CURSO DE ODONTOLOGIA

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ANÁLISE MORFOMÉTRICA DE MANDÍBULAS DE INDIVÍDUOS MESOFACIAIS

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Trabalho de Conclusão de Curso apresentado ao Curso de Odontologia da Universidade de Santa Cruz do Sul para obtenção do título de Cirurgiã-Dentista.

Orientador: Prof. Dr. Deivis de Campos

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Este artigo foi submetido à disciplina de Trabalho de Conclusão de Curso do Curso de Odontologia da Universidade de Santa Cruz do Sul-UNISC como requisito parcial para obtenção do título de Cirurgiã-Dentista.

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RESUMO

O conhecimento da organização do músculo masseter (MM) e temporal (TM) é extremamente importante quando relacionado ao estudo do sistema estomatognático. Além disso, alguns autores têm demonstrado que a mastigação é de grande importância, não só para a ingestão de alimentos, mas também para as funções sistêmicas, mentais e físicas do corpo. Assim, decidimos analisar o potencial biomecânico (comprimento do braço de força, trabalho muscular e vantagem mecânica) da MT e MM em mandíbulas de indivíduos mesofaciais. Nossos resultados mostraram que MM apresentam um potencial biomecânico melhor que MT. Com esses dados, os ortodontistas podem desenvolver um plano de tratamento específico e obter melhores resultados, especialmente nos casos de pacientes onde a biomecânica padrão da articulação temporomandibular é desfavorável.

Palavras-chave: músculo masseter; músculo temporal; mesofacial; mandíbulas.

Abstract

Knowledge of the organization of the masseter (MM) and temporal (TM) is extremely important when related to the study of the stomatognathic system. Moreover, some author's have shown that mastication is of great importance, not only for the intake of food but also for the systemic, mental and physical functions of the body. Thus, we decided to analyze the biomechanical potential (length of the force arm, muscular work and mechanical advantage) of the TM e MM in mandibles of mesofacial subjects. Our results shown that MM exhibit a better biomechanical potential that TM. With these data, orthodontists may develop a specific treatment plan and get better results, especially in cases of patients where the biomechanical pattern of the temporomandibular joint is unfavorable.

Key words: masseter muscle; temporal muscle; mesofacial; mandibles.

SUMÁRIO

MORPHOMETRIC ANALYSIS OF MANDIBLES OF MESOFACIAL INDIVIDUALS

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Running title: Biomechanics of the temporal and masseter muscles

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Abstract

Knowledge of the organization of the masseter (MM) and temporal (TM) is extremely important when related to the study of the stomatognathic system. Moreover, some author's have shown that mastication is of great importance, not only for the intake of food but also for the systemic, mental and physical functions of the body. Thus, we decided to analyze the biomechanical potential (length of the force arm, muscular work and mechanical advantage) of the TM e MM in mandibles of mesofacial subjects. Our results shown that MM exhibit a better biomechanical potential that TM. With these data, orthodontists may develop a specific treatment plan and get better results, especially in cases of patients where the biomechanical pattern of the temporomandibular joint is unfavorable.

Key words: masseter muscle; temporal muscle; mesofacial; mandibles.

1. Introduction

Recently, some studies have shown important information about the functional organization of the human temporal muscle (TM). Although there are some studies that describe the type of fiber, the thickness and the neuromuscular pattern of the masticatory muscles (1- 4) the descriptions regarding the biomechanics organization of masticatory muscles in specific craniofacial standards are still inadequate, especially those that aim to elucidate the biomechanical differences between TM and MM. Knowledge of the organization of the masseter and temporalis muscles is extremely important when related to the study of the stomatognathic system. This knowledge of the masticatory muscle organization assists in research associated with occlusion, the facial growth and temporomandibular disorders (5- 7). Thus, we decided to analyze the biomechanical potential (length of the force arm, muscular work and mechanical advantage) of the TM e MM in mandibles of mesofacial (ME) subjects.

2. Materials and Methods

2.1. Mandibles and morphometric measurements

For this study we utilize 34 mandibles of adult subjects [mean age=45.5±7.1] of both genders, from the collection of the Laboratory of Human Anatomy of University of Santa Cruz do Sul (UNISC) (ethics committee - protocol 141346). All quantification procedures of the length of the force arm, muscular work and mechanical advantage were made according to previous protocols used in research at our university (8).

The distance between the condylar process and the coronoid process (the insertion site of the temporalis muscle) represents the length of the force arm (LFA) of the TM, whereas the distance between the condylar process and mental protuberance is

the length of the resistance arm (LRA) (Figure 1). Similarly, the distance between the condylar process and the anterior border of the masseteric tuberosity (the insertion site of the masseter muscle) represents the L_{FA} of the MM, whereas the distance between the condylar process and mental protuberance is the L_{RA} (Fig 1). Thus, the mechanical advantage of the TM and MM can be obtained using the following ratio: LFA/LRA. The inverse of this ratio represents the muscular work (LRA/LFA) of both muscles.

All measurements were performed on both sides (right and left) of all mandibles. However, we decided to use data from only one side (left), because using the paired *t* test, we conclude that there is no statistical difference between the sides and no apparent tendency toward any such difference ($p = 0.3574$). Were used only mandibles without any deformity or evidence of bone pathology.

2.2. Statistical analysis

In order to verify the variables studied in this work we used paired t test**.** Moreover, the Pearson's correlation coefficients were also calculated to determine the relationship between the results obtained by the two blinded researchers. A P value of 0.05 or less was considered significant in all statistical tests performed. Data was analyzed with the aid of GraphPad Prism 5.01 software (GraphPad Software, Inc.; San Diego, CA).

