ALINE MARIA DO COUTO

PERIAPICOPATIAS INFLAMATÓRIAS DE ORIGEM ENDODÔNTICA:
ESTUDO MULTICÊNTRICO NA POPULAÇÃO BRASILEIRA

Faculdade de Odontologia
Universidade Federal de Minas Gerais
Belo Horizonte
2019

Aline Maria do Couto

PERIAPICOPATIAS INFLAMATÓRIAS DE ORIGEM ENDODÔNTICA: *ESTUDO MULTICÊNTRICO NA POPULAÇÃO BRASILEIRA*

Tese apresentada ao Colegiado de Pós-Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, como requisito parcial à obtenção do grau de Doutor em Odontologia – área de concentração em Endodontia. Linha de pesquisa: Epidemiologia e controle das doenças bucais.

Orientadora: Profa. Dra. Maria Cássia Ferreira de Aguiar.

Belo Horizonte
2019

Ficha Catalográfica

C871p
2019
T

Couto, Aline Maria do.
Periapicopatias inflamatórias de origem endodôntica : estudo multicêntrico na população brasileira / Aline Maria do Couto. -- 2019.

72 f. : il.

Orientador: Maria Cássia Ferreira de Aguiar.

Tese (Doutorado) -- Universidade Federal de Minas Gerais, Faculdade de Odontologia.

1. Granuloma periapical. 2. Cisto radicular. 3. Periodontite periapical. 4. Epidemiologia. I. Aguiar, Maria Cássia Ferreira de. II. Universidade Federal de Minas Gerais. Faculdade de Odontologia. III. Título.

BLACK - D047

Elaborada pela Biblioteca da Faculdade de Odontologia - UFMG

UNIVERSIDADE FEDERAL DE MINAS GERAIS

PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA

COLEGIADO DE PÓS-GRADUAÇÃO EM ODONTOLOGIA

FOLHA DE APROVAÇÃO

Periapicopatias inflamatórias de origem endodôntica: estudo multicêntrico na população brasileira

ALINE MARIA DO COUTO

Tese submetida à Banca Examinadora designada pelo Colegiado do Programa de Pós-Graduação em Odontologia, como requisito para obtenção do grau de Doutor, área de concentração Endodontia.

Aprovada em 23 de julho de 2019, pela banca constituída pelos membros:

Prof(a). Maria Cassia Ferreira de Aguiar - Orientadora
FO-UFMG

Prof(a). Renata de Castro Martins
FO-UFMG

Prof(a). Lucas Guimaraes Abreu
FO-UFMG

Prof(a). Anamaria Pessoa Pereira Leite
UFJF

Prof(a). Sandra Beatriz Chaves Tarquinio
UFPEL

Belo Horizonte, 23 de julho de 2019.

UNIVERSIDADE FEDERAL DE MINAS GERAIS

PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA

ATA DA DEFESA DE TESE DA ALUNA
ALINE MARIA DO COUTO

Aos 23 dias de julho de 2019, às 14:00 horas, na sala 3403 da Faculdade de Odontologia da Universidade Federal de Minas Gerais, reuniu-se a Comissão Examinadora composta pelos professores Maria Cassia Ferreira de Aguiar (Orientadora) – FO/UFMG, Renata de Castro Martins – FO/UFMG, Lucas Guimaraes Abreu – FO/UFMG, Anamaria Pessoa Pereira Leite – UFJF e Sandra Beatriz Chaves Tarquinio – UFPEL, para julgamento da tese de Doutorado em Odontologia, área de concentração em Endodontia, intitulada: **Periapicopatias inflamatórias de origem endodôntica: estudo multicêntrico na população brasileira.** A Presidente da Banca, abriu os trabalhos e apresentou a Comissão Examinadora. Após a exposição oral do trabalho pela aluna e arguição pelos membros da banca, a Comissão Examinadora considerou:

(X) Aprovada

( ) Reprovada

Finalizados os trabalhos, lavrou-se a presente ata que, lida e aprovada, vai assinada por mim e pelos demais membros da Comissão. Belo Horizonte, 23 de julho de 2019.

Prof(a). Maria Cassia Ferreira de Aguiar

Prof(a). Renata de Castro Martins

Prof(a). Lucas Guimaraes Abreu

Prof(a). Anamaria Pessoa Pereira Leite

Prof(a). Sandra Beatriz Chaves Tarquinio

Dedico esse trabalho à DEUS, por me conceder o dom da vida e a graça de realizar esse sonho profissional. À Nossa Senhora de Piedade, pela intercessão constante. Aos meus pais, Otávio e Afonsina, pelo amor e apoio incondicional. E à minha orientadora profª. Maria Cássia, pela admirável dedicação e competência na orientação desse trabalho.

AGRADECIMENTOS

Agradeço em primeiro lugar a DEUS por sempre me conduzir em toda a minha trajetória acadêmica, especialmente no Doutorado. Por sempre estar ao meu lado me concedendo sabedoria e os dons do Espírito Santo. Por me proporcionar tantas oportunidades de estudos e por ter me dado a graça de realizar esse grande sonho. Obrigada por tudo meu DEUS, Pai, Filho e Espírito Santo.

À Nossa Senhora de Piedade, minha Mãezinha, pela intercessão constante e amor incondicional. Obrigada por estar ao meu lado em todos os momentos, conduzindo toda a minha trajetória acadêmica.

Aos Santos e Anjos de Deus, especialmente ao meu Anjo da Guarda por todo amor e intercessão diária a Deus por mim.

À toda minha família, especialmente aos meus grandes amores: os meus pais, Otávio e Afonsina. Obrigada por SEMPRE estarem ao meu lado em todos os momentos e desde a infância terem me incentivado tanto nos estudos. Obrigada pelas orações constantes, amor, carinho, incentivo, dedicação e apoio incondicional. Por sempre me apoiarem na minha trajetória acadêmica e por terem acreditado em mim. Vocês são as minhas grandes inspirações e os responsáveis pela realização desse sonho... Obrigada por TUDO!

Aos meus irmãos, meus sobrinhos, madrinha e cunhadas pelo amor, carinho e apoio incondicional.

Ao Felipe por todo amor, incentivo e companheirismo. Pela ajuda preciosa nesse trabalho inúmeras vezes e por me apoiar tanto em minhas escolhas. Obrigada meu amor, por entender tantas vezes a minha ausência em prol dos estudos.

À minha querida orientadora Profª. Drª. Maria Cássia. Não é à toa que eu lhe chamo de “orientadora-anjo”, pois me faltam palavras para expressar a minha gratidão a você... Obrigada por ter me estendido a mão quando eu mais precisei, por ter acreditado em mim e ter mudado completamente a minha trajetória acadêmica. Obrigada pela forma competente, objetiva e humana que me conduziu na orientação deste trabalho e de tantos outros, compartilhando tantas experiências e conhecimentos comigo. Agradeço imensamente pelas infinitas oportunidades que você deu. Você o exemplo de profissional que um dia eu desejo seguir, e sem sombra de dúvidas é a minha maior inspiração! Obrigada imensamente por TUDO...

À Poliana Cruz, que tive o prazer de conhecer no primeiro dia de aula do doutorado e que se tornou uma grande amiga. Obrigada por ter me ajudado tanto nessa trajetória, pela amizade verdadeira, parceria, companheirismo e por ter me acolhido com tanto amor em sua casa durante o período do estudo multicêntrico.

Aos meus amigos e irmãos fraternos do Vale da Imaculada Conceição, especialmente à Marilda Santana, por todo amor e orações.

Ao Padre Adelzire de Moraes e aos irmãos do grupo de oração pelas orações constantes.

À Universidade Federal de Minas Gerais, à Faculdade de Odontologia e em especial ao Colegiado do Programa de Pós-Graduação em Odontologia.

À Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), pela concessão de bolsa de estudo durante o doutorado.

Aos coordenadores do PPGO-UFMG Profª. Drª. Isabela Pordeus e Prof. Dr. Mauro Abreu, por todo trabalho dedicado à pós-graduação e pela disponibilidade em me ajudar quando foi preciso.

Aos funcionários do PPGO-UFMG: Laís, Luciene, Letícia, Valéria e Victor.

