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ERICA DE ALMEIDA BARROSO

AVALIAÇÃO DA RELAÇÃO DE DIVERSAS CONDIÇÕES DENTÁRIAS COM A PRESENÇA DE SINUSITE MAXILAR CRÔNICA UNI OU BILATERAL: ESTUDO POR TOMOGRAFIA COMPUTADORIZADA DE FEIXE CÔNICO

Juiz de Fora
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Orientador: Prof. Dr. Celso Neiva Campos

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RESUMO

O seio maxilar (SM) se relaciona anatomicamente com as raízes dos dentes maxilares, explicando a disseminação de processos infecciosos de alguns dentes para o seu interior. Este estudo visa associar causas odontogênicas das sinusites à presença da doença uni ou bilateral através de imagens de tomografia computadorizada de feixe cônico. Para este estudo, 41 pacientes da clínica de Otorrinolaringologia do Hospital Universitário da Universidade Federal de Juiz de Fora (UFJF), diagnosticados com sinusite maxilar crônica foram incluídos e divididos em dois grupos: SMB: pacientes com sinusite maxilar bilateral e SMU: pacientes com sinusite maxilar unilateral. Diversas condições dentárias foram avaliadas nos dois grupos, como a distância entre as raízes e o SM, radioluscência apical e perda óssea alveolar. Os dados foram tabulados e analisados com os testes qui-quadrado e exato de Fisher. O intervalo de confiança foi 95% ($p \leq .05$). Não foi observada diferença estatisticamente significativa entre sinusite uni ou bilateral e a proximidade dos ápices radiculares com o SM, presença de radioluscência apical e perda óssea alveolar ($p \geq .05$). No presente estudo causas odontogênicas estiveram presentes nos casos de sinutites uni e bilaterais e os molares apresentaram maior relação de proximidade com o SM no grupo SMU, ainda que não haja significância estatística.

Palavras-Chave: perda óssea alveolar, seio maxilar, doenças periapicais.

ABSTRACT

The anatomical relationship of the maxillary sinus (MS) involves the maxillary dental roots, explaining the easy extension of infectious processes from some teeth to the sinus. This study aims to correlate odontogenic causes to the presence of uni- or bilateral maxillary sinusitis in cone beam computed tomography images. For this study, 41 patients from the Otorhinolaryngology Clinic of the University Hospital, diagnosed with chronic maxillary sinusitis, were included and divided in two groups: BMS: patients with bilateral maxillary sinusitis; UMS: patients with unilateral maxillary sinusitis. Different dental conditions were considered in both groups, like distance from apex root to the sinus, periapical radiolucency and alveolar bone loss. Data were analyzed with Chi Square and Fisher Exact tests. The confidence interval was 95% (P ≤ .05). No statistical difference was observed between uni- or bilateral maxillary sinusitis with the proximity of the teeth to the MS; presence of periapical radiolucency and alveolar bone loss (p>.05). In this study, odontogenic causes are present in uni- and bilateral maxillary sinusitis cases and the molars showed closer relationship to the MS in the UMS group, although without significant association.

Keywords*: alveolar bone loss, maxillary sinus, periapical disease.*

LISTA DE ABREVIATURAS

BMS: bilateral maxillary sinusitis

CBCT: cone beam computed tomography

CMS: chronic maxillary sinusitis

CT: computed tomography

HU: Hospital Universitário

MPR: multiplanar recontruction

MS: maxillary sinus

OCMS: *odontogenic chronic maxillay sinusitis*

SM: seio maxilar

SMB: sinusite maxilar bilateral

SMU: sinusite maxilar unilateral

TCFC: tomografia computadorizada de feixe cônico

UFJF: Universidade Federal de Juiz de Fora

UMS: unilateral maxillary sinusites

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1 INTRODUÇÃO

Os ossos da face contêm em seu interior cavidades pneumáticas, que se comunicam com a fossa nasal através de pequenas aberturas em suas paredes, denominadas seios paranasais (BROOK, 2006). O seio maxilar (SM) faz parte da série de seios paranasais, que inclui também os seios frontal, etmoidal e esfenoidal. É o primeiro deles a se desenvolver, aproximadamente no terceiro mês de vida embrionária e continua seu desenvolvimento até a vida adulta (VON ARX, FODICH e BORNSTEIN, 2014). Seu crescimento final corresponde ao período de erupção dos dentes permanentes, entre 12 e 14 anos de idade. Está anatomicamente posicionado entre a fossa nasal e a cavidade oral, estando vulnerável à invasão por micro-organismos patogênicos através do óstio nasal e da boca (MEHRA e MURAD, 2004).

Antes de atingir seu maior tamanho existe uma distância considerável entre o seu assoalho e os ápices dos dentes maxilares. À medida que o crescimento ocorre, continua sua pneumatização e se expande desde o canino até o terceiro molar no sentido ântero-posterior e do assoalho da órbita ao processo dentoalveolar da maxila, podendo estender-se para os processos zigomático e palatino (MEHRA e JEONG, 2008). O primeiro e o segundo molares maxilares são os dentes mais frequentemente relacionados ao SM. (MAILLET et al., 2011; MEHRA e MURAD, 2004). De acordo com o estudo de Von Arx, Fodich e Bornstein (2014), os segundos pré-molares superiores também foram comumente associados ao SM, podendo apresentar relação crítica com o mesmo.

A rinossinusite é um processo inflamatório multifatorial que envolve as membranas nasal e dos seios paranasais, caracterizada por alguns sintomas como congestão nasal e dor orofacial (DAINES e ORLANDI, 2012). Os pacientes também podem experimentar uma vaga dor de cabeça (THUNTHY, 1998) e queixar-se de dor de garganta, dor dental e gotejamento pós-nasal (CYMERMAN, CYMERMAN e O'DWYER, 2011). Outros sintomas como dor nos olhos, mau odor e dor dentária também foram relatados (BROOK, 2006). Em exames de imagem, pode ser identificada como um espessamento localizado na mucosa do seio maxilar (FERGUSON, 2014; MAILLET et al., 2011; SHANBHAG et al., 2013).

Dada a íntima relação anatômica entre o assoalho do seio maxilar e as raízes dos dentes maxilares posteriores, a sinusite maxilar pode ter origem odontogênica (ABRAHAMS e GLASSBERG, 1996; CYMERMAN, CYMERMAN e O'DWYER, 2011;

FERGUSON, 2014; GOLLER-BULUT et al., 2015; MAILLET et al., 2011; MEHRA e JEONG, 2008; PEREIRA et al., 2015; SHANBHAG et al., 2013; ZIRK et al., 2017).

Sinusites relacionadas a causas odontogênicas podem representar de 10 a 40% dos casos de sinusite (LECHIEN et al., 2014; WORKMAN, GRANQUIST e ADAPPA, 2017) e ocorrem quando a membrana de Schneider é irritada ou rompida por condições dentais, como infecções dos dentes maxilares posteriores, lesões patológicas dos maxilares e dos dentes, trauma associado aos dentes maxilares ou causas iatrogênicas, como complicações de cirurgia dentária ou de implante e procedimentos cirúrgicos maxilofaciais (LEE e LEE, 2010; MEHRA e MURAD, 2004; MEHRA e JEONG, 2008). De acordo com Workman, Granquist e Adappa (2017), cerca de 75% dos casos de sinusite unilateral, onde apenas um dos seios maxilares está comprometido, tem origem odontogênica.

As sinusites odontogênicas merecem consideração especial, devido a algumas diferenças na fisiopatologia, microbiologia e tratamento quando comparada à sinusite comum (MEHRA e MURAD, 2004; MEHRA e JEONG, 2008). A distinção entre dor orofacial de origem odontogênica e dor associada à sinusite maxilar pode ser desafiadora (FERGUSON, 2014).

Os sinais e sintomas da sinusite odontogênica podem ser confundidos com aquelas da sinusite de origem rinogênica, porém algumas características podem ser sugestivas de que a origem da doença é odontogênica. Como exemplos, podem ser citados obstrução nasal unilateral ou odor fétido na boca, sendo este o sinal de maior especificidade das sinusites odontogênicas, mas que está presente em apenas 15-48% dos pacientes. O relato de tratamento odontológico recente, combinado à presença de sinusite unilateral e gosto ruim ou mau odor na boca devem acender o alerta de potencial causa odontogênica da sinusite (WORKMAN, GRANQUIST e ADAPPA, 2017).

Por isso, além do conhecimento da sinusite odontogênica, o profissional da saúde deve estar apto para realizar o diagnóstico diferencial da origem da sinusite maxilar, o que é essencial para o tratamento adequado da doença (ABRAHAMS e GLASSBERG, 1996; CYMERMAN, CYMERMAN e O'DWYER, 2011; DAINES e ORLANDI, 2012).

Embora a tomografia computadorizada *fan beam* seja considerada o padrão-ouro de imagem para visualização do seio maxilar, a tomografia computadorizada de feixe cônico (TCFC) vem sendo amplamente utilizada por dentistas e

otorrinolaringologistas para avaliar os seios paranasais (BREMKE et al., 2009), pois as imagens de TCFC da região maxilar permitem a inspeção de todo o volume do seio maxilar, a identificação de variações anatômicas e anomalias (DOBELE et al., 2013; GOLLER-BULUT et al., 2015; LU et al., 2012; MEHRA e MURAD, 2004; REGE et al., 2012). Como vantagens, oferece uma menor dose de radiação (quando comparada à *fan beam*), menor tempo de digitalização e melhor resolução da imagem (AMERICAN ASSOCIATION OF ENDODONTICS, 2011).

