ORIGINAL

Relationship between bruxism and saliva quality

Relación entre bruxismo y calidad de la saliva

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ABSTRACT

The article addressed the importance of the study of childhood bruxism, highlighting its impact on quality of life and oral health. Although most research on this dysfunction has focused on adults, studies in children have been limited, especially in relation to non-carious lesions such as attrition, erosion and abfraction. In this growing population, significant long-term risks were identified, such as temporomandibular joint (TMJ) dysfunction, ankylosis, and mandibular growth disturbances.

The research presented a prospective longitudinal design with a rigorous protocol that included inclusion and exclusion criteria. This approach allowed the analysis of risk factors and early diagnosis. The methodologies employed included the use of Dr. Wilma A. Simoes' protocol, salivary pH measurement and microbiological studies to identify *Candida spp*. Also, treatment with Simoes Network (SN) appliances was implemented in patients with bruxism as well as in the control group.

It was concluded that bruxism in children requires an interdisciplinary approach combining functional, microbiological and methodological analyses. In addition, it was shown that the adhesion of *Candida spp* to orthopedic appliances, especially *C. albicans*, underlines the need for rigorous hygiene protocols. The method of localization of elements in orthopedic devices, developed by Medizza and Simoes, stood out for optimizing diagnostic and therapeutic accuracy, improving clinical results in less time.

Keywords: Childhood Bruxism; Temporomandibular Joint; Early Diagnosis; Interdisciplinary Treatment; *Candida Spp*.

RESUMEN

El artículo abordó la importancia del estudio del bruxismo infantil, destacando su impacto en la calidad de vida y salud bucal. Aunque la mayoría de las investigaciones sobre esta disfunción se centraron en adultos, los estudios en niños han sido limitados, especialmente en relación con lesiones no cariosas como atrición, erosión y abfracción. En esta población en crecimiento, se identificaron riesgos significativos a largo plazo, como disfunción de la articulación temporomandibular (ATM), anquilosis y alteraciones del crecimiento mandibular.

La investigación presentó un diseño prospectivo longitudinal con un protocolo riguroso que incluyó criterios de inclusión y exclusión. Este enfoque permitió analizar factores de riesgo y realizar un diagnóstico temprano. Entre las metodologías empleadas, se destacaron el uso del protocolo de la Dra. Wilma A. Simoes, la medición de pH salival y estudios microbiológicos para identificar *Candida spp*. Asimismo, el tratamiento con aparatos Simoes Network (SN) fue implementado tanto en pacientes con bruxismo como en el grupo control.

Se concluyó que el bruxismo en niños requiere un abordaje interdisciplinario que combine análisis funcionales, microbiológicos y metodológicos. Además, se demostró que la adhesión de *Candida spp* a los aparatos ortopédicos, especialmente *C. albicans*, subraya la necesidad de protocolos de higiene rigurosos. El método de localización de elementos en aparatos ortopédicos, desarrollado por Medizza y Simoes, destacó por

optimizar la precisión diagnóstica y terapéutica, mejorando los resultados clínicos en menos tiempo.

Palabras clave: Bruxismo Infantil; Articulación Temporomandibular; *Candida Spp*; Diagnóstico Temprano; Tratamiento Interdisciplinario.

INTRODUCTION

Currently, numerous studies have been conducted on bruxism, as this dysfunction has become a significant factor in altering people's quality of life.[1,2,3,4,5]

However, few studies have been conducted on children, especially about non-carious lesions: attrition, erosion, abrasion, abstraction, and bruxism.

In these growing patients, functional disorders of the masticatory system can lead to three long-term problems: TMJ dysfunction, TMJ ankylosis, and mandibular growth disorders.[6,7,8,9,10,11,12,13]

Therefore, it is considered clinically relevant to determine the existence or absence of any factor that may enhance the cause-effect relationship of bruxism in children. This will contribute to the early diagnosis and timely treatment of the established pathology and identify children at risk of developing temporomandibular dysfunction (TMD) and orofacial pain (OFP).[14,15,16,17,18,19,20,21,22,23]

General objective: To evaluate the relationship between bruxism and salivary quality.

METHOD

Control group

Patients without bruxism.

Inclusion criteria

Patients with bruxism who are admitted to the dental clinic between the ages of 6 and 12, of both sexes, and immunocompetent (n=60) will be included consecutively, and for the control group (n=60), patients who do not present such symptoms will be included.