3. Results

In the present study, the value obtained by the correlation test was 0.9587. This value demonstrates the high level of reliability of the observations made by the blinded researchers. The comparence of biomechanical potential between TM and MM in mandibles ME, showed that the results were significantly higher in MM for LFA and

mechanical advantage, 17.2% and 19.0%, respectively. Thus, the muscular work of TM proved to be 17.0% higher than the MM (Table 1).

4. Discussion

The masseter muscle extends from the zygomatic arch to the branch of the mandible. The muscle can be divided into two parts, one superficial and another profound. The superficial part originates from the lower edge of the zygomatic bone, and extends back to the middle of the zygomatic arch (zygomatic temporal suture). The deep portion comes from the inferior border and the medial surface of the zygomatic arch, and extended to the limit of the articular eminence. Thus, we believe that the surface portion is more anterior, and the deep portion is more later, and that through these provisions, the surface fibers are present more inclined, while the deep fibers have a more vertical presentation. Both the superficial portion as the deep portion of the masseter muscle insertion have a large area occupying the lower two thirds of the lateral surface of the mandible branch, with the deepest part of the fibers above and the superficial part below (9 - 12).

On the other hand, the temporal muscle is located above the temporal line and the edge of the frontal process of the zygomatic bone. This muscle is characterized as a muscle that triggers more movement than strength. The anterior, middle and posterior muscle tendon converge in a wide range such that an open to the space between the skull and zygomatic arch and inserting the coronoid process of mandible. It presents its parallel fibers unlike the masseter that are twisted, and longer fibers. (11 - 13).

Given these differences, several studies attempt to demonstrate possible differences between the masseter and temporal muscles in relation to type of muscle fiber that each muscle presents (1, 2). Based on these possible differences we could

trace a specific functional profile for each muscle. However, the literature has shown that both muscles have similar patterns in relation to type of muscle fiber (14-16). Our results demonstrate that the biomechanical pattern is significantly different from the organization of the muscles. So, we can infer that the greatest power of the masseter muscle is created by biomechanics organization and not by differences in the types of muscle fibers.

It is considered that the provision of the muscles may suffer influence of craniofacial morphology, thus, functions related to the stomatognathic system may be affected as well as the mechanical performance of the masticatory system. The variation of the magnitude of maximum applied force will depend on the size and layout of the muscle fibers, and these change depending on the craniométrico pattern of each subject. (14 -16).

If we draw a comparison between individuals with reduced cranial proportions to those in their cranial proportions are more elongated, we see that the first have a mechanical advantage in lifting mandibular muscles (17, 18).

So long face individuals when compared to brachyfacials have a mechanical disadvantage, as there is a negative association between the resistance arm is exercised by the masseter muscle and power arm that is generated by the bite force. (17, 19). Studies indicate that a smaller capacity of the masticatory function is related to long-face subjects. The amplitude of force is related to muscle size, architecture and its position in relation to the joint (20).

The mechanical advantage is considered an important principle; however, the determination of the muscular efficiency is set by the size of the masticatory muscles. (21). Several studies have evaluated the masseter muscle and temporal during the

chewing process. The vast majority analyzed the behavior of these muscles taking into account the gender differences, age and types of food (22-24).

The study that evaluates the masseter muscle in female adults, showed that there is an association between the thickness and the electrical action occurs when pressing the teeth. This means that the more compact is the muscle, the greater its electrical action (25).

Another study compared the behavior of the anterior temporal muscle and masseter muscle in young and elderly subjects, during mastication and during rest, subjected to three distinct types of food. During the rest, the muscles in elderly subjects showed increased activity, as occurred when the masticatory process yielded a lower electrical activity of the muscles studied (26).

The masseter and temporal muscles perform a crucial role in mastication (27). It is known that chewing may suffer many interference factors such as the structure of teeth, occlusal pattern, the temporomandibular joint (TMJ), craniofacial profile, the posture of the head and neck, mouth breathing and poor eating habits (9). Miyamoto K. et al. (1996) (28), reinforces the shape and size of the craniofacial skeleton is related to the function as well as Charalampidou et al. (2008) (19) reinforces the craniofacial features associated with the functionality of the masseter muscle or its mechanical advantage. The masticatory function also considers the relationship between the morphological and functional aspects of the temporomandibular joint, teeth and the neuromuscular system (22).

Sometimes there is a relationship between form and function, but genetically it is not known whether the facial morphology defines the strength of the jaw muscles, or if the opposite occurs, that is a strong influence on the shape of the face muscles. Thus,

the planning of orthodontic treatment should take into account both the tooth movement and the effect of the jaw muscles (29).

Berzin (1999) (30) found that 88% of cases analyzed showed muscle hyperactivity, through an electromyographic analysis of masticatory muscles in individuals with myogenic DTM related to myofascial localized pain. The findings showed that the DTM is directly linked to muscle hyperactivity, but we can have muscles with little activation, especially the masseter muscle that can result in changes in joint biomechanics. In addition, the temporal muscles would be overloaded leading to loss of mastication strength, muscular pain and fatigue (31).

We know that bruxism is a parafunctional habit directly associated with various deleterious effects on the structure of the teeth, periodontium, muscles responsible for chewing and ATM, as well as psychological and behavioral effects to the patient (32-35).

When we associate this parafunctional habit with the temporomandibular joint, we observed some changes in relation to the muscles responsible for chewing process, so the pain, the discomfort from the joint, and its main symptoms in patients are deviations in mandibular path, noises in the joint movements mandibular restricted as well as jaw movements without coordination, difficulty in performing the masticatory process (32- 36- 37).

The pharyngeal arch or brachial arch is largely responsible for the formation of the head and neck region, it receives the immigration of innumerable neural crest cells. The same is composed of five arches and each of them is responsible for the formation of different body structures, in the case the first pharyngeal arch is responsible for the formation of muscular structures such as, for example, mastication muscles, especially the masseter and temporal muscles (38).

