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Speech therapy in temporomandibular dysfunction in two cases: comparative analysis of the effect of traditional therapy and the use of the therapeutic bandage associated

Atuação fonoaudiológica em disfunção temporomandibular em dois casos: análise comparativa dos efeitos da terapia tradicional e o uso da bandagem terapêutica associada

Actuación fonoaudiológica en trastorno temporomandibular en dos casos: un análisis comparativo de los efectos de la terapia tradicional y del uso de vendaje terapéutico asociado

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Abstract

Objective: Verify and compare the effects of traditional speech therapy and the associated use of therapeutic bandage for treating muscle temporomandibular disorders in two cases. **Description and history of procedures:** The study was composed by two female subjects, both thirty-three years old, diagnosed with temporomandibular dysfunction through the Research Diagnostic Criteria for Temporomandibular Disorders. The first person called as TT underwent traditional speech therapy in temporomandibular disorders and the second individual named as TB, in addition to these resources included the use of elastic bandage in bilateral masseter muscle. The following parameters were verified in qualitative and descriptive form: signs and symptoms, pain intensity and range of mandibular functional movements. **Results:** The signs and symptoms present at the start of therapy ended on both therapies. The TB patient had reduced pain symptoms in a small number of sessions in relation to its pair. Both therapies demonstrated to be effective in increasing mandibular excursions. **Conclusion:** speech therapy using traditional techniques and application of elastic bandage associated with these demonstrates therapeutic benefits in subjects with temporomandibular disorders. The use of elastic bandage seems to have promoted therapeutic efficiency in less time.

Keywords: Temporomandibular Joint Dysfunction Syndrome; Temporomandibular Joint; Evaluation of the Efficacy-Effectiveness of Interventions; Bandages.

Resumo

Objetivo: verificar e comparar os efeitos da terapia fonoaudiológica tradicional e o uso associado da bandagem terapêutica no tratamento de disfunções temporomandibulares musculares em dois casos. **Descrição e histórico de procedimentos:** O estudo foi composto por dois indivíduos do sexo feminino, ambos com trinta e três anos de idade, diagnosticados com disfunção temporomandibular através do Research Diagnostic Criteria for Temporomandibular Disorders. O primeiro indivíduo denominado como TT foi submetido à terapia fonoaudiológica tradicional em disfunção temporomandibular e o segundo indivíduo denominado como TB, além desses mesmos recursos contou com a utilização de bandagem elástica no músculo masseter bilateral. Os seguintes parâmetros foram verificados de forma qualitativa e descritiva: sinais e sintomas, intensidade de dor e amplitude dos movimentos funcionais mandibulares. **Resultados:** Os sinais e sintomas presentes no início da terapia foram cessados em ambas as terapêuticas. O paciente TB teve o quadro álgico reduzido em um número reduzido de sessões em relação ao seu par. Ambas as terapêuticas mostram-se efetivas quanto ao aumento de excursões mandibulares. **Conclusão:** A fonoterapia utilizando-se de técnicas tradicionais e a aplicação da bandagem elástica associada a estas demonstram benefícios terapêuticos em sujeitos com disfunção temporomandibular. O uso da bandagem elástica aparenta ter promovido eficiência terapêutica em menor tempo.

Palavras-chave: Síndrome da Articulação Temporomandibular; Articulação Temporomandibular; Avaliação de Eficácia-Efetividade de Intervenções; Bandagens.

Resumen

Objetivo: verificar y comparar los efectos de la terapia fonoaudiologia tradicional y el uso asociado de vendaje terapéutico para el tratamiento de trastornos temporomandibulares musculares en dos casos. **Descripción de los procedimientos y de la historia:** El estudio se ha compuesto por dos individuos de sexo femenino, ambos con treinta y tres años de edad, diagnosticados con disfunción temporomandibular a través del Research Diagnostic Criteria for Temporomandibular Disorders. El primer individuo nombrado como TT fue sometido a la terapia fonoaudiológica tradicional para trastornos temporomandibulares y el segundo individuo nombrado como TB, además de estos recursos contó con el uso de una venda elástica en el músculo masetero bilateral. Los siguientes parámetros fueron verificados de forma cualitativa y descriptiva: signos y síntomas, la intensidad del dolor y la amplitud de los movimientos funcionales mandibulares. **Resultados:** Los signos y síntomas presentes al inicio de la terapia se terminaron en ambas terapias. El paciente TB tubo reducción del dolor en un menor número de sesiones en relación con

su pareja. Ambas terapias se han demostrado eficaces en el aumento de las excursiones mandibulares. **Conclusión:** la fonoterapia utilizando técnicas tradicionales y la aplicación asociada de vendaje elástico, demuestró beneficios terapéuticos en indivíduos con transtorno temporomandibulares. El uso de vendaje elástico parece haber promovido la eficiencia terapéutica en menos tiempo.