Exclusion criteria

Patients with systemic pathologies or medication that causes xerostomia or hypersalivation.

Patients who received antibiotics, anti-inflammatories, or antifungals 72 hours before the study.

Patients suffering from autoimmune diseases and/or undergoing treatment with immunosuppressants or prolonged corticosteroid therapy (greater than 3 months).

Method

Prospective longitudinal study.

Each patient will be given a systemic history, recording risk factors such as age, diabetes, and regular medication. Any previous treatment for bruxism will also be recorded.

An odontogram will be performed, recording conventional treatments and any pathologies present, identifying teeth with facets due to bruxism.

The Occlusion and TMJ Examination Protocol of Dr. Wilma A. Simoes[23] will be used to determine the inclusion or exclusion criteria for patients.

Salivary pH will be measured using commercial strips on a scale of 0 to 7, with a pH of 7 considered normal. A mucous membrane swab will also be placed in an Eppendorf tube with sterile saline solution to perform conventional microbiological tests to study Candida spp.

Samples will be taken at 0, 6, 18, and 24 months.

Statistical analysis of the data will be performed using SPSS.

The experimental and control groups will be treated with Simoes Network (SN) appliances.

Location where the work will be carried out.

Dentistry program at the Inter-American Open University. Wilma Alexandre Simoes Foundation.

Necessary and available resources

The necessary resources are available for dental instruments, the manufacture of SN devices, and the analysis of microbiological samples.

BACKGROUND

"Microbial colonization in orthopedic devices"

Marisa Brusca, Marina Gastón, Alicia Medizzza The viability of microorganisms is related to the quantity and

quality of the inoculum, its adherence, and its ability to interact with the components of removable functional orthodontic appliances (AOFM), as is also the case with the components of orthodontic appliances. The objective is to evaluate the adhesion of Candida spp to different functional maxillary orthopedic appliances. A study was conducted on the adhesion of Candida albicans in patients wearing different functional maxillary orthopedic appliances. Thirty patients of both sexes were included, aged between 6 and 12 years, with periodontal health and no caries, with clinical and radiographic indications for using functional maxillary orthopedic appliances. A sample was taken with a swab around the mucous membranes of the oral cavity and placed in Eppendorf tubes with a sterile physiological solution.

In the same way, samples were taken around the appliance with another swab. This was repeated at the start of treatment and 6, 12, and 18 months later. Routine microbiological analyses were performed. As observed in the electron microscope photos, the results showed that Candida spp adheres to and penetrates acrylic. The most prevalent species were Candida albicans (67 %), Candida dubliniensis (13,5 %), Candida glabrata (7,6 %), and others (11,9 %). In conclusion, we affirm that Candida spp adheres to the acrylic of functional orthodontic appliances. The most prevalent species is C. albicans.[27]

"How to accurately locate frontal elements of a functional orthopedic appliance. Medizza method. Rx-Model Relationship. Alicia B. Medizza, Wilma A. Simoes

This method arises from the need to accurately coordinate the diagnostic indicators found in the Cephalometric Analysis of the Articular Compass and the fabrication of the appliance to optimize the clinical result.

In other words, there is perfect coordination between CLINIC and LABORATORY.[28,29,30]

The Simoes Cephalometric Analysis of Joint Compass Location is performed on the patient's profile teleradiograph, obtaining the design of the wavy bars of the AOF. The above elements are then transferred from the radiographic image to the laboratory model according to the following steps: determination of boundaries (size), position (spatial location), spatial relationships, and control of results. The size is determined by measuring the height (radiograph) and the base of the BO (models). The height (h) is obtained from the radiographic image according to the cephalometric boundaries in each individual in the sagittal plane. The base (b) is received on the model according to the clinical boundaries of each individual in the horizontal plane. For greater accuracy in the transfer results, measuring the percentage of distortion between the size of the radiographic image of the incisor chosen for the cephalometric tracing and its actual size on the model is recommended. To do this, the distance between the cervix and the incisal edge of the incisor chosen in the radiograph (hrx) and the model (hm) is measured with a dry compass. The corresponding mathematical calculation is performed, and the percentage of distortion obtained is applied to all the measurements to be transferred. Easily transferable reference points are chosen to determine the spatial location of each BO and project it onto the model. Work is carried out on the incisor that matches the incisor selected from the radiograph for the location analysis. Two strips of pink wax are cut out to transfer this data to the model. Both are fixed to the model horizontally, following the reference planes used. The prepared BOS is then placed on the wax strips, thus remaining in the position determined by the location analysis in the cephalometric analysis of the joint compass. Once the BOS and BOI have been fixed to the models, their vertical and horizontal relationship must be observed and measured when the models are articulated. In other words, whether or not the BO meet, whether or not they overlap, and how and by how much, the data is noted in the location analysis, and the agreement between the latter and the result obtained in the transfer is checked. This method allows us to optimize the construction of the appliance, and its clinical relevance has been demonstrated since the first fundamental principle of functional maxillary orthopedics is neural excitation caused by stimuli given through functional orthopedic appliances. By approaching the area of action of the appliance with greater accuracy, we can achieve better results in less time.[31]