À todas as instituições participantes deste estudo multicêntrico por autorizarem a sua realização e por me receberem com tanto amor, carinho, atenção e comidas maravilhosas! Obrigada por marcarem minha trajetória de uma forma tão especial:

Faculdade de Odontologia da Universidade Federal de Minas Gerais (UFMG), especialmente às professoras Drª. Maria Cássia e Drª. Patrícia, aos colegas e técnicos do laboratório de Patologia;

Faculdade de Odontologia da Universidade Estadual da Paraíba (UEPB), especialmente aos professores Dr. Cassiano e Drª. Pollianna, aos colegas e técnicos do laboratório de Patologia;

Faculdade de Odontologia da Universidade Federal de Goiás (UFG), especialmente aos professores Drª. Aline, Drª. Nádia e Dr. Elismauro, aos colegas e técnicos do laboratório de Patologia;

Faculdade de Odontologia da Universidade Federal de Pelotas (UFPel), especialmente aos professores Drª. Sandra, Drª Ana Paula, Drª Ana Carolina e Drª Adriana, aos colegas e técnicos do laboratório de Patologia;

Aos queridos alunos de Iniciação Científica: Alline e Daniela (UFMG) e Douglas e Êmile (UFPel), por me ajudarem com tanto afinco e dedicação na coleta de dados, sem vocês eu não teria conseguido! Muito obrigada por tudo!

A todos os professores do PPGO-UFMG por todos os ensinamentos transmitidos.

Aos professores da Endodontia, especialmente Dr. António Paulino, Drª. Ana Cecília, Drª. Guiomar, Drª. Juliana, Drª. Elen e Dr. Luiz, por todos os conhecimentos partilhados durante a minha trajetória e por tanto aprendizado.

Aos professores da disciplina de Estatística e Epidemiologia, por terem me ensinado tanto sobre essas novas áreas, pelas quais eu me apaixonei!

Ao prof. Dr. Lucas Abreu, por tantas vezes ter me ajudado e ter me ensinado TANTO! Obrigada pela imensa boa vontade em ajudar e partilhar seus conhecimentos. Você é uma inspiração! Tenho certeza que irá longe!

Aos professores da Universidade Federal de Juiz de Fora, onde conclui minha graduação e Mestrado. Agradeço imensamente por terem contribuído de uma forma tão especial na minha trajetória acadêmica, especialmente aos professores Drª. Maria das Graças, Dr. Elton Góis (orientadores no Mestrado) Drª. Isabel Leite (colaboradora no Mestrado) e Drª. Luciana Sálvio (orientadora no Trabalho de Conclusão de Curso).

À profª. Drª. Anamaria Leite, por tudo que me ensinou desde a graduação. Obrigada por todo incentivo e preciosa ajuda em toda a minha trajetória. Você é uma grande inspiração!

Aos professores da banca examinadora por aceitarem o convite para avaliarem este trabalho. Agradeço a dedicação, disponibilidade e imensuráveis contribuições dadas ao estudo.

Aos amigos e irmãos do GOU (Grupo de Oração Universitário), pelas orações e momentos de bençãos partilhados, em especial: Antônio, Cássia, Rafaela e Lisândra.

Aos colegas de Doutorado e Mestrado, por tanto momentos de amizade, descontração e parceria, especialmente: Marcela, Otaviano, Júlia, Danilo, Layara e Patrícia (área de Endodontia); Karine, Lauren, Leni e Alcides (área de Patologia); Poliana, Isabella, Clarissa, Ingridy, Gabriela e Matheus (área de Odontopediatria).

Aos colegas da disciplina de Estatística e Epidemiologia, por tantos momentos profícuos de estudos e trocas de conhecimento, especialmente: Tuélita, Carla e Alexia.

E a minha mais profunda gratidão a todos que direta ou indiretamente contribuíram para essa conquista! Muito obrigada!

RESUMO

Introdução: as periapicopatias inflamatórias de origem endodôntica são as doenças mais frequentes dos ossos maxilares e ocorrem principalmente como consequência da disseminação da infecção endodôntica. Apesar de vários estudos, não existem dados recentes sobre as características epidemiológicas e clínicas dessas lesões envolvendo uma amostra tão grande da população. Objetivo: Investigar as características epidemiológicas e clínicas das periapicopatias inflamatórias de origem endodôntica, incluindo o granuloma periapical, o cisto radicular e o abscesso periapical. Metodologia: foi realizado um estudo retrospectivo e multicêntrico em quatro instituições com centros de referência em diagnóstico oral no Brasil. Todos os registros histopatológicos foram revisados e foram incluídos todos os casos diagnosticados microscopicamente como granuloma periapical, cisto radicular e abscesso periapical. Foram coletados os seguintes dados demográficos e clínicos: sexo, idade e cor da pele dos pacientes, sintomas, duração, tamanho e localização das lesões e concordância entre o diagnóstico clínico e histopatológico. Análises estatísticas descritivas e bivariadas, utilizando o teste Qui-quadrado de Pearson, foram realizadas. Em casos de variáveis com mais de duas categorias, utilizou-se o teste Z para comparação das proporções de colunas e a correção de Bonferroni. Valores de $p < 0,05$ foram considerados estatisticamente significativos. Resultados: foram encontrados 10.381 casos de lesões periapicais entre 74.931 espécimes arquivados (13,8%) em 65 anos. Os cistos radiculares foram as lesões mais comuns (59,9%). As lesões periapicais acometeram principalmente mulheres (56,1%), com média de idade de 37,01 anos (13 a 100 ± 14,42 anos) e cor de pele branca (59,2%). As lesões eram geralmente assintomáticas (28,1%), persistindo por mais de um ano (13,3%), com tamanho de até 10 mm (25,2%) e localizadas na maxila (60,1%) e região posterior (49,8%). Os cistos radiculares foram maiores ($p < 0,001$), com maior ocorrência de sintomatologia ($p < 0,027$) e maior frequência na região posterior ($p < 0,001$) em relação aos granulomas periapicais. A possibilidade de discordância entre o diagnóstico clínico e histopatológico foi maior nos granulomas periapicais ($p < 0,001$). Conclusões: as periapicopatias inflamatórias de origem endodôntica foram comuns em serviços de Patologia Bucomaxilofacial, acometendo principalmente adultos. Isso deve ser uma consequência da carga de cáries não tratadas em dentes permanentes. As mulheres são mais afetadas e o cisto radicular é a lesão mais comum.

Palavras-chave: Granuloma periapical. Cisto radicular. Periodontite apical. Epidemiologia.

ABSTRACT

Endodontic periapical lesions: A multicenter study in the Brazilian population

Introduction: Inflammatory periapical lesions are the most frequent diseases of maxillary bones and occur mainly as a consequence of the dissemination of endodontic infection. Despite several studies, there are no recent data on the epidemiological and clinical characteristics of these lesions involving such a large sample. Objective: To investigate the epidemiological and clinical characteristics of periapical lesions, including periapical granuloma, radicular cyst and periapical abscess. Methodology: A multicenter retrospective study was realized in four institutional reference centers in oral diagnosis in Brazil. Histopathological records were reviewed and included all cases diagnosed microscopically as periapical granuloma, radicular cyst and periapical abscess. Data on patient sex, age, skin color, symptoms, lesion duration, lesion size, lesion location and concordance between clinical and histopathological diagnosis were collected. Descriptive statistics and bivariate analyses using Pearson's Chi-square test were done. A z-test, to compare the column proportions, and Bonferroni correction were used, in the case of variables with more than two categories. P values < 0.05 were considered statistically significant. Results: Were found 10,381 cases of periapical lesions among 74,931 archived specimens (13.8%) in 65 years. Radicular cysts were the most common lesions (59.9%). Periapical lesions affected mainly women (56.1%), with a mean age of 37,01 years (range 13 to 100 ± 14,42) and white-skinned (59.2%). The lesions were generally asymptomatic (28.1%), persisting for more than one year (13.3%), size up to 10 mm (25.2%) and located in the maxilla (60.1%) and posterior region (49.8%). The radicular cysts were larger ($p < 0.001$), with a higher occurrence of symptomatology ($p < 0.027$) and higher frequency in the posterior region ($p < 0.001$) compared to periapical granulomas. The possibility of disagreement between clinical and histopathological diagnosis was higher in periapical granulomas ($p < 0.001$) than radicular cyst. Conclusions: Endodontic periapical lesions were common in the Bucomaxillofacial Pathology services affecting mainly adults. This should be a consequence of the burden of untreated caries in permanent teeth. Women are more affected and radicular cyst is the most common lesion.

