

Temporomandibular Disorders: A Report of 124 Patients

Reynaldo Leite Martins-Júnior, DDS, MS; Antônio José Garcia Palma, DDS, MS; Emilio Jose Marquardt, DDS; Thais Monteiro de Barros Gondin, DDS; Florence de Carvalho Kerber, DDS

Abstract

Aim: This study aims to present both the features of 124 consecutive patients with temporomandibular disorders (TMDs) and the results of a reversible, conservative, and low-tech treatment.

Methods and Materials: One hundred fifty-eight records of consecutive patients treated in School of Dentistry at the Univag–University Center in Várzea Grande-MT, Brazil, 124 of whom were considered TMD patients, were examined. The following data were obtained: gender, age, main complaint, diagnosis, co-morbidities, type of treatment performed, and treatment results. The patients who received a successful treatment were contacted for reevaluation four to six years after the conclusion of treatment.

Results: Pain was the main complaint for 92.7 percent of the patients. The majority of patients were female (female:male ratio of 4.1:1), with a peak age range between 20 and 30 years. Roughly 59.7 percent of the patients were diagnosed as having a muscular TMD, 12.9 percent as an articular TMD, and 27.4 percent as a mixed TMD. The success rate for treatment was 91.7 percent, and there was a tendency toward the long-term maintenance of good results.

Conclusion: The features of the 124 TMD patients treated were similar to those reported in the literature with regard to gender, age, and diagnostic prevalence. Most of the disorders



were of a muscular origin, and there was a predominance of women between 20 and 30 years of age. The conservative, reversible, and low-tech treatment success rate for TMD can reach values above 90 percent. Therefore, there is no need for invasive, irreversible, expensive, or high-tech treatments for the majority of patients.

Clinical Significance: The majority of TMD patients can benefit from reversible, conservative, and low-tech treatments such as parafunction control and therapeutic exercises that can be performed by any clinician once an accurate diagnosis has been made.

Keywords: Temporomandibular joint disorders, temporomandibular joint dysfunction syndrome, craniomandibular disorders, TMD

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Introduction

Temporomandibular disorders (TMD) is a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular joint (TMJ), and the associated structures.¹ The symptoms of TMD include pain or tenderness in the temporomandibular joint, muscles of mastication, and facial areas or ear region; clicking, popping, or grating sounds when opening or closing the mouth; catching or locking of the joint; limitations in opening or closing the mouth; and difficulty or discomfort while chewing.² TMD prevalence is higher in women than men, with a peak incidence around 35 years of age.³⁻⁷ Reports indicate a multifactorial or even idiopathic etiology for TMD.^{8,9}

TMD diagnosis is based on the evaluation of the patient's history and a clinical examination, which can be supplemented by TMJ imaging such as computed tomography (CT) or magnetic resonance image (MRI) when necessary.¹⁰⁻¹² The literature has supported the use of several conservative and reversible modalities for TMD management.¹³⁻²¹ Spontaneous remission,²² regression to the mean,^{23,24} and the placebo effect^{25,26} can play a relevant role on the resolution of symptoms. The dental curriculum of the Univag—University Center includes a service for temporomandibular disorder treatment.

The aim of this report is to present both the features of 124 consecutive patients with temporomandibular disorders (TMDs) and the results of a reversible, conservative, and low-tech treatment.

Methods and Materials

In this retrospective study, the records of 158 consecutive patients treated in the School of Dentistry of the Univag—University Center between

2002 and 2004 were examined. The following data were obtained: gender, age, main complaint, diagnosis, co-morbidities, type of treatment performed, and results of that treatment. These data were obtained in 2008. The patients who achieved a successful treatment were contacted and asked three questions four to six years after the conclusion of treatment. This study received approval from the Research Ethical Committee of Julio Muller Hospital, Federal University of Mato Grosso, Cuiaba-MT (Brazil).

Patient Exam and Diagnosis

Two clinicians, who are among the authors of this report, performed the patient examinations, determined the diagnosis, and rendered the recommended treatment but did not participate in the follow-up evaluations. The patients' recorded medical history was used to obtain the following data related to the patient's chief complaint: age of onset and frequency, duration, and intensity of pain.

