PREVALENCE OF TEMPOROMANDIBULAR DYSFUNCTION IN PATIENTS WITH CERVICAL PAIN UNDER PHYSIOTHERAPY TREATMENT

Prevalência de disfunção têmporo-mandibular em pacientes com cervicalgia sob tratamento fisioterápico

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Abstract

The temporomandibular joint (TMJ) is directly related to the cervical and scapular region. Disturbances in the TMJ can affect the positioning of the skull over the cervical region and can determine the postural balance through a common neuromuscular system. The aim of this study was to find out the prevalence of temporomandibular dysfunction (TMD) among patients undergoing Physiotherapy treatment due to cervical pain in the reference public services of Florianópolis, SC, from March to May 2006. A cross-sectional study was carried out involving all patients under Physioterapy treatment due to cervical pain (n=50). The Helkimo's index was used to assess TMD prevalence. Visual examination based on the Portland State University postural analysis was used to establish the relationship between TMD and posture. The prevalence of TMD among the studied individuals was 90.0%. In the postural analysis it was found that the patients exhibited important alterations, suggesting that these postural changes could, hypothetically, explain the high prevalence of TMD among the patients. This study highlighted the need for a multidisciplinary approach involving health professionals who deal with individuals affected by conditions that involve the cervical spine, postural changes and TMDs.

Keywords: Temporomandibular Joint; Temporomandibular dysfunction; Cervical pain; Postural changes; Epidemiology.

Resumo

A articulação têmporo-mandibular (ATM) está diretamente relacionada com a região cervical e escapular. Distúrbios na ATM podem afetar o posicionamento do crânio na região cervical, podendo interferir no equilíbrio postural através de um sistema neuromuscular comum. O objetivo deste estudo foi conhecer a prevalência de disfunção temporomandibular (DTM) em pacientes submetidos a tratamento de Fisioterapia devido a cervicalgia nos serviços públicos de referência de Florianópolis, SC, no período de Março a Maio de 2006. Foi realizado um estudo transversal envolvendo a totalidade de pacientes em tratamento fisioterápico devido a cervicalgia (n=50). O índice de Helkimo foi utilizado para avaliar a prevalência DTM. Exame visual, baseado no método de análise postural da Portland State University foi utilizado para estabelecer a relação entre DTM e postura. A prevalência da DTM entre os indivíduos estudados foi 90,0%. Na análise postural verificou-se que os pacientes apresentavam alterações importantes, sugerindo que essas alterações posturais poderiam, hipoteticamente, explicar a alta prevalência de DTM entre os pacientes. Este estudo reforça a necessidade de uma abordagem multidisciplinar envolvendo profissionais de saúde que lidam com indivíduos afetados por condições que envolvem a coluna cervical, alterações posturais e ATM.

Palavras-chave: *Articulação têmporo-mandibular; Disfunção têmporo-mandibular; Cervicalgia; Alterações posturais; Epidemiologia.*

INTRODUCTION

Among the Physiotherapy specialities, the area of orthopaedics applied to temporomandibular dysfunction (TMD) has been growing, extending knowledge and developing new approaches and therapies. The temporomandibular joint (TMJ) can be defined as a group of anatomical structures that, with the participation of special muscle groups, enables the mandible to execute varied movements during chewing. Anatomically it is linked to the mandible and the base of the skull, which in turn present muscular and ligamentous connexions with the cervical region, forming a functional system known as the cranio-cervico-mandibular system (1).

As a result of the intimate relationship between the muscles of the head and the cervical region and the stomatognathic system, studies have been developed with the aim of observing postural changes in other body structures that can lead to a process of biomechanical disadvantage in the TMJ, and consequently to a clinical condition of TMD (2-7). It is known that the balance of the body, as well as the movements of the head, originated from the positioning of the skull over the cervical and scapular region, determine the posture of the individual. Therefore, it is supposed that any alteration in these structures can bring about postural imbalance, not only in these locations, but also in other muscle groups of the body (8). In this way, TMJ may represent a constant concern for Medicine, Dentistry, Physiotherapy and Public Health who wish to understand the behaviour of the joint in its biomechanical activities such as chewing, speaking, yawning, swallowing, snoring, and in other functions that involve the mouth.