When it is correlated embryology and dentistry, it is noticed that dental anomalies are frequent, and these can lead to functional problems (chewing and phonation) and also aesthetic to the patients. These can be influenced by environmental factors or not, and are the result of the expression of molecules that participate in stages of odontogenesis. Through these data, future studies should be performed analyzing the embryological (39- 40).

Finally, this work aims to provide a simple but multidisciplinary synthesis of the current knowledge concerning the morphogenesis of biomechanics organization of the main muscles of mastication and to help promoting future studies in this area. With these data orthodontists may develop a specific treatment plan and get better results, especially in cases of patients where the biomechanical pattern of the temporomandibular joint is unfavorable. Therefore, the purpose of this study is to compile the latest scientific information concerning the relationship between mastication and general health.

CONFLICTS OF INTEREST

All authors have none to declare.

FIGURES LEGENDS AND TABLE

FIGURE 1. Schematic drawing of the mandible showing the specific points that were used to measure the length of the force arm (LFA) and of the resistance arm (LRA) of the temporalis muscle (TM) and masseter muscle (MM). a, condylar process; b, masseteric tuberosity; *, anterior border of the masseteric tuberosity; c, mental protuberance.

TABLE 1. Comparison of all morphometric parameters estimated. SD, standard deviation; *P*, level of significance.

REFERENCES

1- Palinkas M, Nassar MS, Cecílio FA, Siérre S, Semprini M, De Souza JPM, Hallak JE, Regalo SC. Age and gender influence on maximal bite force and masticatory muscles thickness. Arch Oral Biol. 2010; 55(10):797-802

2- Farella M, Bakke M, Michelotti A, Rapuano A, Martina R. Masseter thickness, endurance and exercise-induced pain in subjects with different vertical craniofacial morphology. Eur J Oral Sci. 2003; 111(3):183-8

3- Emshoff R, Emshoff I, Rudisch A, Bertran S. Reliability and temporal variation of masseter muscle thickness measurements utilizing ultrasonography. J Oral Rehabil. 2003; 30(12):1168-72

4- Korfage JA, Brugman P, Vaneijden TM. Intermuscular and intramuscular differences in myosin heavy chain composition of the human masticatory muscles. J Neurol SCI. 2000; 178(2):95-106

5- Bakke M, Thomsen CE, Vilmann A, Soneda K, Farella M, Moller E. Ultrasonographic assessement of the swelling of the human masseter muscle after static and dynamic activity. Arch Oral Biol. 1996; 41(2):133-40

6- Raadsheer MC, Van Eijden TM, Van Spronsen PH, Van Ginkel FC, Kiliaridis S, Prahl -Andersen B. Masseter muscle thickness in growing individuals and its relation to facial morphology. Arch Oral Biol. 1996; 41(4):323-32

7- Ariji Y, Sakuma S, Izumi M, Sasaki J, Kurita K, Ogi N, et al. Ultrasonagraphic features of the masseter muscle in female patients with temporomandibular disorder associated with myofascial pain. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2004; 98(3):337-41

8- Marques H B, Richter F F, Heck L, Xavier L L, de Campos, Deivis. Biomechanical potential of the temporal muscle in brachyfacial and dolichofacial subjects: a study on dry mandibles. Orthodontics & Craniofacial Research (Print) 2016; 19.

9- Ferla A, Da Silva AMT, Rodrigues ECC. Electrical activity of the anterior temporal and masseter in mouth and nasal breathing children. Rev Bras Otorrinolaringol. 2008; 74(4):588-95

10- Genaro KF, Passos DCO, Berrétin-Felix, Trindade Júnior AS. Atividade muscular da mastigação na anquilose temporomandibular. Rev CEFAC. 2013; 15(1):111-18

11- Dressano D. Análise eletromiográfica e da força do músculo masseter em indivíduos com distintos padrões craniométricos [Tese de mestrado]. Piracicaba: Faculdade de Odontologia de Piracicaba - UNICAMP; 2012.

12- Guimarães TB, Ferreira MB, Wakamatsu A, Oliveira SR, Guimarães AS, Suazo GI, et al. Muscle fiber type composition, fiber diameter, capillary density in temporalis and masseter muscles and correlation with bite force. Int J Morphol. 2013; 31(2):747-43

13- Malta J, Campolongo GD, De Barros TEP, De Oliveira RP. Eletromiografia aplicada aos músculos da mastigação. Acta Ortop Bras. 2006; 14(2):106-7

14- Koolstra JH, Van Eijden TMGJ, Weijs WA, Naeije M. A three-dimensional mathematical model of the human masticatory system predicting maximum possible bite forces. J Biomechan. 1988a; 21(7):563-76

Koolstra JH, Eijden TMV, Weijs WA. Three-dimensional performance of the human masticatory system: the influence of the orientation and physiological cross-section of the masticatory muscles. Amsterdam: Free University Press; *In: Biomechanics XI-A 1988 b*; 101-6

15- Van Spronsen PH, Weijs WA, Van Ginkel FC, Prahl-Andersen B. Jaw muscle orientation and moment arms of long-face and normal adults. J Dent Res. 1996; 75(6):1372–80

16- Raadsheer MC, Van Eijden TMGJ, Van Ginkel FC, Prahl-Andersen B. Contribution of jaw muscle size and craniofacial morphology to human bite force magnitude. J Dent Res. 1999; 78(1):31-42

17- Throckmorton GS, Finn RA, Bell WH. Biomechanics of differences in lower facial height. Am J Orthod. 1980; 77(4):410-20

18- Sonneseen L, Bakke M, Solow B. Temporomandibular disorders in relation to craniofacial dimensions, head posture and bite force in children selected for orthodontic treatment. Europen Journal of Orthodontics. 2001; 23(2):179-92