To rate pain, a verbal numeric rating scale was used where the patients were asked to score their pain from zero to 10, with zero indicating "no pain" and 10 indicating "worst imaginable pain,"²⁷ and character (e.g.; shooting, throbbing, burning, etc). Patients also were asked to provide the following information: site and spread of pain; accompanying symptoms and abnormalities; precipitating, relieving, and worsening factors; association with trauma; previous treatments and their results; and medical and odontological history. Subsequently, a physical exam was performed, which included digital palpation of mastication and cervical muscles and the TMJ; measurement of the amplitude and pattern of mandibular opening (unassisted open without pain, maximal unassisted open, and maximal assisted open); and evaluation of opening, closing, and lateral movements. All these procedures were realized based on the research diagnostic criteria (RDC-TMD),¹ with the following exceptions: the clinicians did not palpate the intraoral areas (lateral pterygoid area and tendon of temporalis) and for muscular TMD, they did not make the difference between myofascial pain and myofascial pain with limited opening (both were classified as "muscular TMD"). In order to be classified as "muscular TMD," the patient had to recognize the pain on palpations as the pain for the chief complaint. Next, an examination of the oral and peri-oral structures, lymph nodes, and cranial nerves was performed according to Eversole and

Table 1. Diagnostic criteria (modified from RDC-TMD).¹

Types of TMD	Criteria
Muscular TMD	
Muscular	<ul style="list-style-type: none"> Pain in the mastication musculature that worsens during mandibular function and is reproduced and recognized by the patient during muscular palpation
Articular TMD	
Disc displacement with reduction (DDR)	<ul style="list-style-type: none"> A "click" in the TMJ during mouth opening and closing, with deviation during opening toward the affected side that is corrected after the sound is produced
Disc displacement without reduction (DDNR)	<ul style="list-style-type: none"> Limited mouth opening with a history of sudden onset Deflection to the affected side on mouth opening Limitation of contralateral joint movement History of articular sound (clicking-type) with disappearance of the sound coincident with the onset of the opening limitation
Osteoarthrosis	<ul style="list-style-type: none"> Crepitus-type articular sound An image showing evidence of a degenerative process at the TMJ
Osteoarthritis	<ul style="list-style-type: none"> Osteoarthrosis criteria plus pain at the TMJ during rest and/or function as well as TMJ palpation
Arthralgia	<ul style="list-style-type: none"> Pain localized at the TMJ during rest and/or function without crepitation TMJ images showing no degenerative process Pain upon palpation of the TMJ

Silverman.²⁸ From the data obtained, the specific TMD diagnosis and classification were made using criteria modified from RDC-TMD, as shown in Table 1.

Accomplished Treatments

The initial option for treatment consisted of conservative, reversible, and low-tech therapies based on data obtained from literature.¹³⁻¹⁷

All patients were advised of the nature and extent of their particular condition, including its benign and cyclic character, its controversial etiology, possible trigger factors, and the probability of a good prognosis after controlling these factors. Audiovisual resources such as photographs, movies, and computerized animations were used whenever possible. All patients also were counseled to avoid some parafunctional habits, such as biting nails or objects, chewing gum, and clenching their teeth during the day by keeping them separated as much as possible. We suggested that patients adopt some sort of reminder for their routines. For example, they could program their mobile phones to beep

every 20 minutes to check for dental contact; if positive contact was present, the patient would then separate the jaws and relax the mandible.

Additionally, muscular TMD patients were encouraged to apply moist heat on the painful muscles for 20 minutes three times a day. Additionally, they were instructed to perform active range-of-motion exercises three times a day: they should slowly open their mouth as wide as they could and keep the mouth in this position while counting from 1 to 10. Then, they should slowly close the mouth and repeat this movement 10 times. They should do the same for lateral jaw movements to the right and left sides. A Michigan splint for nocturnal use was only recommended in cases of either evident bruxism or pain immediately upon awakening. Trigger-point injections using lidocaine 1 percent without epinephrine were only administered in cases involving failure of the aforementioned procedures.