Durante muitos anos pouca importância foi dada à condição dental em casos de sinusite crônica. Acredita-se que, devido ao fato de radiografias serem os exames de imagem comumente utilizados, e por serem associadas à grande sobreposição da imagem das estruturas da face, não era dada a devida importância à relação dos ápices das raízes dentais com o seio maxilar. Assim, pode ocorrer que muitos pacientes portadores de sinusite crônica tratem a doença por longo período considerando que o foco infeccioso esteja no seio maxilar, enquanto a verdadeira origem poderia ser odontogênica. Além disso, poucos estudos associam patologias clínicas de dentes maxilares posteriores com alterações na mucosa do seio maxilar, que são visíveis em imagens de TCFC. Estas avaliações poderiam ajudar a identificar as correlações entre os dentes e as patologias sinusais e explicar questões de sinusite maxilar sem fator causal de origem rinogênica. (BRÜLLMANN et al., 2012).

Diante do exposto, o objetivo deste estudo foi avaliar, em pacientes diagnosticados com sinusite, a associação de diversas condições dentárias com a presença de sinusite maxilar uni ou bilateral em exames de TCFC.

2 PROPOSIÇÃO

O presente estudo visou analisar a relação de proximidade dos ápices dos dentes maxilares posteriores com o SM e a presença de condições patogênicas dentais, como radioluscência apical e doença periodontal, visando estabelecer uma associação com a presença de sinusite maxilar crônica unilateral.

a) Mensurar a distância dos ápices radiculares dos dentes maxilares posteriores ao SM.

b) Verificar a existência de relação entre a proximidade das raízes dentais com SM e as alterações sinusais.

c) Associar a presença de radioluscência periapical e perda óssea periodontal com a presença de alterações sinusais.

d) Verificar e classificar a perda óssea periodontal.

3 MATERIAL E MÉTODOS

3.1 Tipo de estudo

Trata-se de um estudo observacional, transversal, realizado em 41 pacientes provenientes do ambulatório de Otorrinolaringologia do Hospital Universitário da Universidade Federal de Juiz de Fora (HU/UFJF).

3.2 Comitê de Ética em Pesquisa

Para o desenvolvimento desta pesquisa, o projeto foi submetido ao Comitê de Ética em Pesquisa com Seres Humanos da Universidade Federal de Juiz de Fora e aprovado sob o Parecer de número 1.461.931(Anexo A), em 22/03/2016.

3.3 Seleção da Amostra

Os pacientes provenientes do HU/UFJF foram diagnosticados com sinusite maxilar crônica, por uma médica Otorrinolaringologista por meio de exame clínico e de endoscopia. Os pacientes deveriam apresentar sintomas como obstrução, congestão ou descarga nasal e dor ou pressão na face. A manutenção destes sintomas deveria ser superior a 12 semanas para ser caracterizado como sinusite maxilar crônica (DAINES E ORLANDI, 2012).

Como critério de exclusão, foram considerados: idade inferior a 21 anos, cirurgia parendodôntica em dentes posteriores, cirurgia ortognática, enxerto ósseo, anomalias craniofaciais e pacientes com ausência dos dentes maxilares posteriores avaliados.

3.4 Aquisição e análise das imagens de TCFC

As imagens de TCFC foram obtidas pelo mesmo tomógrafo (I-Cat®, Imaging Sciences International, Hatfield, Pensilvânia, EUA) com o seguinte protocolo de aquisição: 120 kV, 8mA, 26,9 segundos de tempo de rotação, espessura de corte de 0,25mm e FOV de 7 x 23 cm.

Os exames de tomografia foram avaliados a fim de identificar a presença de espessamento mucoso ≥ 3 mm no seio maxilar, caracterizando sinusite unilateral (quando apenas um seio maxilar foi acometido) ou bilateral (quando os dois seios foram acometidos). Foram avaliados ainda nos exames de TCFC a presença de lesão periapical e perda óssea periodontal nos dentes maxilares posteriores (segundo pré-molar, primeiro molar e segundo molar). Foi mensurada a menor distância entre o ápice radicular e a cortical externa do SM. Ainda, foi quantificada a perda óssea periodontal.

Os exames foram avaliados por um único examinador, endodontista, calibrado, com experiência em imagens de TCFC e treinado para registrar a presença ou ausência das alterações avaliadas no presente estudo. A calibração do examinador se deu por meio da visualização de 20 imagens de TCFC antes das sessões de avaliação. Para mensurar a reprodutibilidade do método, 10% dos exames foram avaliados em dois momentos distintos, com intervalo de duas semanas entre eles.

As mensurações foram realizadas através da ferramenta disponível no software XoranCat, versão 3.1.62 (Xoran Technologies, Ann Arbor, Michigan, EUA) do tomógrafo i-CAT® Vision. O brilho e o contraste das imagens puderam ser ajustados pelas ferramentas do *software* para melhorar a visualização. Para a realização das medições, a tela do tomógrafo foi ajustada em modo de reconstrução multiplanar (MPR), com corte em 0,25 mm, sem filtro.

3.5 Divisão dos grupos

Os pacientes foram divididos em dois grupos:

SMB- sinusite maxilar bilateral

UMS- sinusite maxilar unilateral

Para cada um dos grupos foram avaliados os parâmetros a seguir:

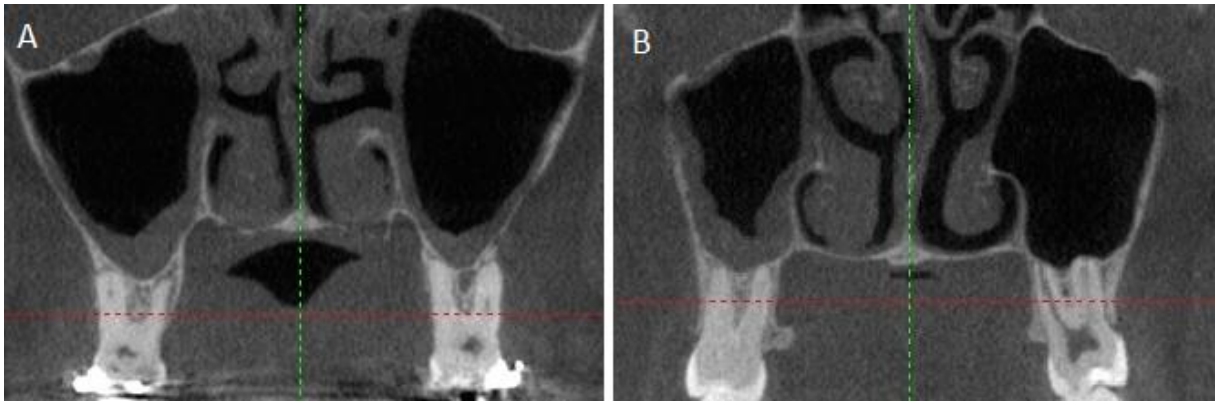

Figura 1 – Cortes coronais de TCFC demonstrando (A) seios maxilares de paciente com sinusite bilateral e (B) seios maxilares de paciente com sinusite unilateral.
Fonte: Banco de dados Radiologia FO/UFJF.

3.5.1 Análise da distância dos ápices radiculares à cortical externa do SM

Para a realização das medições da distância dos ápices radiculares à cortical externa do seio maxilar, foi utilizado o corte coronal. Um corte axial foi definido para cada raiz estudada, a partir do início da visualização do ápice radicular. A partir daí, foi determinado o corte coronal correspondente a esse corte axial pré-definido, e nele foi mensurada a distância entre o ápice e a cortical externa do seio maxilar.

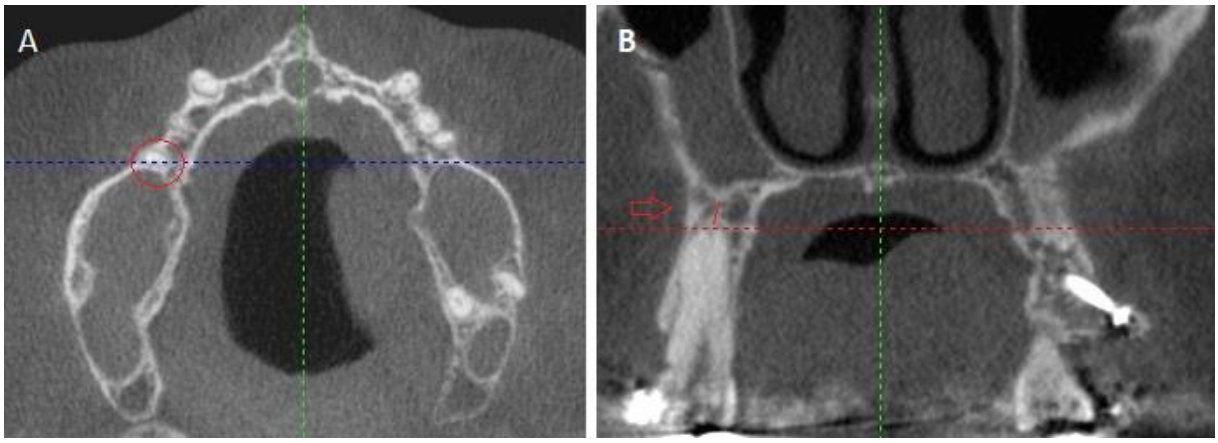

Figura 2 – Imagem de TCFC demonstrando (A) corte axial definido para o ápice de uma raiz e (B) corte coronal correspondente para realização das mensurações.
Fonte: Banco de dados Radiologia FO/UFJF.

De acordo com Ok et al. (2014), classificou-se a relação anatômica entre o SM e as raízes de cada dente maxilar posterior, identificando a menor distância que separa os ápices radiculares dos respectivos dentes das corticais do seio maxilar.