19- Charalampidou M, Kjellberg H, Georgiakaki I, Kiliaridis S. Masseter muscle thickness and mechanical advantage in relation to vertical craniofacial morphology in children. Acta Odontol Scand. 2008; 66(1):23-30

20- Boom HP, Van Spronsen PH, Van Ginkel FC, Van Schijndel RA, Castelijns JA, Tuinzing DB. A comparison of human jaw muscle cross-sectional area and volume in long and short face subjects, using MRI. Arch Oral Biol. 2008; 53(3):273-81

21- Throckmorton GS, Dean JS. The relationship between jaw muscle mechanical advantage and activity levels during isometric bites in humans. Arch Oral Biol. 1994; 39(5):429-37

22- Berretin FG, Genaro KF, Trindade IEK, Trindade Júnior AS. Masticatory function in temporomandibular dysfunction patients: electromyographic evaluation. J Appl Oral Sci. 2005; 13(4):360-5

23- Rahal A, Goffi-Gomez MVS. Estudo eletromiográfico do músculo masseter durante o apertamento dentário e mastigação habitual em adultos com oclusão dentária normal. Rev Soc Bras Fonoaudiol. 2009; 14(2):160-4

24- Pancherz H. Temporomandibular joint growth changes in hyperdivergent and hypodivergent Herbst subjects. A long-term roentgenographic cephalometric study. American Journal of Orthodontics and Dentofacial Orthopedics. 2004; 126(2):153-61

25- Georgiakaki I, Tortopidis D, Garefis P, Kiliaridis S. Ultrasonographic thickness and eletromyographic activity of masseter muscle of human females. J Oral Rehabil. 2007; 34(2):121-8

26- Galo R, Vitti M, Santos CM, Hallak JE, Regalo SC. The effect of age on the function of the masticatory system- an electromyographical analysis. Gerodontology. 2006; 23(3):177-82

27- Gedrange T, Harzer W. Muscle influence on postnatal craniofacial development and diagnostics. J Orofac Orthop. 2004; 65(6):451-66

28- Miyamoto K, Yamada K, Ishizuka Y, Morimoto N, Tanne K. Masseter muscle activity during the whole day in young adults. Am J Orthod Dentofacial Orthop. 1996; 110(4):394-98

29- Pepicelli A, Woods M, Briggs C. The mandibular muscles and their importance in orthodontics: a contemporary review. Am J Orthod Dentofac Orthop. 2005; 128(6):774–80

30- Bérzin F. Estudo eletromiográfico da hiperatividade de músculos mastigatório em pacientes portadores de desordem crânio- mandibular (DCM), com dor miofacial. In: Anais do 4º Simpósio Brasileiro e Encontro Internacional sobre dor. 1999; São Paulo; 405

31- Bérzin F. Estudo eletromiográfico da hiperatividade de músculos mastigatório em pacientes portadores de desordem crânio- mandibular (DCM), com dor miofacial. In: Anais do 5º Simpósio Brasileiro e Encontro Internacional sobre dor. 2001; São Paulo; 292

32- Motta LJ, Da Costa Silva PF, De Godoy CHL, Bortoletto CC, Garcia PRA, Da Silva FC, et al. Avaliação dos ruídos da articulação temporomandibular em crianças com bruxismo. Rev CEFAC. 2015; 17(1):111-6

33- Serra-Negra JM, Paiva SM, Seabra AP, Dorella C, Lemos BF, Pordeus IA. Prevalence of sleep bruxism in a group of Brazilian schoolchildren. Eur Arch Paediatric Dent. 2010; 11(4):192-5

34- Insana SP, Gozal D, McNeil DW, Montgomery-Downs HE. Community based study of sleep bruxism during early childhood. Sleep Med. 2013; 14(2):183-8

35- Ferreira-Bacci Ado V, Cardoso CL, Diaz-Serrano KV. Behavioral problems and emotional stress in children with bruxism. Braz Dent J. 2012; 23(3):246-51

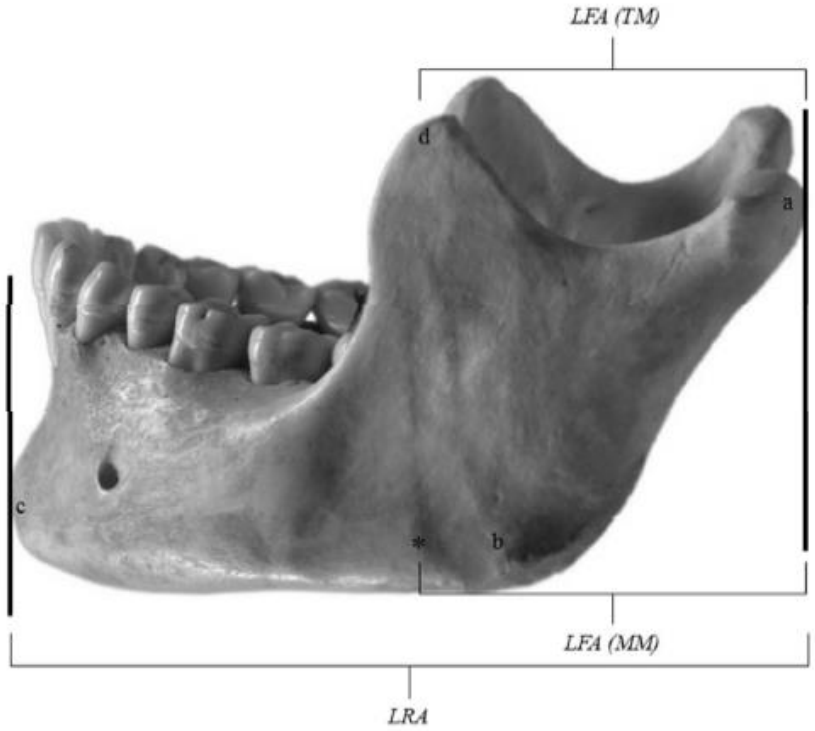
36- Fernandes G, Franco AL, Siqueira JT, Gonçalves DA, Camparis CM. Sleep bruxism increases the risk for painful temporomandibular disorder, depression and non-specific physical symptoms. J Oral Rehabil. 2012; 39(7):538-44

