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Cleomar Donizeth Rodrigues

CONTRIBUIÇÃO DA IMAGEM TRIDIMENSIONAL PARA O DIAGNÓSTICO DO CISTO DE RETENÇÃO MUCOSO DO SEIO MAXILAR

Goiânia - GO
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Trabalho apresentado na forma de artigo científico para exame de defesa de doutorado ao Programa de Pós-Graduação em Ciências da Saúde da Universidade Federal de Goiás.

Orientador: Prof. Dr. Carlos Estrela
Co-orientadora: Profa. Dra. Ana Helena G. de Alencar

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BANCA EXAMINADORA DA TESE DE DOUTORADO

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Dedicatória

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LISTA DE ABREVIATURAS, SIGLAS E SÍMBOLOS

CRMSM	Cisto de retenção mucoso do seio maxilar
TCFC	Tomografia computadorizada de feixe cônico
TC	Tomografia computadorizada
UFG	Universidade Federal de Goiás
TCLE	Termo de consentimento livre e esclarecido
IL	*Ilinois*
mm	Milímetro
AM	Amazonas
JPEG	*Joint Photographic Experts Group*
DPI	*Dots per inch*
HP	*Hewlett-Packard*
MG	Minas Gerais
PA	*Pennsylvania*
USA	*United States of America*
kVp	Quilovoltagem pico
mAs	Miliamperagem por segundo
cm	Centímetro
bits	*Binary digit*
DICOM	*Digital imaging and communications in medicine*
MI	*Michigan*
GHz	*Gigahertz*
GB	*Gigabyte*
RAM	*Random access memory*

RESUMO

Objetivos: Detectar o cisto de retenção mucoso do seio maxilar (CRMSM) por meio da radiografia panorâmica e tomografia computadorizada de feixe cônico (TCFC).

Metodologia: Seis mil radiografias panorâmicas foram selecionadas do banco digital de dados para análise de diagnóstico de CRMSM. Foram detectadas imagens sugestivas de CRMSM em 185 radiografias, cujos pacientes foram localizados e convidados a retornar para controle. Trinta indivíduos retornaram para a realização de radiografia panorâmica para controle entre 6 e 46 meses. Constatada a presença do CRMSM pelo controle radiográfico realizava-se a TCFC, para uma melhor avaliação do seio maxilar. Cistos foram mensurados e comparados por meio das imagens dos dois métodos. Os testes de Wilcoxon, de Spearman e Kolmorogov-Smirnov foram utilizados para análise estatística. O Nível de significância estabelecido foi de 5%.

Resultados: Foi observada diferença estatisticamente significante entre os métodos para detecção dos CRMSM ($p<0,05$); 23 CRMSM diagnosticados por meio da radiografia panorâmica controle foram confirmados por TCFC, no entanto, 5 CRMSM detectados em TCFC não foram identificados pelas imagens de radiografias panorâmicas. Oito CRMSM detectados pelo controle radiográfico não foram confirmados pela TCFC. A discrepância da extensão do CRMSM entre as imagens das radiografias panorâmicas inicial e controle e da panorâmica controle e TCFC não foram estatisticamente significantes ($p=0,617$ e $p=0,626$, respectivamente), bem como a correlação entre tempo e a discrepância da extensão dos CRMSM ($r= -0,16$ e $p= 0,381$).

Conclusão: O exame por tomografia computadorizada do feixe cônico apresentou maior potencial de detecção de CRMSM que a radiografia panorâmica.

Palavras chave: cisto mucoso, seios maxilares, radiografia panorâmica, tomografia computadorizada do feixe cônico.

ABSTRACT

Objective: To detect the mucous retention cyst of maxillary sinus (MRCMS) through panoramic radiography and cone beam computed tomography (CBCT).

Methods: Six thousand panoramic radiographs were selected from digital database for diagnostic analysis of MRCMS. We detected suggestive images of MRCMS in 185 radiographs of patients who were located and invited to return to control. Thirty patients returned for the realization of panoramic radiography for control between 6 and 46 months. Given the presence of MRCMS by radiographic control we performed the CBCT for a better evaluation of the maxillary sinus. Cysts were measured and compared through the images of two methods. The Wilcoxon, Spearman and Kolmorogov-Smirnov tests were used for statistical analysis. The level of significance was set at 5%.

Results: There was statistically significant difference between the methods for detection of MRCMS ($p < 0.05$); 23 MRCMS detected by panoramic radiography control were confirmed by CBCT, however, 5 MRCMS detected in CBCT images were not identified by panoramic radiographs. Eight MRCMS detected by X-ray control were not confirmed by CBCT. The discrepancy of extent of MRCMS between images of initial panoramic radiographs and control ones for the CBCT were not statistically significant ($p = 0.617$ and $p = 0.626$, respectively) as well as the correlation between time and discrepancy of extent of MRCMS ($r = -0.16$, $p = 0.381$).

Conclusion: The cone beam computed tomography examination provides more accurate detection of MRCMS than panoramic radiography.

Keywords: mucous cyst, maxillary sinus, panoramic radiograph, cone beam computed tomography.

1. INTRODUÇÃO

O cisto de retenção mucoso do seio maxilar (CRMSM) caracteriza-se por constituir uma lesão assintomática, encontrado em exames por imagens com um aspecto radiopaco, em forma de cúpula e borda nitidamente arredondada. Apresenta-se com crescimento lento, forma expansiva, manutenção da integridade da mucosa e das corticais[1]. Sua etiologia é indefinida[2,3], podendo estar associada a processos alérgicos e inflamatórios da mucosa naso-sinusal[1,4,5,6], traumatismos[7], infecções dentárias periapicais e periodontais[2,4,8,9], umidade relativa do ar e a temperatura ambiente[3,4,10]. No entanto, nenhuma correlação significativa foi encontrada entre a umidade relativa do ar, temperatura média e o mês de diagnóstico do CRMSM[11]. Devido a taxa de regressão espontânea e desaparecimento dos CRMSM variar entre 16 % e 41%[2,4,12] tem sido sugerido controle clínico e radiográfico e, mesmo quando constatado um aumento considerável do CRMSM não tem sido indicada uma terapêutica específica, exceto para alívio de sintomas quando presentes[12].

Exames por imagens possibilitam aos cirurgiões-dentistas oportunidades de detectar alterações do seio maxilar. A radiografia de Water é considerada ideal para avaliação dos seios maxilares, porém os aspectos mais inferiores e posteriores podem estar obscurecidos pela sobreposição do processo alveolar e pelos dentes posteriores[13]. A radiografia panorâmica tem sido utilizada como exame de rotina para avaliação do complexo maxilo-mandibular. Embora não seja uma técnica indicada para avaliar os seios maxilares em toda sua extensão[14] devido suas limitações, ainda é utilizada devido ao baixo custo, disponibilidade e facilidade de exame[13].

A tomografia computadorizada (TC) constitui um método de valor no diagnóstico quando se investiga alterações dos seios paranasais[15]. Gonzalez *et al.*[16] compararam a radiografia panorâmica e a TC em avaliação de 84 seios maxilares. A radiografia panorâmica apresentou limitações no diagnóstico de alterações dos seios maxilares, enquanto que a TC sugeriu ser um exame mais acurado. Embora a TC apresente vantagens diagnósticas, não é mais utilizada na rotina odontológica devido à dose de radiação e alto custo [16,18].

O contínuo desenvolvimento de novas tecnologias possibilitou o surgimento da tomografia computadorizada de feixe cônico (TCFC)[17,19], provendo à Odontologia a reprodução da imagem tridimensional dos tecidos mineralizados maxilofaciais, com mínima distorção e dose de radiação significantemente reduzida em comparação à TC[17,18,19], com perspectivas de constituir-se um importante recurso para o diagnóstico de alterações e planejamento do tratamento dos seios maxilares[20].

A escassez de estudos comparando o emprego da radiografia panorâmica e a TCFC para detecção de alterações nos seios maxilares motivou a realização deste estudo, cujo objetivo foi detectar o cisto de retenção mucoso do seio maxilar por meio da radiografia panorâmica e tomografia computadorizada de feixe cônico.

2. OBJETIVO

O objetivo deste estudo foi detectar o cisto de retenção mucoso do seio maxilar por meio da radiografia panorâmica e tomografia computadorizada de feixe cônico.

3. MÉTODOS

Seis mil radiografias panorâmicas realizadas entre outubro de 2006 a junho de 2010 para fins de tratamentos odontológicos foram selecionadas do banco digital de dados de um instituto privado de radiologia (Revelação Imagens Orais, Brasília, DF, Brasil). Os critérios de inclusão utilizados foram imagens de radiografias adequadamente adquiridas e processadas de pacientes com idade mínima de 12 anos. Foram selecionadas 185 radiografias com imagens sugestivas de CRMSM, cujos pacientes foram localizados e convidados a retornar para controle. Trinta e dois retornaram e concordaram em participar da pesquisa. Foram excluídos 2 pacientes, sendo que 1 se submeteu à cirurgia nos seios maxilares e uma paciente estava gestante.

Este estudo foi aprovado pelo Comitê de Ética em Pesquisa da Universidade Federal de Goiás, Brasil, bem como o termo de consentimento livre e esclarecido (TCLE), sob o protocolo 169/2009 (Anexo1).

Radiografia panorâmica para controle foi realizada nos 30 pacientes e quando imagem sugestiva de CRMSM foi constatada o paciente foi convidado a submeter-se à TCFC, para uma melhor avaliação do seio maxilar.

As radiografias panorâmicas inicial e para controle dos 30 pacientes foram realizadas com o aparelho Orthoralix 9200 AEC panoramic system (Gendex® Dental

Systems, Des Plaines, IL), usando ponto focal de 0,5mm e filme Kodak (T-MAT, 15X30, Manaus,AM, Brasil), e arquivadas em formato digital JPEG, em 150DPI, por meio de um *scanner* Scan Jet 4C HP® com leitor de transparência. Dois especialistas em Radiologia Odontológica e Imaginologia, com mais de 10 anos de experiência clínica, calibrados, analisaram as imagens para detecção de alterações sugestivas de CRMSM. Quando houve diferenças entre os dois examinadores, um consenso foi obtido discutindo a imagem com um terceiro especialista em Radiologia. O critério de detecção do CRMSM por meio da radiografia panorâmica foi a visualização de uma imagem radiopaca em forma de cúpula, no assoalho ou demais paredes do seio maxilar. As medidas súpero-inferior e látero-medial do CRMSM foram obtidas nas radiografias panorâmicas inicial e para controle por meio do *software* Radiocef Studio 2 (Radiomemory®, Belo Horizonte/MG,Brasil), considerando-se a maior extensão (Figura 1).