Keywords: Periapical granuloma. Radicular cyst. Periapical Periodontitis. Epidemiology.

LISTA DE TABELAS

ARTIGO: APICAL PERIODONTITIS: A MULTICENTRE STUDY OF 10,381 CASES IN BRAZIL

LISTA DE ABREVIATURAS E SIGLAS

ARTIGO: APICAL PERIODONTITIS: A MULTICENTRE STUDY OF 10,381 CASES IN BRAZIL

UEPB	Universidade Estadual da Paraíba
UFG	Universidade Federal de Goiás
UFMG	Universidade Federal de Minas Gerais
UFPel	Universidade Federal de Pelotas

SUMÁRIO

1 CONSIDERAÇÕES INICIAS

Nas últimas décadas, houve um avanço significativo na prevenção e no controle da cárie dentária, especialmente no Brasil (MINISTRY OF HEALTH, 2012) por meio da implementação das Diretrizes da Política Nacional de Saúde Bucal (MINISTRY OF HEALTH, 2004). No entanto, apesar desses esforços, a prevalência global de cárie não tratada em dentes permanentes permaneceu estática em todas as regiões do mundo nos últimos anos (KASSEBAUM *et al*., 2015), sendo atualmente a doença mais comum que afeta a população mundial (GBD, 2016). A principal consequência das lesões cariosas não tratadas é a necrose pulpar e, posteriormente, as doenças inflamatórias periapicais (ZERO *et al.,* 2011). Portanto, juntamente com a periodontite, a cárie é a principal causa de perda dentária em pacientes adultos (JEPSEN *et al.,* 2017).

As periapicopatias inflamatórias de origem endodôntica, também denominadas lesões periapicais ou periodontites apicais, são as doenças ósseas mais frequentes que afetam os maxilares (JAMSHIDI *et al.,* 2015). Essas lesões inflamatórias se desenvolvem na região periapical do dente, principalmente como consequência da infecção proveniente do sistema de canais radiculares (ABBOTT, 2002; NAIR, 1997). Além da etiologia microbiana, fatores traumáticos e iatrogênicos também podem desencadear essa doença (NAIR, 2004).

A resposta imunológica do hospedeiro frente à agressão tem um papel importante no desenvolvimento e manutenção das lesões periapicais (MÁRTON; KISS, 2000). O intuito dessa resposta inflamatória no periápice é limitar a invasão bacteriana na região impedindo a sua disseminação (NAIR, 1997). No entanto, o resultado do confronto entre a microbiota invasora e o sistema de defesa do hospedeiro é a destruição expressiva dos tecidos da região (NAIR, 1997), resultando na formação das lesões periapicais (NAIR, 2004).

A periodontite apical aguda primária é a resposta inicial frente à agressão bacteriana (NAIR, 1997). Esse quadro pode evoluir para uma cicatrização, uma intensificação e disseminação óssea (abscesso periapical), uma formação de fístula ou tornar-se uma lesão crônica (NAIR, 2004). A periodontite apical crônica, incluindo o granuloma periapical e o cisto radicular (ABBOTT, 2004), surge em decorrência da evolução e persistência desse processo inflamatório (NAIR, 2004). O cisto radicular

geralmente se desenvolve de um granuloma periapical, apesar de nem todo granuloma sofrer transformação cística (NAIR, 1997). O processo envolvido na patologia dessas lesões é dinâmico e, portanto, sua a classificação não é estática (ABBOTT, 2004). Nesse sentido, uma lesão crônica pode sofrer uma exacerbação aguda, geralmente em forma de abscesso (NAIR, 1997) e marcada por uma intensa destruição óssea periapical (NAIR, 2004). Por outro lado, essa lesão pode evoluir para um quadro crônico novamente, caracterizado pela ausência ou diminuição na reabsorção óssea (NAIR, 2004).

A epidemiologia na área de endodontia tem um papel fundamental na compreensão da distribuição das doenças periapicais entre as diferentes populações e dos aspectos que influenciam a sua ocorrência (SHAHRAVAN; HAGHDOOST, 2014). Nesse sentido, estudos clínico-epidemiológicos visando obter um melhor entendimento das lesões periapicais foram realizados em diversos países (BECCONSALL-RYAN; TONG; LOVE, 2010; DIEGUES *et al.,* 2011; LIN *et al.,* 2010; SAFI *et al.,* 2008; TAVARES *et al.,* 2017). No entanto, existe uma variabilidade expressiva nos resultados, sobretudo com relação às frequências das lesões. Essa variação pode ser explicada principalmente pela falta de uniformidade em relação à nomenclatura usada para o diagnóstico destas lesões. Ou ainda, pela variabilidade geográfica, que pode ser considerada uma fonte de variação significativa para a ocorrência das lesões orais e maxilofaciais de um modo geral (LIMA *et al*., 2008).

Indubitavelmente, o conhecimento epidemiológico amplo e atualizado da população afetada, pode auxiliar no desenvolvimento de políticas públicas que priorizem ações de prevenção e controle dessas lesões (GORDIS, 2009). Além do mais, o entendimento clínico sobre os aspectos específicos de cada lesão pode auxiliar no entendimento da etiopatogenia, levantar evidências sobre uma possível predisposição genética ou simplesmente ajudar a entender a sua evolução.

Assim, o objetivo deste trabalho foi realizar um estudo transversal envolvendo diferentes regiões do Brasil para avaliar as características das periapicopatias inflamatórias de origem endodôntica, a partir dos arquivos dos serviços de Patologia Bucal. Os resultados serão apresentados na forma de artigo científico, de acordo com as normas do Programa de Pós-Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal de Minas Gerias.

2 OBJETIVOS

2.1 Objetivo geral

Investigar as características epidemiológicas e clínicas das periapicopatias inflamatórias de origem endodôntica, incluindo o granuloma periapical, o cisto radicular e o abscesso periapical.

2.2 Objetivos específicos

a) Identificar a frequência de cada lesão periapical, bem como traçar o perfil demográfico dos indivíduos diagnosticados com cada tipo de lesão.
b) Descrever as características clínicas das lesões, bem como analisar a concordância entre os diagnósticos clínicos e histopatológicos.
c) Verificar se existe variação nas frequências e nas características epidemiológicas e clínicas das lesões periapicais diagnosticadas entre as diferentes regiões geográficas do Brasil incluídas no estudo.
d) Verificar se existe associação entre os granulomas periapicais e cistos radiculares e as variáveis independentes: dados demográficos, características clínicas das lesões e a concordância entre o diagnóstico clínico e histopatológico.

3 METODOLOGIA EXPANDIDA

3.1 Procedimentos éticos e delineamento do estudo

Esse estudo foi aprovado pelo Comitê de Ética em Pesquisa da Universidade Federal de Minas Gerais (COEP-UFMG), através do parecer de número 2.638.092 e protocolo CAAE 87761518.7.1001.5149 (ANEXO A). Foram concedidas autorizações das coordenações dos laboratórios de Patologia Bucomaxilofacial das instituições participantes (ANEXOS B, C, D e E).

Foi realizado um estudo transversal, retrospectivo e multicêntrico (1952-2017) com a participação de quatro instituições com centros de referência em diagnóstico oral no Brasil localizadas em diferentes regiões geográficas: Universidade Estadual da Paraíba (UEPB, região nordeste), Universidade Federal de Goiás (UFG, região centro-oeste), Universidade Federal de Minas Gerais (UFMG, região sudeste) e Universidade Federal de Pelotas (UFPel, região sul).