37- Thilander B, Rubio G, Pena L, De Mayorga C. Prevalence of temporomandibular dysfunction and its association with malocclusion in children and adolescents: an epidemiologic study related to specified stages of dental development. Angle Orthod. 2002; 72(2):146-54

38- Campos B, Susanibar F, Carranza CA, Oliveira NCM. Embriologia do Sistema Estomatognático. In: Susanibar F, Marchesan IQ, Ferreira VJA, Douglas CR, Parra D, Dioses A. Motricidade Orofacial: fundamentos neuroanatômicos, fisiológicos e linguísticos. 1. ed. Ribeirão Preto: Book Toy; 2015. p. 23-60.

39- Mafra RP, Vasconcelos RG, Vasconcelos MG, Lélia Maria Guedes Queiroz LMG, Barboza CAG. Desenvolvimento dental: aspectos morfogenéticos e relações com as anomalias dentárias do desenvolvimento. Rev. Bras. Odontol.2012; 69(2)

40- Liu KNC. Agenesias dentárias: revisão de literatura. Porto Alegre. Monografia [Graduação em Odontologia]- Universidade Federal do Rio Grande do Sul; 2011



Schematic drawing of the mandible showing the specific points that were used to measure the length of the force arm (LFA) and of the resistance arm (LRA) of the temporalis muscle (TM) and masseter muscle (MM).
a, condylar process; b, masseteric tuberosity; *, anterior border of the masseteric tuberosity; c, mental protuberance.

190x254mm (96 x 96 DPI)

TABLE 1

MORPHOMETRIC PARAMETERS	**Temporal Muscle** **Mean ±SD**	**Masseter Muscle** **Mean ±SD**	***P***
Length of the resistance arm – L_{RA} (mm)	106.14±5.82	106.14±5.82	**-**
Length of the force arm – L_{FA} (mm)	36.9±3.0	44.6±4.7	***0.0001***
Muscular work (L_{RA}/L_{FA})	2.88±0.23	2.39±0.21	***0.0001***
Mechanical advantage (L_{FA}/L_{RA})	0.34±0.02	0.42±0.03	***0.0001***

ANEXO A- Normas da Revista Orthodontics e Craniofacial Research

Author Guidelines

Content of Author Guidelines: 1. General, 2. Ethical Guidelines, 3. Manuscript Submission Procedure, 4. Manuscript Types Accepted, 5. Cover Letter, 6. Manuscript Format and Structure, 7. After Acceptance.

Relevant Documents: Colour Work Agreement

Useful Websites: Submission Site, Articles published in *Orthodontics & Craniofacial Research*,Author Services, Wiley Blackwell Publishing's Ethical Guidelines, Guidelines for Figures

1. GENERAL

Orthodontics & Craniofacial Research is published to serve its readers as an international forum for the presentation and critical discussion of issues pertinent to the advancement of the specialty of orthodontics and the evidence-based knowledge of craniofacial growth and development. This forum is based on scientifically supported information, but also includes minority and conflicting opinions.

The objective of *Orthodontics & Craniofacial Research* is to facilitate effective communication between the research community and practicing clinicians. Original Papers of high scientific quality that report the findings of clinical trials, clinical epidemiology, and novel therapeutic or diagnostic approaches are appropriate submissions. Similarly, we welcome papers in genetics, developmental biology, syndromology, surgery, speech and hearing, and other biomedical disciplines related to clinical orthodontics and normal and abnormal craniofacial growth and development. In addition to original and basic research, the journal publishes Short Communications, Reviews, Letters, and Meeting Reports.

Orthodontics & Craniofacial Research is published quarterly. The review of submitted papers will be coordinated by the editor and members of the editorial board. It is policy to review manuscripts within 4 to 6 weeks of receipt and to publish within 3 to 6 months of acceptance.

Please read the instructions below carefully for details on the submission of manuscripts, the journal's requirements and standards as well as information concerning the procedure after a manuscript has been accepted for publication in Orthodontics & Craniofacial Research. Authors are encouraged to visit Wiley Blackwell Author Services for further information on the preparation and submission of articles and figures.

1.1 Authorship

Authors submitting a paper do so on the understanding that the manuscript has been read and approved by all authors and that all authors agree to the submission of the manuscript to the Journal.

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Prior to acceptance there is no requirement to inform an Editorial Office that you intend to publish your paper OnlineOpen if you do not wish to. All OnlineOpen articles are treated in the same way as any other article. They go through the journal's standard peer-review process and will be accepted or rejected based on their own merit.

1.5 Early View

Orthodontics & Craniofacial Research is covered by Wiley Blackwell's Early View service. Early View articles are complete full-text articles published online in advance of their publication in a printed issue. Articles are therefore available as soon as they are ready, rather than having to wait for the next scheduled print issue. Early View articles are complete and final. They have been fully reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after online publication. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the traditional way. They are therefore given a Digital Object Identifier (DOI), which allows the article to be cited and tracked before it is allocated to an issue. After print publication, the DOI remains valid and can continue to be used to cite and access the article**.**

2. ETHICAL GUIDELINES

Submission is considered on the conditions that papers are previously unpublished, and are not offered simultaneously elsewhere; that authors have read and approved the content, and all authors have also declared all competing interests; and that the work complies with the Ethical Policies of the Journal and has been conducted under internationally accepted ethical standards after relevant ethical review.