Em seguida cada dente foi classificado da seguinte maneira, considerando-se a raiz cujo ápice apresentou a menor distância do SM:

I- com pelo menos um ápice radicular dentro do seio maxilar;

II- com pelo menos um ápice radicular em contato com a cortical externa do seio maxilar (0 mm);

III- com pelo menos um ápice radicular com distância de até 1 mm da cortical do seio maxilar;

IV- com pelo menos um ápice radicular com distância maior de 1 mm da cortical do seio maxilar

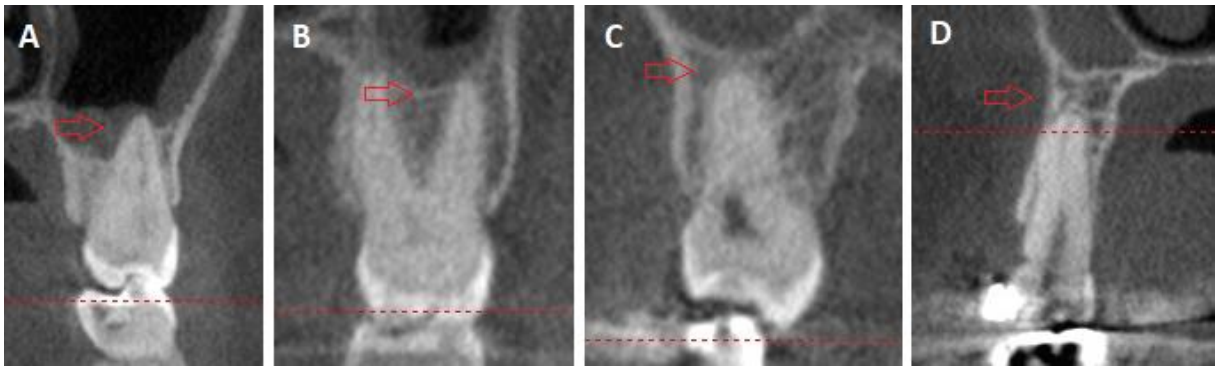

Figura 3 – Classificação dos ápices radiculares com relação ao seio maxilar: (A) – ápice radicular no interior do seio maxilar; (B) – ápice radicular em contato com o assoalho do seio maxilar; (C) – ápice radicular com distância de até 1mm da cortical externa do seio maxilar e (D) – ápice radicular com distância maior que 1mm da cortical externa do seio maxilar.
Fonte: Banco de dados Radiologia FO/UFJF.

3.5.2 Análise da presença de radioluscência apical

Classificou-se como presença de lesão periapical quando pelo menos uma raiz de algum dos dentes do seio maxilar avaliado apresentou tal condição. Foi utilizado o corte coronal correspondente ao ápice de cada raiz para esta avaliação. Considerou-se, então, que um dente possuía lesão periapical caso houvesse radioluscência apical associada à porção apical ou espessamento no espaço do ligamento periodontal maior ou igual a 0,5mm (aproximadamente o dobro do que se considera dentro dos padrões de normalidade para o ligamento periodontal) em pelo menos uma raiz de um dente (NASCIMENTO et al. 2016).

Em cada grupo, a presença de radioluscência apical associada a pelo menos uma raiz de um dente, foi classificada em:

I- Presente

II- Ausente.

3.5.3 Análise da perda óssea periodontal

Para a realização das mensurações da perda óssea periodontal, foram utilizados os cortes coronais definidos para cada sítio a ser avaliado. A junção cemento-esmalte foi utilizada como referência para análise da inserção óssea e foram avaliados seis sítios para cada um dos dentes: mésio-vestibular, vestibular, disto-vestibular, mésio-palatino, palatino e disto-palatino, sendo aferida, para cada sítio, a distância entre a junção cemento-esmalte e a crista óssea (PISTORIUS, et al., 2001).

A perda óssea foi calculada como uma porcentagem do que se considerou como inserção óssea normal. A inserção óssea normal foi determinada através de mensuração do nível ósseo normal (2 mm abaixo da junção cemento-esmalte) ao ápice radicular. Foi calculada então a porcentagem da perda óssea periodontal e esta foi classificada (levando-se em consideração o maior valor encontrado para cada dente avaliado) em:

I- leve (<25%)

II- moderada (25-50%)

III- acentuada (>50%)

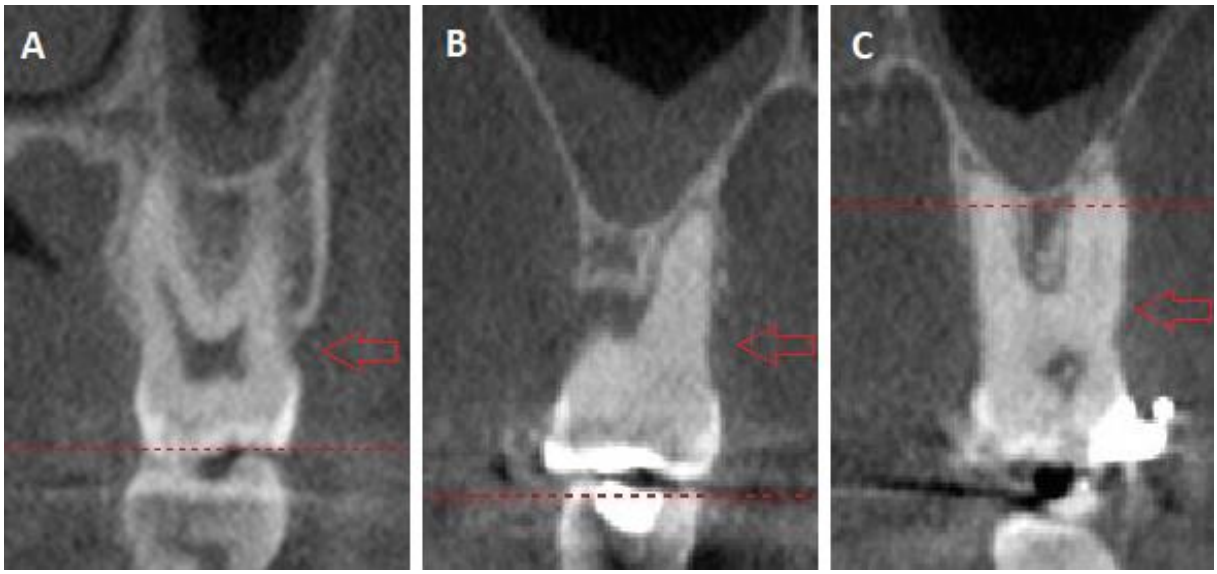

Figura 4 – Classificação da perda óssea periodontal: (A) - presença de perda óssea leve; (B) – presença de perda óssea moderada e (C) – presença de perda óssea acentuada.

Fonte: Banco de dados Radiologia FO/UFJF.

3.6 Análise estatística

Os dados foram tabulados em planilha do software Excel (Microsoft Office, USA, 2010). A análise descritiva dos dados e análise estatística foi realizada no software IBM SPSS Statistics (versão 13.0; IBM Corp, Chicago, USA). A calibração intra-examinador foi avaliada pelo índice Kappa.

Para verificar a associação do acometimento uni ou bilateral das sinusites com as diferentes variáveis avaliadas (proximidade dos dentes com o seio maxilar, lesão periapical e perda óssea) foram aplicados os testes de qui-quadrado e exato de Fisher.

4 ARTIGO CIENTÍFICO

Relationship of dental conditions with uni- or bilateral chronic maxillary sinusitis – a tomographic study

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Abstract

Background: The anatomical relationship of the maxillary sinus (MS) involves the maxillary dental roots, explaining the easy extension of infectious processes from some teeth to the sinus. This study aims to correlate odontogenic causes to the presence of uni- or bilateral maxillary sinusitis in cone beam computed tomography images.

Methods: For this study, 41 patients from the Otorhinolaryngology Clinic of the University Hospital, diagnosed with chronic maxillary sinusitis, were included and divided in two groups: BMS: patients with bilateral maxillary sinusitis; UMS: patients with unilateral maxillary sinusitis. Different dental conditions were considered in both groups, like distance from apex root to the sinus, periapical radiolucency and alveolar bone loss. Data were analyzed with Chi Square and Fisher Exact tests. The confidence interval was 95% ($P \leq .05$).

Results: No statistical difference was observed between uni- or bilateral maxillary sinusitis with the proximity of the teeth to the MS; presence of periapical radiolucency and alveolar bone loss ($p>.05$).

Conclusion: In this study, odontogenic causes are present in uni- and bilateral maxillary sinusitis cases and the molars showed closer relationship to the MS in the UMS group, although without significant association.

Keywords: alveolar bone loss, maxillary sinus, periapical disease.

Introduction

Rhinosinusitis is classified on the basis of the signs, symptoms, and course of the disease. Chronic rhinosinusitis is defined as persistent signs and symptoms for longer than 12 weeks[1]. According to various reports, a dental origin is found in 10 to 40% of cases of chronic maxillary sinusitis (CMS). Its incidence is consistently growing and it is more frequent among women [2-5].

The anatomical relationship of the maxillary sinus (MS) involves the maxillary dental roots, explaining the extension of the infectious processes from some teeth to the maxillary sinus. Maxillary molars have the closest physical proximity to the floor of the MS, and are the most frequently involved teeth in odontogenic rhinosinusitis disease[4,6]. The second premolars are also commonly associated to the maxillary sinus[7].

Computed tomography (CT) is the gold standard for evaluation of MS disease and associated odontogenic disease, as it can display bone and soft tissue features in great detail. Cone-beam computed tomography (CBCT) is an excellent low-radiation alternative to conventional CT [3,8]. Also, CBCT has better spatial resolution when compared with medical CT[8] and can reveal a correlation between visible basal mucosal findings in the maxillary sinus and decayed posterior maxillary teeth, root fillings or periodontitis[9].

Odontogenic chronic maxillary sinusitis occurs when the Schneiderian membrane is irritated or perforated, as a result of a dental condition, such as dental infection, among other conditions [2,3]. Pulpal necrosis can quickly turn into periapical osteitis, followed by a periapical abscess that is visible radiographically. This infection can percolate directly into the MS with thickening of the mucosa around areas adjacent to the involved teeth[3]. Maxillary bone loss has also been shown to have a direct effect on the thickness of the sinus membrane[1].

Unilateral rhinosinusitis is characterized by obvious primarily single-sided sinus lesions on imaging and chronic or recurrent symptoms[5]. Although unilateral maxillary sinusitis is a common clinical picture, there are no studies comparing to the bilateral disease.

