Jurnal Medical Aradean (Arad Medical Journal)
Vol. XXI, issue 3, 2018, pp. 23-26

ELECTROTHERAPY CONTRIBUTION TO THE RECOVERY FROM TEMPOROMANDIBULAR ALGO-DYSFUNCTIONAL SYNDROME

CALIN BOCHIS[1], HORAȚIU URECHESCU[1], ALIN BOCHIS[2], DIANA CARINA IOVANOVICI[3], IOAN ROMANUL[2], IOAN TIG[2]

[1]Oro-Maxillofacial Surgery Clinic Timisoara
[2]University of Oradea, Faculty of Medicine and Pharmacy
[3]UMF Victor Babes Timisoara

ABSTRACT. In this study were included a number of 22 patients who addressed the ambulatory of the Oro-Maxillofacial Surgery Clinic Timisoara between March 2017 and March 2018 for pain in the temporomandibular joint. The stages of algo-disfunctional syndrome for the selected cases were determined according to the current criteria approved in Romania. Data collection was prospective and was made directly by examining the patients. at study entry, at 7 days and at 21 days. The majority of the patients had a onesided condition, but a significant percentage had a bilateral condition. Approximately 30% of the patients included in the study had stable occlusions and the others had unstable occlusions. As for the pain evolution, the study shows that VAS score decreases in parallel in the two groups, therefore electrotherapy can be a therapeutic alternative, together with mechanotherapy and soft food. The effect of the therapy used in the two groups is proven by the JLFS 20 score, an important improvement of mobility, mastication and communication is observed in 92.3 % cases in the group with combined therapy, compared with 75% in the second group.
KEYWORDS: Algo-disfunctional syndrome, temporomandibular joint, differentiated treatment.

INTRODUCTION

The temporo-mandibular joint, the only mobile joint at the skull level, is the most evolved in the body. It presents a number of characteristics that make it unique, and the treatment of the conditions present at this level is difficult and particular for each case. The algodisfunctional syndrome is a polysimptomatic disorder, with an incidence of approximately 20% among the population, with a peak in the age group of 20-40 years (Boutault F et al., 1990). The American Academy of Oral Disease (1993) recommends the following classification of temporomandibular joint functional disorders: deviations in the form of joint surfaces, disorders of the condyle-disk complex, TMJ disorders, ankylosis of TMJ (Mitchel et al., 2014, Ivkovic et al., 2018).

The subjective clinical signs are: muscle fatigue, pain, limitation of mandible mobility, especially after chewing, muscle spasm, crackles and crepitation, feeling of unilateral obstruction at the joint level. Objective clinical signs are: mandibular deviations, both static and kinematics, limiting mandibular movements and hypotonia of masticatory muscles, especially the temporal and masseter (Herb K et al., 2006). The muscle and/or joint pain is the main symptom of algo-dysfunctional syndrome. It is caused by the stimulation of the nociceptors from the joint (Ivkovic et al., 2018). The nature of the pain is different, depending on the presence or absence of inflammation. In the first case, the pain is sharp, intense, closely related to the joint mobilization, and when the local inflammation occurs, the pain becomes constant, the intensity increasing with joint mobilization. Pain and mobility impairment, in the sense of increasing or decreasing it, are frequent during the morning, and they are no longer present during the day. The most common impairment is hypermobility. The mandibular kinematics can be affected both when opening the mouth and in lateral or propulsion movements. For diagnosis is used ultrasonography (Crăciun md ET AL., 2017). The condition is particularly common in people over 50 years of age. The single or multiple joint noises occur mainly due to the alteration of the disk - condyle relationship as a result of uncoordinated contraction between the lateral pterygoid muscle (the condylus no longer performs a sliding motion on a disk surface but "strikes" it). These joint manifestations are influenced by the duration from the onset of the condition and the sensitivity of the individual. The correct identification of symptoms and accurate diagnosis are therefore essential in choosing the therapeutic course (Ivkovic et al.; 2018, Ieremia et al.; 2005; Gauer et al., 2015).