Before preparing your manuscript for submission please consult the Equator Network (=Enhancing the QUAlity and Transparency Of health Research) website, where you can find the reporting guidelines for all main study types including: randomized trials (CONSORT), systematic reviews (PRISMA), observational studies (STROBE), animal studies (ARRIVE), and others. The journal expects authors to comply with these standards and follow these guidelines.
http://www.equator-network.org/

3. MANUSCRIPT SUBMISSION PROCEDURE

Manuscripts should be submitted electronically via the online submission site Manuscript Central. Complete instructions for submitting a paper are available

online and below. Further assistance can be obtained from the editorial office at OCRedoffice@wiley.com.

3.1 Getting Started

Launch your web browser (supported browsers include Internet Explorer 5.5 or higher, Firefox 1.0.4 or higher or Safari 1.2.4) and go to the journal's Manuscript Central Site.
* Log-in or, if you are a new user, click on “register here”.
* If you are registering as a new user.
- After clicking on 'register here', enter your name and e-mail information and click 'Next'. Your e-mail information is very important.
- Enter your institution and address information as appropriate, and then click 'Next.'
- Enter a user ID and password of your choice (we recommend using your e-mail address as your user ID), and then select your area(s) of expertise under keywords. Click 'Finish'.
* If you are a registered user, but have forgotten your log in details, enter your e-mail adddress under “Password help”. The system will send you an automatic user ID and a new temporary password.
* Log-in and select 'Author Center”.

3.2 Submitting Your Manuscript

After you have logged into your “Author Center”, you may submit a manuscript by clicking the submission link under “Author Resources”.
* Enter data and answer questions as appropriate. You may copy and paste directly from your manuscript and you may upload your pre-prepared covering letter.
* Click the 'Next' button on each screen to save your work and advance to the next screen.
* You are required to upload your files.
- Click on the 'Browse' button and locate the file on your computer.
- Select the designation of each file in the drop down next to the Browse button.
- When you have selected all files you wish to upload, click the 'Upload Files' button.
* Review your submission (in HTML and PDF format) before completing your submission by sending it to the Journal. Click the 'Submit' button when you are finished

reviewing.

* The title page, the structured abstract and the main manuscript are uploaded as three separate files. The manuscript should start with a page containing only the title. All other information should be on the title page that is uploaded as a separate file.

3.3 Manuscript Files Accepted

Manuscripts should be uploaded as Word (.doc or .docx) or Rich Text Format (.rtf) files (not write-protected) plus separate figure files. GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing. The files will be automatically converted to HTML and PDF on upload and will be used for the review process. The text file must contain the entire manuscript including title page, structured abstract, text, references, tables, and figure legends, but no embedded figures. In the text, please reference figures as for instance “Figure 1”, “Figure 2” etc to match the tag name you choose for individual figure files uploaded. Manuscripts should be formatted as described in the Author Guidelines below.

3.4 Blinded Review

All manuscripts submitted *Orthodontics & Craniofacial Research* will be reviewed by two experts in the field. *Orthodontics & Craniofacial Research* uses single blinded review. The names of the reviewers will thus not be disclosed to the author submitting a paper.

3.5 Suspension of Submission Mid-way in the Submission Process

You may suspend a submission at any phase before clicking the 'Submit' button and save it to submit later. The manuscript can then be located under 'Unsubmitted Manuscripts' and you can click on 'Continue Submission' to continue your submission when you choose to.

3.6 E-mail Confirmation of Submission

After submission you will receive an e-mail to confirm receipt of your manuscript. If you do not receive the confirmation e-mail after 24 hours, please check your e-mail address carefully in the system. If the e-mail address is correct please contact your IT department. The error may be caused by some sort of spam filtering on your e-mail server. Also, the e-mails should be received if the IT department adds our e-mail server (uranus.scholarone.com) to their whitelist.

3.7 Manuscript Status

You can access ScholarOne Manuscripts (formerly known as Manuscript Central) any time to check your 'Author Centre' for the status of your manuscript. The Journal will inform you by e-mail once a decision has been made.

3.8 Submission of Revised Manuscripts

To upload a revised manuscript, locate your manuscript under 'Manuscripts with Decisions' and click on 'Submit a Revision'. Please remember to delete any old files uploaded when you upload your revised manuscript**.**

4. MANUSCRIPT TYPES ACCEPTED

Original Research Articles: of high scientific quality that report the findings of clinical trials, clinical epidemiology, and novel therapeutic or diagnostic approaches are appropriate submissions. Similarly, we welcome papers in genetics, developmental biology, syndromology, surgery, speech and hearing, and other biomedical disciplines related to clinical orthodontics and normal and abnormal craniofacial growth and development. Only manuscripts reporting the results of original clinical or clinically relevant investigations are suitable for publication.

Short Communications: should not exceed 2000 words, including the references. Priority will be given to communications relating to primary research data. This section permits time-sensitive material to be published within 6 months of submission.

Reviews: systematic reviews and meta-analyses are preferred above narrative reviews.

Letters to the Editor: are encouraged to stimulate scientific discussions on recently published papers. The Editor will refer them to the authors. The readers' comments and authors' replies may subsequently be published together.

Meeting Reports: Proceedings of significant meetings may also be published at the discretion of the Editor-in-Chief.

Case Reports are no longer accepted.

5. COVER LETTER

It must be stated in the cover letter, that the manuscript has not been published, simultaneously submitted, or already accepted for publication elsewhere, and that all authors have read and approved the manuscript. State any conflict of interest related to individual authors' commitments and any project support.

Make a full statement about all submissions and previous reports that could be regarded as redundant or as duplicate publication of the same or similar work, and alert the editor if the manuscript includes subjects about which the authors have published a previous report or have submitted a related report to another journal. Refer to and reference any such report in the new paper. Upload copies of such material as supplementary files.