As imagens tomográficas foram obtidas em um tomógrafo computadorizado de feixe cônico i-CAT (Imaging Sciences® International, Hatfield, PA, USA), com 120 kVp e 18,45 mAs e exposição de 20 segundos. A área de exposição utilizada foi de 13 cm (das coroas dos dentes superiores ao terço médio do osso frontal), tamanho do *voxel* de 0,3 x 0,3 x 0,3 mm e escala de cinza de 12 bits. As imagens em formato DICOM foram processadas, interpretadas e medidas no *software* Xoran Cat versão 3.1.62 (Xoran® Technologies, Ann Arbor, MI, USA). O critério de detecção do CRMSM por meio da TCFC foi a visualização de uma opacificação em forma de cúpula no assoalho ou demais paredes do seio maxilar. Foram feitas medidas súpero-inferior, póstero-anterior e látero-medial do CRMSM nas reconstruções sagitais, axiais e coronais, sendo considerada a de maior extensão (Figura 1).

As imagens radiográficas e tomográficas foram avaliadas em um computador

com processador Intel® Core™ 2 Duo-6300 2.00 GHz, 2,93GB de memória RAM (Intel Corporation, USA), placa de vídeo NVIDIA GeForce 6200 turbo cache (NVIDIA® Corporation, USA) e monitor de 19 polegadas EIZO - Flexscan S2000, resolução 1600x1200 pixels (EIZO NANAO® Corporation Hakusan, Japan), em ambiente apropriado. A discrepância entre as medidas dos CRMSM nas radiografias panorâmicas inicial e para controle e, entre a radiografia panorâmica para controle e TCFC foi obtida pela diferença entre a maiores extensões.

Para análise da frequência do CRMSM, de acordo com o método de diagnóstico, foi utilizado o teste de Kolmorogov-Smirnov ($p<0,05$). O teste estatístico de Wilcoxon foi empregado para avaliação da discrepância obtida entre as radiografias panorâmica inicial e para controle e, entre a radiografia panorâmica para controle e a TCFC. A correlação entre o tempo de controle e a extensão do CRMSM foi analisada pelo teste de Spearman.

Os pacientes que apresentaram outras patologias sinusais foram encaminhados para atendimento especializado e os que exibiam CRMSM continuaram em controle periódico.

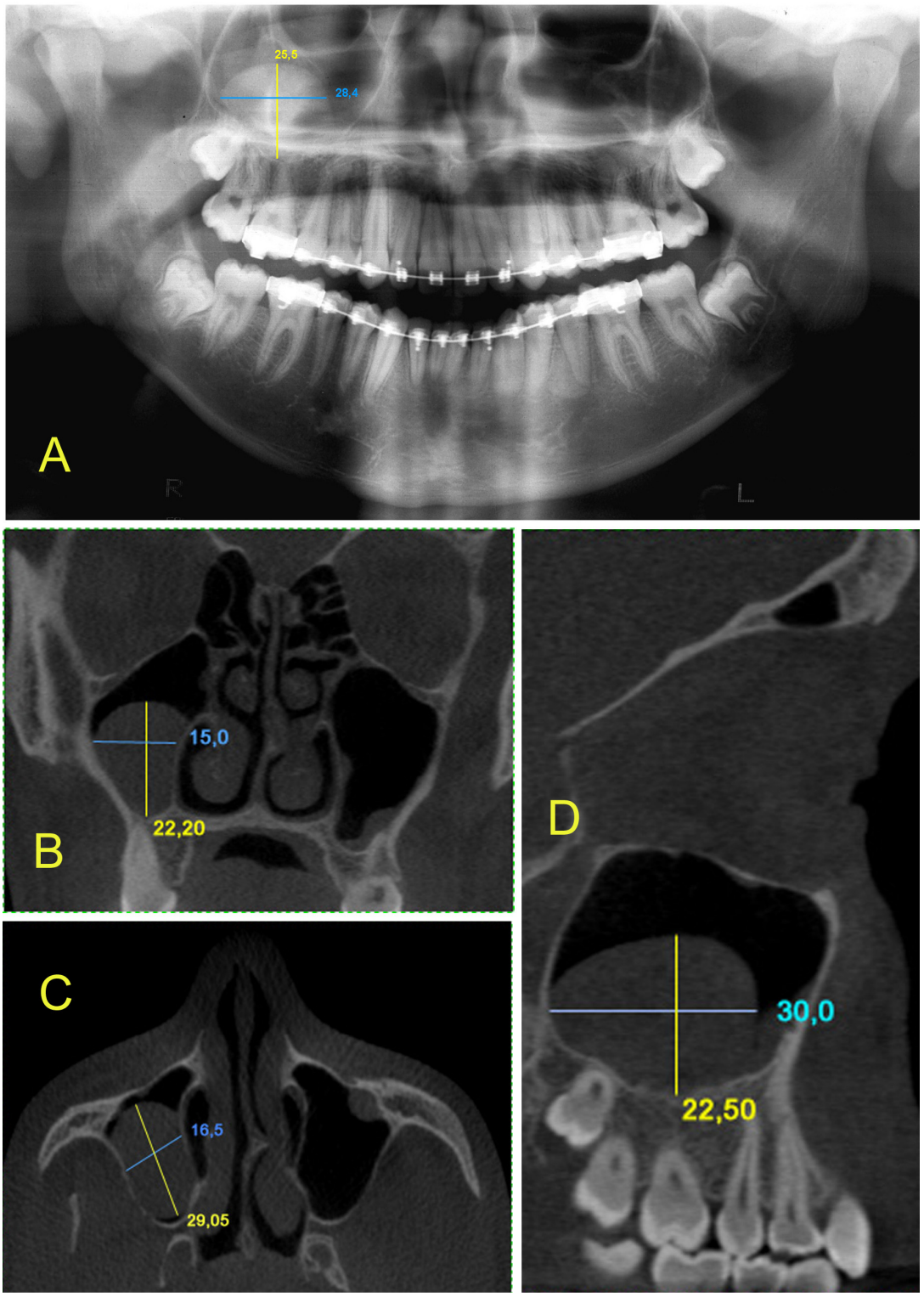

Figura 1. Mensuração do CRMSM em radiografia panorâmica (A) e em imagens de TCFC em reconstruções coronal (B), axial (C) e sagital (D).

4. RESULTADOS

Do total de 30 pacientes que realizaram o controle radiográfico, 17 eram do gênero masculino e 13 do feminino, com idade média de 37,5 anos (Tabela 1). O intervalo de tempo decorrido entre a realização da radiografia panorâmica inicial e para controle variou entre 6 e 46 meses.

Foram detectados 32 CRMSM nas imagens da radiografia panorâmica inicial, sendo 28 unilaterais e 2 bilaterais. Nas imagens da radiografia panorâmica para controle foram detectados 31 CRMSM (27 unilaterais e 2 bilaterais), sendo que 2 CRMSM da radiografia panorâmica inicial tinham desaparecido e 1 novo foi diagnosticado.

A discrepância do CRMSM nas imagens das radiografias panorâmica inicial e para controle variou de -22,45 mm (redução da extensão ou desaparecimento do CRMSM) a +15,21 mm (aumento da extensão do CRMSM), não apresentando diferença estatisticamente significante pelo teste de Wilcoxon (p=0,617).

Na radiografia panorâmica para controle 46,87% (n=15) dos CRMSM apresentaram aumento em sua extensão, 25% (n=8) redução, 21,87% (n=7) permaneceram inalterados ou com alteração menor que 1 mm e 6,25% (n=2) desapareceram (Tabela 1).

A correlação entre o tempo decorrido da realização da radiografia panorâmica inicial para a de controle e a discrepância dos CRMSM foi analisada por meio do teste de Spearman, sendo os resultados estatisticamente insignificantes (r= -0,16 e p= 0,381).

Dos 31 CRMSM detectados na radiografia panorâmica para controle 23 foram confirmados nas imagens da TCFC e 8 eram falso positivo (Figura 2). As imagens de TCFC evidenciaram a presença de 5 CRMSM não detectados pela radiografia panorâmica para controle (Figura 3). A freqüência de CRMSM detectados por meio da radiografia panorâmica para controle e TCFC foi avaliada por meio do teste Kolmogorov-Smirnov, apresentando diferença estatisticamente significante ($p<0,05$).

Dos 23 CRMSM detectados por meio de radiografia panorâmica e confirmados pela TCFC, 12 (52,17%) apresentaram a extensão aumentada na imagem da TCFC, 5 (21,73%) mostraram a extensão reduzida e 6 (26,08%) mantiveram suas extensões, não sendo estatisticamente significante pelo teste de Wilcoxon (p=0,626), (Tabela 2).

Tabela 1. Extensão (mm) e tempo de controle (meses) dos CRMSM detectados nas radiografias panorâmicas inicial (n= 32) e para controle (n=31).