Algodisfunctional syndrome therapy is extremely complex and requires both multidisciplinary collaboration and combining various therapeutic methods to achieve the highest success rate (Gauer et al., 2015). The conservative treatment aims to decrease pain, muscle hyperreactivity, caused by parafunctions, malocclusion and emotional stress. The presence of malocclusion, reversible or irreversible, requires occlusal therapy to change jaw position and pathological dental contacts. In the case of defects in the joint surfaces, it is essential to educate the

patient as regards mastication in order to position the jaw to reduce the intracapsular pressure in the affected joint (Ivkovic et al., 2018). Also, joint stabilization is recommended during the night and 1-2 hours during the day, for at least 8-10 weeks. In case of pain persistence, surgical intervention is recommended. In the case of disorders in the complex condyle-disk, the main purpose of repositioning therapy is temporary stabilization of the mandible in an appropriate anterior position. The purpose of repositioning therapy is therefore to eliminate pain and allow muscle relaxation (Ivkovic et al., 2018, Ieremia et al., 2005). Along with the orthodontic and prosthetic treatment, an essential role is played by mechanotherapy, educating the patient to avoid the use of maximum angles, the use of soft food. In the case of algo-disfunctional syndrome determined by degenerative pathology in the TM joint, NSAIDs, corticosteroids, orally, or local infiltrations with hyaluronic acid are recommended, along with analgesic electrotherapy, such as low frequency, medium frequency and high frequency currents. TENS (transcutaneous electrical stimulation) with analgesic role, xylin iono-phoresis, CDD with analgesic and dynamic role, laser therapy are frequently used (Mitchel et al., 2014).

To evaluate the subjective and objective manifestations of the temporomandibular joint pathology a number of scales have been designed, but there is no standard assessment tool. JFLS (Jaw Functional Limitation Scale) was originally made up of 8 elements that perform a global functional evaluation of the masticatory system. Subsequently, another 12 items, JLFS-20, were added, assessing mastication, joint mobility and verbal and nonverbal communication (Schiffmanet E al., 2014). So we have three subscales, for mastication: items 1-6, for mobility: 7-10, the rest for communication (Ohrbach et al., 2008, Ohrbach et al., 2017).

The purpose of this study is to evaluate the impact of pain and joint function on the quality of life of the patient with algo-disfunctional syndrome, namely the assessment of applied treatments.

MATERIALS AND METHODS

In the study were included 22 patients that came to the ambulatory of the Timisoara Oro-Maxillofacial Surgery Clinic between March 2017-March 2018 for pain in the temporomandibular joint, accompanied by other subjective manifestations as limiting mandibular kinematics, impairment of chewing as a result pain or other functional disorders, aged between 14-68 years. Patients were divided into two groups of 14 (group I) and 8 patients (group II), respectively.

Patients in group I underwent a complex orthodontic treatment, as appropriate, mouthguard or prosthesis, associated with mechanotherapy and soft food and NSAIDs, and those in group II followed a treatment consisting of soft food, mechanotherapy, physiotherapy. The physiotherapy used consisted of laser therapy with infrared probe, 10 sessions, dosage 18 J/cm^2, with analgesic effect, TENS 140 HZ, 10 min. with analgesic effect, magnetodiaflux, to rebalance the neurovegetative system. Mechanotherapy consists of active axial exercises at the ATM level, repeated 10 times, alternating with isometric exercises, duration of 4 seconds, associated with local massage.

For the pain assessment, the visual analogue scale, VAS, (with values between 0-100 mm) was used and for the function evaluation the JLFS-20 scale was used to evaluate mastication, verbal and nonverbal communication. The score ranges between 0 and 10 for each question, then the arithmetic mean is made. "0" means no limitation, and "10" is a severe limitation (Ohrbach et al., 2017).

The statistical processing was done with the Excel program, and the sensitivity to change was evaluated by calculating the magnitude of the effect size ("Effect size" – ES). ES is a method of standardizing the magnitude of changing a variable after a determined period of time. This standardization allows comparison of JLFS 20 change values measured initially and at 21 days after treatment. Interpretation of the results: ES small = 0.20 is a *small change*, moderate ES = 0.50 *moderate change*, high ES ≥ 0.80 is a *big change*.