Authors are responsible for obtaining permission from everyone acknowledged by name in Acknowledgment section, because readers may infer their endorsement of the data and conclusions. Therefore, state explicitly that acknowledged persons have seen the text and given their permission to be named**.**

5.1 Conflict of Interest and Source Funding

Orthodontics & Craniofacial Research requires that all authors (both the corresponding author and co-authors) disclose any potential sources of conflict of interest. Any interest or relationship, financial or otherwise that might be perceived as influencing an author's objectivity is considered a potential source of conflict of interest. These must be disclosed when directly relevant or indirectly related to the work that the authors describe in their manuscript. Potential sources of conflict of interest

include but are not limited to patent or stock ownership, membership of a company board of directors, membership of an advisory board or committee for a company, and consultancy for or receipt of speaker's fees from a company. If authors are unsure whether a past or present affiliation or relationship should be disclosed in the manuscript, please contact the editorial office at OCRedoffice@wiley.com. The existence of a conflict of interest does not preclude publication in this journal.

The above policies are in accordance with the Uniform Requirements for Manuscripts Submitted to Biomedical Journals produced by the International Committee of Medical Journal Editors (http://www.icmje.org/). It is the responsibility of the corresponding author to have all authors of a manuscript fill out a conflict of interest disclosure form, and to upload all forms together with the manuscript on submission. The disclosure statement should be included under Acknowledgements. Please find the form below:

Conflict of Interest Disclosure Form

6. MANUSCRIPT FORMAT AND STRUCTURE

6.1 Format

Authors are advised to consult a recent issue of the Journal to become familiar with its style and format.
Please adhere to the following general guidelines and advices when preparing the manuscript:

1. Font Times New Roman 12; if you use a non-English word processor, program it for English. Be especially careful to use full stop as decimal point, not comma.
2. Use double spacing throughout the text; left and right margins of at least 3 cm.
3. Begin each of the following sections on a separate sheet: Title Page; Abstract and Keywords; body of the text starting with Introduction up to and including Acknowledgements; References; Figure Legends; and Tables (each on a separate sheet).
4. Number the pages consecutively beginning with the title page. Do not number lines.
5. The beginning of paragraphs should be properly marked with an indent.
6. Enter only one space after the full stop at the end of a sentence.

7. Be consistent: use the same form of units, etc., and key these elements in exactly the same way throughout the manuscript. Put a space between the digits and the unit, e.g. 5.2 mm.
8. The manuscript (Title Page, Abstract Page, Introduction, Material and Methods, Results, Discussion, Conclusions, Acknowledgments, References, and Figure Legends) should not exceed 3200 words. There should be a maximum of 3 tables, 3 figures and 35 references.
9. All identifying information (e.g. names and institutes) should be removed from the manuscript text prior to submission. However, the Title Page should include author and correspondence details (see below).

Language: The language of publication is English. Both British and American spelling conventions are acceptable, but usage should be consistent. It is preferred that manuscript is professionally edited. A list of independent suppliers of editing services can be found here. All services are paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication

Abbreviations, Symbols and Nomenclature: Only standardized terms which have been generally accepted should be used. Units, Symbols and Abbreviations. 5th ed. London: The Royal Society of Medicine; 1994, will be the reference source for these. Unfamiliar abbreviations must be defined when first used. 'The two-digit system' should be used for tooth identification (see Federation Dentaire Internationale (1971) Int Dent J 1971; 21:104-6).

Scientific Names: All Latin or foreign words must be italicized throughout the text.

6.2 Structure

All manuscripts submitted to *Orthodontics & Craniofacial Research* should include: Title Page, Abstract Page, Introduction, Material and Methods, Results, Discussion, Conclusions, Acknowledgments, References, Figure Legends, Tables, arranged in that order. This division is also appropriate for short communications. For review papers and qualitative studies, other headings may be used as appropriate. Figures should not be included in the text file and should be uploaded as separate files.

Title Page has to contain the following information, arranged in this order:

* Full title of the manuscript (in bold). Include all information in the title necessary to make electronic retrieval of the article both sensitive and specific. Do not capitalize the

title: only the first word has a capital.
* Initials and last name of each author (in italics), each author on a new line. Do not include academic degrees.
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* Indicate the number of words for the abstract and for the full manuscript.

Abstract: The abstract should not exceed 250 words and be structured as the below example (See: Br J Orthod 1996; 203-9):

Objectives - To test the hypothesis that mechanical forces combined with laser treatment induce elevated expression of genes associated with the inflammatory process.

Setting and Sample Population - The Department of Orthodontics at Temple University. Thirty-six consecutively started patients requiring extractions of both maxillary first premolars.

Material & Methods - A randomized controlled trial design employed the 'split mouth' technique. Retraction springs were attached to canines, and on one side of the arch the canine tooth periodontal tissues received topical application of low-frequency laser beam. Linear movement of canine teeth projected on midsagittal plane was measured and Northern blot analyses of gene expression in the gingival crevicular fluid were performed.

Results - At the end of the 28-day study teeth receiving combined mechanical force and laser treatment moved 32% faster. None of the laser-treated teeth were slower than the mechanical force alone

Conclusion **-** Application of a low frequency laser beam to orthodontically moving teeth appears to be a clinically effective adjunct to enhance tooth movement rate.

Keywords: maximum of 5 key words. Give not more than five keywords in alphabetical order after the abstract, and, wherever possible, use terms from the Medical Subject Headings (MeSH) list of Medline. Abstract and keywords should be included in the main document file.

Introduction: Should contain the hypothesis, the rationale of the study. References should only develop the argument. This section is not an exhaustive literature review. Aim and/or working hypothesis, if applicable, must be clearly stated in the last paragraph of the section.