Caso Nº	Idade (Anos)	Gênero	Panorâmica Inicial + Extensão	Panorâmica controle+ Extensão	Controle #	Discrepância (mm) #
1	64	F	32,00	32,00	6	0
2 D	39	M	*	17,28	6	-
2 E	39	M	15,59	15,83	8	0,24
3	45	F	13,32	15,38	19	2,06
4	29	M	31,30	36,31	20	5,01
5	16	M	29,01	27,13	20	-1,88
6	47	F	27,00	27,64	21	0,64
7	12	F	16,01	17,43	21	1,42
8	37	F	21,33	36,54	23	15,21
9	30	M	19,47	20,96	23	1,49
10	28	M	19,13	27,93	24	8,8
11	18	F	10,95	12,63	25	1,68
12	59	F	22,45	*	28	-22,45
13	60	F	33,81	25,79	28	-8,02
14	54	F	33,82	16,37	28	-17,45
15	21	M	23,96	25,68	28	1,72
16	31	F	18,89	33,10	29	14,21
17 D	37	M	31,98	30,36	29	-1,62
17 E	37	M	32,83	35,94	29	3,11
18	22	M	31,95	31,18	31	-0,77
19	36	M	23,43	23,40	31	-0,03
20	32	M	29,94	16,63	33	-13,31
21	30	M	22,08	22,26	33	0,18
22	20	M	20,22	18,87	34	-1,35
23	14	M	10,43	15,74	35	5,31
24	21	M	24,65	23,88	37	-0,77
25	20	F	20,41	21,42	38	1,01
26	41	M	16,40	14,37	38	-2,03
27	12	F	26,80	22,22	38	-4,58
28	49	M	16,97	18,79	40	1,82
29	26	M	16,26	18,18	42	1,92
30 D	35	M	21,10	30,69	46	9,59
30 E	35	M	19,98	*	46	-19,98

D = Direito; E= Esquerdo; M= Masculino; F=Feminino * = Ausência do CRMSM

- = Ausência do CRMSM na panorâmica inicial;

+ Teste de Wilcoxon: p=0,617; # Teste de Spearman: r = -0,16 e p= 0,381.

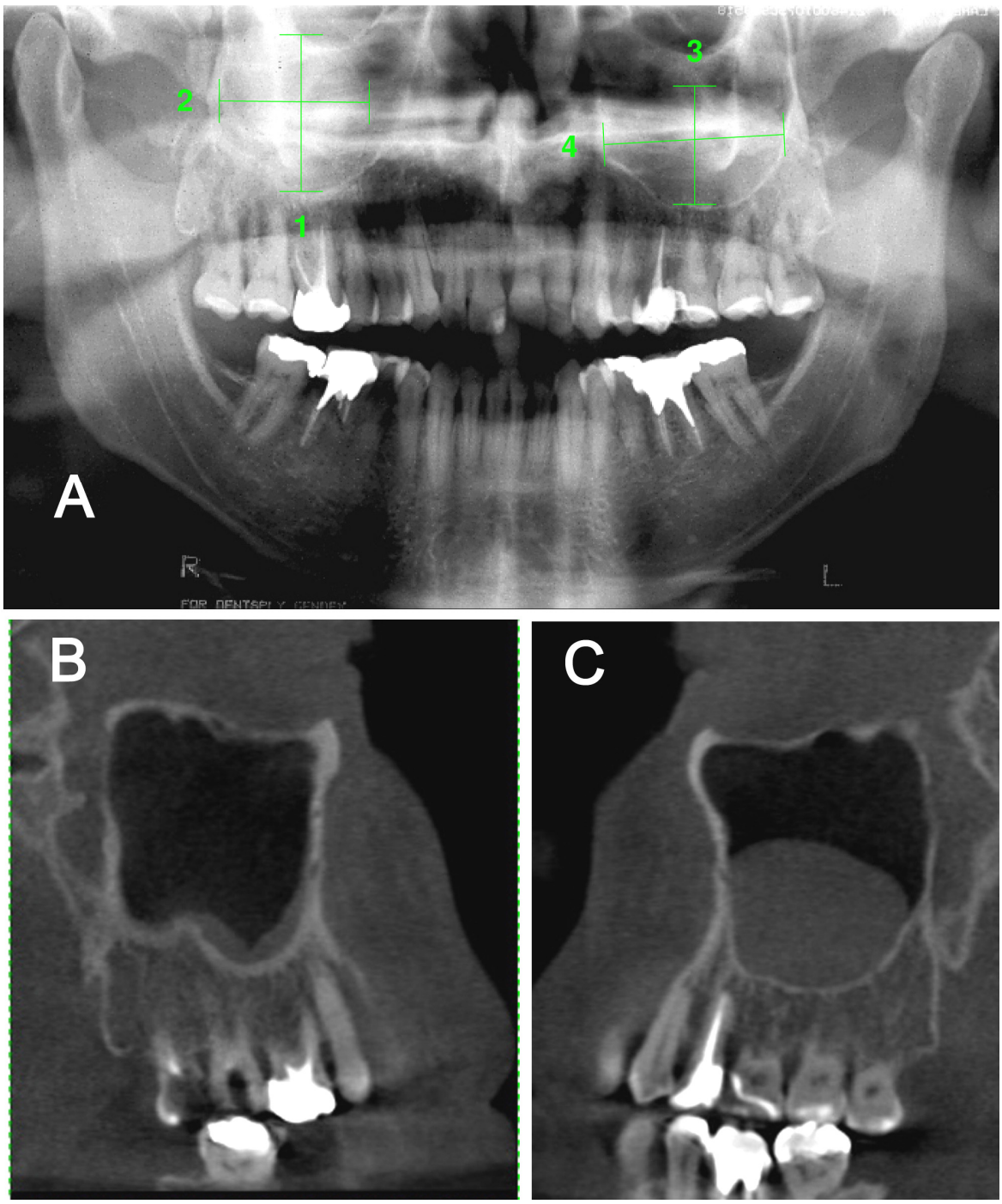

Figura 2. Radiografia panorâmica para controle com CRMSM bilateral (A); reconstrução sagital em TCFC, do mesmo paciente, com ausência do CRMSM do lado direito (B) e presença de CRMSM do lado esquerdo(C).

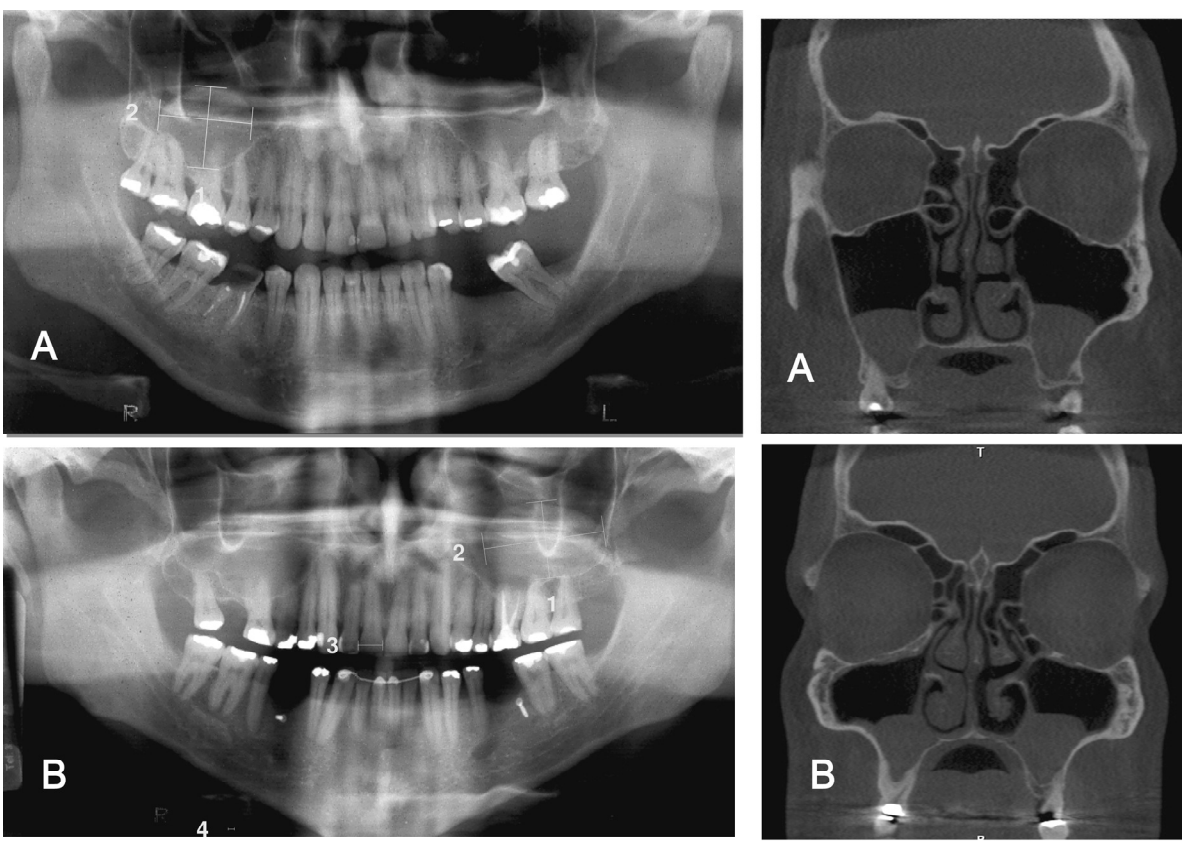

Figura 3. A- Radiografia panorâmica para controle com CRMSM no lado direito e reconstrução coronal em TCFC confirmando o CRMSM do lado direito e evidenciando a presença de outro do lado esquerdo. B - Radiografia panorâmica para controle com CRMSM no lado esquerdo e reconstrução coronal em TCFC do mesmo paciente com CRMSM bilateral.

Tabela 2. Extensão (mm) dos CRMSM detectados na radiografia panorâmica para controle e TCFC (n=23)

Caso Nº	Idade (Anos)	Gênero	Panorâmica Controle + Extensão	TCFC + Extensão	Discrepância (mm)
1	64	F	32,00	28,20	-3,8
4 E	30	M	36,31	38,74	2,43
5	17	M	27,13	32,47	5,34
6	49	F	27,64	29,00	1,36
7	14	F	17,43	24,02	6,59
9	32	M	20,96	24,05	3,09
10	30	M	27,93	21,65	-6,28
11	20	F	12,63	12,77	0,14
13 D	62	F	25,79	27,31	1,52
15	23	M	25,68	22,75	-2,93
16	33	F	33,10	34,87	1,77
17 E	39	M	35,94	23,72	-12,22
18	24	M	31,18	31,94	0,76
19 D	37	M	23,40	24,61	1,21
20	35	M	16,63	15,09	-1,54
21	33	M	22,26	26,18	3,92
22	23	M	18,87	22,9	4,03
24 D	24	M	23,88	25,83	1,95
25	23	F	21,42	21,35	-0,07
26	44	M	14,37	17,61	3,24
27	12	F	22,22	21,43	-0,79
29	30	M	18,18	18,19	0,01
30 E	39	M	30,69	30,46	-0,23

*Foi considerada a maior extensão do CRMSM na panorâmica para controle e na TCFC.