RESULTS AND DISCUSSIONS

The assessed group consists of 9 male patients and 13 female patients, representing 41% men and 59% women. The average age of the two groups is comparable, being 29.2 and 32.7 respectively, and corresponds to the highest incidence interval in specialized literature (Manfredini D et al., 2010). 36% of patients had bilateral impairment of the TM joint, while 64% had unilateral damage. During the study, the presence of chewing discomfort, was observed and evaluated with the JLS 20 scale. Figure 1 shows that 86% of the patients enrolled in the study show effortless chewing and that discomfort is minimal for the rest of the patients.

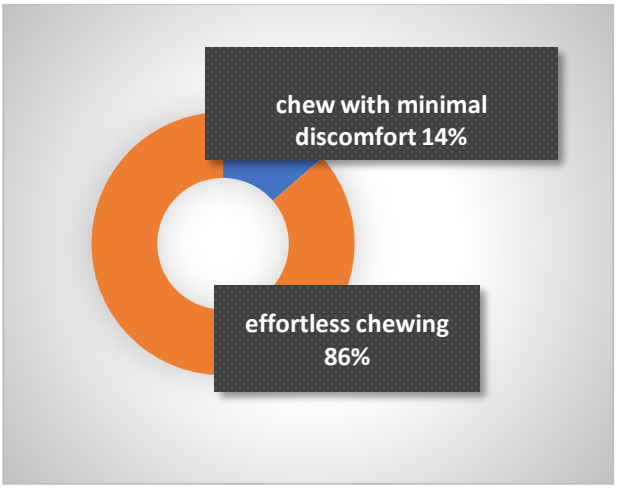

Fig.1. Patient distribution according to mastication effort (chewing with minimal discomfort 14%, effortless chewing 86%)

Unstable occlusion occurs symptomatically in 17 of the total studied patients, stable occlusion being found in 5 of the studied patients. Pain, evaluated with the VAS at study inclusion, at 7, 14 and 21 days respectively, significantly decreased in both groups. Figure 2 shows that the mean values obtained at the four determinations decrease parallely in both groups. In each group, one of the cases presents a persistent pain, which does not respond to the treatment, and the surgery is recommended. Figure 3 shows the parallel evolution of VAS values at 21 days for the two studied groups.

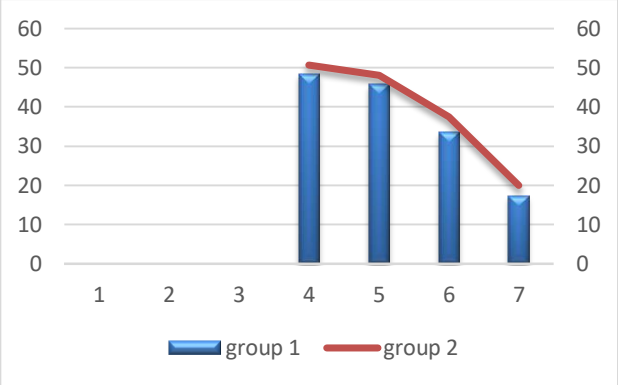

Fig.2. The evolution of the mean value of the VAS score obtained in the four determinations in the two groups

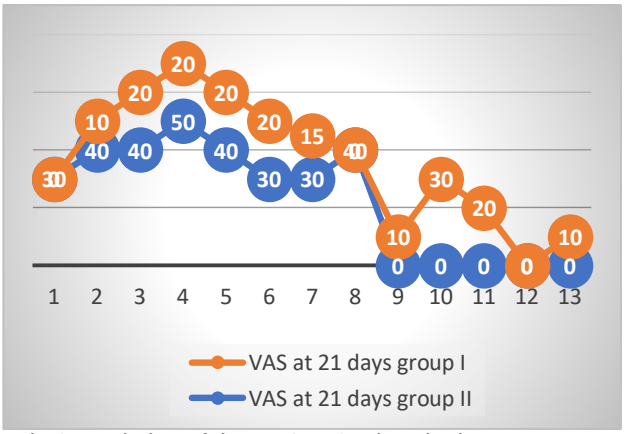

Fig.3. Evolution of the VAS at 21 days in the two groups

The evolution of the overall values of the JLFS 20 score, was subsequently followed; it indicates the effect of treatment on the mobility, mastication and verbal and non-verbal communication for the temporomandibular algo-function syndrome. Table 1 includes the initial JLFS values after 21 days. It also includes the sensitivity to change for each patient.