Patients with articular disc displacement with reduction (DDR) were informed of the benign and rarely progressive nature of this condition. When

possible, patients were trained to either limit their mouth opening or avoid specific mandibular movements that could trigger the articular sound. Patients with articular disc displacement without reduction (DDNR) were instructed to perform the therapeutic exercises recommended by Yuasa and Kurita.¹⁴

In cases involving osteoarthritis, in addition to the general guidelines already described that were recommended to all patients, a Michigan splint was used during sleep in order to prevent overloading the TMJ. The osteoarthritis treatment protocol, after exclusion of the possibility of systemic disease by a rheumatologist, consisted of using one or more of the following treatment protocols: a Michigan splint during sleep, ice application on the TMJ, gentle exercises of movement (opening, lateral, and protrusion), and the use of an analgesic. If these procedures failed, a nonsteroidal, anti-inflammatory drug (NSAID) was added to the treatment protocol.

In cases where these treatments were not successful and the symptoms failed to resolve or recurred and adversely affected the patient's quality of life, the next step involved discussing with the patient the possibilities of arthrocentesis, corticosteroid infiltration, or even surgical procedures. Patients with arthralgia were treated with an analgesic and NSAID, gentle exercises, and cold applications on painful TMJ for 20 minutes three times a day.

Results Assessment

Treatment results were evaluated during subsequent appointments, in which all initial examinations were repeated and the patients were asked again to report their pain levels and by choosing one of the following options: "worse," "unchanged," "a little bit better," "better," "much better," or "symptom-free."

Treatment was considered successful when there was a considerable improvement in the signs and symptoms. Improvement was deemed to be achieved when the patients reported the condition as "much better" or "symptom-free" for three consecutive appointments in a 45- to 60-day period. Clinically, this meant no pain or pain frequency and intensity on a much lower level than before the treatment. In addition, unassisted opening without pain had to be equal to or above

40 mm. Patients whose single complaint was an articular sound (clicking or crepitus), i.e., the patients classified only as "osteoarthritis" or "DDR", without pain, were excluded from the evaluation in Table 3 because the elimination of these symptoms was not one of the treatment goals.

Those patients with no or only slight improvement who still needed professional care even after all of the procedures were classified as therapy failures.

Results

Of the 158 patients whose records were evaluated, 124 (78.5 percent) were classified as having some TMD subtype previously described. Thirty-four of the original 158 patients who actually sought treatment were evaluated and judged not to be TMD patients. Their diagnoses included odontogenic pain, condyle hypertrophy, coronoid process hyperplasia, burning mouth syndrome, bruxism, primary headache, otalgia, fibromyalgia, trigeminal neuralgia, and rhinosinusitis.

TMD patients were predominantly women (100 of the 124 patients, or 80.6 percent), for a female:male ratio of 4.1:1, with a peak age range between 20 and 30 years and a mean age of 34.2 years (Figure 1).

Pain, either separately or in association with another symptom (e.g., articular sound), was the main reason for seeking treatment (Table 2).

The majority of subjects (59.7 percent) were classified with the muscular subtype of TMD. Table 3 summarizes both the diagnosis and the response to treatment for the 124 patients treated.

Sixty-one of the TMD patients (49.2 percent) presented co-morbidities that included a primary headache (n=26), rhinosinusitis (n=6), and neck pain (n=29). Fifteen patients had more than one co-morbidity.

Among the 110 (91.7 percent) patients for whom treatment was successful, the initial mean pain value was 7.06. However, by the end of treatment, this mean value declined to 0.37 on the zero to 10 scale mentioned previously. An evaluation of this group was performed four