3.2 Coleta de dados

Foram revisados 74.931 registros histopatológicos de biópsias das regiões oral e maxilofacial, realizadas nos serviços de Patologia Bucomaxilofacial das instituições participantes. Todos os casos com diagnóstico microscópico de granuloma periapical, cisto radicular e abscesso periapical (EL-NAGGAR *et al.,* 2017) foram selecionados. Os termos usados para essa pesquisa foram: granuloma periapical, granuloma apical, granuloma dental, granuloma radicular, granuloma radículo-dentário, cisto radicular, cisto periapical, cisto periodontal apical, cisto dentário, cisto apical, cisto radículo-dentário, cisto residual, cisto radicular residual, cisto periapical residual, cisto radículo-dentário residual, abscesso periapical e abscesso radículo-dentário.

Foram coletados dos prontuários dos pacientes os seguintes dados demográficos e clínicos: sexo**,** idade, cor da pele dos pacientes, sintomatologia, tempo de evolução da lesão, tamanho da lesão, localização e concordância entre o diagnóstico clínico e histopatológico.

3.3 Variáveis do estudo

a) Variável dependente:
   - Granuloma periapical;
   - Cisto radicular (englobando cisto radicular e cisto residual);
   - Abscesso periapical.

b) Variáveis independentes e categorização:
   - Sexo: feminino / masculino;
   - Idade: 13 a 19 anos / 20 a 29 anos / 30 a 39 anos / 40 a 49 anos / 50 a 59 anos / ≥ 60 anos;
   - Cor: branca / não-branca;
   - Sintomatologia: assintomática / sintomática;
   - Tempo de evolução da lesão: 0 a 6 meses / 7 a 12 meses / mais de 1 ano;
   - Tamanho da lesão: até 10 mm / maior que 10 mm;
   - Localização anatômica I: maxila / mandíbula;
   - Localização anatômica II: anterior / posterior / ambos;
   - Concordância entre o diagnóstico clínico e histopatológico: sem concordância / com concordância.

3.4 Critérios de elegibilidade

a) Critérios de inclusão:
   - Casos com diagnóstico microscópico de granuloma periapical, cisto radicular e abscesso periapical;
   - Casos de pacientes acima de 13 anos.
b) Critérios de exclusão:
   - Casos sem diagnóstico histopatológico definido;
   - Casos que afetavam a população pediátrica (0-12 anos).

3.5 Metodologia estatística

Os dados coletados foram organizados e tabulados no programa Excel para *Windows* 10, sendo posteriormente transferidos para o *Statistical Package for the*

Social Sciences (SPSS) software, version 22.0 (SPSS Inc., Chicago, IL, USA). Foi realizada inicialmente análise descritiva, que incluiu a distribuição das frequências de todas as variáveis estudadas. Posteriormente, através de análises bivariadas, foi testada a associação da variável dependente com as demais variáveis, utilizando o teste Qui Quadrado de Pearson. Nos casos de variáveis independentes com mais de duas categorias, foi realizado o teste Z e a correção de Bonferroni. O nível de significância adotado foi de 5% ($p<0,05$).

4 ARTIGO

Formatado segundo as normas do periódico *Oral Diseases* (Anexo F)
Fator de impacto: 2.31 (Qualis – A1)

Title Page

Apical periodontitis: a multicentre study of 10,381 cases in Brazil

Running title: Apical periodontitis

keywords: Apical Periodontitis. Periapical granuloma. Radicular cyst. Periapical Abscess.

Authors: Aline Maria do Couto[1], Daniela Pereira Meirelles[1], Alline Teixeira Valeriano[1], Douglas Silva de Almeida[2], Êmile de Moraes[2], Sandra Beatriz Chaves Tarquinio[2], Aline Carvalho Batista[3], Elismauro Francisco de Mendonça[3], Nádia do Lago Costa[3], Pollianna Muniz Alves[4], Cassiano Francisco Weege Nonaka[4], Maria Cássia Ferreira de Aguiar[1].

Institutional Affiliation:
[1]Department of Oral Surgery and Pathology, School of Dentistry, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.
[2]Department of Semiology and Clinics, School of Dentistry, Universidade Federal de Pelotas, Pelotas, RS, Brazil.
[3]Department of Stomatology (Oral Pathology), School of Dentistry, Universidade Federal de Goiás, Goiânia GO, Brazil.
[4]Department of Dentistry, School of Dentistry, Universidade Estadual da Paraíba, Campina Grande PB, Brazil.

Corresponding author:
Aline Maria do Couto
Department of Oral Surgery and Pathology

School of Dentistry, Universidade Federal de Minas Gerais
Av. Antônio Carlos, 6627, Belo Horizonte, MG, Brazil. CEP: 31.270-901.
E-mail: alinemariacouto@hotmail.com

Abstract

Objective: To investigate the epidemiological and clinical characteristics of apical periodontitis.
Material and Methods: A multicentre study was carried out in four institutions in oral diagnosis in Brazil. Histopathological records were reviewed, and all cases diagnosed microscopically as periapical granuloma, radicular cyst and periapical abscess were included. Demographic and clinical data were collected. Descriptive statistics and Pearson's chi-square test were performed.
Results: 10,381 cases of apical periodontitis were found (13.8% of 74,931 archived specimens) over a period of 65 years. Radicular cysts were the most common lesions (59.9%). Apical periodontitis mainly affected women (56.1%), mean age of 37.01 years old (range 13 to 100 ± 14,42) and people of white ethnicity (59.2%). The lesions were generally asymptomatic (28.1%), located in the maxilla (60.1%) and posterior region (49.8%). The radicular cysts were larger when compared to granulomas ($p < 0.001$). The possibility of a disagreement between the clinical and histopathological diagnoses was higher when the final diagnosis was a periapical granuloma ($p < 0.001$).
Conclusions: Apical periodontitis continues to be common, affecting mainly adults. This should be a consequence of the burden of untreated caries in permanent teeth. Women are more affected, and radicular cyst were the most common lesions.

Introduction

The global prevalence of untreated caries in permanent teeth has remained static in all regions of the world in recent years (Kassebaum et al., 2015), currently being the most common disease affecting the world population (GBD 2015 Disease and Injury Incidence and Prevalence Collaborators, 2016). This situation is not different in Brazil, despite the significant advances in caries prevention and control in children (Ardenghi, Piovesan, & Antunes, 2013). The main consequence of untreated

caries is pulp necrosis (Zero, Zandona, Vail, & Spolnik, 2011). Therefore, along with periodontitis, dental caries is the main cause of tooth loss in adult patients (Jepsen et al., 2017).

Periapical disease, generally called apical periodontitis, is an inflammatory disease around the apex of the root of a tooth caused by an infection in the root canal system (Nair, 1997; Abbott, 2002). Although trauma and iatrogenic factors can trigger this disease, caries is the main cause of pulp infection (Nair, 2004; Zero, Zandona, Vail, & Spolnik, 2011). Apical periodontitis is characterised by local inflammation, bone and tissues destruction resulting in periapical lesions which are usually classified in accordance with their histological structure in periapical granulomas, radicular cysts and periapical abscesses (Nair, 1997; Peters & Lau, 2003).

Epidemiological clinical studies in different populations show apical periodontitis as a widespread condition in many countries (Safi, Adl, Azar, & Akbary, 2008; Becconsall-Ryan, Tong, & Love, 2010; Lin et al., 2010; Diegues, Colombo Robazza, Costa Hanemann, Costa Pereira, & Silva, 2011; Tavares, Rodrigues, Dos Santos, Armada, & Pires, 2017). However, there is an expressive variability in the results, especially in relation to the frequency of these lesions. Considering that Brazil is a continental country, with marked social differences among regions and inequalities associated with oral health care (Ardenghi et al., 2013), a multicentre study can show, more appropriately, the epidemiological and clinical aspects of apical periodontitis in this country. In addition, this study may help the knowledge of specific features of apical periodontitis and its association with the demographic and clinical characteristics of the affected population.

So, the aim of this multicentre study was to investigate the epidemiological and clinical characteristics of apical periodontitis including periapical granulomas, radicular cysts and periapical abscesses in a sample of the Brazilian population.