Palabras claves: Síndrome de la Articulación Temporomandibular; Articulación Temporomandibular; Evaluación de Eficacia-Efectividad de Intervenciones; Vendajas. .

Introduction

Temporomandibular Disorders (TMDs) are recognized as a group of altered musculoskeletal and neuromuscular conditions involving temporomandibular joints (TMJs), masticatory muscles and all associated tissues [1,2]. They are part of a spectrum of syndromes associated with stress and are characterized by environmental and psychological factors [3], including fatigue, impairment of work and school activities, sleep and appetite / eating disorders, anxiety and depression [4].

The etiology of TMJ dysfunctions is multifactorial [5] and the factors that contribute to its development include malocclusion, traumatic factors, systemic diseases, parafunctional habits [6], postural changes and stress and anxiety [7].

It is known that the most observed signs and symptoms in patients with TMD are limitations of the range of mandibular movements, pain or discomfort, joint noise, difficulty in chewing and headache [8-11]. TMD has been identified as the first cause of non-dental pain in the orofacial region [4].

The treatment of TMDs should be performed by a multidisciplinary team, formed by surgeon-dentist, psychologist, physiotherapist and speech therapist. This treatment should always aim at restoring weakened functions, pain relief, reduction of muscle overload, the promotion of neuromuscular and occlusal balance, and the reduction of stress and anxiety [4,12].

The elastic bandaging is an excellent therapeutic resource, because it adds greater efficiency to the therapies, since it is applied correctly and associated to the objectives of these. The application of elastic bandage occurs in the integumentary system, which provides environmental information into the body and provides communication between the various bodily systems. Therefore, it is through the integument that the bandage provides constant and lasting stimuli through the afferent pathways of the primary sensory cortex, allowing better integration of the somatosensory system, for a final result of better motor response [13]. Among the potential uses of elastic bands are use in hypofunctional muscles, hyperfunctional, hypotonic, hypertonic, for drainage of edema, such as in motor sequelae caused by neurological lesion, facial paralysis and/or in cases of cervical tension [14].

This new methodology is complementary to the other therapeutic methods, however, despite the finding of its efficiency by the clinical practice, there are no studies in the TMD area that proves this. As a result of this effectiveness, its use becomes more and more frequent, making necessary the development of researches in the area.

Therefore, the objective of the present study was to verify and compare the effects of traditional speech therapy and the associated use of therapeutic bandaging in the treatment of temporomandibular muscle dysfunctions in two cases.

Method

The study was approved by the Research Ethics Committee under number 17518713.5.0000.5539. The subjects signed the Term of Free and Informed Consent of the research and authorized the use of the material for scientific publications and presentations.

Participants were diagnosed with TMD through the *Research Diagnostic Criteria for Temporomandibular Disorders* (RDC/TMD). The RDC/TMD is considered the most adequate instrument in the classification of TMDs [15] and comprises a diagnostic criteria questionnaire in TMD research, such as with myofascial pain or myofascial pain with aperture limitation, excluding the presence of joint involvement. The information regarding the diagnosis was obtained by means of a consultation with the aforementioned document attached to an individual chart provided by the dentistry school clinic. Due to the diagnosis by both

subjects, being in the group of muscular disorders, the treatment was exclusively speech therapy.

All participants were submitted to anamnesis and complete speech therapy assessment during three sessions at the beginning of the therapeutic process; after these procedures, the therapy sessions were started, and twelve speech therapy sessions were held for fifty minutes each, three times a week.