The present study was motivated by involvement of researchers in the treatment of patients with cervical pain after reassessment of Physiotherapy treatment, since they complained of a lack of relief from their painful symptoms. Our hypothesis was based on a possible relationship between cervical pain and TMD. We sought to identify possible sufferers of TMD among patients under treatment for cervical pain, and to explore a possible relationship between the TMD and postural changes.

The objective of this study was to estimate the prevalence of TMD among patients undergoing Physiotherapy treatment for cervical pain at the public referral rehabilitation services of Florianópolis, SC, from March to May 2006.

MATERIAL AND METHODS

A cross sectional study was carried out at the *Centro Catarinense de Reabilitação* (CCR) and the Physiotherapy Clinic of the *Universidade do Estado de Santa Catarina* (UDESC) in Florianópolis, SC, during the period from March to May of 2006. These institutions were chosen as they are regarded as centres of excellence of the *Sistema Único de Saúde - SUS* for physical rehabilitation, specifically Physiotherapy. The sample consisted of all patients with cervical pain (n=50) from a total of 1385 Physiotherapy appointments in the orthopaedic area.

The prevalence of TMD was assessed using Helkimo index (9), which classifies TMD as mild, moderate and severe. This index is based on 10 questions concerning TMD, presented to the individual during an interview. It is calculated from the replies obtained, where each 'yes' was awarded 10 points, 'sometimes', 5 points and 'no', zero points. The sum of points determined the TMD index: 0-15 points as unaffected by TMD; 20-40 points as affected by mild TMD; 45-65 points as affected by moderate TMD and 70-100 points as affected by severe TMD.

In order to establish the relationships between TMD and posture it was necessary to observe the patients through a visual examination. This was based on the method of postural analysis of Portland State University adapted by Althoff et al. (10) which uses observation from a subjective perspective. The main objective was to detect asymmetries and possible postural deviations in the head, shoulders, spine, hips, knees, feet and plantar arches in both dorsal and lateral views. Other clinical data were obtained as follows: maximum oral opening, using a standard ruler with a millimetre scale positioned between the incisal borders of the lower and upper incisors; manual palpation of the TMJ, facial musculature, cervical spine and scapular waist; auscultation of the TMJ carried out with the aid of a *Welch Allyn* stethoscope. An attempt was also made to observe the presence of evident anomalies such as open bite, cross bite, over bite or deviation from the midline. The presence of evident wear on the occlusal and incisal surfaces, as well as the presence of a dental prosthesis was also noted. All of the data collected were recorded in a clinic-epidemiological chart specially designed for this study.

Non-clinical data were obtained at the same interview. Questions dealt with gender, age, marital status, schooling, current occupation, household income and principal complaint. In addition, other information was collected, such as the origin of the referral, as well as the location and intensity of pain. Specific questions were also asked, such as difficulties with joint mobility and with opening and closing movements of the mandible; lateralisation movements of the mandible; tiredness or muscular pain on chewing, headache; pain in the cervical spine, ears or TMJ; presence of joint sounds; presence of trismus or teeth grinding as factors of emotional tension; disturbances of vision and balance problems.

Prior to data collection, the researcher underwent training and calibration with the aim of learning the various clinical and physical criteria to be used in the data collection, besides checking the intra-examiner diagnostic reproducibility. The training and calibration process was developed with 20 patients from the CCR who were not participants in the main study. The lowest kappa value found was $k = 0.70$ for the global postural analysis in the dorsal view.

A pilot study was carried out with the aim of testing whether or not the methodology could be executed in the local situation. No changes to the methodology were found to be necessary.

Data were descriptively analysed. This study was approved by the Committee for Ethics and Research of the *Universidade do Sul de Santa Catarina* and the patients signed a term of free and informed consent written according to the Norm 196/96 from the *Conselho Nacional de Saúde*, confirming their agreement to participate in the study.

RESULTS

Of the total of 1385 orthopaedic appointments attended by patients in the study period, 800 (57.8%) were at the CCR and 585 (42.2%) were at UDESC. Of this total, 50 (11.0%) individuals were undergoing treatment for cervical pain. The mean age of the patients was 50 years (SD = 13.3) and the mean years of schooling was 6 (SD = 2.8). The socio-demographic characteristics of the population studied are described in Table 1.