The combination of clinical dental examination and tomographic assessment could help in diagnosing odontogenic rhinosinusitis. Thus, the definition of the dental etiology is essential for the proper treatment of CMS[10]. Therefore, this study aims to

correlate odontogenic causes to the presence of unilateral maxillary sinusitis in CBCT images.

Material and methods

Sample Selection

The present study was approved by the Research Ethics Committee (No. 1.461.931). Forty one patients from the public Otorhinolaryngology Clinic of the University Hospital were selected.

The patients included in this study were diagnosed with CMS through clinical examination and endoscopy by an otolaryngology specialist with more than 20 years of experience in the area. Patients had to exhibit symptoms, such as obstruction, nasal congestion or discharge, and pain or pressure in the face for longer than 12 weeks to be characterized as CMS[1].

The following exclusion criteria were used in the present study: age younger than 21 years; maxillo-mandibular lesions or orthognathic surgery; and edentulism of all posterior teeth in the upper arch. In cases where the patients presented absence of posterior teeth unilaterally, only the maxillary sinuses associated with present teeth were evaluated.

Acquisition and analysis of CBCT images

All the CBCT images were obtained by the same scanner (I-Cat; Imaging Sciences International, Hatfield, PA) using the following acquisition protocol: 120 kV, 8 mA, rotation time of 26.9 seconds, slice thickness of 0.25 mm, and field of view of 7 x 23 cm.

The exams were analyzed to identify the presence or absence of mucosal thickening in the maxillary sinus demonstrating uni- or bilateral sinusitis (thickening superior to 3mm)[9] and to verify the presence of periapical radiolucency (with a thickness of 0.5mm)[11]. The shortest distance between the root apex and the external cortical of the maxillary sinus was also measured to correlate the presence of thickening of the sinus mucosa with the distance of the tooth to the maxillary sinus.

The exams were evaluated in the same order (second premolar, first and second molar, on the right and left side) using the tools available on the software XoranCat, version 3.1.62 (Xoran Technologies, Ann Arbor, Michigan, EUA) of the i-

CAT® Vision scanner in the multiplanar (MPR) view. Ten percent of the images were evaluated again with an interval of two weeks to evaluate the reproducibility of the method.

The distance between the root apex and the sinus was established, for each root, an axial section where the apex could first be visualized. Based on that axial section there was a corresponding coronal section where the distance between the root apex and the external cortical of the maxillary sinus was measured **(Figure 1).**

The anatomical relation between the teeth and the sinus was classified, always considering, for each tooth, the root with the smallest distance, according a anterior study[12]: Type I: at least one root apex penetrated into the maxillary sinus; type II: at least one root apex in contact with the maxillary sinus; type III: the closest root apex with a distance of at least 1 mm from the maxillary sinus; and type IV: the closest root apex with a distance of more than 1 mm of the maxillary sinus **(Figure 2).**

For each sinus it was considered as presence of periapical radiolucency if at least one root of one tooth showed this condition[13]. In the coronal section of each root apex it was analyzed the presence of a periapical radiolucency associated to the apex with the thickness of at least 0.5mm[11]. The groups were classified as presence or absence of periapical radiolucency

For the analysis of the alveolar bone loss six sites for every tooth evaluated were considered. For each site, the distance between the cemento-enamel junction and the bone crest was measured[14]. The bone loss was calculated as a percentage of the distance considered normal, which was determined by the distance between the root apex and 2mm above the cemento-enamel junction. The bone loss was classified as: type I: soft (<25%); type II: moderated (25-50%); and type III: severe (>50%) **(Figure 3).**

Division Into Groups

The analyzed images were divided into two groups: BMS - patients with bilateral maxillary sinusitis, when both maxillary sinus showed mucosal thickening ≥ 3 mm, and UMS - patients with unilateral maxillary sinusitis, based on CBCT exams, when only one maxillary sinus showed mucosal thickening ≥ 3 mm.

Statistical Analysis

Descriptive data analysis and statistical analysis were run in IBM SPSS Statistics software (version 13.0; IBM Corp, Chicago, USA). Intra-examiner calibration was assessed using the Kappa index. To verify the association between uni- or bilateral sinusitis and the different dental conditions evaluated (teeth relation with MS, alveolar bone loss and periapical radiolucency) the Chi Square and Fisher Exact test were applied. The confidence interval was 95% ($P < .05$).

Results

In this study, 41 patients diagnosed with chronic maxillary sinusitis were included. Twenty-five women (60.97%) and 16 men (39.03%). Thirty-one patients showed bilateral sinusitis (75.60%) and 10 showed unilateral sinusitis (24.4%).

All the CBCT images were evaluated by the same examiner, and the intraexaminer Kappa was 0,91, demonstrating great agreement.

To evaluate the association of the dental conditions to the rhinosinusitis, for the unilateral cases, only the affected sinuses were considered. It was not observed significant association ($p>.05$) between uni or bilateral maxillary sinusitis with the proximity of the teeth to the MS **(Table 1)**.

No statistical difference was observed between uni- or bilateral maxillary sinusitis with presence of periapical radiolucency and alveolar bone loss ($p>.05$) as described in **Tables 2 and 3.**

Discussion

CBCT is often used to assess paranasal sinuses. The high resolution and lower radiation doses when compared to medical CT represent its major advantages[9]. It has high diagnostic capacity[4,8] because it allows simultaneous and accurate assessment of maxillary sinus, teeth and adjacent tissues in all planes, including the relationships between these structures[13]. Thus, CBCT was chosen to conduct this study to allow correct diagnosis of the sinus condition, dental relationship with the sinus, periapical radiolucencies and alveolar bone loss[3].

For this study it was considered the thickness of the mucosa with a parameter of ≥3 mm in height to consider a sinus affected[9]. Most studies have suggested that healthy maxillary sinus present thickening about 1 mm[15] or 2 mm[16,17]. Therefore, in the present study, mucosal thickening was not considered in isolation. All patients included in the study were diagnosed with CMS because CMS is generally more associated

with prolonged and ineffective treatments[10]. The diagnosis was made by an otolaryngology specialist which reduces bias in the really diagnosis of sinusitis.

A close vertical relation of the root to the sinus floor is reported to be a risk factor for maxillary sinusitis[18]. Pulpal necrosis can quickly turn into periapical osteitis, followed by a periapical abscess that is visible radiographically. This infection can percolate directly into the maxillary sinus with thickening of the mucosa around areas adjacent to the involved teeth[3]. Routine root canal therapy can initiate periapical inflammation at the floor of the sinus, and instrumentation can even introduce bacteria into the sinus cavity, both of which can propagate rhinosinusitis. Maxillary periodontitis has also been shown to have a direct effect on the thickness of the sinus membrane, with some resolution of this thickening occurring after periodontal therapy[1].Thus, in this study, the dental conditions evaluated were periapical radiolucency and alveolar bone loss.

The patients with bilateral sinusitis were 31, and both sinuses were included, hence BMS was composed by 62 sinuses (75.60%). Ten patients had unilateral sinusitis, and for this group only the affected sinus was considered, conforming UMS with 10 sinuses (24.20%), corroborating with other study that found higher frequency of bilateral disease[13].

Although some studies show that men are more likely than women to have thickened sinus mucosa[9,19], this study had a higher incidence of female (60.97%) against male (39.03%), which agrees with other studies[2,3,13,15,20], which can be explained by the difference of the sample and ethnicity of the population.

In the present study, no statistical difference was observed between the proximity of the teeth to the MS; presence of periapical radiolucency and alveolar bone loss with any kind of maxillary sinusitis (uni- or bilateral) ($p>.05$), most probably because of the sample difference among the groups. As it was considered only the affected sinus for UMS and both sinuses for BMS, this difference was increased. Nevertheless, some inferences can be made.

Regarding the distance from the root apex to the maxillary sinus floor, the UMS group showed a closer relation (penetrated or in contact with sinus floor) of the first and second molars than the group with bilateral sinusitis ($p>.05$) **(Table 1)**. Ariji et al. found no difference of the distance from the teeth to MS among affected sinus or not[18]. Some studies[2,6,20] showed that first molars have the closest relationship with maxillary sinus diseases, while in our study the second molars were more frequently penetrated

into maxillary sinus in both groups (p>.05), consenting with OK et al.[12]. Moreover, other studies[12,16] conclude that the relationship between the maxillary teeth and the MS varies according to age, which wasn't taken in consideration in this study.

Pulpal inflammation or infection can affect the integrity of the sinus floor. The development of a periapical lesion in teeth whose roots apex are close to or extending into the maxillary sinuses could elicit inflammatory changes in the mucosal lining and, subsequently, the development of sinusitis[6]. In this study, periapical radiolucency showed no association to maxillary chronic sinusitis, either uni- or bilateral, with corroborates with Phothikhun et al.[15] results. Regarding the radiological findings, in some researches the periapical radiolucency was the most related condition to sinus mucosal thickening[6,9,21]. Other study[6] differed from this because it considered all endodontically treated teeth, while this study only considered teeth showing a periapical radiolucency associated to the apex with the thickness of at least 0.5mm[11], either teeth endodontically treated or not.

The present study also found no statistically significant association (p>.05) between uni- or bilateral maxillary chronic sinusitis with the presence of alveolar bone loss whereas other studies have showed this is the odontogenic condition mostly related to chronic maxillary sinusitis[10,13,17,18,22]. Nascimento et al.[13] also demonstrated that generalized sinus mucosal thickening was more frequently associated with periodontal bone loss and localized sinus mucosal thickening with periapical radiolucency. This differentiation among generalized or localized thickening of the sinus mucosa was not considered in the present study. The difference among studies can be explained because of the sample size analyzed in each study.