In the first three therapy sessions during the interview and evaluation, information was collected through the anamnesis questionnaire about the presence of signs and symptoms related to temporomandibular dysfunction, as for example, absence or presence of muscle fatigue, headache, daytime and/or nighttime bruxism, joint noise, and difficulty opening the mouth, chewing and yawning. At the end of therapy, this information was collected again in order to compare the before and after the speech therapy intervention. In addition to the anamnesis questionnaire, in these same two moments the Visual Analogue Scale (VAS) [16] of pain on the discomfort of the temporomandibular region was applied. The scale, which can be visualized in Figure 1, measures the patient's pain sensation from 0 to 10, and the higher the score, the greater the pain sensation.

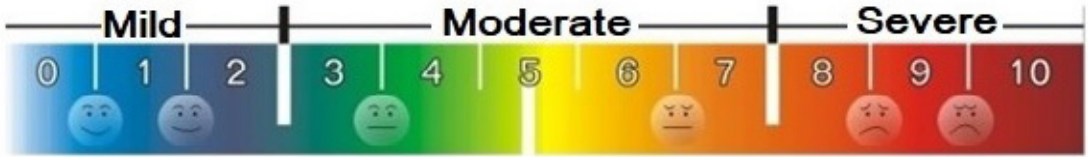

Figure 1. Analogic visual scale

To measure the possible functional gains from employed therapeutic performance, the following mandibular movements were measured with the use of a pachymeter (0.05 mm) at the moment of evaluation and at the end of the therapeutic process:

- Opening mouth without pain: measurement performed during maximum jaw opening after verbal request.
- Left lateralization: measurement performed during the maximum of the jaw lateralization to the left side after verbal request.
- Right lateralization: measurement performed during the maximum of the jaw lateralization to the right side after verbal request.

Data analysis was done in a qualitative and descriptive manner, comparing the two subjects studied and discussing the results with data from the literature.

SUBJECT TT:

Subject TT (traditional therapy), thirty-three years, and female gender. About a month ago, began to manifest symptoms such as headache and facial pain on the left that prevents her from performing actions such as yawning and chewing solid foods.

In response to the anamnesis questionnaire elaborated by the authors, the patient reported fatigue, joint noise, daytime and night bruxism, difficulty opening and moving the mouth, chewing and yawning, facial pain (masseter muscle) on the left, radiating to temporal muscle and trapezius on the same side and throbbing headache on both sides; according to the patient, the symptoms appeared after the meals and in the morning when waking up, staying all day, with worsening when eating solid foods. The symptoms described above are usually accompanied by irritation and stress.

As for the frequency and duration of pain, reported pain every day of the week lasting all day. About the habits, she mentioned daytime and nighttime dental tightening.

After evaluation and complete anamnesis, the TT subject underwent traditional speech therapy for temporomandibular dysfunction, which included guidelines for withdrawal of deleterious habits, thermotherapy, massage, isometric and isotonic exercises in a region of masseteric musculature and relaxation of cervical musculature, beyond to the guidelines for daily exercise at home.

Regarding the data collected in the anamnesis elaborated by the authors, the symptoms reported

as fatigue, headache, joint noise, nighttime and daytime bruxism, as well as difficulty opening and moving the mouth, chewing and yawning, all these indications of impairment in the temporomandibular region after the therapeutic process disappeared.

Table 2 shows the therapeutic evolution in the pain chart by the EVA scale. On the first date, it is possible to observe a greater sensation of pain on the left side, in the next dates, besides reducing, the level of pain was equalizing for both sides, which may be the result of a balance of forces, previously unbalanced. At the end of the twelve speech therapy sessions the TT subject was exempted from the pain chart.

INDIVIDUAL TT	Date 1 R/L	Date 2 R/L	Date 3 R/L	Date 4 R/L
M. Masseter	1/10	3/8	4/0	0/0
M. Temporal	0/7	2/0	0/0	0/0
M. Medial Pterygoid	1/7	5/6	2/3	0/0
M. Lateral Pterygoid	7/8	7/7	3/3	0/0
M. Occipital	8/8	0/0	0/0	0/0
M. Trapezius	10/10	4/3	3/3	0/0
M. Submandibular	3/10	3/0	2/0	0/0
M. Sternocleidomastoid	8/8	0/0	0/0	0/0

M: Muscle – R: Right Side – L: Left Side

SOURCE: Prepared by the authors

Figure 2. Therapeutic evolution in the individual TT

The results of mandibular movement measurements are shown in Table 3 for the TT subject. It is observed that the TT subject presented reduced mandibular functional movements, below what is expected for adults and at the end of the therapeutic process presented an increase in the amplitude of the movements, suiting to the expected for the age group.