+ Teste de Wilcoxon: p=0,626

5. DISCUSSÃO

A identificação do CRMSM em exames por imagens favorece observar suas características, seu comportamento, bem como estabelecer um protocolo terapêutico. O CRMSM mantém a integridade das paredes dos seios maxilares[1] e geralmente é assintomático[7,12,15,21], sendo que a maioria se rompe espontaneamente não requerendo tratamento[12]. O acompanhamento clínico e radiográfico torna-se essencial, frente à alternativa terapêutica e pelo fato de exclusão da presença de imagens que possam sugerir outras patologias, como mucocele, pólipos e sinusites[4,15].

No presente estudo foram detectados 32 CRMSM nas imagens da radiografia panorâmica inicial e 31 CRMSM nas imagens da radiografia panorâmica para controle, sendo que 2 CRMSM da radiografia panorâmica inicial desapareceram e 1 novo foi diagnosticado. Diferença estatisticamente significante não foi observada entre a extensão do CRMSM na radiografia panorâmica inicial e para controle e, não houve correlação entre a extensão do CRMSM e o tempo decorrido entre os exames.

Wang *et al,.*[12] reportaram que quando o CRMSM não apresenta alteração significativa em 4 anos, provavelmente continue com as mesmas dimensões em um prazo maior. Caso o aumento significativo seja observado, pode ser esperado que esteja com dimensões maiores em um segundo controle. Devido a taxa de regressão espontânea e desaparecimento dos CRMSM variar entre 16 % e 41%[2,4,12] tem sido sugerido controle clínico e radiográfico e, mesmo quando constatado um aumento

considerável, não tem sido indicada uma terapêutica específica, exceto para alívio de possíveis sintomas[12].

Os resultados deste estudo mostraram diferença significante na identificação do CRMSM por meio de imagens de TCFC e de radiografia panorâmica. Vinte e três CRMSM detectados por meio das imagens da radiografia panorâmica foram confirmados pela TCFC, no entanto 5 CRMSM detectados nas imagens da TCFC não foram identificados nas imagens de radiografias panorâmicas. Resultados estes justificados pelas limitações da radiografia panorâmica a qual não permite a observação de toda extensão do seio maxilar. O teto do seio maxilar e pequenas alterações localizadas fora da camada de imagem e nas regiões látero-superior ou no centro do seio maxilar não podem ser visualizadas[13,22,23] .

As imagens da radiografia panorâmica neste estudo detectaram 8 CRMSM que não foram confirmados nas imagens de TCFC. Apesar dos benefícios, a radiografia panorâmica apresenta limitações, como a sobreposição de imagens, podendo conduzir a resultados falsos positivos. As conchas nasais inferiores e as cavidades nasais estendem-se e projetam-se ao longo dos seios maxilares quando o paciente é posicionado muito para trás no aparelho de raios X ou com a cabeça elevada, produzindo imagens sugestivas de alterações nos seios maxilares[24]. Estudo anterior[16] comparou a TC com a radiografia panorâmica e concluiu que a TC continua a ser o exame mais eficaz para o diagnóstico de alterações inflamatórias dos seios maxilares.

O desenvolvimento dos equipamentos de TCFC tem possibilitado uma melhor qualidade de imagem para diagnóstico, com menor dose de radiação, facilidade na realização do exame e custo inferior ao da TC[17,18,19]. A TCFC pode ser uma ferramenta útil para diagnóstico e planejamento do tratamento de patologias dos seios maxilares[20.]

Ao comparar as imagens das radiografias panorâmicas com as obtidas na TCFC, constatou-se neste estudo que dos 23 CRMSM detectados por meio de radiografia panorâmica e confirmados pela TCFC, 12 (52,17%) apresentaram a extensão aumentada na imagem da TCFC, 5 (21,73%) mostraram a extensão reduzida e 6 (26,08%) mantiveram suas extensões. Resultados estes justificados pelo fato de que em diversos CRMSM a maior extensão foi detectada no sentido póstero-anterior na TCFC, medida que não foi possível de ser realizada na radiografia panorâmica, desde que imagens radiográficas convencionais fornecem possibilidade de mensuração apenas bidimensional. As imagens da TCFC permitiram uma leitura por mapeamento e aquisições de informações valiosas por meio da visualização em diferentes planos.

A TCFC tem permitido avanços significativos na área de diagnostico e pesquisa em Odontologia. O CRMSM foi detectado com maior precisão no exame de TCFC comparado à radiografia panorâmica.

6. CONCLUSÃO

O exame por tomografia computadorizada do feixe cônico apresenta maior potencial de detecção de CRMSM que a radiografia panorâmica.

Agradecimentos

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Anexo 1 – Parecer consubstanciado do Comitê de Ética em Pesquisa

SERVIÇO PÚBLICO FEDERAL

UNIVERSIDADE FEDERAL DE GOIÁS
PRÓ-REITORIA DE PESQUISA E PÓS-GRADUAÇÃO
COMITÊ DE ÉTICA EM PESQUISA

UFG

PROTOCOLO
169/2009

Goiânia, 04 de dezembro de 2009

PARECER CONSUBSTANCIADO

I. IDENTIFICAÇÃO:

Título do projeto: " Prevalência,fatores de riscos e evolução do cisto mucoso do seio maxilar em uma sub-população brasileira"

Pesquisador Responsável: Cleomar Donizeth Rodrigues

Pesquisadores Participantes: Carlos Estrela, Márcia Maria F da Silveira, Adriana C. Marques de Faria, Silvana R. Quinan da Silva.

Local de realização: Faculdade de Odontologia

Informamos que o Comitê de Ética em Pesquisa da Universidade Federal de Goiás, após análise das adequações solicitadas, **Aprovou,** o projeto acima referido, e o mesmo foi considerado em acordo com os princípios éticos vigentes.

O pesquisador responsável deverá encaminhar ao CEP/UFG, relatórios da pesquisa, encerramento, conclusão (ões) e publicação (ões) de acordo com as recomendações da Resolução 196/96.

Profa Dra Rita Goreti Amaral
Coordenadora do CEP/UFG

APÊNDICES

Apêndice 1: Artigo Publicado

Prevalence and risk factors of mucous retention cysts in a Brazilian population.

Autores – CD Rodrigues, GF Freire, LB Silva, MM Fonseca da Silveira and C Estrela.

Periódico – Dentomaxillofacial Radiology (Publicado – Dentomaxillofacial Radiology – DMFR (2009) 38, 480-483

Apêndice 2: Artigo a ser submetido

Tree-dimensional Images contributing to the diagnosis of Mucous Retention Cyst in Maxillary Sinus.

Autores – CD Rodrigues, MM Fonseca da Silveira, AH Gonçalves de Alencar, MAGS Silva, Mendonça EF and C Estrela.

Periódico – Dentomaxillofacial Radiology (DMFR)

Apêndice 3: Produção científica 2009-2011

Apêndice 4: Guidelines for Publishing Papers DentoMaxilloFacial Radiology

Apêndice 1: Artigo Publicado

Dentomaxillofacial Radiology (2009) 38, 480-483

http://dmfr.birjournals.org

RESEARCH

Prevalence and risk factors of mucous retention cysts in a Brazilian population

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Objectives: The aim of this study was to estimate the prevalence and analyse the risk factors of mucous retention cysts (MRCs) of the maxillary sinus.
Methods: From November 2002 to May 2007, 6293 panoramic radiographs were taken and retrospectively reviewed to estimate the prevalence of MRCs and to analyse risk factors (month, relative air humidity and mean temperature). The months in which MRCs occurred were recorded and analysed. The Spearman rank correlation coefficient was used to correlate MRCs with relative air humidity, environmental temperature and month (significance level R^2>0.85).
Results: Of the 6293 radiographs analysed, 201 (3.19%) images were suggestive of MRCs. No significant correlation was found between MRCs and relative humidity (R^2=0.15) of the air or temperature (R^2=0.40). The months with the highest numbers of MRC cases were September, October and November.
Conclusions: The prevalence of MRCs was low, and no statistical correlation was found between MRCs and relative humidity of the air, mean temperature or month.
Dentomaxillofacial Radiology (2009) ***38****, 480-483.doi: 10.1259/dmfr/48774803*
Keywords: mucous retention cyst, cyst, panoramic radiograph, differential diagnosis, maxillary sinus

Introduction

The paranasal sinuses are air cavities that communicate with the nasal cavities by canals and ostia. The sinuses are covered by a thin mucous membrane which adheres to the periosteum, and the ciliate epithelium helps to remove the secretions formed in the sinus cavities. Radiographically, sinuses are seen as radiolucent oval structures outlined by a thin radiopaque line. Their radiolucency is assigned to their air content, whereas the radiopacity of their contours is a result of the density of their walls. Variations in shape, size, radiolucency and wall thickness may be found when different radiographic projections are used.[1–4] Mucus retention cysts (MRCs) of the maxillary sinus are often found incidentally during the evaluation of radiographs.[4–6]

The most frequent lesion of the maxillary sinus is the MRC[4,7]. This expansive, chronic inflammatory cyst is radiographically seen as a radiopaque single or multiple lesion of the sinus wall. It grows slowly, and thus preserves the integrity of the mucous membrane; its borders are soft and very well defined; and no cortical bone is seen. Some cysts remain the same for a long time; some increase gradually; others disappear spontaneously. In most cases, these cysts are asymptomatic,[7–11] although some discomfort may be reported.[12,13] The pathogenesis of MRCs is uncertain,[14,15] although they are strongly associated with allergic, inflammatory and infectious processes,[7,10,12] but not with dental or gingival pathologies.[13,15] Wang et al[16] reported that most retention cysts of the maxillary sinus spontaneously regressed or showed no significant change in size in the long term. The formation of the MRC has been associated with the seasons, particularly the end of the winter,[8] as well as with mean temperature and air humidity.[15] Some studies[17,18] reported that high humidity and air pollution might be associated with their occurrence. The aim of this study was to evaluate the prevalence and analyse the risk factors of MRCs of the maxillary sinus.