TABELA 1 - Socio-demographic characteristics of the individuals suffering from cervical pain undergoing Physiotherapy treatment in public services in Florianópolis, SC (n=50)

Variables	n	%
Gender		
Female	36	72.0
Male	14	28.0
Marital status		
Married	22	44.0
Single	21	42.0
Widowed	4	8.0
Divorced	3	6.0
Current occupation		
Retired	12	24.0
Homemaker	5	10.0
Daily help	5	10.0
Clerk	4	8.0
Other occupations	24	48.0
Household income		
1 to 3 minimum salaries	28	56.0
3 or more minimum salaries	22	44.0
TOTAL	**50**	**100.0**

The majority of referrals for Physiotherapy treatment for cervical pain came from physicians (90.0%) followed by dentists (10.0%). In the analysis of the main complaint of those interviewed, it was found that 44.0% reported pain in the cervical spine, followed by headache in 32.0% (Table 2).

TABELA 2 - Main complaints of individuals suffering from cervical pain undergoing Physiotherapy treatment in public services in Florianópolis, SC (n=50)

Main complaint	n	%
Pain in the cervical spine	22	44.0
Headache	16	32.0
Pain in the TMJ	12	24.0
Tinnitus	11	22.0
Vertigo	9	18.0
Restriction on mouth opening	7	14.0
Pain in the masticator muscles	7	14.0
Headache + pain in the cervical spine + tinnitus + pain in the TMJ + pain in the masticator muscles	5	10.0
Headache + pain in the cervical spine + tinnitus + pain in the TMJ + pain in the masticator muscles + vertigo + restriction on mouth opening	5	10.0
Others	7	14.0
Total	**50**	**100.0**

Table 3 shows the signs and symptoms related to the restriction on extent of movement of the cervical spine, pain and altered sensitivity on palpation of the TMJ, facial musculature, palpation of the cervical spine and scapular waist of the patients. Table 4 depicts the results relating to auscultation of the TMJ and the assessment of the oral cavity.

TABELA 3 - Signs and symptoms of individuals suffering from cervical pain and undergoing Physiotherapy treatment in the public services in Florianópolis, SC (n=50)

Extent of movement of the cervical spine	**n**	**%**
Extension	27	54.0
Lateral inclination to the left	27	54.0
Lateral inclination to the right	25	50.0
Flexion	24	48.0
Rotation to the right	21	42.0
Rotation to the left	20	40.0
Palpation of the TMJ and facial musculature		
ATM	18	36.0
Temporal	12	24.0
Masseter	9	18.0
Lateral pterygoid	9	18.0
Suprahyoids	9	18.0
Infrahyoids	8	16.0
Medial pterygoid	7	14.0
Palpation of the cervical spine and scapular waist		
Upper trapezius	43	86.0
Lower trapezius	27	54.0
Scalenes	26	52.0
Scapular elevators	26	52.0
Suboccipitals	23	43.0
Rhomboids	21	42.0
Paravertebrals	21	42.0
Sternocleidomastoids	10	20.0

TABELA 4 - Auscultation of the TMJ and assessment of the oral cavity of individuals suffering from cervical pain and undergoing Physiotherapy treatment in the public services in Florianópolis, SC (n=50)

Auscultation of the TMJ	**n**	**%**
Crepitation on opening	32	64.0
Popping on opening	22	44.0
Crepitation on closing	22	44.0
Popping on closing	8	16.0
Assessment of the oral cavity		
Deviation from the midline	39	78.0
Cross bite	28	56.0
Dental prosthesis	27	54.0
Wear on incisor occlusal surfaces	26	52.0
Periodontal pathologies	21	42.0
Open bite	6	12.0
Over bite	4	8.0

The most frequently observed postural changes in the dorsal view were elevation of the shoulders (100.0%) and unevenness of the scapulas (88.0%). The most common findings in the lateral view were abdominal protrusion (100.0%) and hyperextension of the elbows (98.0%) (Table 5).