INDIVIDUAL TT	Before	After
Mouth Opening	25,00	52,00
Right Lateralization	8,45	10,50
Left Lateralization	11,00	14,00

SOURCE: Prepared by the authors

Figure 3. Mandibular excursions before and after speech therapy

SUBJECT TB

TB patient (therapy and bandaging), thirty-three years old, female gender. For approximately five years had been presenting complaints of constant headache.

In response to the anamnesis questionnaire elaborated by the authors, the TB patient reported fatigue, facial pain (masseter muscle) bilateral, with greater intensity on the right, radiating to cervical, temporal and occipital muscles, throbbing headache on both sides, difficulty opening and moving the mouth, chewing and yawning as well as joint noise. Regarding the parafunctions, reported nighttime bruxism, moreover, complained about her teeth being cracking because of the tightening of the teeth.

Regarding frequency and duration of pain, reported pain more than three times a week, lasting for several consecutive days.

After the diagnosis of temporomandibular disorder, anamnesis and complete evaluation, besides the same techniques and orientations given to the TT subject, this individual also had the use of elastic bandage in the masseter muscle bilaterally, with fixed point at the insertion of the muscle (skin of the angle of the mandible) and movable point at the origin (zygomatic arch skin), aiming at relaxation of this structure, remaining at the same twenty-four hours/day. The bandage was changed three times a week at the end of each session, staying forty-five consecutive days in total. Twelve sessions of therapy were performed, with fifty minutes each, three times a week.

As with the TT individual, symptoms reported by the TB individual during anamnesis such as fatigue, headache, joint noise, nighttime and daytime bruxism, as well as difficulty opening and moving the mouth, chewing and yawning also disappeared after traditional speech therapy plus the use of elastic bandage, which can be seen in Table 4.

Signs/Symptoms	TT		TB	
	Before	After	Before	After
Fatigue	P	A	P	A
Headache	P	A	P	A
Joint noise	P	A	P	A
Bruxism Nighttime/Daytime	P	A	P	A
Difficulty Opening/To move the mouth	P	A	P	A
Difficulty chewing/yawning	P	A	P	A

P: Present – A: Absent

SOURCE: Prepared by the authors

Figure 4. Comparative therapeutic evolution signs/sympthons individuals TT and TB

Although the TB individual reported a higher level of pain on the right side, during the palpation examination it was verified that the pain level was almost the same for both sides, and can be visualized in Table 5, that demonstrates the therapeutic evolution of pain by EVA scale.

INDIVIDUAL TB	Date 1 R/L	Date 2 R/L	Date 3 R/L	Date 4 R/L
M. Masseter	10/03	0/0	0/0	0/0
M. Temporal	10/8	6/7	3/0	0/0
M. Medial Pterygoid	7/8	5/6	3/3	0/0
M. Lateral Pterygoid	9/9	5/5	0/0	0/0
M. Occipital	10/10	10/6	6/3	0/0
M. Trapezius	10/10	5/2	0/0	0/0
M. Submandibular	10/10	10/10	6/6	0/0
M. Sternocleidomastoid	10/10	0/0	0/0	0/0

M: Muscle – R: Right Side – L: Left Side

SOURCE: Prepared by the authors

Figure 5. Therapeutic evolution in the individual TB

In regarding Table 6, it is verified that the subject TB required a smaller number of sessions compared to the other subject to be exempt of pain in the masseter muscle. Still taking into account that the subject TB showed greater sensitivity to pain in relation to his partner, TT subject.

M. MASSETER	Date 1 R/L	Date 2 R/L	Date 3 R/L	Date 4 R/L
Individual TT	1/10	3/8	4/0	0/0
Individual TB	10/3	0/0	0/0	0/0

M: Muscle – R: Right Side – L: Left Side

SOURCE: Prepared by the authors

Figure 6. Comparative therapeutic evolution in the pain chart of the masseter muscle individual TT and TB

At the beginning of the therapeutic process, the TB subject presented reduced mandibular functional movements and after being submitted to the traditional therapy in speech therapy and using as complementary therapy the elastic bandage, increased the amplitude of the movements, adapting to this age group, and can thus be visualized in Table 7.