In relation to the etiological agent, the iatrogenia was by far, the most frequent cause of odontogenic chronic maxillary rhinosinusitis found by some authors[2,3,19,20] followed by periodontitis and odontogenic cysts. The anatomical relationship between the MS and the posterior teeth should be taken into consideration when performing surgical or endodontic treatment in this area to avoid iatrogenias[23]. However, in this study, iatrogenia is not evaluated because the focus was the inflammatory disease.

The treatment of odontogenic chronic maxillary sinusitis always starts with the dental treatment[2]. The elimination of the source of infection is critical in achieving resolution of odontogenic sinusitis. In many cases, a combination of oral surgery and endoscopic sinus surgery is necessary[3]. Collaboration between otolaryngologists and

dentists can enable early diagnosis and treatment of odontogenic maxillary rhinosinusitis[17].

In this study, odontogenic causes are present in uni- and bilateral maxillary sinusitis cases without statistic difference, however, to conclude this fact, other studies are necessary, with a better sample distribution and including iatrogenia as an odontogenic cause.

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Tables

Table 1. Association between uni- or bilateral maxillary sinusitis with the proximity of the teeth to MS

		Bilateral Maxillary Sinusitis (BMS) n (%)	Unilateral Maxillary Sinusitis (UMS) n (%)	P*
Relation MS with 2nd premolar	Type I	9 (16.07)	1 (10.00)	>.05
	Type II	9 (16.07)	3 (30.00)	
	Type III	8 (14.29)	2 (20.00)	
	Type IV	30 (53.57)	4 (40.00)	
	Total	56 (100)	10 (100)	
Relation MS with 1st molar	Type I	19 (35.85)	5 (62.50)	>.05
	Type II	17 (32.08)	2 (25.00)	
	Type III	3 (5.66)	1 (12.50)	
	Type IV	14 (26.42)	0 (0)	
	Total	53 (100)	8 (100)	
Relation MS with 2nd molar	Type I	23 (37.70)	6 (66.67)	>.05
	Type II	20 (32.79)	2 (22.22)	
	Type III	7 (11.48)	0 (0.00)	
	Type IV	11 (18.03)	1 (11.11)	
	Total	61 (100)	9 (100)	

Type I- at least one root apex penetrated into MS; type II- at least one root apex in contact with MS cortical; type III- the closest root apex with a distance smaller than 1mm from the MS; and type IV- the closest root apex with a distance of more than 1mm from the MS.

* Significant association by chi-square test ($P \leq .05$).

Table 2. Association between uni- or bilateral maxillary sinusitis with the presence of periapical radiolucency.

		Bilateral Maxillary Sinusitis n (%)	Unilateral Maxillary Sinusitis n (%)	P*
2nd premolar	Presence	12 (21.43)	1 (10.00)	>.05
	Absence	44 (78.57)	9 (90.00)	
	Total	56 (100)	10 (100)	
1st molar	Presence	19 (35.85)	1 (12.50)	>.05
	Absence	34 (64.15)	7 (87.50)	
	Total	53 (100)	8 (100)	
2nd molar	Presence	11 (18.03)	0 (0)	>.05
	Absence	50 (81.97)	9 (100)	
	Total	61 (100)	9 (100)	

* Significant association by chi-square test (P ≤ .05).

Table 3. Association between uni- or bilateral maxillary sinusitis with alveolar bone loss

		Bilateral Maxillary Sinusitis n (%)	Unilateral Maxillary Sinusitis n (%)	P*
2nd premolar	Type I	40 (71.43)	7 (70.00)	
	Type II	15 (26.79)	2 (20.00)	>.05
	Type III	1 (1.79)	1 (10.00)	
	Total	56 (100)	10 (100)	
1st molar	Type I	33 (62.26)	4 (50)	
	Type II	17 (32.08)	4 (50)	>.05
	Type III	3 (5.66)	0 (0)	
	Total	53 (100)	8 (100)	
2nd molar	Type I	39 (63.93)	4 (44.44)	
	Type II	19 (31.15)	5 (55.56)	>.05
	Type III	3 (4.92)	0 (0)	
	Total	61 (100)	9 (100)	

Type I- soft alveolar bone loss (<25%); type II- moderated bone loss (25-50%); and type III- the severe bone loss (>25%).

* Significant association by chi-square test (P ≤ .05).

Figures

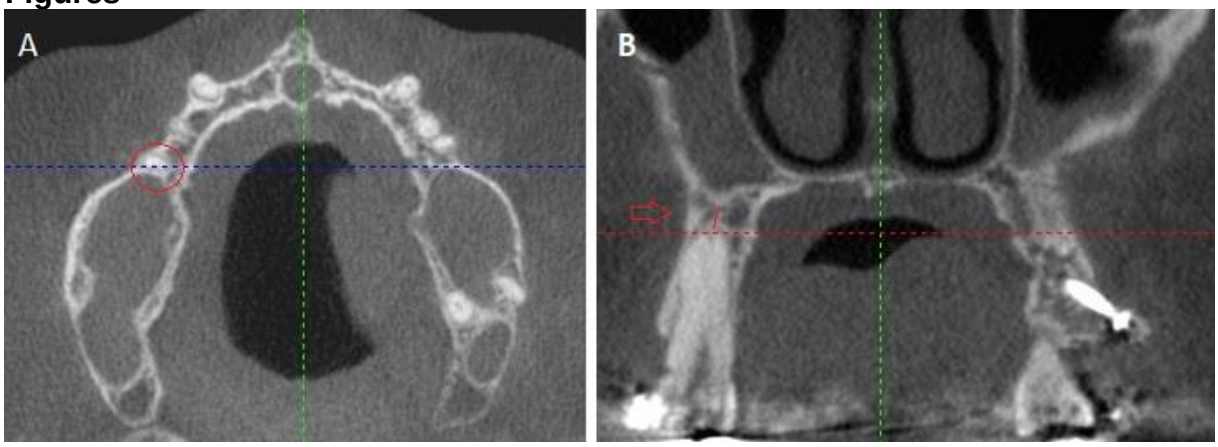

Figure 1: CBCT image demonstrating (A): axial section selected for a root apex and (B) correspondent coronal section for acquisition of distance between root apex and MS.

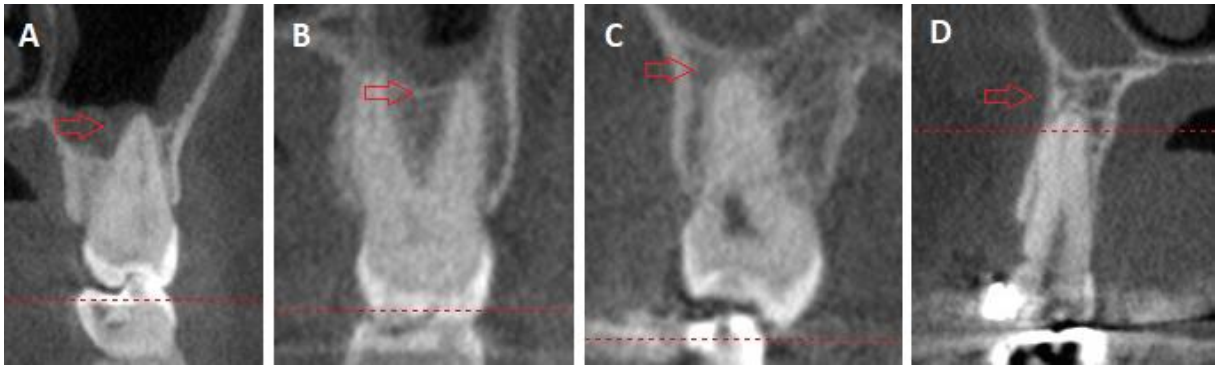

Figure 2: Anatomical relation between the roo apex and the MS: (a) type I: protruded into MS; (B) type II: in contact with MS; (C) type III: distance of at least 1 mm from MS; (D) type IV: distance of more than 1 mm from MS.

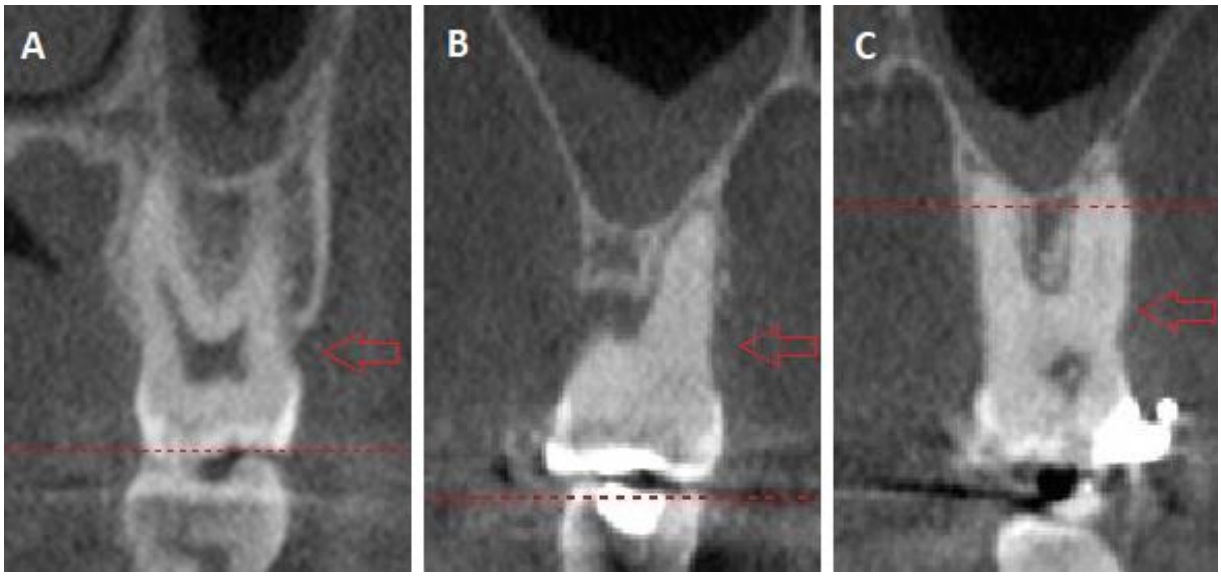

Figure 3: Bone loss: (A): type I: soft (<25%); (B) type II: moderated (25-50%); and (C) type III: severe

5 CONSIDERAÇÕES FINAIS

Através do presente estudo, apesar das variáveis não terem apresentado significância estatística, pôde-se observar que nos indivíduos que apresentaram sinusite maxilar crônica unilateral os primeiros e segundos molares apresentaram maior relação de proximidade com o seio maxilar do que nos indivíduos com sinusite bilateral. Sugere-se novos estudos com melhor distribuição amostral e novas variáveis de origem dentária para se tentar estabelecer uma correlação entre causas odontológicas e as sinusites unilaterais.