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Materials and methods

This cross-sectional study used panoramic radiographs retrieved from randomly selected patient charts of our radiological centre (RC; Brazilian Dentistry Association, Brasilia, DF, Brazil). = The sample consisted of 6293 panoramic radiographs taken with an Orthoralix 9200 AEC panoramic system (Gendex Dental Systems, Des Plaines, IL) using 0.5 mm focal spot and Kodak dental film (T-MAT, 15X30, Manaus, AM, Brazil) between November 2002 and May 2007 in Brasilia city (latitude 15°46'47"S; longitude 47°55'47"W; altitude 1171 m). In this sample, 3776 patients were men and 2517 were women, and their mean age was 25±10 years. The study design was approved by the institutional Ethics in Research Committee.

Three independent qualified radiologists with 5 years' clinical experience discussed interpretation criteria and then examined the radiographs. The radiographs were examined in a darkened room using a light box (Medalight, LP-300, Universal Electronics, NY). The criterion for radiographic detection was a radiopaque dome-shaped or hemispherical image seen on the floor of the maxillary sinus and that had its base on the antral wall.[19] If a consensus was not reached after two observers examined the radiographs, the third observer made the final decision.

The risk factors analysed were relative air humidity, temperature and month. All the data about relative air humidity and environmental temperature were supplied by INMET (National Institute of Meteorology, Brasília, DF, Brazil) and reported as the mean for each date (2002–2007).

The Spearman coefficient was used to correlate MRCs with the month of the year, relative air humidity and environmental temperature (significance level $R^2>0.85$).

Results

A total of 6293 panoramic radiographs were evaluated; 201 were suggestive of MRCs, which resulted in a prevalence of 3.19%. Table 1 shows the distribution of panoramic tomograms in each month from November 2002 to May 2007. Table 2 presents the correlation of MRCs with month of the year, relative humidity of air and temperature. The months with the highest numbers of MRC cases were September (6.26%), October (8.19%) and November (6.34%). The months with the lowest relative humidity of the air were August, September and October. The results of the Spearman test showed that there was no significant correlation of MRCs with relative humidity of the air or temperature. Figures 1 and 2 show examples of panoramic radiographs of patients with MRCs.

Discussion

The mean prevalence of MRCs of the maxillary sinus, found in 201 of the 6293 panoramic radiographs analysed, was 3.19% (Table 2). These findings are in agreement with previous studies, which found MRCs in 1.4–9.6% of their samples.[9,13,18,20]

MRCs were found in 119 (59.2%) male and in 82 (40.8%) female patients. Allard et al[1] and White and Pharoah[15] reported that MRC occurrence is higher among men than among women, at a ratio of 2:1. Myall et al[7] and Gothberg et al[12] reported that MRCs might be found in all age groups, except among children. They reported that most cases occur after the first and particularly in the second decade of life.[7,14] Casamassimo and Lilly[8] found that MRC was diagnosed in the third decade of life in 69% of the cases, and that there was no association between cyst size and the patient's age. The third decade is the age at which a higher prevalence of MRCs is observed.[8,17] In our study, a preference for the second and third decades was found, and a decrease in the frequency of cases was seen with increasing age, possibly because younger patients were examined more often.

The lesion was found in the right maxillary sinus in 104 cases (Figure 1) and in the left maxillary sinus in 95 cases. These findings show that the frequency of MRCs among Brazilians is in agreement with that reported in previous studies with other populations.[1,17,18] In our study, cysts were found in both sinuses in only two cases (Fig 2).

Table 1 Distribution of panoramic tomograms in each month from November 2002 to May 2007 in Braslia city (Brazil)

Month	2002	2003	2004	2005	2006	2007	Total	N (%)
January	-	101	111	134	142	134	622	14 (2.25)
February	-	136	85	77	121	147	566	8 (1.41)
March	-	145	128	149	126	176	724	8 (1.10)
April	-	133	103	125	109	106	576	15 (2.60)
May	-	125	112	164	145	121	667	18 (2.69)
June	-	93	102	133	88	-	416	20 (4.80)
July	-	154	106	176	135	-	571	14 (2.45)
August	-	121	118	166	158	-	563	10 (1.77)
September	-	126	106	110	105	-	447	28 (6.26)
October	-	97	65	109	144	-	415	34 (8.19)
November	113	78	101	81	84	-	457	29 (6.34)
December	53	67	43	54	52	-	269	3 (1.11)
							6293	

n. number of mucous retention cysts found

Figure 1 Panoramic radiograph of a 27-year-old female patient. Left maxillary sinus floor elevation: image suggestive of mucous retention cyst (circle)

In this study, MRCs of the maxillary sinus were detected in all months of the year and were correlated with mean relative air humidity and temperature (Tables 1 and 2 and Figures 1 and 2).

The month with the highest prevalence of MRCs was October (34 cases; 8.19%), which had the eighth highest relative air humidity value (60.5%), whereas the month with the lowest incidence was December (3 cases, 1.11%), which had the fourth highest relative air humidity value (74.6%). The month with the highest mean humidity value (January 77.8%) had an incidence of 14 cases; half of the cases were detected in September (the second lowest mean humidity value, 46%). The three months with the smallest numbers of cases were December (1.11%), February (1.41%) and March (1.10%), all months with high relative air humidity values (74.6%, 77% and 76.6% respectively). August, with the lowest air humidity value (45%), was not the month with the lowest incidence (10 cases, 1.77%), but the month with the fourth smallest number of cases. Statistical results did not find a correlation between the prevalence of the MRC and relative air humidity, which is in agreement with findings reported by Allard et al[1] and White and Pharoah,[15] but differs from those reported by Ruprecht et al,[11] who conducted their study in the desert. The mean temperature of the city of Brasilia varied slightly during the study period. The lowest mean temperature was recorded in the month of July (18.85°C), and the highest in October (22.9°C). The three months with the greatest numbers of MRC cases were October (34), November (29) and September (28), months with the highest mean temperatures (22.9°C, 21.86°C and 22.87°C respectively). Conversely, the month with the lowest mean temperature (July) was not the month with the lowest incidence of cases (14), whereas the three months with the smallest numbers of cases, December (3), February (8) and March (8), had higher mean temperatures (21.98°C, 21.78°C and 21.64°C respectively). The month with the fourth largest number of cases (June, 20) had the second lowest mean temperature (19.1°C); therefore, there was no correlation between mean temperature and MRC prevalence.

Future studies should include an evaluation of patients' general health and of the treatment protocols used for these clinical cases.

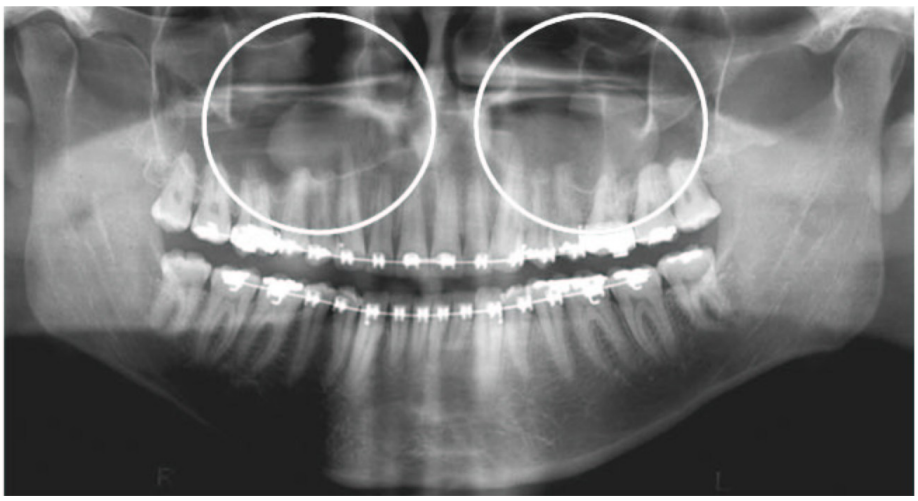

Figure 2 Panoramic radiograph of a 32-year-old male patient. Image suggestive of bilateral mucous retention cyst (circles)

Table 2 Correlation of mucous retention cysts with month, mean temperature from November 2002 to May 2007 in Brasilia city (Brazil)

Month	Panoramic (n)	MRC n (%)	Mean humidity (%)	Mean temperature (oC)
January	622	14 (2.25)	77.8	21.86
February	566	8 (1.41)	77.0	21.78
March	724	8 (1.10)	76.6	21.64
April	576	15 (2.60)	71.4	21.68
May	667	18 (2.69)	64.2	20.22
June	416	20 (4.80)	58.5	19.10
July	571	14 (2.45)	52.2	18.85
August	563	10 (1.77)	45.0	21.10
September	447	28 (6.26)	46.0	22.87
October	415	34 (8.19)	60.5	22.90
November	457	29 (6.34)	73.4	21.86
December	269	3 (1.11)	74.6	21.98

Spearman coefficient, R2 =0.15 for mean humidity and 0.40 for mean temperature; n =6293 panoramic radiographs and 201 MRCs (mean 3.19%)

Conclusion

The mean prevalence of MRCs of the maxillary sinus was low (3.2%), and statistical analyses did not reveal any correlation with relative air humidity or mean temperature. The comparison of occurrence in the right or left sides was not significant; male sex and the second and third decades of life were the groups with the greatest numbers of cases.

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Dentomaxillofacial Radiology D8149.3d 11/6/09 15:46:15 The Charlesworth Group, Wakefield +44(0)1924 369598 – Rev 7.51n/W (Jan 20 2003) Mucous retention cyst

Apêndice 2: Artigo a ser submetido

Tree-dimensional Images contributing to the diagnosis of Mucous Retention Cyst in Maxillary Sinus

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Tree-dimensional Images contributing to the diagnosis of Mucous Retention Cyst in Maxillary Sinus

ABSTRACT

Objective: To detect the mucous retention cyst of maxillary sinus (MRCMS) through panoramic radiography and cone beam computed tomography (CBCT).