INDIVIDUAL TB	Before	After
Mouth Opening	26,90	40,75
Right Lateralization	8,95	12,20
Left Lateralization	4,95	10,00

SOURCE: Prepared by the authors

Figure 7. Mandibular excursions before and after speech therapy

Discussion

Despite the small number of subjects, the study is in agreement with the literature, once that studies show that TMD is more prevalent in females [9, 11, 17]. Research indicates that this data is due to the fact that women present a greater search for treatments in relation to men, higher estrogen level, menstrual cycle [2] and even higher anxiety in this genre [5]. The age of the subjects in this study is also in agreement with the literature and with the American Academy of Orofacial Pain, which indicates a prevalence of TMD between the second and fourth decade of life [2,11,18,19].

Regarding TMD symptoms investigated by the authors' anamnesis questionnaire, studies report that the most frequently encountered symptoms are headache [10,20], otological symptoms [11], joint noise and limited range of joint movements [6,9,17]. These findings from the literature agree with the initial chart of symptoms presented by the study patients.

The reduction of symptoms related to TMDs in the studied subjects indicates that the two therapeutic approaches used were efficient in reducing them. Currently, there is no consensus on which therapy is ideal for the treatment of TMD, all approaches indicate cases of success and cases where there has been no significant improvement [11,20,21,22].

In a study of the literature, the authors used leisure, deactivation of pain trigger points and TMJ functional exercises in TMD subjects, with a result of significant reduction of pain, also measured by VAS, with optimization of mandibular functional movements, which reached normality after therapy [20]. In a review of the literature on the effects of conventional treatments and botulinum toxin on TMD, the authors concluded that the latter wasn't more effective than the other approaches in reducing pain [21].

Research to compare the physiotherapy and odontological approaches in TMD pain reduction concluded that both treatments proved to be positive for relieving painful symptoms [11]. A study about the use of acupuncture in adults with TMD concluded that the method reduced pain and that this reduction was maintained for at least twelve months [22].

The use of elastic bandage favors the reduction of pressure exerted on the sensory receptors, due to the undulations that the bandage promotes, raising the skin and improving the blood and lymphatic circulation [23,24]. Despite of the use of elastic bandage to be increasingly widespread among health professionals, most of the studies found are concentrated in the sports and physiotherapeutic areas.

Few studies have shown significant results regarding the use of elastic bandage, such as static stretching as prevention of muscular problems [25], reduction of non-specific low back pain [26], improvement of skeletal muscle pain in the thoracic region [27] and efficacy in the Treatment of mechanical cervicalgia [28].

Although the physiological mechanisms are the same, no studies have been found in the literature that relate improvement of TMD pain with the application of elastic bandaging. In the present study, it was verified that the elastic bandage associated with conventional speech therapy may have contributed to the reduction of pain in a shorter time of therapy. According to the data, in the fourth session of therapy there was no presence of pain in the TB subject, which took four more sessions to occur in the TT subject.

It is believed that the improvement in mandibular functional movements, due to both therapeutics used, may be associated with a decrease in pain, since pain can lead to movement limitation; another study reports that the increase in the range of motion found in its sample is due to a greater activation of the depressor muscles and relaxation of the jaw lift muscles [10].

The therapeutic bandage associated with traditional speech therapy has been shown to promote the reduction of pain in a smaller number of sessions compared to traditional isolated therapy, due to the sensory maintenance of the stimulus for an extended period of time that transcends the moments of therapy in clinical environment.

As for the other aspects, both therapies obtained similar results, since the two subjects presented improvement in relation to the functional mandibular movements and significant reduction of the initially presented symptoms.

The results obtained with the two therapeutic approaches demonstrate that both were efficient in promoting functional gains in subjects with TMD. There was an apparent greater efficiency with the application of the elastic bandage associated with traditional speech therapy, verified with the fewest sessions to reduce pain symptoms.

There is a need for further studies with more rigid methodological design, greater number of subjects studied and application of quantitative indicators to prove the efficiency of elastic bandage application in TMDs.

Conclusion

Speech therapy, using traditional techniques and the application of the elastic bandage associated with these, demonstrate therapeutic benefits in subjects with TMD. The use of elastic bandage seems to have promoted therapeutic efficiency in less time, however, both techniques proved to be effective at the end of speech therapy treatment.

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