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ZIRK, M. et al. Odontogenic sinusitis maxillaris: A retrospective study of 121 cases with surgical intervention. **Journal of Cranio-maxillofacial Surgery**, v. 45, n. 4, p.520-525, Apr. 2017.

ANEXO A – Parecer Consubstanciado do Comitê de Ética em Pesquisa com Seres Humanos da Universidade Federal de Juiz de Fora.

HOSPITAL UNIVERSITÁRIO DA UNIVERSIDADE FEDERAL DE JUIZ DE FORA-MG

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Avaliação da relação entre a presença de sinusite crônica com diagnóstico de alterações nos dentes maxilares posteriores

Pesquisador: Celso Neiva Campos

Área Temática:

Versão: 2

CAAE: 52337715.4.0000.5133

Instituição Proponente: UNIVERSIDADE FEDERAL DE JUIZ DE FORA UFJF

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 1.461.931

Apresentação do Projeto:

O Projeto de pesquisa apresenta um estudo que pretende avaliar 120 indivíduos divididos em dois grupos,provenientes do ambulatório de Otorrinolaringologia do Hospital Universitário da Universidade Federal de Juiz de Fora. Grupo I: Serão observados pacientes diagnosticados com sinusite maxilar crônica por Otorrinolaringologista. Excluindo os pacientes com sinusite maxilar comprovadamente alérgica, edentulismo da rcada superior.Grupo 2: Serão avaliados 60 pacientes da Clínica de Endodontia, cujo Critério de inclusão será: Pacientes que apresentarem necrose pulpar em pelo menos um dente maxilar posterior, diagnosticada após a avaliação clínica pelo pesquisador
especialista em Endodontia e não possuir histórico de sinusite crônica.Critérios de exclusão) Pacientes com edentulismo da arcada superior e com histórico de sinusite crônica. Os dados clínicos obtidos serão tabulados no software SPSS 21 e submetidos a uma análise estatística. O teste utilizado dependerá da análise de normalidade dos dados. O nível de significância será de 5%.

Objetivo da Pesquisa:

Avaliar a relação entre a presença de sinusite maxilar crônica com diagnóstico de alterações nos dentes posteriores maxilares em uma amostra de pacientes diagnosticados com sinusite crônica

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que realizarão a Tomografia computadorizada Cone Beam, de modo a estabelecer uma correlação entre estas patologias e avaliar possíveis alterações do seio maxilar em pacientes diagnosticados com necrose pulpar e lesão periapical; Verificar a existência de relação entre a proximidade das lesões periapicais e das raízes dos dentes maxilares posteriores com o seio maxilar.maxilares posteriores.

Avaliação dos Riscos e Benefícios:

Entre os benefícios pode se considerar que através deste estudos poderá vir a contribuição para um melhor esclarecimento sobre a associação entre alterações sinusais e problemas dentários, o que ajudará no diagnóstico diferencial entre sinusite de origem nasal e de origem odontogênica. Com isso, o paciente poderá ter a possibilidade de
obter a cura de uma doença que se arrasta por anos. Além disso, permitirá uma maior interação entre os Otorrinolaringologistas e os Cirurgiões- Dentistas para realizarem um plano de tratamento adequado para os pacientes em questão. A pesquisa pode ser considerada de riscos mínimo pois apenas o desconforto da tomografia é considerado.

Comentários e Considerações sobre a Pesquisa:

A presença de sinusite crônica pode estar relacionada com problemas nos dentes maxilares posteriores e com isto grande sofrimento para os pacientes e perda dos dentes pelas doenças periodentais. Assim sendo este estudo tem importância e relevância para a comunidade científica e para os participantes dela.

Considerações sobre os Termos de apresentação obrigatória:

Os critérios de inclusão e exclusão estão bem definidos. Será realizada em instituição habilitada e por profissionais com curriculo coerente com a proposta. Os exames a serem realizados, no caso as Tomografias serão feitas dentro do tratamento já existente no ambulatório e está declarado pelo órgão competente.No TCLE estão descritos os procedimentos, riscos e ressarcimento em caso de alguma evnetualidadee por parte dos pesquisadores. Todos os documentos anexos,carta de encaminhamento, declaração de concordância, orçamento,declaração de infraestrutura,curriculo lates dos
pesquisadores estão anexos e correspondem ao solicitado na Resolução 466.

Conclusões ou Pendências e Lista de Inadequações:

Projeto aprovado.

HOSPITAL UNIVERSITÁRIO DA UNIVERSIDADE FEDERAL DE JUIZ DE FORA-MG

Continuação do Parecer: 1.461.931

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_612517.pdf	16/02/2016 13:01:39		Aceito
Declaração de Pesquisadores	declaracao_tomografia_pesquisador.pdf	16/02/2016 13:01:01	Carolina Oliveira de Lima	Aceito
Declaração de Instituição e Infraestrutura	declaracao_sem_custo_tomografia_assinada.docx	14/02/2016 15:50:29	Carolina Oliveira de Lima	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Termo_de_Compromisso_livre_e_esclarecido_modificado.docx	14/02/2016 15:42:42	Carolina Oliveira de Lima	Aceito
Declaração de Instituição e Infraestrutura	Declaracao_de_infraestrutura_faculdade_odontologia_assinada.docx	28/01/2016 12:11:49	Carolina Oliveira de Lima	Aceito
Orçamento	orcamento_assinado_pelo_orientador.docx	08/01/2016 09:42:54	Carolina Oliveira de Lima	Aceito
Folha de Rosto	folha_de_rosto.pdf	08/01/2016 09:32:17	Carolina Oliveira de Lima	Aceito
Outros	comprovante_cadastro_do_projeto.pdf	11/12/2015 20:31:58	Carolina Oliveira de Lima	Aceito
Outros	comprovante_registro_cadastro_pesquisador.pdf	11/12/2015 20:31:15	Carolina Oliveira de Lima	Aceito
Outros	declaracao_de_concordancia_faculdade_odontologia_tomografia_assinada.pdf	11/12/2015 20:30:29	Carolina Oliveira de Lima	Aceito
Outros	carta_de_encaminhamento.pdf	11/12/2015 20:29:00	Carolina Oliveira de Lima	Aceito
Outros	aprovacao_do_orcamento_comite_hospital_universitario.pdf	11/12/2015 20:27:37	Carolina Oliveira de Lima	Aceito
Outros	termo_de_confidencialidade_e_sigilo_assinado.pdf	11/12/2015 20:25:07	Carolina Oliveira de Lima	Aceito
Outros	declaracao_concordancia_hospital_universitario_assinado.pdf	11/12/2015 20:24:09	Carolina Oliveira de Lima	Aceito
Declaração de Instituição e Infraestrutura	declaracao_de_infraestrutura_hospital_universitario_assinada.pdf	11/12/2015 20:22:59	Carolina Oliveira de Lima	Aceito
Projeto Detalhado / Brochura Investigador	projeto_de_pesquisa.doc	11/12/2015 20:06:53	Carolina Oliveira de Lima	Aceito
Outros	Curriculo_Lattes_Erica.pdf	11/12/2015 20:03:21	Carolina Oliveira de Lima	Aceito
Outros	curriculo_lattes_Leticia.docx	25/11/2015 20:06:45	Carolina Oliveira de Lima	Aceito
Outros	curriculo_lattes_Carolina.pdf	25/11/2015 20:06:27	Carolina Oliveira de Lima	Aceito

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Continuação do Parecer: 1.461.931

Outros	curriculo_lattes_Karina.docx	25/11/2015 20:02:49	Carolina Oliveira de Lima	Aceito
Outros	curriculo_lattes_Celso.docx	25/11/2015 20:01:47	Carolina Oliveira de Lima	Aceito
Outros	Termo_de_sigilo.docx	25/11/2015 19:54:51	Carolina Oliveira de Lima	Aceito
Outros	declaracao_concordancia_faculdade_odontologia_tomografia.doc	25/11/2015 19:54:05	Carolina Oliveira de Lima	Aceito
Outros	Declaracao_de_concordancia_hospital.doc	25/11/2015 19:42:45	Carolina Oliveira de Lima	Aceito
Declaração de Pesquisadores	Carta_de_encaminhamento.doc	25/11/2015 19:41:51	Carolina Oliveira de Lima	Aceito
Declaração de Instituição e Infraestrutura	Declaracao_de_infraestrutura_hospital.doc	25/11/2015 19:41:18	Carolina Oliveira de Lima	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Termo_de_Compromisso_livre_e_esclarecido.docx	25/11/2015 19:40:34	Carolina Oliveira de Lima	Aceito

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

JUIZ DE FORA, 22 de Março de 2016

Assinado por:
Gisele Aparecida Fófano
(Coordenador)

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ANEXO B – Normas do periódico “Australian Dental Journal”

Author Guidelines

Contents

1. SUBMISSION

Thank you for your interest in the *Australian Dental Journal*. Note that submission implies that the content has not been published or submitted for publication elsewhere except as a brief abstract in the proceedings of a scientific meeting or symposium.

Once you have prepared your submission in accordance with the Guidelines, manuscripts should be submitted online at **http://mc.manuscriptcentral.com/adj**

The submission system will prompt you to use an ORCiD (a unique author identifier) to help distinguish your work from that of other researchers. Click **here** to find out more.