Methods: Six thousand panoramic radiographs were selected from digital database for diagnostic analysis of MRCMS. We detected suggestive images of MRCMS in 185 radiographs of patients who were located and invited to return to control. Thirty patients returned for the realization of panoramic radiography for control between 6 and 46 months. Given the presence of MRCMS by radiographic control we performed the CBCT for a better evaluation of the maxillary sinus. Cysts were measured and compared through the images of two methods. The Wilcoxon, Spearman and Kolmorogov-Smirnov tests were used for statistical analysis. The level of significance was set at 5%.

Results: There was statistically significant difference between the methods for detection of MRCMS ($p < 0.05$); 23 MRCMS detected by panoramic radiography control were confirmed by CBCT, however, 5 MRCMS detected in CBCT images were not identified by panoramic radiographs. Eight MRCMS detected by X-ray control were not confirmed by CBCT. The discrepancy of extent of MRCMS between images of initial panoramic radiographs and control ones for the CBCT were not statistically significant ($p = 0.617$ and $p = 0.626$, respectively) as well as the correlation between time and discrepancy of extent of MRCMS ($r = -0.16$, $p = 0.381$).

Conclusion: The cone beam computed tomography examination provides more accurate detection of MRCMS than panoramic radiography.

Keywords: mucous cyst, maxillary sinus, panoramic radiograph, cone beam computed tomography.

INTRODUCTION

The mucous retention cyst of maxillary sinus (CRMSM) is characterized by an asymptomatic lesion found in examination of images featuring radiopaque appearance, dome-shaped and distinctly rounded edge. It is presented with slow growth, expansive, maintenance of mucosal and cortical integrity[1]. Its etiology is unclear.[2,3] It may be associated with allergic and inflammatory processes of sinonasal mucosa,[1,4,5,6] trauma,[7] periapical and periodontal dental infections,[2,4,8,9] relative humidity and room temperature.[3,4,10] However, no significant correlation was found between relative humidity, mean temperature and month of diagnosis of MRCMS.[11] Because of the rate of spontaneous regression and disappearance of MRCMS vary between 16% and 41%[2,4,12] it has been suggested clinical and radiographic control, and even when it is found a considerable increase in the MRCMS it has not been given a specific treatment, except for symptoms relief when present.[12]

Imaging examinations enabled the dentists opportunities to detect changes in maxillary sinus. Water's radiography is considered ideal for evaluation of the maxillary sinuses, but the most inferior and posterior aspects may be obscured by overlap of alveolar process and the posterior teeth.[13] Panoramic radiography has been used as a routine screening tool for evaluation of maxillo-mandibular complex. Although it is not a technique suitable for evaluating maxillary sinuses in all its extension[14] because its limitations, it is still used because of its low cost, availability and ease of examination.[13]

Computed tomography (CT) is a value method on diagnosis when investigating alterations in paranasal sinuses.[15] Gonzalez et al.[16] compared the panoramic radiograph

and CT in evaluation of 84 maxillary sinuses. Panoramic radiography showed limitations in the diagnosis of alterations in maxillary sinus, while CT suggested to be a closer examination. Although CT diagnosis has advantages, it is no longer used in routine dental care because of high radiation dose and cost.[16,18]

The continuous development of new technologies allowed the appearance of cone beam computed tomography (CBCT),[17,19] providing dentistry the reproduction of three-dimensional image of mineralized maxillofacial tissues, with minimal distortion and significantly reduced radiation dose compared to CT,[17,18,19] with prospects of becoming an important resource for diagnosing changes and treatment planning of maxillary sinus.[20]

The scarcity of studies comparing the use of panoramic radiography and CBCT to detect changes in the maxillary sinuses motivated this study, whose objective was to detect the mucous retention cyst of maxillary sinus by panoramic radiography and cone beam computed tomography.

METHODS

Six thousand panoramic radiographs performed between October 2006 and June 2010 for purposes of dental treatment were selected from the digital database from a private institute of radiology (Revelação Imagens Orais, Brasília, DF, Brazil). The inclusion criteria were radiographic images properly acquired and processed and patients aged at least 12 years. We selected 185 radiographs with suggestive image of MRCMS, whose patients were located and invited to return to control. Thirty two returned and agreed to participate the survey. We excluded two patients: one underwent surgery in the maxillary sinuses and one patient was pregnant.

This study was approved by Ethics in Research Committee from Federal University of Goiás, Brazil, as well as consent term under protocol 169/2009 (Annex1).

Panoramic radiography for control was performed in 30 patients, and when a suggestive image of MRCMS was found the patient was asked to submit to CBCT for a better evaluation of maxillary sinus.

Initial and control panoramic radiographs were obtained with Orthoralix 9200 AEC panoramic system (Gendex® Dental Systems, Des Plaines, IL) using 0.5 mm focal and Kodak film (T-MAT, 15X30, Manaus, Brazil), and they were stored in digital JPEG format, at 150dpi, using the scanner Scan Jet 4C HP® with transparency unit. Two specialists in Dental Radiology and Imaginology, with over 10 years of clinical experience, calibrated, analyzed the images to detect MCRMS. When there were differences between the two examiners, a consensus was reached discussing the image with a third specialist in radiology. The MRCMS detection criterion through the panoramic radiograph was the visualization of a dome-shaped radiopaque image, on the floor or on other walls of the maxillary sinus. Superoinferior and lateromedial measures of MRCMS were obtained from initial and control panoramic radiographs through software Radiocef Studio 2 (Radiomemory®, Belo Horizonte, Brazil), considering the major length (Figure 1).

The CBCT images were obtained with i-CAT tomography (Imaging Sciences® International, Hatfield, PA, USA),120 kVp and 18.45 mAs, and exposure of 20 seconds. The used field of view (FOV) was 13 cm (from the crowns of upper teeth to the middle third of frontal bone), voxel size of 0.3 x 0.3 x 0.3 mm and a gray scale of 12 bits

The images in DICOM format were processed, interpreted and measures in the software Xoran Cat version 3.1.62 (Xoran® Technologies, Ann Arbor, MI, USA). MRCMS

detection criterion in CBCT was the view of a dome-shaped opacity on the floor or other walls of the maxillary sinus. Measurements of MRCMS were made in the sagittal, axial and coronal reconstructions, being considered the greatest extension (Figure 1).

Radiograph and CBCT scans were evaluated on a computer running at an Intel® Core™ 2 Duo-6300 2.00 GHz, 2.93 GB of RAM (Intel Corporation, USA), NVIDIA GeForce 6200 Turbo Cache videocard (NVIDIA ® Corporation, USA) and 19-inch EIZO monitor - FlexScan S2000, 1600x1200 pixels (EIZO NANAO® Corporation Hakusan, Japan) in an appropriate ambient. The discrepancy between measures of MRCMS in initial and control panoramic radiographs and between panoramic radiography for control and CBCT was obtained by the difference between the largest extensions.

To analyze the frequency of MRCMS, according to the diagnosis method, it was used Kolmorogov-Smirnov test ($p < 0.05$). The Wilcoxon statistical test was used to evaluate the discrepancy obtained between the initial and control panoramic radiographs, and between control panoramic radiography and CBCT. The correlation between the time of control and extension of MRCMS was analyzed by Spearman test.

Patients who had other sinus pathologies were referred to specialized care and those who exhibited MRCMS remained in periodic control.

RESULTS

From total of 30 patients who underwent radiographic control, 17 were male and 13 female mean age of 37.5 years (Table 1). The time lag between the realization of the initial panoramic radiograph an for control one varied between 6 and 46 months.

Thirty-two MRCMS were detected in images of initial panoramic radiography, 28 unilateral and 2 bilateral. In the images of control panoramic radiograph were found 31 MRCMS (27 unilateral and 2 bilateral), and 2 MRCMS from initial panoramic radiograph had disappeared and a new one was detected.

The discrepancy of MRCMS in the images of initial and control panoramic radiographs ranged from -22.45 (extension reduction or disappearance of MRCMS) to +15.21 mm (increase of the extent of MRCMS). There was no statistically significant difference by Wilcoxon test ($p = 0.617$).

In control panoramic radiograph 46.87% (n=15) of MRCMS showed increase in extension, 25% (n=8) presented reduction, 21.87% (n=7) remained unchanged or with change less than 1mm, and 6.25% (n=2) disappeared (Table 1).

The correlation between the elapsed time from initial panoramic radiograph for the control one and the discrepancy of MRCMS was analyzed using the Spearman test and the results were statistically insignificant ($r = -0.16$, $p = 0.381$).

From 31 MRCMS detected on control panoramic radiographs, 23 were confirmed on CBCT images, and 8 were false positive (Figure 2). CBCT images showed the presence of 5 MRCMS not detected by panoramic radiography for control (Figure 3). The frequency of MRCMS detected by control panoramic radiography and CBCT was assessed using the Kolmogorov-Smirnov test, presenting statistically significant difference ($p < 0.05$).

From 23 MRCMS detected by panoramic radiography and confirmed by CBCT, 12 (52.17%) had an increased extension on CBCT image, 5 (21.73%) showed reduced extension, and 6 (26.08%) maintained its extensions, what is not statistically significant by the Wilcoxon test ($p = 0.626$), (Table 2).

DISCUSSION

The identification of MRCMS on imaging examinations favors to observe their characteristics, their behavior, as well as to establish a therapeutic protocol. MRCMS maintains the integrity of maxillary sinuses walls[1] and is usually asymptomatic,[7,12,15,21] most of which is broken spontaneously requiring no treatment.[12] Clinical and radiographic examination is essential, with the alternative therapy, and because of exclusion of presence of images that may suggest other pathologies, such as mucocele, polyps and sinusitis.[4,15]

In the present study 32 MRCMS were detected in images of initial panoramic radiography and 31 MRCMS in images of panoramic radiography for control, and 2 MRCMS from initial panoramic radiograph disappeared and a new one was diagnosed. No statistically significant difference was observed between the extent of MRCMS in initial panoramic radiograph and for control one, and there was no correlation between the extent of MRCMS and the elapsed time between examinations.