Material and Methods

Ethical issues and study design

The study was approved by the Committee of Ethics on Research of the Universidade Federal de Minas Gerais (protocol CAAE 87761518.7.1001.5149). Patient’s anonymity was guaranteed according to the Helsinki Declaration. A

multicentre retrospective study (1952-2017) was conducted in four institutional reference diagnostic centres in oral diagnosis, located in different geographic regions in Brazil: Universidade Estadual da Paraíba (UEPB, northeast region), Universidade Federal de Goiás (UFG, mid-west region), Universidade Federal de Minas Gerais (UFMG, southeast region) and Universidade Federal de Pelotas (UFPel, southern region).

Sample

The histopathological records (n = 74,931) of oral and maxillofacial lesions registered at the Oral Pathology Services of all the participating institutions were reviewed without any date restrictions. All cases with a microscopic diagnosis of a periapical granuloma, radicular cyst or periapical abscess (El-Naggar, Chan, Grandis, Takata, & Sootweg, 2017) were selected. The terms used for this study were periapical granuloma, apical granuloma, dental granuloma, radicular granuloma, dental radicular granuloma, radicular cyst, periapical cyst, apical periodontal cyst, dental cyst, apical cyst, dental radicular cyst, residual cyst, residual radicular cyst, residual periapical cyst, residual dental radicular cyst, periapical abscess, dental radicular abscess, dental abscess and dentoalveolar abscess.

The following demographic and clinical data were collected from the patient records: sex (female or male), age (13-19, 20-29, 30-39, 40-49, 50-59 or ≥ 60), skin colour of the patients (white or non-white), symptoms (asymptomatic or symptomatic), lesion duration (0-6 months, 7-12 months or more than 1 year), lesion size (up to 10 mm or > 10 mm), lesion location (maxilla or mandible and anterior, posterior or both) and concordance between the clinical and histopathological diagnoses (disagreement, agreement or nonspecific clinical diagnosis). Cases without a histopathological diagnosis and cases that affected the paediatric population (0–12 years old) were excluded.

Statistical analysis of data

The statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 22.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics and bivariate analyses using Pearson's Chi-square test were done. A z-test, to compare the column proportions, and Bonferroni correction were

used, in the case of variables with more than two categories. P values < 0.05 were considered statistically significant.

Results

From a total of 74,931 cases, 13.8% (10,381 samples) were represented by apical periodontitis. Considering the specific diagnosis, radicular cysts represented 8.29%, periapical granulomas represented 5.48% and periapical abscesses only 0.07% of all registered diagnosis. The cases were distributed as follows: 286 in UEPB, 903 in UFG, 4,388 in UFMG and 4,804 in UFPel. Table 1 shows the frequency of apical periodontitis per institution and in general.

Clinical and demographic data of lesions are presented in Table 2. Lesions affected mainly women (5,821–56.1%) in all the institutions. The mean age of the patients was 37.01 years old (13–100 ± 14.42) and 2,376 (22.9%) were between 30-39 years old. The predominant colour of the skin was white (6,148–59.2%), this was common to all the institutions, except for the UEPB in which the most predominant colour was non-white (159–68.2%).

The frequency of a specific diagnosis in all the institutions followed the same tendency. The most frequent lesions were radicular cysts (6,215–59.9%), followed by periapical granulomas (4,110–39.6%). Periapical abscesses represented only 0.5% of the total sample. The lesions were predominantly asymptomatic (2,921–28.1%) with a duration of more than one year (1,378–13.3%) and a size of up to 10 mm (2,617–25.2%). The mean lesion size was 12.58 mm (range of 0.1 to 150.0 ± 13.68). Regarding the anatomical location, the highest frequency was the maxilla (6,241–60.1%) and posterior region (5,172–49.8%).

Regarding the agreement between the clinical and histopathological diagnoses, there was an agreement in 5,865 (56.5%) cases, disagreement in 1,933 (18.6%) and 1,577 (15.2%) of the cases had a non-specific clinical diagnosis, making it impossible to analyse them. Table 3 shows the clinical diagnoses of the cases where there was a disagreement: for the cases in which the histopathological diagnosis was a periapical granuloma, the most frequent diagnostic hypothesis was a radicular cyst (1,278–94.7%). For the cases of a radicular cyst, the most frequent hypothesis was a periapical granuloma (352–62.4%) and an odontogenic keratocyst

(62–11.0%). Finally, for cases of a periapical abscess, the most frequent hypothesis was a radicular cyst (12–60.0%).

The association of the clinical features and histological diagnosis is shown in Table 4. There was a significantly higher frequency of women diagnosed with periapical granulomas and radicular cysts ($p < 0.001$) and a significantly higher frequency of radicular cysts diagnosed in patients aged 13–19 and 50–59 years old in relation to periapical granulomas ($p < 0.001$).

Although infrequent, symptomatology was more frequent to cysts than granulomas ($p < 0.027$). Cysts were also bigger than granulomas ($p < 0.001$). The mean size of the periapical granulomas was 7.22 mm (0.2–150.0 ± 8.24), and the mean size of the cysts was 15.62 mm (0.1–150.0 ± 15.16). Both periapical granulomas and radicular cysts were located preferentially in the posterior region of the jaws, with cysts outnumbering granulomas ($p < 0.001$). The discordance between the clinical and histological diagnoses was more common when the histological diagnosis was a granuloma ($p < 0.001$).

Discussion

This multicentre study showed that apical periodontitis lesions are common, representing 13.8% of the lesions submitted to a diagnosis in the participating institutions. The radicular cysts represented 8.29%, periapical granulomas represented 5.48%, and periapical abscesses represented 0.07%. The frequency of lesions was higher in the southern region (19.5%). The causal association of caries with periapical disease helps in the understanding of these results (Zero, Zandona, Vail, & Spolnik, 2011). Although caries is developing later in life with a reduction in childhood prevalence, there is a burden in adult ages with economic and social consequences (Kassebaum et al., 2015). Therefore, the effective investment in preventive or curative actions of dental caries in all ages would prevent the development of chronic periapical disease in Brazil and in countries in a similar situation.

In the present study, radicular cysts (59.9%) were more frequent than periapical granulomas (39.6%) following what is described in other studies (Safi et al., 2008; Fierro-Garibay, Almendros-Marqués, Berini-Aytés, & Gay-Escoda, 2011; Tavares et al., 2017). However, there are also studies describing granulomas as the

most common apical periodontitis lesions (Stockdale & Chandler, 1988; Croitoru et al., 2016). Comparisons are difficult due to differences in sample size, type of study, nomenclature and histopathological criteria in the differentiation of cysts and granulomas (Ricucci et al., 2006; Safi et al., 2008; Becconsall-Ryan et al., 2010; Lin et al., 2010; Diegues et al., 2011; Tavares et al., 2017). Finally, in this study, periapical abscesses were extremely uncommon lesions, similar to other studies (Diegues et al., 2011; Becconsall-Ryan, Tong, & Love, 2010).

Cysts were the most frequent apical periodontitis lesions. Conventional endodontic treatment is more successful for granulomas than cysts (Carrillo, Peñarrocha, Bagán, & Vera, 2008; Tavares et al., 2017). So, surgical treatment is employed more for the treatment of cysts that are more commonly sent for a histopathological exam, explaining this prevalence.

Another interesting aspect is that there is a tendency to surgically remove larger lesions, while minor lesions are usually treated without surgical therapy (Natkin, Oswald, & Carnes, 1984). Usually, larger lesions are radicular cysts (Zain, Roswati, & Ismail, 1989). Indeed, in this study, we observed a significantly higher frequency of radicular cysts measuring more than 10 mm compared to granulomas. Most periapical granulomas (87.4%) had a mean size of 10 mm and cysts were approximately double the size of other granulomas as observed by other authors (Tavares et al., 2017).

It is interesting to observe that the results were similar, independent of the institution where these data were collected. In all the institutions, women were more affected by apical periodontitis than men. Granulomas and cysts, analysed separately, had the highest frequency in women, similar to that found in another study (Tavares et al., 2017), although other studies showed a male predominance for radicular cysts (Becconsall-Ryan et al., 2010; Lo Muzio et al., 2017). The fact that apical periodontitis lesions are more frequent in women does not necessarily reflect a genetic predisposition for the development of these lesions or that they are influenced by sex. The most probable cause is that women are more concerned about their oral health and search for treatment more frequently than men (Georgopoulou, Spanaki-Voreadi, Pantazis, & Kontakiotis, 2005).