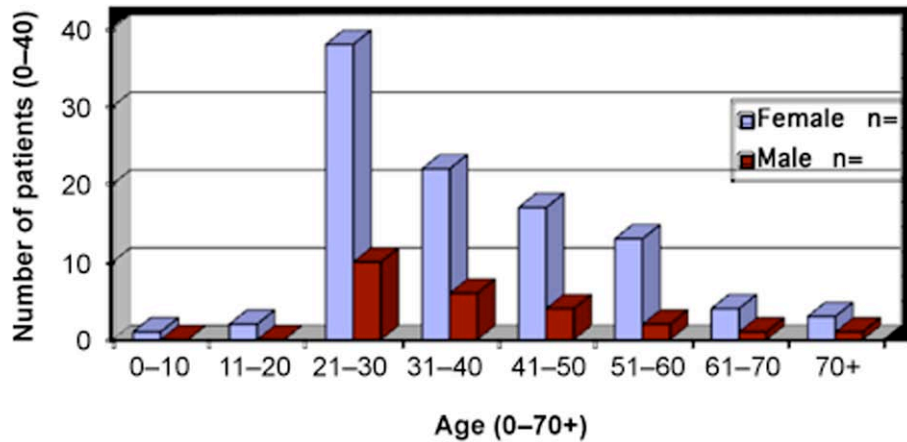


Figure 1. Distribution of TMD subjects by gender and age.

Table 2. A list of the patients' chief complaints.

Chief Complaints	Number of Patients (n)	Percentage (%)
Pain	68	54.8
Pain and others (open lock, closed lock, articular sound)	47	37.9
Others (open lock, closed lock, articular sound)	9	7.3
Total	124	100

Table 3. Distribution of diagnosis and treatment outcomes.

Types of Temporomandibular (TMD) Disorders	Number (n)	Percentage (%)	Evaluated	Success	Percentage (%)
Muscular	74	59.7	74	69	93.2
Articular	16	12.9			
DDR = 3			—	—	
DDNR = 9			9	9	100
Osteoarthritis = 1			—	—	
Osteoarthritis = 2			2	1	50
Arthralgia = 2			2	2	100
Mixed	34	27.4			
Muscular + DDR = 29			29	26	89.7
Muscular + DDNR = 4			4	3	75
Total	124	100	120	110	91.7

Table 4. Results of the reevaluation four to six years after completion of treatment.

Question 1. Did you perform the management as directed?		
	Number of Patients (n)	Percentage (%)
Yes	29	80.6
No	2	5.6
Rarely	5	13.9
Total	36	100.0
Question 2. How do you find yourself today regarding your symptoms?		
I did not have any pain and/or locking episode	29	80.6
I had less pain and/or locking episodes, with less intensity, and I control them by myself	7	19.4
I had fewer pain and/or locking episodes with a lower intensity, but I still need professional care	0	0
I had as much pain and/or locking episodes than before, but I control them by myself	0	0
I had as much pain and/or locking episodes than before, and I still need professional care	0	0
I had more pain and/or locking episodes	0	0
Question 3. What is your degree of satisfaction with the treatment you received? (0= no satisfaction at all; 10 = totally satisfied)		
Grade Rating Scale (0–10)		
10	29	80.5
9	6	16.7
8	1	2.8
Total	36	100

to six years after treatment via a standardized questionnaire and those results are presented in Table 4. The patients from the unsuccessful treatment group were not contacted.

Discussion

Several of the patients included in this study sought treatment due to symptoms of other origins, and several showed the presence of other conditions together with TMD. Such situations emphasize the need for dentists to recognize the differential diagnoses between TMD and other sources of pain in the orofacial region. They also highlight the need for interdisciplinary treatment planning between different health professionals in certain cases, such as neurologist, ear-nose-and-throat (ENT) physicians, and physical therapists.

In the present study, treatment was considered successful for 91.7 percent of the patients. The

majority of patients (n=29, or 80.6 percent) who could be evaluated four to six years after the conclusion of treatment showed no TMD recurrence (Table 4). A small portion (n=7, or 19.4 percent) of these patients presented occasional recurrence of symptoms, although at a decreased frequency and intensity. These results were an improvement compared to the reported results of other authors, such as Nikolakis et al.,¹⁵ De Laat et al.,¹⁶ and Michelotti et al.¹⁷ These authors demonstrated treatment success in 80 percent, 60 percent, and 77 percent of patients, respectively, compared to our 91.7 percent success rate.

One of the possible reasons for this difference is the fact that the subjects in our patient population had been directly referred by general clinicians without previous treatment. In fact, they actually received their first treatments in our clinic. Therefore, it is likely that the sample in this study was more diverse in comparison to traditional tertiary care services, where the patients consisted

of a higher number of refractory patients who have already received simpler therapies without demonstrating any improvement.

