explanation for this negative impact could be the co-occurrence of multiple painful conditions in the body.[3,4] In particular, temporomandibular and cervical pain disorders could be two of the most common examples, since both of these prevalent disorders frequently coexist in the same subject.[5–8] Temporomandibular disorders (TMD)[/TMDs] and cervical disorders encompass a large group of clinical conditions, or signs and symptoms, that affect the masticatory system and the cervical structures, respectively.[9,10]

Substantial evidence exists for a possible association between the signs and symptoms of TMD and cervical motion impairment or posture differences.[11–13] At least two systematic reviews were published between 2006 and 2013 regarding this topic, but both drew unclear conclusions, pointing out the need for further research.[10,14] Whereas the biomechanical and anatomical aspects in reviews of this type are often given the most attention, the relationship between mechanical sensitivity of the masticatory and cervical muscles and presence of TMD and self-reported neck disability, has been underexplored, especially considering that this relationship could be indicative of how pain impacts one's daily activities.[15] Notably, the first paper to directly address neck disability in patients with TMD was published in 2010,[16] as measured by a well-recognized and validated instrument (Neck Disability Index – NDI). In essence, the paper stated that neck disability was associated with jaw disability and TMD-related disability. A focus on the relationship between neck disability and TMD signs and symptoms may provide a better understanding of how disability related to the cervical region could affect masticatory and cervical muscle pain.

One of the most reliable tests for mechanical muscle sensitivity assessment is the pressure pain threshold (PPT).[17,18] In particular, PPT data provides a pathophysiological basis to evaluate peripheral or central nervous system abnormalities and alterations in pain perception and modulation.[19] Moreover, muscle tenderness is an explicit criterion for masticatory myofascial pain (MMP), the most common type of TMD.[20,21] Finally, appraising the correlation between cervical and masticatory muscles with the PPT is paramount for understanding the association between the cervical spine and the trigeminal region. Furthermore, the experimental pain evidenced by healthy volunteers indicated a partial overlap, considering the pain spread and referral patterns observed between the trigeminal and the cervical muscles.[22]

Based on these findings, the primary aims of this study were: (a) to compare the degree of self-reported neck disability between subjects with MMP and asymptomatic controls, and (b) to correlate the degree of self-reported neck disability with (1) pain intensity, (2) PPT of the temporomandibular joint (TMJ), (3) masticatory and cervical muscles and (4) the extracephalic site (Achilles tendon). An additional aim was to correlate the PPT values of masticatory sites, cervical muscles and the extracephalic site. According to these objectives, our hypotheses were: (a) the MMP subjects will have a greater degree of self-reported neck disability than the asymptomatic control patients; (b) there will be a positive correlation among self-reported neck disability and (1) pain intensity, (2) PPT values of masticatory cervical muscles and (3) the extracephalic site; and (c) there will be a positive correlation between the PPT values of the masticatory sites and those of the cervical muscles or the extracephalic site.

2. Methods

2.1. Design

This case–control study was conducted at the Orofacial Pain Laboratory of the Federal University of Sergipe (Brazil) and approved by the Human Research Ethics Committee of the same institution, in May 2011.

2.2. Subjects and recruitment

The study subjects were recruited by advertisements. Eligible participants included university students and local community volunteers of both genders, who underwent a clinical examination for TMD signs and symptoms. They were divided into two groups according to the inclusion and exclusion criteria: symptomatic group (Group 1) and control group (Group 2).

In brief, the inclusion criteria for the symptomatic group (Group 1) were: (a) ages between 18 and 35 years; (b) complaint of pain in the orofacial region for at least 6 months; (c) masticatory myofascial pain diagnosis as determined by the updated Research Diagnostic Criteria (RDC/TMD).[20] The exclusion criteria for the symptomatic group, respectively, were: (a) history of facial or cervical trauma, cervical and/or craniofacial surgical procedures; (b) neurological disorders or fibromyalgia; (c) previous treatments performed in the last three months for TMD; (d) orthodontic treatment in progress or occlusal risk factors for TMD; and (e) use/abuse of substances or medications, such as analgesics, alcohol, anxiolytics, antidepressants or oral contraceptives. The inclusion criterion for eligible participants of the control group (Group 2) was volunteers between 18 and 35 years of age. The exclusion criteria for the control group were: (a) any painful TMD, as determined by the updated Research Diagnostic Criteria (RDC/TMD); (b) history of facial or cervical trauma, cervical and/or craniofacial surgical procedures; (c) neurological disorders or fibromyalgia; (d) orthodontic treatment in progress or occlusal risk factors for TMD; and (e) use/abuse of substances or medications such as analgesics, alcohol, anxiolytics, antidepressants or oral contraception.

Both groups were matched in regard to age and gender. Two experts in orofacial pain and RDC/TMD assessment performed independent and blind evaluations of the eligible subjects, and only those who received the same diagnostic (masticatory myofascial pain or asymptomatic) by both experts were included and assigned to the respective, corresponding group. An alpha level of 0.05 and a beta level of 0.2 (or a power of 0.8) was the least determinant of a small to moderate correlation ($r = 0.4$), insofar as a total sample size of approximately 47 subjects was required.[23]