TABELA 5 - Assessment of the posture of individuals suffering from cervical pain and undergoing Physiotherapy treatment with the public services in Florianópolis, SC (n=50)

Postural assessment - dorsal plane	**n**	**%**
Elevation of the shoulders	50	100.0
Unlevel scapulas	44	88.0
Inclination of the head	39	78.0
Lateralisation of the head	39	78.0
Unlevel hips	31	62.0
Rotation of the knees	31	62.0
Lateralisation of the feet	30	60.0
Postural assessment: lateral plane		
Abdominal protrusion	50	100.0
Hypertension of the knees	49	98.0
Increase in physiological lordosis	46	92.0
Protrusion of the shoulders	45	90.0
Withdrawal of the thorax	37	79.0
Anteriorisation of the head	37	79.0
Increase in physiological kyphosis	30	60.0

Finally, the prevalence of TMD was 90.0%. Of these, 42.0% were identified as suffering from mild TMD, 20.0% as moderate and 28.0% as severe according to the used criteria (5).

FINAL CONSIDERATIONS

On analysing the patients referred for Physiotherapy treatment due to cervical pain, it was found that most of them did not report any relief of their painful symptoms. The finding of 90.0% of TMD prevalence among those patients would give reasons to believe in a hypothetic relationship between cervical pain and postural alterations and TMD. This relationship is based upon the complex anatomical and biomechanical interaction between the stomatognathic system, the head and neck region (5, 7, 11).

The presence of pain was detected in the physical examination during observation of the movement amplitude and palpation of the TMJ, as well as in the facial muscles involved in chewing and the muscles of the neck. It is common to find referred pain in the orofacial structures, originating as primary pain in cervical structures (6). Several oral problems, including malocclusion, brought on by incorrect habits in the TMJ or cervical spine posture observed in this study, can lead to microtrauma in the stomatognathic region, resulting in local pain as well as pain radiating from these structures (12).

The findings relating to cervical spine revealed alterations in spinal mobility. It suggests the presence of points of tension in these structures giving rise to painful symptoms in other locations, impeding the complete range of movement. Higher pain values on palpation were also observed on inspection of the muscles of the cervical spine and the scapular waist. Pain was recorded as one of the

principal factors leading the patient to seek Physiotherapy treatment. Pain in the cervical spine was the most frequently cited (44%) followed by headache (32%). Headache can also be a symptom of many disorders that affect the masticator system and it is especially prevalent among patients with TMD (13).

The results of our research showed the presence of static imbalance or visual disturbance of 28% and 66% of those investigated, respectively. The inner ear is functionally related to audition and balance, influencing the position and the angle of the head (8). A disturbance of vision can also influence the balance, since it is known that proprioceptive, vestibular and visual information, integrated into the extrapyramidal motor system to form the body plan, is necessary for the maintenance of the static and dynamic adjustment (14).

We also found a high prevalence for popping on opening, on closing, as well as crepitation on opening and on closing mouth. Intra-articular sounds and noises are always indicative of pathology, generally resulting from degenerative pathologies of the disc, of the retrodiscal tissues or of the joint surfaces. Crepitations may be originated from the erosion of fibrous cartilage or the installation of arthritis in the TMJ (15).

The analysis of the patients' posture revealed important alterations: 78% of the postural alterations in relation to the positioning of the head being lateralised in the dorsal view and 74% with anteriorisation of the head in the lateral view. Despite the different theories and studies to explain the increase in cervical lordosis, holding the head in an anteriorised position is an important sign in patients who suffering TMD (1, 6, 7).

In the postural assessment of the shoulders, all patients were found to present unevenness in the dorsal view and 60% had protrusion of the shoulders in the lateral view. This sign is considered to be the result of a late process of adaptation in the body structures. Among its aetiologic factors are hyperactivity of the masticator muscles and increased cervical lordosis (7, 16). The height of the shoulders can also become unbalanced by TMJ pain, since this can cause muscular spasms that produce elevation of the shoulder on the affected side (17). The TMJ interfere in the balance of the cervical spine by compensation compromising multiple organic functions, as well as producing excessive tension and wear in other body structures (17). The opposite is also true. Tension accumulated in other regions of the body can have repercussions in the TMJ, causing an undesirable imbalance in the normal functioning of the organism.

Observation of the hip, abdomen, lumbar spine, knees and feet demonstrated significant alterations, interfering in the posture of the patients. For the maintenance of the body's static and dynamic adjustment, the intervention of the exteroception and proprioception sensory receptors are necessary. The skin, muscles, joints, stomatognathic system and higher centres all act in this adjustment (16). This suggests, therefore, the existence of a relationship in which the muscular-skeletal system influences the static and dynamic balance of the human body. TMD may depend on ascending pathologies. This means that the postural problems located below the craniomandibular complex are responsible for the pathology (1). Likewise, pathologies originating from the structures of the TMJ can set off muscular imbalances in other structures of the body.