Another reason for the high success rate may be the fact that the criteria for successful treatment did not necessarily require the complete resolution of all symptoms. For example, in patients with muscular TMD pain and simultaneous clicking occurrence, pain relief was a goal, but sound elimination was not. Thus, patients were discharged after pain was controlled, even if they still made an articular sound. Such symptoms are currently considered to be within the bounds of normal variation, and they rarely develop into more severe dysfunctions.^{29,30} For the same reason, four patients with a single complaint of articular sound were not evaluated with regard to their treatment results.

One of the main limitations of this study involves the absence of a control group. The improvement of the symptoms in patients with TMD occurs due to specific and nonspecific treatment factors. In the latter case, these may include spontaneous remission,²² regression to the mean,^{23,24} and the placebo effect.^{25,26} Therefore, it would be erroneous to attribute a patient's clinical improvement exclusively to the treatment. This idea is supported by the results of the question regarding the treatment procedures under the patient's own management. Although the standard answers were initially "yes" or "no," some patients declared that they performed these procedures in an infrequent manner. Because of this possible outcome, a third response option ("rarely") was added. Consequently, about 20 percent of the patients who achieved success affirmed that they did not properly execute the control procedures (i.e., at least in these cases, treatment would have not been a determining factor for the resolution of the symptoms). This number may be even higher if we presume that some subjects may have been reluctant to admit that they had not performed the in-home exercises.

Despite this limitation, and regardless of the specific and nonspecific effects, the findings of this study demonstrate that a conservative, reversible, low-cost, and low-tech approach is sufficient for controlling most TMD patients. None of the subjects evaluated received treatment with any electronic device, underwent treatment that resulted in

permanent changes to their occlusion, or received any type of dentofacial orthopedic or orthodontic device. For these patients, any irreversible or invasive treatment would have been considered overtreatment. In our sample, invasive approaches were limited to arthrocentesis (one patient) and the infiltration of trigger points with a local anesthetic to relieve myofascial pain (three patients).

TMD exhibits cyclic characteristics;³¹ therefore, longitudinal follow-up of these patients is important. Consequently, the low number of patients contacted four to six years after the conclusion of treatment is another limiting factor in this study. Of the 110 patients who achieved treatment success, we managed to contact 36 (32.7 percent). The other 74 (67.3 percent) could not be reached because the telephone numbers for them in their files were either disconnected or incorrect. Despite this limitation, there is no reason to believe that there should be any differences between the subjects who were reached and those who were not.

A minority of subjects (19.4 percent) classified as having successful treatment (Table 4) presented with subsequent TMD episodes in the long term. However, when these episodes did occur, they exhibited a reduced frequency and intensity. Further, these patients showed autonomy by assuming self-management of their condition, thereby affirming that they could control the episodes by themselves via the in-home procedures that they had already learned. The high satisfaction rating for the treatments performed revealed that the majority of well-oriented patients could function more normally despite these few remaining symptoms.

These good outcomes notwithstanding, it is important to emphasize that some subjects did not show any improvement despite all efforts. Although these cases were rare, they consumed a significant amount of clinical time due to frequent follow-up appointments and frustrating outcomes. These patients would probably benefit from management by multidisciplinary team care. Assessment of the reasons for treatment failure in these patients, however, lies outside the objectives of this study.

Conclusion

1. The features of the TMD patients treated at the School of Dentistry of Univag are similar

to those reported in the literature with regard to gender, age, and diagnostic prevalence. Most of the disorders were of a muscular origin, and there was a predominance of TMD among women of child-bearing age.

2. The conservative, reversible, and low-tech treatment success rate for TMD can reach values above 90 percent. Therefore, there is no need for invasive, irreversible, expensive, or high-tech treatments for the majority of patients.

Clinical Significance

The majority of TMD patients can benefit from reversible, conservative, and low-tech treatments, such as patient parafunctional control and therapeutic exercises, that can be provided by any clinician once an accurate diagnosis has been made.