Table 1. Evolution of the JLFS Global Score 20 initially and at 21 days

JLFS INITIALLY	JLFS AT 21 DAYS	STANDARD DEVIATION	EFFECT SIZE
3.19	2.49	0.5	>0.80
4.11	4.11	0	0
1.625	1.12	0.36	
2.65	1.75	0.64	
1.875	1.5	0.27	>0.80
3.02	0.33	1.9	
3.30	2.56	0.52	
4.178	3.31	0.99	0.50
4.25	0.58	2.59	
3.27	2.40	0.61	
2.91	2.04	0.61	
3	2.40	0.42	
4.33	3.45	0.62	>0.80
3.291	2.67	0.44	
2.735	0.33	1.7	
2.818	0.33	1.76	
3.568	0.58	2.11	
3.22	2.45	0.545	
4.485	3.20	0.9	
5.02	3.901	2.45	0.50
2.26	1.56	0.5	>0.80
3.22	3.22	0	0

Thus, it was found that in group I that benefited from orthodontic and/or prosthetic treatment with NSAIDs, mechanotherapy and soft nutrition, the effect size shows a great change in terms of improving mobility, mastication and verbal and nonverbal communication, of 92.3% and 75% for patients that underwent treatment with analgesic electrotherapy, soft food and mechanotherapy.

Algo-dysfunctional TM syndrome has a multi factorial etiology (Al-Ani MZ et al., 2004, Lomas J et al., 2018), being the result of the interaction of biological, psychological and social factors. This led to the introduction of the "bio-psychosocial" model. Initially, the role of dental occlusion was considered to be determinant in TM dysfunction, fact denied by scientific evidence, the bio-psychosocial model being accepted (Epker J,1999). Researches in this field prove the interaction of bruxism, pain and psychosocial factors, and proposes a universally accepted model, namely, the "overload model" (Bucur et al. 2009, Ivkovic et al., 2018, Ieremia et al., 2005). The objectives of the treatment are to combat pain and reduce dysfunction; therefore, a multidisciplinary approach is required, consisting of a dentist, a surgeon, a maxillofacial surgeon, a medical recovery specialist and a psychologist. A study carried on 1500 patients with TM algo-dysfunctional syndrome showed that approximately 40% had a spontaneous remission of symptoms. (Ivkovic et al., 2018, Ieremia et al., 2005, Gauer et al., 2015).

Regarding the contribution of physiotherapy, there is little evidence in the treatment of algo-disfunctional syndrome. The results of this study showed that analgesic electrotherapy is effective against pain, with the possibility of reducing non-steroidal anti-inflammatory drugs. The mechanical stress exerted by the maxillary muscles on the joint, bruxism, the result of emotional stress is reduced by the balancing effect of the neuro-vegetative system of magneto-diaflux (Gauer et al., 2015). The reduction in algic syndrome occurred in both groups, the VAS score having a parallel evolution. Also, the results obtained concerning mastication, mobility and communication are significant, therefore physiotherapy may be an option in complex treatment management of

temporomandibular algo-disfunctional syndrome, especially when the administration of anti-inflammatory drugs is not advisable.

CONCLUSIONS

Regarding the evolution of pain, the study shows that the VAS score drops in the two studied groups, therefore electrotherapy can be a therapeutic alternative along with mechanotherapy and soft nutrition. The effect of the therapy applied to the two groups is highlighted by the JLFS 20 score; the major improvement in mobility, mastication and communication is achieved for 92.3% in group I, with complex combined therapy compared to 75% in group II. In group II, a case with stationary symptomatology was present.

REFERENCES

Al-Ani MZ, Davies SJ, Gray RJ, Sloan P, Glenny AM, Stabilisation splint therapy for temporomandibular pain dysfunction syndrome. Cochrane Database Systematic Reviews (1), 2004.