The mean age of the patients affected by apical periodontitis was 37.01 years old. The mean age varies but the predominance in the third and fourth decades is common to all the studies (Safi et al., 2008; Lin et al., 2010; Croitoru et al., 2016;

Tavares et al., 2017). Possibly these findings are associated with the highest prevalence of untreated caries in young adults, culminating in the development of periapical disease (Kassebaum et al., 2015). On the other hand, as observed by others, apical periodontitis lesions are not frequent in adults older than 60 years old (Berlinck, Tinoco, Carvalho, Sassone, & Tinoco, 2015). This probably occurs because exodontia, as an alternative to conventional endodontic treatment, is carried out more frequently in the elderly than in younger patients (Berlinck et al., 2015).

The majority of patients diagnosed with apical periodontitis were white. However, since the vast majority of cases were from the South (46.3%) and Southeast of Brazil (42.3%), these data may be overestimated since the population of the South and Southeast of Brazil is predominantly white (Seyferth, 2002). However, it is important to stress that the concentration of cases in the south and southeast regions (88.6%) may also reflect a situation of inequality in the access to oral health services in Brazil. This reinforces the need for public policies that democratise access to this type of treatment in all regions of the country.

Regarding the clinical characteristics, our results show that most of the cases of apical periodontitis have a long evolution, with a duration of more than one year and an absence of symptomatology. The symptomatic cases of the study (13.8%) were possibly due to an acute exacerbation of inflammation (Nair, 2004). It is interesting to observe that the occurrence of symptomatology was higher in cysts compared to granulomas. Cysts are bigger than granulomas and can cause bone expansion, pain and discomfort (Diwan, Bhagavaldas, Bagga, & Shetty, 2015; Tavares et al., 2017).

The first permanent molars are the teeth which are most affected by carious lesions (Constante, Souza, Bastos, & Peres, 2014). In this sense, teeth diagnosed with caries and molar teeth are pointed out as at a higher risk for apical periodontitis (Vengerfeldt, Mändar, Nguyen, Saukas, & Saag, 2017). In the present study, the majority of granulomas and cysts had a predilection for the posterior region; cysts were the most frequent lesion. The fact that the permanent molars are the first teeth to erupt makes them more susceptible to caries, pulp infection and apical periodontitis (Vengerfeldt et al., 2017). On the other hand, other authors reported that the most common region for granulomas and cysts was the anterior maxilla (Safi et al., 2008; Tavares et al., 2017). Aesthetic reasons can explain these results since patients are concerned with preserving their teeth in this region, even though

endodontic therapy was unsatisfactory (Ochsenius, Escobar, Godoy, & Peñafiel, 2007).

Analyses of the concordance between the clinical and histopathological diagnoses can be grouped in three occurrences: disagreements ranging the spectrum of periapical inflammatory diseases, for example, cysts diagnosed as granulomas and vice-versa; periapical diseases diagnosed as others bone pathologies including cysts and tumours of a varied origin; and periapical diseases diagnosed as mucosal lesions. All these situations denote a failed diagnosis based only in one aspect of the disease, clinical or radiographic. However, for the establishment of the initial provisional diagnosis of any lesion, it is necessary to correlate both aspects (Mohanty, Gulati, Mediratta, & Ghosh, 2013). A pulp vitality test is fundamental in the establishment of a diagnosis of apical periodontitis (Petersson, Söderström, Kiani-Anaraki, & Lévy, 1999) and unfortunately, this test is frequently neglected by dentists. In most cases, the initial diagnosis was conducted only by the radiographic exam. Although periapical radiolucency can be interpreted as a lot of different lesions, the inflammatory lesion of an endodontic origin is the most common and continues to be the first hypothesis (Koivisto, Bowles, & Rohrer, 2012). The diagnosis agreement was higher when the histopathological diagnosis was a cyst. The radiographic aspect of a cyst is more easily recognised, characterised by well or poorly defined radiolucent areas, intimately associated with the apex of a non-vital tooth (Neville, Damm, Allen, & Bouquot, 2009); these lesions were more common favouring this result, as also described by another study (Diegues et al., 2011), although others had found a higher agreement when the diagnosis was a granuloma (Stockdale & Chandler, 1988; Becconsall-Ryan et al., 2010). The radiographic differentiation of periapical inflammatory disease is difficult, especially when represented by small and poorly defined radiolucent areas (Rózyło-Kalinowska, 2007). Thus, the gold standard to differentiate between these lesions is a biopsy followed by a histopathological evaluation (Becconsall-Ryan et al., 2010; Rosenberg et al., 2010).

This study has limitations. Although the study embraced different geographic regions of Brazil, these data do not represent a random sample. Thus, caution is required in extrapolating the findings to the rest of the population (Van der Veken, Curvers, Fieuws, & Lambrechts, 2017). It is also necessary to mention a possible

social bias in the study since the samples were obtained from public educational institutions, generally frequented by patients of a lower socioeconomic level.

The present study evaluated the epidemiological and clinical characteristics of apical periodontitis. The strengths of this study are the long period of investigation, the multicentre outreach including different geographic regions of Brazil and the huge sample size. Although policies on dental caries control, apical periodontitis continues to be the most frequent bone lesion in the jaws (Jamshidi, Shojaei, Roshanaei, Modabbernia, & Bakhtiary, 2015), especially among adults. The diagnosis can be neglected and requires more attention since the economic and social costs involving the treatment of this lesion. This study also emphasises the importance of a histopathological examination for the definitive diagnosis of apical periodontitis.

Conclusions

- Apical periodontitis lesions were common diagnoses in the Brazilian Oral Pathology Services. Women, young adults and people of white ethnicity were the most affected patients.
- Radicular cysts were the most frequent lesion. Apical periodontitis lesions were asymptomatic and located preferentially in the maxilla and posterior region.

Acknowledgements

Pró-Reitoria de Pesquisa da Universidade Federal de Minas Gerais (PRPq-UFMG), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES, Financial Code 001), Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

Conflict of Interest

None to declare.

References

Abbott, P. V. (2002). The Periapical Space - A Dynamic Interface. *Australian Endodontic Journal,* 28, 96–107.

Ardenghi, T. M., Piovesan, C., & Antunes, J. L. F. (2013). Desigualdades na prevalência de cárie dentária não tratada em crianças pré-escolares no Brasil. *Revista de Saúde Pública,* 47(3 Suppl), 129–137. doi: 10.1590/S0034-8910.2013047004352

Becconsall-Ryan, K., Tong, D., & Love, R. M. (2010). Radiolucent inflammatory jaw lesions: a twenty-year analysis. *International Endodontic Journal,* 43, 859–865. doi: 10.1111/j.1365-2591.2010.01751.x

Berlinck, T., Tinoco, J. M. M., Carvalho, F. L. F., Sassone, L. M., & Tinoco, E. M. B. (2015). Epidemiological evaluation of apical periodontitis prevalence in an urban Brazilian population. *Brazilian Oral Research,* 29(1), 1–7. doi: 10.1590/1807-3107BOR-2015.vol29.0051

Carrillo, C., Peñarrocha, M., Bagán, J. V., & Vera, F. (2008). Relationship between histological diagnosis and evolution of 70 periapical lesions at 12 months, treated by periapical surgery. *Journal of Oral and Maxillofacial Surgery,* 66, 1606–1609. doi: 10.1016/j.joms.2007.12.014

Constante, H. M., Souza, M. L., Bastos, J. L., & Peres, M. A. (2014). Trends in dental caries among Brazilian schoolchildren: 40 years of monitoring (1971-2011). *International Dental Journal,* 64, 181–186. doi: 10.1111/idj.12103

Croitoru, I. C., CrăiŢoiu, Ş., Petcu, C. M., Mihăilescu, O. A., Pascu, R. M., Bobic, A. G., ... CrăiŢoiu, M. M. (2016). Clinical, imagistic and histopathological study of chronic apical periodontitis. *Romanian Journal of Morphology & Embryology,* 57(2 Suppl), 719–728.