For help with submissions, please contact **adj.eo@wiley.com**.

We look forward to your submission.

2. AIMS AND SCOPE

The *Australian Dental Journal* is the official journal of the Australian Dental Association Inc. The role of the Journal is to keep its readers informed of research, clinical developments, clinical opinions and treatments as well as other key issues of relevance to dentistry as practised in Australia. The objective of the Journal is to stimulate interest, debate, discussion and interaction among dentists and specialists of all disciplines within the field of dentistry.

3. MANUSCRIPT CATEGORIES AND REQUIREMENTS

Submissions to the journal should be limited to one of the categories defined below. Specific information regarding length and format is provided for each category.

Scientific Articles

Scientific articles are papers that report significant clinical or basic research in dentistry.

Word limit: 7500 words maximum including references, tables and figures

Abstract: Structured abstract (200 words maximum) divided into (background, methods, results and conclusions.

Text Structure:

- Introduction
- Materials and Methods
- Results
- Discussion
- References (Vancouver Style)

Figures: There is no limit to the number of figures.

Review Article

Generally, review articles will be solicited by the Editor and are intended to be focused reviews of basic and clinical science related to all aspects of dentistry. Unsolicited submissions will be considered but, to avoid duplicating a topic already in preparation, authors should contact the editor before developing a manuscript.

Word limit: 7500 words (Review should be no longer than 10 pages including figures and tables)

Abstract: Unstructured abstract (200 words maximum)

Text Structure:

- Introduction
- Body
- References (Vancouver Style)

Figures: There is no limit to the number of figures.

Case Reports and Clinical Notes

Case reports and clinical notes manuscripts will emphasize all aspects of clinical dentistry. They should describe: (a) unique cases that may represent a previously undescribed condition; (b) unexpected association of two or more diseases; (c) adverse or unexpected treatment response; (d) any other clinical observation based upon well-documented cases that provides important new information; or (e) a new or revised clinical technique or procedure.

Case Reports and Clinical Notes should be concise and occupy no more than three Journal pages.

Word Limit: NO WORD LIMIT SET

Abstract: Unstructured Abstract (200 words maximum)

Text Structure:

- Introduction
- Case Description and Results
- Discussion
- References (Vancouver Style)

Letters to the Editor

Letters may comment on articles published in the Journal and should offer constructive criticism. When appropriate, comment on the letter is sought from the author. Letters to the Editor may also address any aspect of the profession, including education, new modes of practice and concepts of disease and its management.

Letters should be brief (no more than two A4 pages).

4. PARTS OF THE MANUSCRIPT

The manuscript should be submitted in separate files: title page; main text file; figures.

Title page

The title page should contain:
(i) a short informative title that contains the major key words. The title should not contain abbreviations (see Wiley's **best practice SEO tips**);
(ii) the full names of the authors;
(iii) the author's institutional affiliations at which the work was carried out;
(iv) the full postal and email address, plus telephone number, of the author to whom correspondence about the manuscript should be sent;
(v) acknowledgements (if applicable).

Acknowledgements
Keep acknowledgements to a minimum. The source of financial grants and other funding must be acknowledged, including a frank declaration of the authors' industrial links and affiliations. The contribution of colleagues or institutions should also be acknowledged. Permission and approval of the wording from the person or institution thanked is the responsibility of the author. Personal thanks and thanks to anonymous reviewers are not appropriate.

Conflict of Interest Statement
The Australian Dental Journal requires all authors including corresponding and co-authors to fill out conflict of interest form(s) for all submissions. For more details please refer to the 'Conflict of Interest and Disclosure' information in the 'Editorial Pocilies and Ethical Consideration' section.

Please download the ICMJE Conflict of Interest form **here**

Without these statements submissions cannot be considered and will be sent back to the author.

Main text file
As papers are double-blind peer reviewed the main text file should not include any information that might identify the authors.

The main text file should be presented in the following order:

- title, abstract and key words
- main text
- references
- tables (each table complete with title and footnotes)
- figure legends
- Appendices (if relevant)

Figures and supporting information should be supplied as separate files.

Footnotes to the text are not allowed and any such material should be incorporated into the text as parenthetical matter.

Abstract and key words
All manuscripts must have an abstract that states the purpose, basic procedures, main findings and principal conclusions of the study. The abstract should not contain abbreviations or references.
Five key words (for the purposes of indexing) should be supplied below the abstract in alphabetical order.

Please refer to 'Manuscript Categories and Requirements' for abstract requirements for the various manuscript categories.

References

The Vancouver system of referencing should be used (examples are given below). In the text, references should be cited using superscript Arabic numerals in the order in which they appear. If cited in tables or figure legends, number according to the first identification of the table or figure in the text.

Cite the surname and initial(s) of authors without stops. In the reference list when there are more than six authors to a paper, cite the first three, then indicate et al. In the body of the text when there are two authors cite both, when there are three or more then indicate et al. All citations mentioned in the text, tables or figures must be listed in the reference list.

Abbreviate the title of journal references according to the Index to Dental Literature or Index Medicus. State the year of publication, the number of the volume (not the number of the issue)

and the first and last page numbers of the article.

In general, abstracts are not acceptable as references.

Authors are responsible for the accuracy of the references.

Examples of reference style

Observe the following, including spacing and punctuation.

Journal: One or more author

1. Ellis B, Lamb DJ. The setting characteristics of alginate impression materials. Br Dent J 1981;151:343-346.

Journal: Corporate author

2. Therapeutics, Instruments, Materials and Equipment Committee, Australian Dental Association. Cotton pellets and gingival retraction cords. Clinical Notes No 2. Aust Dent J 1984;29:279.

Book: Single author

3. Nikiforu G. Understanding dental caries. 1. Etiology and mechanisms: basic and clinical aspects. Basle: Karger, 1975:150-151.

Book: Two authors/later edition

4. Brand RW, Isselhard DE. Anatomy of orofacial structures. 2nd edn. St Louis: Mosby, 1982:69-72.

Book: Editors as authors

5. Meyer J, Squier CA, Gerson SJ, eds. The structure and function of oral mucosa. Oxford: Pergamon, 1984.

Book: Reference to a chapter

6. Carlsson GE, Haraldson T. Functional response. In: Brånemark P-I, Zarb GA, Albrektsson T, eds. Tissue integrated prostheses. Osseointegration in clinical dentistry. Chicago: Quintessence, 1985:155-163.

Thesis, monograph, dissertation

7. Kingsford-Smith ED. Marginal seal of cervical restorations. Sydney: The University of Sydney, 1988. MDS thesis.

8. Cairns RB. Infrared spectroscopic studies of solid oxygen. Berkeley, California: University of California, 1965. Dissertation.

Papers awaiting publication

These may appear as references, provided they have been accepted by the Journal to which they have been submitted. They should be cited as follows:

9. Grant TC. Chronic periodontitis. Int Dent J (in press).

Websites

When referring to a website, include the date it was accessed. If the website only is cited, it should appear in the text within parentheses. If the website is additional to a reference, it should be included at the end of the reference as follows:

10. Australian Institute of Health and Welfare. Cancer in Australia. Canberra: AIHW, 1998. URL: ‘http://www.aihw.gov.au’. Accessed June 2005.

Written communications

These may be inserted in the text in parentheses or may appear as footnotes, providing they bear the writer’s name and the date of the communication. Example: (Smith GJ, written communication, July 1986).

Unpublished observation, verbal communications

These may not be listed as references.

Tables

Tables should be self-contained and complement, but not duplicate, information contained in the text. Tables should be numbered consecutively in the text and supplied as files that allow

editing, not pasted as images. Legends should be concise but comprehensive – the table, legend and footnotes must be understandable without reference to the text. Vertical lines should not be used to separate columns. Column headings should be brief, with units of measurement in parentheses; all abbreviations must be defined in footnotes. Footnote symbols: †, ‡, §, ¶, should be used (in that order) and *, **, *** should be reserved for *P*-values. Statistical measures such as SD or SEM should be identified in the headings.

Figure legends

Legends should be concise but comprehensive and appear on a separate page. The figure and its legend must be understandable without reference to the text, include definitions of any symbols used and define/explain all abbreviations and units of measurement.

Figures

All illustrations (line drawings and photographs) are classified as figures. Figures should be cited in consecutive order in the text. Magnifications should be indicated using a scale bar on the illustration.

Preparation of figures:

Although low quality images are adequate for review purposes it is important to note that publication requires high quality images to ensure the final product is exceptional.

For Peer-Review Submission:

Authors must submit EPA for line art. Line art includes graphs, flowcharts, diagrams, scatter plots and other text-based figures that are not tables.

Authors must submit TIFF for images (including photographs, drawings, imaging system outputs such as MRIs or ultrasounds.

MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented programs.

- Scans (TIFF only) should have a resolution of 300 dpi (halftone) or 600 to 1200 dpi (line drawings) in relation to the reproduction size.
- EPS files should be saved with fonts embedded (and with a TIFF preview if possible).
- For scanned images, the scanning resolution (at final image size) should be as follows to ensure good reproduction: line art: <600 dpi; half-tones (including gel photographs): <300 dpi; figures containing both halftone and line images: <600 dpi.

Click **http://media.wiley.com/assets/7323/92/electronic_artwork_guidelines.pdf** for the basic figure requirements for initial peer review, as well as more detailed post-acceptance figure requirements.

Colour Figures:

Figures submitted in colour may be reproduced in colour online free of charge. Please note, that it is preferable that line figures are supplied in black and white to ensure they are legible if printed by a reader in black and white. If an author would prefer figures colour printed in hard copies of the journal, a fee will be charged by the Publisher.

Appendices

Appendices will be published after the references. For submissions they should be supplied as separate files but referred to in the text.