Bhargava D, Neelakandan RS, Dalsingh V, Sharma Y, Beena S, A Likert type psychometric scale to assess the temporomandibular joint (TMJ) function for evaluation of quality of life following total joint replacement surgeries, Department of Oral and Maxilofacial Surgery. People's College of Dental Sciences and Research Center People's University, Bhanpur, Bhopal Madhya Pradesh, India, 2018.

Boutault F, Bodin H, Fabie M. Condylar retrusion in the algo-dysfunctional syndrome of the mastication apparatus, Rev Stomatol Chir Maxillofac 91(2), 92-100, 1990

Crăciun MD, Silişteanu CS, Filip F, Filip R, Ultrasonography applications in algo-disfunctional syndrome of the temporomandibular joint E-Health and Bioengineering Conference (EHB), 2017

Epker J, Gatchel RJ, Ellis E, A model for predicting chronic tmd: practical application in clinical settings, JADA, 130(10), 1470-1475, 1999.

Gauer RL, Semidey MJ, Diagnosis and treatment of temporomandibular disorders. Womack Army Medical Center, Fort Bragg, North Carolina Am Fam Physician. 91(6), 378-386, 2015.

Herb K, Cho S, Stiles MA, Temporomandibular joint pain and dysfunction, Curr Pain Headache Rep. 10(6), 408-14, 2006

Ieremia L, Lászlo M, Ormenişan A., Osteoarthrosis of TMJ – result of the aggressive osseous remodelation process triggered by the bone resorbtion. Various used concepts and the frequency of the morbid entity. UMF Tg-Mureş, Gnatoprotetică. Implantologie / Gnatoprosthetics. Implantology, Medicina Stomatologică, 9(6), 2005.

Ivkovic N, Racic M, Structural and Functional Disorders of the Temporomandibular Joint (Internal Disorders). Intech Open, 2018. DOI: 10.5772/intechopen.81937.

Lomas J, Gurgenci T, Jackson C, Campbell D, Temporomandibular dysfunction, Australian Journal of general Paractice, 47 (4), 2012-2014, 2018.

Luther F1, Layton S, McDonald F. Orthodontics for treating temporomandibular joint (TMJ) disorders. Cochrane Database Syst Rev. (7), 2010.

Manfredini D, Piccotti F, Ferronato G, Guarda-Nardini L. Age peaks of different RDC/TMD diagnoses in a patient population. J Dent. 38(5), 2010.

Mitchel B, Cummins C, LeFebre R, Salava A, Temporomandibular joint disorders: A clinical assessment, 2014.

Ohrbach R, Larsson P, List T, The jaw functional limitation scale: development, reability, and validity of 8-item and 20-item versions. J. Orofac Pain, 2008.

Ohrbach R, Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) Scoring Manual for Self-Report Instruments. Prepared by Richard Ohrbach (University at Buffalo, NY, US) and Wendy Knibbe (ACTA, Amsterdam, The Netherlands) Version: January 9, 2017.

Schiffman E, Ohrbach R, Truelove E, Look J, Anderson G, Goulet JP, List T, Svensson P, Gonzalez Y, Lobbezoo F, Michelotti A, Brooks SL, Ceusters W, Drangsholt M, Ettlin D, Gaul C, Goldberg LJ, Haythornthwaite JA, Hollender L, Jensen R, John MT, De Laat A, de Leeuw R, Maixner W, Van der Meulen M, Murray GM, Nixdorf, Palla S, Petersson A, Pionchon P, Smith B, Visscher CM, Zakrzewska J, Dworkin SF, Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications: Recommendations of the International RDC/TMD Consortium Network and Orofacial Pain Special Interest Group, Journal of Oral & Facial Pain and Headache, 28 (1), 6–27, 2014.

Ulyana D, Telishevska, OD, Telishevska DHL, National Medical University, Lviv, Ukraine, Klasyfikacje zaburzeń skroniowo-żuchwowych i protokołów badań pacjentów – analiza porównawcza pod kątem możliwości ich codziennego stosowania w praktyce klinicznej, 2018

Weinberg LA, Chastain JK, New TMJ clinical data and the implication on diagnosis and treatment. J Am Dent Assoc., 120(3), 305-11, 1990

Vicas L, Cseppento C, Practical course of physiotherapy, ISBN 973-9268-47-1, Oradea, Convex, 2006.