Diegues, L. L., Colombo Robazza, C. R., Costa Hanemann, J. A., Costa Pereira, A. A., & Silva, C. O. (2011). Correlation between clinical and histopathological diagnoses in periapical inflammatory lesions. *Journal of Investigative and Clinical Dentistry,* 2, 184–186. doi: 10.1111/j.2041-1626.2011.00053.x

Diwan, A., Bhagavaldas, M. C., Bagga, V., & Shetty, A. (2015). Multidisciplinary Approach in Management of a Large Cystic Lesion in Anterior Maxilla - A Case Report. *Journal of Clinical and Diagnostic Research,* 9, ZD41–ZD43. doi: 10.7860/JCDR/2015/13540.5992

El-Naggar, A. K., Chan, J. K. C., Grandis, J. R., Takata, T., & Slootweg, P. J. (2017). *WHO classification of head and neck tumours* (4nd ed). Lyon, IARC.

Fierro-Garibay, C., Almendros-Marqués, N., Berini-Aytés, L., & Gay-Escoda, C. (2011). Prevalence of biopsied oral lesions in a Department of Oral Surgery (2007-2009). *Journal of Clinical and Experimental Dentistry,* 3, e73–e77. doi: 10.4317/jced.3.e73

GBD 2015 Disease and Injury Incidence and Prevalence Collaborators (2016). Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet,* 388, 1545–1602. doi: 10.1016/S0140-6736(16)31678-6

Georgopoulou, M. K., Spanaki-Voreadi, A. P., Pantazis, N., & Kontakiotis, E. G. (2005). Frequency and distribution of root filled teeth and apical periodontitis in a Greek population. *International Endodontic Journal,* 38, 105–111. doi: 10.1111/j.1365-2591.2004.00907.x

Jamshidi, S., Shojaei, S., Roshanaei, G., Modabbernia, S., & Bakhtiary, E. (2015). Jaw Intraosseous Lesions Biopsied Extracted From 1998 to 2010 in an Iranian Population. *Iranian Red Crescent Medical Journal,* 17, e20374. doi: 10.5812/ircmj.17(5)2015.20374

Jepsen, S., Blanco, J., Buchalla, W., Carvalho, J. C., Dietrich, T., Dörfer, C., … Machiulskiene, V. (2017). Prevention and control of dental caries and periodontal diseases at individual and population level: consensus report of group 3 of joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *Journal of Clinical Periodontology,* 44(Suppl 18), S85–S93. doi: 10.1111/jcpe.12687

Kassebaum, N. J, Bernabé, E., Dahiya, M., Bhandari, B., Murray, C. J. L., & Marcenes, W. (2015). Global burden of untreated caries: a systematic review and metaregression. *Journal of Dental Research,* 94, 650–658. doi: 10.1177/0022034515573272

Koivisto, T., Bowles, W. R., & Rohrer, M. (2012). Frequency and distribution of radiolucent jaw lesions: a retrospective analysis of 9,723 cases. *Journal of Endodontics,* 38, 729–732. doi: 10.1016/j.joen.2012.02.028.

Lin, H. P, Chen, H. M., Yu, C. H., Kuo, R. C., Kuo, Y. S., & Wang, Y. P. (2010). Clinicopathological study of 252 jaw bone periapical lesions from a private pathology laboratory. *Journal of the Formosan Medical Association,* 109, 810–818. doi: 10.1016/S0929-6646(10)60126-X.

Lo Muzio, L., Mascitti, M., Santarelli, A., Rubini, C., Bambini, F., Procaccini, M., ... Nocini, P. F. (2017). Cystic lesions of the jaws: a retrospective clinicopathologic study of 2030 cases. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology,* 124, 128–138. doi: 10.1016/j.oooo.2017.04.006.

Mohanty, S., Gulati, U., Mediratta, A., & Ghosh, S. (2013). Unilocular radiolucencies of anterior mandible in young patients: A 10 year retrospective study. *National Journal of Maxillofacial Surgery,* 4, 66–72. doi: 10.4103/0975-5950.117885

Nair, P. N. (1997). Apical periodontitis: a dynamic encounter between root canal infection and host response. *Periodontology 2000,* 13, 121–148.

Nair, P. N. (2004). Pathogenesis of apical periodontitis and the causes of endodontic failures. *Critical Reviews in Oral Biology & Medicine,* 15, 348–381.

Natkin, E., Oswald, R.J., & Carnes, L. I. (1984). The relationship of lesion size to diagnosis, incidence, and treatment of periapical cysts and granulomas. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology,* 57, 82–94.

Neville, B. W., Damm, D. D., Allen, C. M., & Bouquot, J. E. (2009). *Patologia Oral e Maxilofacial* (Trad. 3nd ed). Rio de Janeiro, Elsevier.

Ochsenius, G., Escobar, E., Godoy, L., & Peñafiel, C. (2007). Odontogenic cysts: analysis of 2,944 cases in Chile. *Medicina Oral Patologia Oral y Cirugia Bucal,* 12, E85–E91.

Peters, E., & Lau, M. (2003). Histopathologic examination to confirm diagnosis of periapical lesions: a review. *Journal of the Canadian Dental Association,* 69, 598–600.

Petersson, K., Söderström, C., Kiani-Anaraki, M., & Lévy, G. (1999). Evaluation of the ability of thermal and electrical tests to register pulp vitality. *Endodontics & Dental Traumatology,* 15, 127–131.

Ricucci, D, Pascon, E. A., Ford, T. R., & Langeland, K. (2006). Epithelium and bacteria in periapical lesions. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology,* 101, 239–249. doi: 10.1016/j.tripleo.2005.03.038

Rosenberg, P. A, Frisbie, J., Lee, J., Lee, K., Frommer, H., Kottal, S., … Fisch, G. (2010). Evaluation of pathologists (histopathology) and radiologists (cone beam computed tomography) differentiating radicular cysts from granulomas*. Journal of Endodontics,* 36, 423–428. doi: 10.1016/j.joen.2009.11.005

Rózyło-Kalinowska, I. (2007). Digital radiography density measurements in differentiation between periapical granulomas and radicular cysts. *Medical Science Monitor,* 13(Suppl 1), 129–136.

Safi, L., Adl, A., Azar, M. R., & Akbary, R. (2008). A Twenty-year Survey of Pathologic Reports of Two Common Types of Chronic Periapical Lesions in Shiraz

Dental School. *Journal of Dental Research Dental Clinics Dental Prospects,* 2, 63–70. doi: 10.5681/joddd.2008.013

Seyferth, G. (2002). Colonização, imigração e a questão racial no Brasil. *Revista USP,* 117–149. doi: 10.11606/issn.2316-9036.v0i53p117-149

Stockdale, C. R., Chandler, N. P. (1988). The nature of the periapical lesion-a review of 1108 cases. *Journal of Dentistry,* 16, 123–129.

Tavares, D. P., Rodrigues, J. T., Dos Santos, T. C. R. B., Armada, L., & Pires, F. R. (2017). Clinical and radiological analysis of a series of periapical cysts and periapical granulomas diagnosed in a Brazilian population. *Journal of Clinical and Experimental Dentistry,* 9, e129–e135. doi: 10.4317/jced.53196

Van der Veken, D., Curvers, F., Fieuws, S., & Lambrechts, P. (2017). Prevalence of apical periodontitis and root filled teeth in a Belgian subpopulation found on CBCT images. *International Endodontic Journal,* 50, 317–329. doi: 10.1111/iej.12631

Vengerfeldt, V., Mändar, R., Nguyen, M. S., Saukas, S., & Saag, M. (2017). Apical periodontitis in southern Estonian population: prevalence and associations with quality of root canal fillings and coronal restorations. *BMC Oral Health,* 17, 147. doi: 10.1186/s12903-017-0429-7

Zain, R. B., Roswati, N., & Ismail, K. (1989). Radiographic evaluation of lesion sizes of histologically diagnosed periapical cysts and granulomas. *Ann Dent,* 48, 3–5.