On this occasion, we will discuss OCCLUSION and OCCLUSAL IMPRINTS as diagnostic elements in the presence or absence of system dysfunction. These imprints tell us about attrition, erosion, abrasion, abstraction, parafunction, periodontium, muscle anarchy, TMJ, and posture.

Form and function are two complementary factors in biology, and it is clear that occlusal morphology and TMJ correspond to each other through function.[32]

The most challenging part of making a diagnosis is distinguishing between similarities, which is why we must start by knowing the typical patterns of occlusal morphology, both in its static concept (functional descriptive occlusal morphology) and its dynamic concept (mandibular movements).

Levels of occlusion (cusp - ridge - fossa - groove)

Interocclusal relationships (stops – stabilizers – canines – A-B-C points)

Mandibular movement factors (initial position – type of movement (rotation – translation) – direction of movement (planes) – degree of movement – clinical significance of movements.[33]

When observing and interpreting occlusal impressions in patients, it is essential to consider their relationship

with craniofacial morphology (biotype), neuromuscular activity, chewing pattern, and individual adaptability to achieve a correct diagnosis.

Occlusal impressions – TMJ, impressions collected in the ongoing search for the correct diagnosis.

CONCLUSION

Based on the analysis of the studies presented, it is clear that bruxism, particularly in children, represents a condition that goes beyond a simple, functional disorder, directly impacting the quality of life and oral health of those who suffer from it. Although numerous studies have addressed this dysfunction in adults, the lack of specific research in children, especially about non-carious lesions such as attrition, erosion, abrasion, and abstraction, highlights the urgent need for further investigation. Children at a crucial stage of development are particularly vulnerable to long-term effects such as temporomandibular joint (TMJ) dysfunction, TMJ ankylosis, and mandibular growth abnormalities.

The proposed methodological design, which includes a prospective longitudinal study with rigorously established inclusion and exclusion criteria, allows a detailed characterization of the risk factors associated with childhood bruxism and the identification of possible indicators that enable early diagnosis and timely treatment. The use of Dr. Wilma A. Simoes' occlusion and TMJ examination protocol, combined with microbiological analyses and salivary pH measurements, reinforces the comprehensive nature of the approach. This approach not only facilitates the identification of children at risk of developing temporomandibular disorders (TMD) and orofacial pain (OFP) but also lays the foundation for more effective preventive interventions.

On the other hand, studies related to microbial colonization in functional orthodontic appliances highlight the relevance of microbiological factors in managing these pathologies—the adhesion of Candida spp. Species, especially Candida albicans, to the acrylic components of functional orthodontic appliances highlight the importance of considering the interaction between the oral environment and the devices used in treatment. These findings emphasize the need for strict hygiene protocols and microbiological monitoring in pediatric patients to prevent associated complications.

In addition, the method developed by Medizza and Simoes to locate frontal elements in functional orthopedic appliances highlights the importance of diagnostic accuracy and clinical-laboratory coordination to optimize therapeutic results. This approach allows for more efficient interaction between form and function, which are inseparable elements in the biology of the masticatory system. It promotes neural excitation and the stimuli necessary for faster and more effective correction.

The combination of functional, microbiological, and methodological studies underscores the need for an interdisciplinary approach to treating childhood bruxism. Advancing this line of research will not only contribute to improving diagnosis and treatment. Still, it will also allow for identifying and mitigating risk factors at early stages, significantly improving the quality of life of pediatric patients.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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