References

1. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord.* 1992; 6(4):301-55.
2. Klasser GD, Greene CS. The changing field of temporomandibular disorders: what dentists need to know. *J Can Dent Assoc.* 2009; 75(1):49-53.
3. LeResche L. Epidemiology of temporomandibular disorders: implications for the investigation of etiologic factors. *Crit Rev Oral Biol Med.* 1997; 8(3):291-305.
4. Von Korff M, Dworkin SF, LeResche L, Kruger A. An epidemiologic comparison of pain complaints. *Pain.* 1988; 32(2):173-83.
5. Nomura K, Vitti M, Oliveira AS, Chaves TC, Semprini M, Siéssere S, Hallak JE, Regalo SC. Use of the Fonseca's questionnaire to assess the prevalence and severity of temporomandibular disorders in Brazilian dental undergraduates. *Braz Dent J.* 2007; 18(2):163-7.
6. AO, Oginni FO, Adekoya-Sofowora CA. Signs and symptoms of temporomandibular disorders in Nigerian adult patients with and without occlusal tooth wear. *Community Dent Health.* 2007; 24(3):156-60.
7. Janal MN, Raphael KG, Nayak S, Klausner J. Prevalence of myofascial temporomandibular disorder in US community women. *J Oral Rehabil.* 2008; 35(11):801-9.
8. Michelotti A, Iodice G. The role of orthodontics in temporomandibular disorders. *J Oral Rehabil.* 2010; 37(6):411-29.
9. Greene CS. The etiology of temporomandibular disorders: implications for treatment. *J Orofac Pain.* 2001; 15(2):93-105; discussion 106-16.
10. Mohl ND. Temporomandibular disorders: the role of occlusion, TMJ imaging, and electronic devices. A diagnostic update. *J Am Coll Dent.* 1991; 58(3):4-10.
11. Mohl ND, McCall WD Jr, Lund JP, Plesh O. Devices for the diagnosis and treatment of temporomandibular disorders. Part I: Introduction, scientific evidence, and jaw tracking. *J Prosthet Dent.* 1990; 63(2): 198-201.
12. McNeill C, Mohl ND, Rugh JD, Tanaka TT. Temporomandibular disorders: diagnosis, management, education, and research. *J Am Dent Assoc.* 1990; 120(3):253, 255, 257 passim.
13. Gramling SE, Neblett J, Grayson R, Townsend D. Temporomandibular disorder: efficacy of an oral habit reversal treatment program. *J Behav Ther Exp Psychiatry.* 1996; 27(3):245-55.
14. Yuasa H, Kurita K; Treatment Group on Temporomandibular Disorders. Randomized clinical trial of primary treatment for temporomandibular joint disk displacement without reduction and without osseous changes: a combination of NSAIDs and mouth-opening exercise versus no treatment. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2001; 91(6):671-5.
15. Nicolakis P, Erdogmus B, Kopf A, Nicolakis M, Piehslinger E, Fialka-Moser V. Effectiveness of exercise therapy in patients with myofascial pain dysfunction syndrome. *J Oral Rehabil.* 2002; 29(4):362-8.
16. De Laat A, Stappaerts K, Papy S. Counseling and physical therapy as treatment for myofascial pain of the masticatory system. *J Orofac Pain.* 2003; 17(1):42-9.
17. Michelotti A, Steenks MH, Farella M, Parisini F, Cimino R, Martina R. The additional value of a home physical therapy regimen versus patient education only for the treatment of myofascial pain of the jaw muscles: short-term results of a randomized clinical trial. *J Orofac Pain.* 2004; 18(2):114-25.