In this way, it is suggested that the findings of this investigation concerning postural changes could explain the high prevalence of TMD highlighting that the patients had not a diagnosis of TMD, but rather were suffering from cervical pain. The results would indicate a hypothetical inter-relationship between the TMD and postural alterations.

In this way the diagnosis of patients with TMD should not be based on the result of only one test. Rather based on a combination of objective and subjective observations, in which several health professionals such as physicians, dentists, physiotherapists, speech therapists and psychologists, carry out a complete assessment of the complex muscular-skeletal disturbances in the cervical region and in TMD (13).

It can be concluded that 90% of the patients with cervical pain were found to have TMD. The findings of this study suggest a relationship between TMD and patients who present cervical pain and postural changes. We recommend new appropriately designed, such as cohort studies in order to elucidate the possible relationship between postural alterations, cervical pain and TMD.

REFERENCES

1. Arrelano JCV. Relações entre postura corporal e sistema estomatognático. JBA. 2002;2: 155-64.
2. Moreno S, Young CY, Yanaze F, Cunali PA. Análise das características oclusais de pacientes com ruídos na articulação temporomandibular. JBA. 2002;2:113-9.
3. Bevilaqua-Grosso D, Guirro R, Costa EP, Arthuri MT. Proposta de uma ficha de avaliação para desordem craniomandibular a partir da caracterização dos pacientes atendidos na clínica de fisioterapia da UNIMEP. Rev Fisiot Univ São Paulo. 2001;8:30-9.
4. Chiaoy L, Jesuino F. Estudo das alterações posturais nos indivíduos com disfunção da articulação temporomandibular. Reabilitar. 2003;18:37-39.
5. Mazzetto MO, Carniel IC, Figueiredo MAC. Alterações psicossociais em pacientes com desordens craniomandibulares. JBA. 2001;1:233-43.
6. Silveira AM, Feltrin PP, Zanetti RV, Mautoni MC. Prevalência de portadores de DTM em pacientes avaliados no setor de otorrinolaringologia. Rev Bras Otorrinolaring 2007;73:528-532.
7. Ritzel CH, Diefenthaeler F, Rodrigues AM, Guimarães ACS, Vaz MA. Temporomandibular joint dysfunction and trapezius muscle fatigability. Rev Bras Fisioter. 2007;11:333-339.
8. Amantéa DV, Novaes AP, Campolongo GD, Barros TP. A importância da avaliação postural no paciente com disfunção temporomandibular. Acta Ortop Brás. 2004;12:1-8.
9. Helkimo, M. Studies on function and dysfunction of the masticatory system II. Index for anamnestic and clinical dysfunction and occlusal state (I a IV). Svensk Farm Tidski. 1974;67:101-21.
10. Althoff SA, Heyden SM, Robertson LD. Posture screening – a program that works. J Phy Educ Rec Danc. 1988;59:20-4.
11. Oliveira AS, Bermudez CC, Souza RA, Souza CMF, Dias EM, Castro CES et al. Impacto da dor na vida de portadores de disfunção temporomandibular. J Appl Oral Sci. 2003;11: 1-8.
12. Cardoso AC. Oclusão: para você e para mim. São Paulo: Santos; 2003.
13. Pedroni CR, Oliveira AS, Bérzin F. Pain characteristics of temporomandibular disorder: a pilot study in patients with cervical spine dysfunction. J Appl Oral Sci. 2006;14:388-92.
14. Arcanjo GN, Lima RF, Macená RHM, Almeida LC. Análise da relação entre mudanças posturais na coluna e alterações visuais. Fisiobras. 2005;6:354-60.
15. Valle MG. Diagnóstico das patologias da articulação temporomandibular na prática odontológica diária. JBA. 2002;2:165-73.
16. Bricot B. Posturologia. São Paulo: Ícone; 2001.
17. Munhoz WC, Marques AP, Siqueira JTT. Radiographic evaluation of cervical spine of subjects with temporomandibular joint internal disorder. Braz Oral Res. 2004;18:283-9.

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