Wang et al.[12] reported that when MRCMS shows no significant change in four years, it will probably continue with the same dimensions in an extended period. If the significant increase is observed, it can be expected to be larger in size with a second control. Because of the rate of spontaneous regression and disappearance of MRCMS vary between 16% and 41%[2,4,12] it has been suggested clinical and radiographic control, even when they found a considerable increase it has not been given a specific treatment, except for relieving possible symptoms.[12]

The results of this study showed significant differences in the identification of MRCMS through CBCT and panoramic radiography images. Twenty-three MRCMS detected by panoramic radiography images were confirmed by CBCT, however 5 MRCMS detected in CBCT images were not identified in panoramic radiographs images. These results were justified by limitations of panoramic radiography which does not allow observation of entire length of the maxillary sinus. The roof of maxillary sinus and minor modifications located outside imaging layer and in laterosuperior regions or in the center of the maxillary sinus can not be viewed.[13,22,23]

The images of panoramic radiography in this study found 8 MRCMS that were not confirmed in CBCT images. Despite the benefits, panoramic radiography has limitations such as image overlay, which may lead to false positive results. Lower nasal turbinates and nasal cavities extend and protrude over the maxillary sinus when the patient is positioned too far back on X-ray machine or with the head elevated, producing images that suggest changes in the maxillary sinuses.[24] This previous study[16] compared CT with panoramic radiography and concluded that CT remains the most effective test for the diagnosis of inflammatory changes of the maxillary sinuses.

The development of CBCT equipment has allowed a better image quality for diagnosis, with lower radiation dose, ease in the examination and lower cost than CT.[17,18,19] The CBCT may be a useful tool for diagnosis and treatment planning of maxillary sinus diseases.[20] Comparing images of panoramic radiographs with those obtained in CBCT, it was found in this study that from 23 MRCMS detected by panoramic radiography and confirmed by CBCT, 12 (52.17%) had increased in length, 5 (21.73%) showed reduced extension, and 6 (26.08%) maintained their extensions. These results were substantiated by the fact that in many MRCMS the greatest extent

was detected in the posterior-anterior direction in CBCT, a measure that could not be made on the panoramic radiograph, provided that conventional radiographic images give only two-dimensional measurability. CBCT images allowed a reading by mapping and acquisition of valuable information by viewing at different levels.

CBCT has enabled significant advances in diagnostic and research in dentistry. MRCMS was detected with greater precision in CBCT examination compared to panoramic radiography.

Acknowledgments

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Table 1. Extension (mm) and control time (months) of MRCMS detected in the initial (n=32) and control (n=31) panoramic radiographs.

Case Number	Age (Years)	Gender	Initial Panoramic + Extension	Control Panoramic+ Extension	Control Months#	Discrepancy (mm) #
1	64	F	32.00	32.00	6	0
2 R	39	M	*	17.28	6	-
2 L	39	M	15.59	15.83	8	0.24
3	45	F	13.32	15.38	19	2,06
4	29	M	31.30	36.31	20	5.01
5	16	M	29.01	27.13	20	-1.88
6	47	F	27.00	27.64	21	0.64
7	12	F	16.01	17.43	21	1.42
8	37	F	21.33	36.54	23	15.21
9	30	M	19.47	20.96	23	1.49
10	28	M	19.13	27.93	24	8.8
11	18	F	10.95	12.63	25	1.68
12	59	F	22.45	*	28	-22.45
13	60	F	33.81	25.79	28	-8.02
14	54	F	33.82	16.37	28	-17.45
15	21	M	23.96	25.68	28	1.72
16	31	F	18.89	33.10	29	14.21
17 R	37	M	31.98	30.36	29	-1.62
17 L	37	M	32.83	35.94	29	3,11
18	22	M	31.95	31.18	31	-0.77
19	36	M	23.43	23.40	31	-0.03
20	32	M	29.94	16.63	33	-13.31
21	30	M	22.08	22.26	33	0.18
22	20	M	20.22	18.87	34	-1.35
23	14	M	10.43	15.74	35	5.31
24	21	M	24.65	23.88	37	-0.77
25	20	F	20.41	21.42	38	1.01
26	41	M	16.40	14.37	38	-2.03
27	12	F	26.80	22.22	38	-4.58
28	49	M	16.97	18.79	40	1.82
29	26	M	16.26	18.18	42	1.92
30 R	35	M	21.10	30.69	46	9.59
30 L	35	M	19.98	*	46	-19.98

R = Right; L= Left; M= Male; F=Female * = Absence of MRCMS
- = Absence of MRCMS in initial panoramic radiograph;
+ Wilcoxon Test: p=0.617; # Spearman Test: r = -0.16 e p= 0.381

Table 2. Extension (mm) of MRCMS detected in control panoramic radiograph and in CBCT (n = 23)

Case Number	Age (Years)	Gender	Control Panoramic + Extension	CBCT + Extension	Discrepancy (mm)
1	64	F	32.00	28.20	-3.8
4 L	30	M	36.31	38.74	2.43
5	17	M	27.13	32.47	5.34
6	49	F	27.64	29.00	1.36
7	14	F	17.43	24.02	6.59
9	32	M	20.96	24.05	3.09
10	30	M	27.93	21.65	-6.28
11	20	F	12.63	12.77	0.14
13 R	62	F	25.79	27.31	1.52
15	23	M	25.68	22.75	-2.93
16	33	F	33.10	34.87	1.77
17 L	39	M	35.94	23.72	-12.22
18	24	M	31.18	31.94	0.76
19 R	37	M	23.40	24.61	1.21
20	35	M	16.63	15.09	-1.54
21	33	M	22.26	26.18	3.92
22	23	M	18.87	22.9	4.03
24 R	24	M	23.88	25.83	1.95
25	23	F	21.42	21.35	-0.07
26	44	M	14.37	17.61	3.24
27	12	F	22.22	21.43	-0.79
29	30	M	18.18	18.19	0.01
30 L	39	M	30.69	30.46	-0.23

* It was considered the largest extension of MRCMS in control panoramic and in CBCT

\+ Wilcoxon Test p=0.626

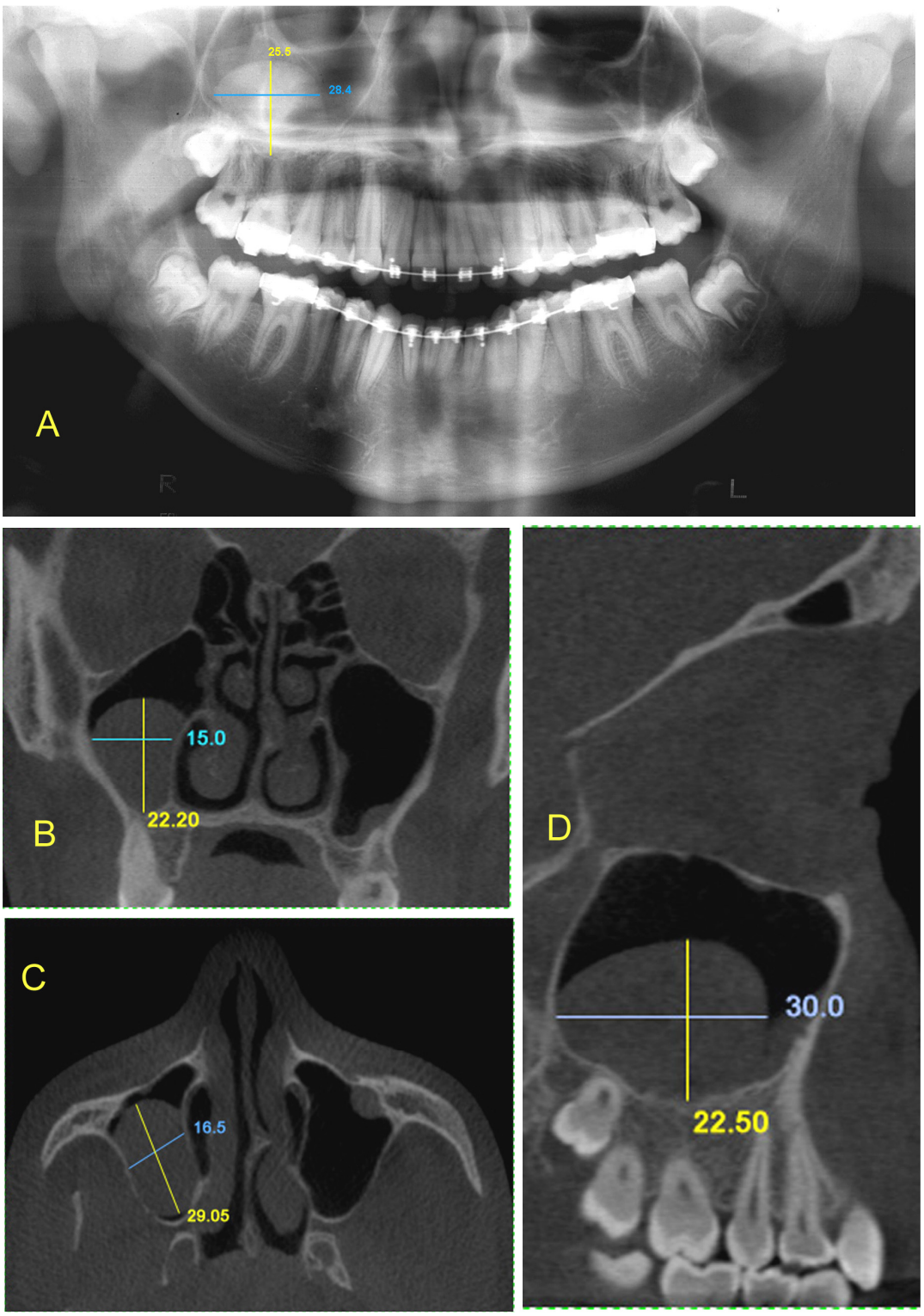

Figure 1. Measurement of MRCMS in panoramic radiograph (A) and in CBCT images in in coronal (B), axial (C) and sagittal (D) reconstructions.