Supporting Information

Supporting information is information that is not essential to the article but that provides greater depth and background. It is hosted online, and appears without editing or typesetting. It may include tables, figures, videos, datasets, etc. **Click here** for Wiley's FAQs on supporting information.

Note: if data, scripts or other artefacts used to generate the analyses presented in the paper are available via a publicly available data repository, authors should include a reference to the location of the material within their paper.

General Style Points
The following points provide general advice on formatting and style:

- Abbreviations: In general, terms should not be abbreviated unless they are used repeatedly and the abbreviation is helpful to the reader. Initially, use the word in full, followed by the abbreviation in parentheses. Thereafter use the abbreviation only.
- Units of measurement: Measurements should be given in SI or SI-derived units. Visit the Bureau International des Poids et Mesures (BIPM) website for more information about SI units.
- Numbers: numbers under 10 are spelt out, except for: measurements with a unit (8mmol/l); age (6 weeks old), or lists with other numbers (11 dogs, 9 cats, 4 gerbils).
- Reference to Figures: When referring to a figure at the beginning of a sentence, spell the word out (Figure 1). When referring to a figure within the sentence, abbreviate (in Fig 2…) When referring to a figure at the end of a sentence, abbreviate and enclose in brackets (Fig.3).
- Trade Names: Chemical substances should be referred to by the generic name only. Trade names should not be used. Drugs should be referred to by their generic names. If proprietary drugs have been used in the study, refer to these by their generic name, mentioning the proprietary name and the name and location of the manufacturer in parentheses.

Wiley Author Resources

Manuscript Preparation Tips: Wiley has a range of resources for authors preparing manuscripts for submission available **here**. In particular, authors may benefit from referring to Wiley's best practice tips on **Writing for Search Engine Optimization.**

Editing, Translation, Formatting Support:
Wiley editing services <http://wileyeditingservices.com/en/> can greatly improve the chances of a manuscript being accepted. Offering expert help in English language editing, translation, manuscript formatting and figure preparation.

5. EDITORIAL POLICIES AND ETHICAL CONSIDERATIONS

Peer Review and Acceptance

The acceptance criteria for all papers are the quality and originality of the research and its significance to our readership. Except where otherwise stated, manuscripts are peer reviewed by two anonymous reviewers and the Editor.

The *Australian Dental Journal* has a comprehensive, double-blind peer review process. Editorial decisions are supported by peer reviews and Editor guidance. The Editor considers all information related to suitability of the manuscript for the journal's audience, manuscript novelty, academic rigor, quality of communication, and other matters. The Editor's decisions about which manuscripts are accepted for publication are final.

Principles for Publication of Research Involving Human Subjects

Manuscripts must contain a statement to the effect that all human studies have been reviewed by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in an appropriate version of the Declaration of Helsinki (as revised in Brazil 2013), available at **http://www.wma.net/en/30publications/10policies/b3/index.html**. It should also state clearly in the text that all persons gave their informed consent prior to their inclusion in the study.
All investigations on human subjects must include a statement that the subject gave informed consent. Patient anonymity should be preserved. Photographs need to be cropped sufficiently to prevent human subjects being recognized (or an eye bar should be used). If a patient pictured in a digital image or photograph can be identified, his or her permission is required to publish the image. The corresponding author must submit a letter signed by the patient

authorizing the *Australian Dental Journal* to publish the image or photograph.
This approval must be received by the Editorial Office prior to final acceptance of the manuscript for publication.

Conflicts of Interest Disclosure

The *Australian Dental Journal* 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: **adj@ada.org.au**. 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/**).

Please download the Conflict of Interest form and ensure all authors complete the form.

Make sure to upload the completed forms to your submission and designate the files as conflict of interest forms. Please note 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 on behalf of all co-authors upon submission.

Materials should comply with the ICMJE Uniform Requirements. EQUATOR reporting guidelines and checklists (e.g. CONSORT, STROBE, STARD, QUOROM, MOOSE) should be used when appropriate.

Data Sharing and Accessibility

The journal encourages authors to share the data and other artefacts supporting the results in the paper by archiving it in an appropriate public repository. Authors should include a data accessibility statement, including a link to the repository they have used, in order that this statement can be published alongside their paper.

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed. You can learn more at https:**//authorservices.wiley.com/statements/data-protection-policy.html**

Publication Ethics

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6. AUTHOR LICENSING

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Authors may choose to publish under the terms of the journal's standard copyright agreement, or **OnlineOpen** under the terms of a Creative Commons License.

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7. PUBLICATION PROCESS AFTER ACCEPTANCE

Accepted article received in production

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Author Guidelines updated 30 July 201

ANEXO C – Comprovante de submissão do artigo

Submission Confirmation

Print

Thank you for your submission

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Relationship of dental conditions with uni- or bilateral chronic maxillary sinusitis – a tomographic study

Authors
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Vasconcelos, Letícia
de Lima, Carolina
Campos, Celso

Date Submitted
08-Jul-2019

APÊNDICE A - Termo de Consentimento Livre e Esclarecido

UNIVERSIDADE FEDERAL DE JUIZ DE FORA

COMITÊ DE ÉTICA EM PESQUISA – CEP HU/UFJF

JUIZ DE FORA – MG – BRASIL

Departamento de Clínica Odontológica da Faculdade de Odontologia da Universidade Federal de Juiz de Fora

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TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

O Sr. (a) está sendo convidado (a) como voluntário (a) a participar da pesquisa **"Avaliação da correlação entre a presença de sinusite crônica com diagnóstico de alterações nos dentes maxilares posteriores".** Nesta pesquisa pretendemos **analisar a relação entre a presença de alterações dentárias, como infecção ou inflamação nos dentes superiores posteriores com a presença de sinusite maxilar crônica. O motivo que nos leva a realizar este trabalho deve-se ao fato de que existem poucos estudos que avaliam a associação entre estas doenças. Estas avaliações podem ajudar a identificar alterações sinusais e explicar casos de pacientes com sinusite maxilar crônica, que se arrastam por anos, mesmo com tratamento. Isto pode ser causado por uma sinusite de origem nos dentes e não de origem nasal.**

Para esta pesquisa, adotaremos os seguintes procedimentos: **uma avaliação clínica da condição dos seus dentes e um exame por Tomografia Computadoriza de Feixe Cônico, no Departamento de Radiologia Odontológica, da Faculdade de Odontologia da Universidade Federal de Juiz de Fora, para avaliarmos a presença de problemas dentários e alterações no seio maxilar. Há a existência de risco mínimo previsível em função da execução de exame clínico e exame tomográfico, destacando que nenhum dos exames são invasivos ou requerem preparação prévia para o mesmo. Os exames seguirão os protocolos recomendados para suas execuções. A pesquisa contribuirá para um melhor esclarecimento sobre a possível associação entre alterações no seio maxilar e problemas dentários, o que ajudará no diagnóstico diferencial entre estes dois problemas. Além disso, permitirá uma maior interação entre os Otorrinolaringologistas e os Cirurgiões-Dentistas para realizarem um plano de tratamento adequado e eficaz para cada paciente. De acordo com os resultados do seu exame, você será encaminhado para o tratamento de canal nas Clínicas de Endodontia ou Clínicas Integradas de Atenção Secundária, do Departamento de Clínica Odontológica da Universidade Federal de Juiz de Fora e/ou para o Serviço de Otorrinolaringologia do Hospital Universitário da Universidade Federal de Juiz de Fora.**

Para participar deste estudo o Sr (a) não terá nenhum custo, nem receberá qualquer vantagem financeira. Apesar disso, caso sejam identificados e comprovados danos provenientes desta pesquisa, o Sr.(a) tem assegurado o direito a indenização. O Sr. (a) terá o esclarecimento sobre o estudo em qualquer aspecto que desejar e estará livre para participar ou recusar-se a participar. Poderá retirar seu consentimento ou interromper a participação a qualquer momento. A sua participação é voluntária e a recusa em participar não acarretará qualquer penalidade ou modificação na forma em que o Sr. (a) é atendido (a) pelo pesquisador, que tratará a sua identidade com padrões profissionais de sigilo. Os resultados da pesquisa estarão à sua disposição quando finalizada. Seu nome ou o material que indique sua participação não será liberado sem a sua permissão.

O (A) Sr (a) não será identificado (a) em nenhuma publicação que possa resultar desta pesquisa.

Este termo de consentimento encontra-se impresso em duas vias originais, sendo que uma será arquivada pelo pesquisador responsável, na **Secretária do Mestrado em Clínica Odontológica da Faculdade de Odontologia da Universidade Federal de Juiz de Fora**e a outra será fornecida ao Sr. (a). Os dados e instrumentos utilizados na pesquisa ficarão arquivados com o pesquisador responsável por um período de 5 (cinco) anos, e após esse tempo serão destruídos. Os pesquisadores tratarão a sua identidade com padrões profissionais de sigilo, atendendo a legislação brasileira (Resolução Nº 466/12 do Conselho Nacional de Saúde), utilizando as informações somente para os fins acadêmicos e científicos.

Eu, _____, portador do documento de Identidade _____ fui informado (a) dos objetivos da pesquisa **"Avaliação da relação entre a presença de sinusite crônica com diagnóstico de alterações nos dentes maxilares posteriores",** de maneira clara e detalhada e esclareci minhas dúvidas. Sei que a qualquer momento poderei solicitar novas informações e modificar minha decisão de participar se assim o desejar.

Declaro que concordo em participar. Recebi uma via original deste Termo de Consentimento Livre e Esclarecido e me foi dada à oportunidade de ler e esclarecer as minhas dúvidas.

Juiz de Fora, _____ de _____ de 2016.

_____ _____

Nome e assinatura do(a) participante Data

_____ _____

Nome e assinatura do(a) pesquisador Data

_____ _____

Nome e assinatura da testemunha Data

Em caso de dúvidas com respeito aos aspectos éticos deste estudo, você poderá consultar o CEP HU – Comitê de Ética em Pesquisa HU/UFJF – Hospital universitário Unidade Santa Catarina

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