18. Ismail F, Demling A, Hessling K, Fink M, Stiesch-Scholz M. Short-term efficacy of physical therapy compared to splint therapy in treatment of arthrogenous TMD. *J Oral Rehabil.* 2007; 34(11):807-13.
19. Riley JL 3rd, Myers CD, Currie TP, Mayoral O, Harris RG, Fisher JA, Gremillion HA, Robinson ME. Self-care behaviors associated with myofascial temporomandibular disorder pain. *J Orofac Pain.* 2007; 21(3):194-202.
20. Al-Ani Z, Davies S, Sloan P, Gray R. Change in the number of occlusal contacts following splint therapy in patients with a temporomandibular disorder (TMD). *Eur J Prosthodont Restor Dent.* 2008; 16(3):98-103.
21. Alencar F Jr, Becker A. Evaluation of different occlusal splints and counselling in the management of myofascial pain dysfunction. *J Oral Rehabil.* 2009; 36(2):79-85.
22. Kurita K, Westesson PL, Yuasa H, Toyama M, Machida J, Ogi N. Natural course of untreated symptomatic temporomandibular joint disc displacement without reduction. *J Dent Res.* 1998; 77(2):361-5.
23. Whitney CW, Von Korff M. Regression to the mean in treated versus untreated chronic pain. *Pain.* 1992; 50(3):281-5.
24. Barnett AG, van der Pols JC, Dobson AJ. Regression to the mean: what it is and how to deal with it. *Int J Epidemiol.* 2005; 34(1):215-20.
25. Goodman P, Greene CS, Laskin DM. Response of patients with myofascial pain-dysfunction syndrome to mock equilibration. *J Am Dent Assoc.* 1976; 92(4):755-8.
26. Greene CS, Goddard G, Macaluso GM, Mauro G. Topical review: placebo responses and therapeutic responses. How are they related? *J Orofac Pain.* 2009; 23(2):93-107.
27. Holdgate A, Asha S, Craig J, Thompson J. Comparison of a verbal numeric rating scale with the visual analogue scale for the measurement of acute pain. *Emerg Med (Fremantle).* 2003; 15(5-6):441-6.
28. Eversole LR, Silverman S Jr. Physical diagnosis of the head and neck. In: Silverman S Jr, Eversole LR, Truelove EL, editors. *Essentials of oral medicine.* Hamilton, Ontario, Canada: BC Decker; 2001. p. 6-26.
29. Lundh H, Westesson PL, Koop S. A three-year follow-up of patients with reciprocal temporomandibular joint clicking. *Oral Surg Oral Med Oral Pathol* 1987; 63(5):530-3.
30. Greene CS, Laskin DM. Long-term status of TMJ clicking in patients with myofascial pain and dysfunction. *J Am Dent Assoc.* 1988; 117(3):461-5.
31. Egermark I, Magnusson T, Carlsson GE. A 20-year follow-up of signs and symptoms of temporomandibular disorders and malocclusions in subjects with and without orthodontic treatment in childhood. *Angle Orthod.* 2003; 73(2):109-15.

About the Authors

Reynaldo Leite Martins-Júnior, DDS, MSc (Corresponding Author)



Dr. Martins-Júnior received his master's of science degree in 2006 from the UNIFESP-Escola Paulista de Medicina in São Paulo/SP, Brazil. Currently he is a professor of orofacial pain in the School of

Dentistry at the Univag–Centro Universitário in Varzea Grande-MT, Brazil. He is also a member of the Department of Dentistry of the Mato Grosso Cancer Hospital in Cuiabá-MT. His research interests include temporomandibular disorders and orofacial pain.

e-mail: reynaldo@terra.com.br

Antônio José Garcia Palma, DDS, MS



Dr. Palma is a professor of orofacial pain in the School of Dentistry at the Univag–Centro Universitário in Varzea Grande-MT, Brazil. He is also a member of the Department of Dentistry of the Mato Grosso

Cancer Hospital in Cuiabá-MT. His research interests include temporomandibular disorders and orofacial pain.

Emilio Jose Marquardt, DDS



Dr. Marquardt received his dental degree in 2004 from School of Dentistry of Univag–University Center in Várzea Grande, MT, Brazil. Currently he maintains a private practice in Cuiabá, MT, Brazil.

Thais Monteiro de Barros Gondin, DDS



Dr. Gondin received her dental degree in 2005 from School of Dentistry of Univag—University Center in Várzea Grande, MT, Brazil. Currently she maintains a private practice in Rondonópolis, MT, Brazil.

Florence de Carvalho Kerber, DDS



Dr. Kerber received her dental degree in 2005 from School of Dentistry of Unic—University of Cuiabá, in Cuiabá, MT, Brazil. Currently she is a student in the School of Medicine at Unic—University of Cuiabá in Cuiabá, MT, Brazil.