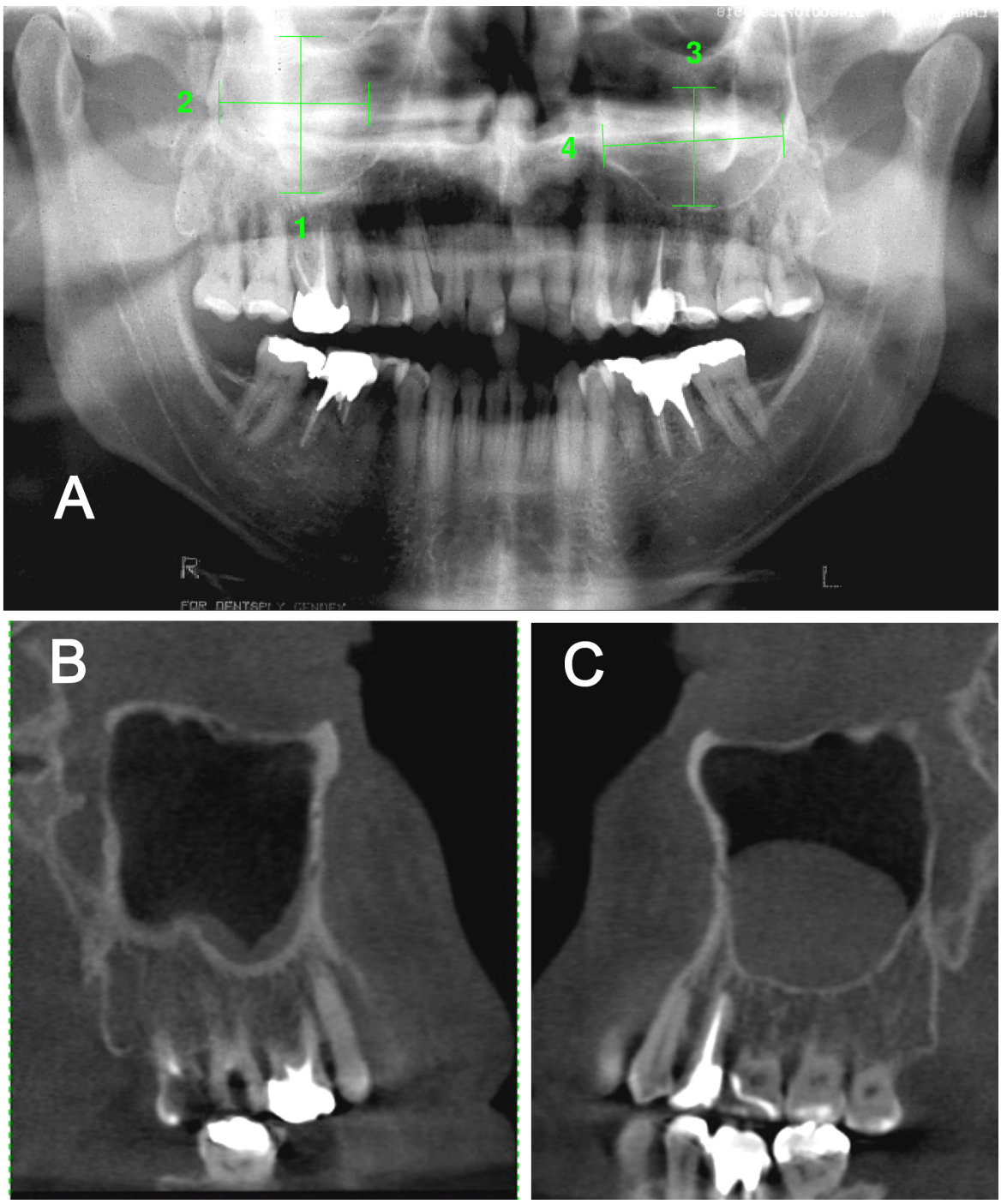

Figure 2. Panoramic radiography for control with bilateral MRCMS (A), sagittal CBCT reconstruction, from same patient, with absence of MRCMS in the right side (B) and presence of MRCMS in the left side (C).

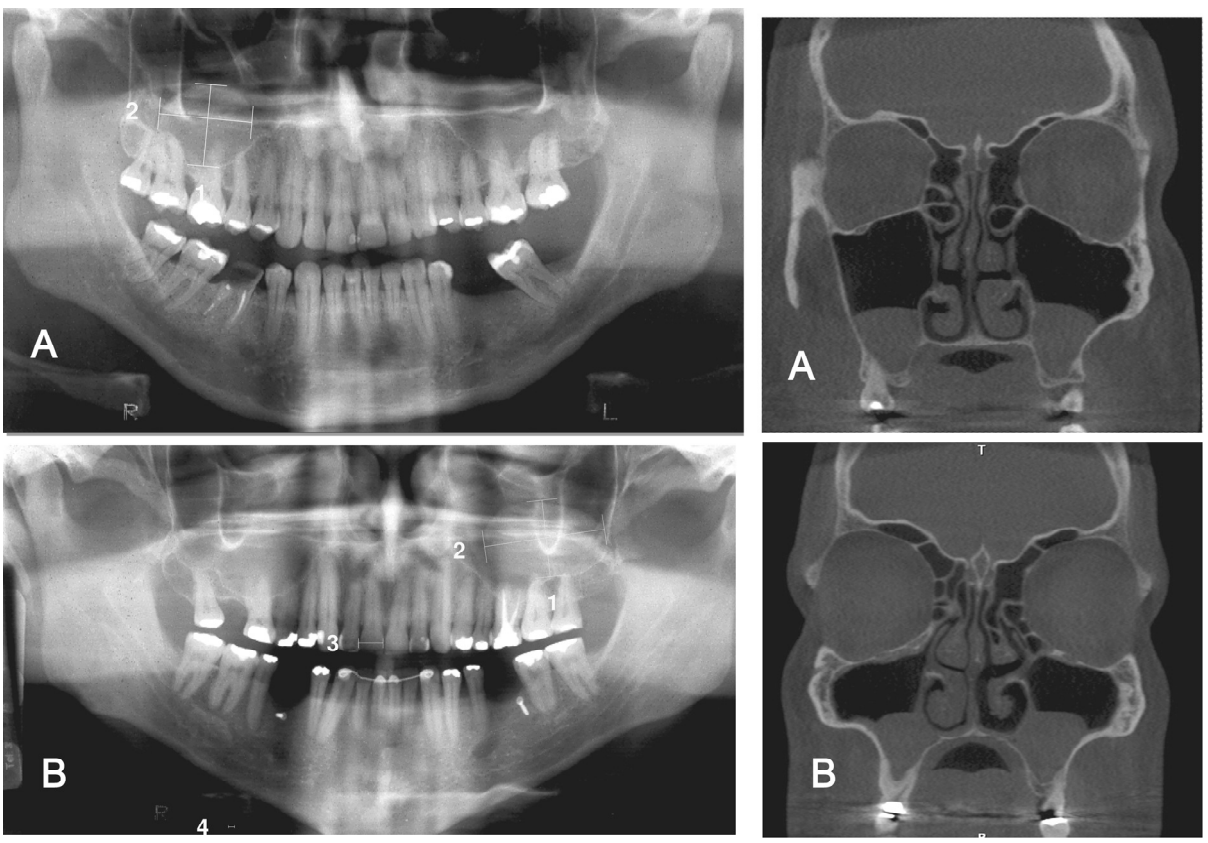

Figure 3. A - Control panoramic radiography with MRCMS in the right side and coronal CBCT reconstruction confirming MRCMS in the right side and showing the presence of another on the left one. B – Control panoramic radiography with CRMSM in the left side and coronal CBCT reconstruction from the same patient with bilateral MRCMS.

APÊNDICE 3: Produção científica : 2009-2011

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3.3.3. Decúrcio DA, Alencar AHG, Rodrigues CD, Silva JÁ, Estela CRA, Estrela C. Determinação do raio de curvatura das raízes vestibulares de molares superiores usando tomografia computadorizada de feixe cônico. In: 26a Reunião da SBPqO, 2009, Águas de Lindóia. Braz Oral Research. São Paulo : FOUSP-USP, 2009(23):155-155.

3.3.4. Decúrcio DA, Alencar AHG, Rodrigues CD, Silva JÁ, Estrela CRA, Estrela C. Determinação do raio de curvatura das raízes vestibulares de molares superiores usando tomografia computadorizada de feixe cônico. In: 26a Reunião da SBPqO, 2009, Águas de Lindóia. Braz Oral Research. São Paulo : FOUSP-USP, 2009(23):155-155.

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APÊNDICE 4: Guidelines for Publishing Papers DentoMaxilloFacial Radiology

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Examples of references

Journal article:
Gardner DG, Kessler HP, Morency R, Schaffner DL. The glandular odontogenic cyst: an apparent entity. J Oral Pathol 1988; 17:359– 366.

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Dufoo S, Maupome G, Diez-de-Bonilla J. Caries experience in a selected patient population in Mexico City. Community Dent Oral Epidemiol (in press).

Complete book:
Kramer IRH, Pindborg JJ, Shear M. Histological typing of odontogenic tumours (2nd edn). Berlin: Springer Verlag, 1992.

Chapter in book:
DelBalso AM, Ellis GE, Hartman KS, Langlais RP. Diagnostic imaging of the salivary glands and periglandular regions. In:DelBaso AM (ed). Maxillofacial imaging. Philadelphia, PA: WB Saunders, 1990, pp 409–510.

Abstract:
Mileman PA, Espelid I. Radiographic treatment decisions – a comparison between Dutch and Norwegian practitioners. J Dent Res 1986; 65: 609 (Abstr 32).

Letter to the Editor:
Gomez RS, de Oliveira JR, Castro WH. Spontaneous regression of a paradental cyst. Dentomaxillofac Radiol 2001; 30: 296(letter).

J*ournal article on the internet:*
Abood S. Quality improvement initiative in nursing homes: the ANA acts in an advisory role. Am J Nurs [serial on the Internet].2002 Jun [cited 2002 Aug 12];102(6):[about 3 p.]. Available from:http://www.nursingworld.org/AJN/2002/june/Wawatch.Htm

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