Material and Methods: Should contain sufficient pertinent detail to allow duplication of the study. Use appropriate subheadings for the different sections to obtain clarity. References should be provided wherever possible. Legends to the figures may also contain summary information of methods. Statistical methods employed should be identified in this section.

When submitting review manuscripts, particularly Systematic Reviews, include a section describing the methods used in locating, selecting, extracting, and synthesizing data. Summarize these methods in the abstract.

(i)Ethics: When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 1983. Do not use patients' names, initials, or hospital numbers, especially in illustrative material. When reporting experiments on animals, indicate whether the institution's or a national research council's guide for, or any national law on, the care and use of laboratory animals was followed.

(ii) Clinical Trials: Clinical trials should be reported using the CONSORT guidelines available atwww.consort-statement.org. A CONSORT checklist should also be included in the submission material. *Orthodontics & Craniofacial Research* encourages authors submitting manuscripts reporting from a clinical trial to register the trials in any of the following free, public clinical trials

registries: www.clinicaltrials.gov, http://clinicaltrials.ifpma.org/clinicaltrials/, http://isrctn.org/. The clinical trial registration number and name of the trial register will then be published with the paper.

Results: Should be presented clearly in logical sequence. For clarity, subheadings may be used. The Results section is not the place for interpretation of the data. Graphs or representative illustrations should be included in this section. Do not repeat in the text, data easily found in the tables or illustrations (double documentation is not acceptable). The author(s) should indicate where to place the illustrations in the text.

Discussion: Do not repeat what has already been reported in the results section, or in the introduction! Results should be interpreted and discussed here in view of the previously published studies. This section is the only proper section for subjective comments.

Conclusions: The last paragraph should be dedicated to the conclusions of the study. There ought to be a correspondence between the aims and hypotheses in the end of the introduction and conclusions. Conclusions in the abstract should be comparable.

Acknowledgments: Under acknowledgments please specify contributors to the article other than the authors accredited. Please also include specifications of the source of funding for the study and any potential conflict of interests if appropriate. Authors are responsible for obtaining permission from everyone acknowledged by name (see section on Cover Letter above).

6.3 References

Should be numbered consecutively in the order of citation and kept pertinent. References should be identified in Arabic numerals in parentheses in the text and legends. Quoted references should contain first and last page numbers. The acceptable style is based on Index Medicus. References should be in Vancouver style as described in N Engl J Med 1997; 336:310-312. For further information see ACP's homepage: www.acponline.org/journals/resource/unifreqr.htm

Non-refereed material and, if possible, non-English publications should be avoided. Congress abstracts, unaccepted papers, unpublished observations, and personal

communications may not be placed in the Reference list. References to 'unpublished findings' and to 'personal communication' (provided explicit consent has been given by the sources) may be inserted in parentheses in the text.

Examples:

Journal articles

List all authors up to 6; for 7 or more, list the first 6 authors and then add et al. Tanne K, Sakuda M. Biomechanical and clinical changes of the craniofacial complex from orthopedic maxillary protraction. *Angle Orthod* 1991;61:145-152.

Books

Graber TM, Neumann B. *Removable orthodontic appliances.* 2nd ed. Philadelphia: WB Saunders; 1984.

Book chapters

Ross RB, Johnston MC. Developmental anomalies and dysfunction. In: Zarb GA, Carlsson GE, Sessle BJ, Mohl ND, editors. *Temporomandibular joint and masticatory muscle disorders.*Copenhagen: Blackwell Munksgaard; 1994. p. 221-254.

Thesis

Hughes D. Application of a classical model of competitive business strategy to orthodontic practice [Master's thesis]. Philadelphia: Temple University; 1995.

We recommend the use of a tool such as Reference Manager for reference management and formatting. Reference Manager reference styles can be searched for here.

6.4 Tables, Figures and Figure Legends

Tables: Should be typed on separate sheets from the text and numbered consecutively using Arabic numerals. Titles must be self-explanatory. Data may be presented either in a table form or as a graph, but not both.

Figures: The main purpose of the illustrations is to clarify the results. Micrographs should be designed to reproduce without reduction. Individual photographs should be unmounted. If grouped, however, they may be lightly mounted. Line drawings should be professionally prepared. Locations of illustrations should be identified in the manuscript. An abbreviated description of methods that generated the data is an appropriate inclusion in the legend. Further information can be obtained at Wiley Blackwell's guidelines for instructions: http://authorservices.wiley.com/bauthor/illustration.asp

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Supporting Information can be a useful way for an author to include important but ancillary information with the online version of an article. Examples of Supporting Information include additional tables, data sets, figures, movie files, audio clips, 3D structures, and other related nonessential multimedia files. Supporting Information should be cited within the article text, and a descriptive legend should be included. It is

published as supplied by the author, and a proof is not made available prior to publication; for these reasons, authors should provide any Supporting Information in the desired final format.

For further information on recommended file types and requirements for submission, please visitAuthor Services.

7. AFTER ACCEPTANCE

7.1 Offprints

Free access to the final PDF offprint of your article will be available via author services only. Please therefore sign up for author services if you would like to access your article PDF offprint. Additional paper offprints may be ordered online. Please click on the following link, fill in the necessary details and ensure that you type information in all of the required fields:http://offprint.cosprinters.com/blackwell.

ANEXO B – Submissão do artigo junto à revista

Submission Confirmation

Print

Thank you for your submission

Submitted to	Orthodontics and Craniofacial Research
Manuscript ID	OCR-2016-11-107-ORI
Title	Biomechanics potencial of the temporal and masseter muscles in mandibles of mesofacial subjects
Authors	Chitolina Pradebon, Ana Chitolina Pradebon, Marieli Reghelin Goulart, Guilherme Malysz, Tais de Souza Reis, Magda de Campos, Deivis
Date Submitted	05-Nov-2016