Zero, D. T., Zandona, A. F., Vail, M.M., & Spolnik, K. J. (2011). Dental caries and pulpal disease. *Dental Clinics of North America,* 55, 29–46. doi: 10.1016/j.cden.2010.08.010

Table 1. Frequency of apical periodontitis.

Institution (geographical region of Brazil)	**Period investigated**	**Biopsied lesions in the studied period**	**Number of diagnosis n (%)**
UEPB (northeast)	2011-2017	2,793	286 (10.2)
UFG (mid-west)	1996-2017	10,958	903 (8.2)
UFMG (southeast)	1952-2017	36,610	4,388 (11.9)
UFPel (south)	1959-2017	24,570	4,804 (19.5)
Total		74,931	10,381 (13.8)

Note: UEPB: Universidade Estadual da Paraíba. UFG: Universidade Federal de Goiás. UFMG: Universidade Federal de Minas Gerais. UFPel: Universidade Federal de Pelotas.

Table 2. Distribution of the clinical and demographic features of 10,381 apical periodontitis.

		Institution (geographical region of Brazil)			
	Total (n=10,381)	UEPB (northeast; n=286)	UFG (mid-west; n=903)	UFMG (southeast; n=4,388)	UFPel (south; n=4,804)
Variables	n (%)	n (%)	n (%)	n (%)	n (%)
Sex					
Female	5,821 (56.1)	180 (63.4)	476 (57.8)	2,408 (56.3)	2,757 (57.9)
Male	4,321 (41.6)	104 (36.6)	348 (42.2)	1,868 (43.7)	2,001 (42.1)
Missing	239 (2.3)				
Age (years)					
13-19	999 (9.6)	27 (10.1)	52 (8.4)	497 (12.4)	423 (9.4)
20-29	2,258 (21.8)	56 (20.9)	154 (24.8)	1,010 (25.1)	1,038 (23.0)
30-39	2,376 (22.9)	57 (21.3)	166 (26.7)	1,028 (25.6)	1,125 (25.0)
40-49	1,886 (18.2)	61 (22.8)	130 (20.9)	797 (19.8)	898 (19.9)
50-59	1,175 (11.3)	33 (12.3)	78 (12.6)	442 (11.0)	622 (13.8)
≥ 60	722 (7.0)	34 (12.7)	41 (6.6)	249 (6.2)	398 (8.8)
Missing	965 (9.3)				
Skin color					
White	6,148 (59.2)	74 (31.8)	250 (71.0)	2,180 (55.7)	3,644 (85.4)
Non-white	2,616 (25.2)	159 (68.2)	102 (29.0)	1.731 (44.3)	624 (14.6)
Missing	1,617 (15.6)				
Histopathological diagnosis					
Periapical granuloma	4,110 (39.6)	140 (49.0)	338 (37.4)	1,844 (42.0)	1,788 (37.2)
Radicular cyst	6,215 (59.9)	146 (51.0)	564 (62.5)	2,519 (57.4)	2,986 (62.2)
Periapical abscess	56 (0.5)	0 (0.0)	1 (0.1)	25 (0.6)	30 (0.6)
Symptoms					
Asymptomatic	2,921 (28.1)	158 (78.6)	205 (74.0)	1,158 (70.1)	1,400 (63.0)
Symptomatic	1,431 (13.8)	43 (21.4)	72 (26.0)	495 (29.9)	821 (37.0)
Missing	6,029 (58.1)				
Lesion duration					
0-6 months	493 (4.7)	55 (44.7)	58 (22.1)	281 (18.6)	99 (20.6)
7-12 months	508 (4.9)	41 (33.3)	59 (22.4)	296 (19.6)	112 (23.3)
More than 1 year	1,378 (13.3)	27 (22.0)	146 (55.5)	936 (61.9)	269 (56.0)
Missing	8,002 (77.1)				
Size					
Up to 10 mm	2,617 (25.2)	169 (80.9)	49 (49.5)	581 (53.7)	1,818 (72.8)
> 10 mm	1,270 (12.2)	40 (19.1)	50 (50.5)	500 (46.3)	680 (27.2)
Missing	6,494 (62.6)				
Lesion location I					
Maxilla	6,241 (60.1)	123 (56.4)	534 (67.9)	2,447 (61.7)	3,137 (66.6)
Mandible	3,440 (33.1)	95 (43.6)	253 (32.1)	1,521 (38.3)	1,571 (33.4)
Missing	700 (6.7)				
Lesion location II					
Anterior	3,719 (35.8)	64 (31.7)	351 (47.6)	1,554 (39.5)	1,750 (38.1)

Posterior	5,172 (49.8)	133 (65.8)	345 (46.7)	2,099 (53.4)	2,595 (56.5)
Both	569 (5.5)	5 (2.5)	42 (5.7)	277 (7.0)	245 (5.3)
Missing	921 (8.9)				
Concordance between clinical and histopathological diagnosis					
Disagreement	1,933 (18.6)	74 (26.7)	194 (23.4)	720 (17.7)	945 (22.5)
Agreement	5,865 (56.5)	185 (66.8)	518 (62.6)	2,346 (57.7)	2,816 (67.0)
Nonspecific clinical diagnosis	1,577 (15.2)	18 (6.5)	116 (14.0)	1,000 (24.6)	443 (10.5)
Missing	1,006 (9.7)				

Table 3. Clinical diagnosis of cases with a disagreement between the clinical and histopathological diagnosis (n = 1,933).

	Histopathological diagnosis		
	Periapical granuloma (n=1,349)	Radicular cyst (n=564)	Periapical abscess (n=20)
Variable	n (%)	n (%)	n (%)
Clinical diagnosis			
Periapical granuloma	-	352 (62.4)	4 (20.0)
Radicular cyst	1,278 (94.7)	-	12 (60.0)
Periapical granuloma or radicular cyst	-	-	4 (20.0)
Periapical abscess	22 (1.6)	25 (4.4)	-
Osteomyelitis	4 (0.3)	12 (2.1)	0 (0.0)
Bone sequestration	1 (0.1)	2 (0.4)	0 (0.0)
Bisphosphonate associated osteonecrosis	0 (0.0)	1 (0.2)	0 (0.0)
Foreign body reaction	1 (0.1)	0 (0.0)	0 (0.0)
Periodontal lesion	2 (0.1)	5 (0.9)	0 (0.0)
Endodontic-periodontal lesion	3 (0.2)	6 (1.1)	0 (0.0)
Pyogenic granuloma	0 (0.0)	6 (1.1)	0 (0.0)
Granulomatous epulis	1 (0.1)	0 (0.0)	0 (0.0)
Central Giant Cell Granuloma	1 (0.1)	2 (0.4)	0 (0.0)
Dentigerous cyst	7 (0.5)	20 (3.5)	0 (0.0)
Odontogenic keratocyst	6 (0.4)	62 (11.0)	0 (0.0)
Periodontal cyst	9 (0.7)	25 (4.4)	0 (0.0)
Paradentary cyst	1 (0.1)	6 (1.1)	0 (0.0)
Globule-maxillary cyst	3 (0.2)	5 (0.9)	0 (0.0)
Nasopalatine duct cyst	1 (0.1)	3 (0.5)	0 (0.0)
Median palatine cyst	0 (0.0)	1 (0.2)	0 (0.0)
Median mandibular cyst	0 (0.0)	2 (0.4)	0 (0.0)
Maxillary sinus cyst	0 (0.0)	1 (0.2)	0 (0.0)
Mucous retention cyst	0 (0.0)	2 (0.4)	0 (0.0)
Epidermoid cyst	1 (0.1)	0 (0.0)	0 (0.0)
Simple bone cyst	0 (0.0)	2 (0.4)	0 (0.0)
Fibrous dysplasia	1 (0.1)	1 (0.2)	0 (0.0)
Cemento-osseous dysplasia	0 (0.0)	2 (0.4)	0 (0.0)
Central odontogenic fibroma	1 (0.1)	0 (0.0)	0 (0.0)
Neurofibroma	0 (0.0)	1 (0.2)	0 (0.0)
Ameloblastoma	4 (0.3)	9 (1.6)	0 (0.0)
Squamous odontogenic tumor	0 (0.0)	1 (0.2)	0 (0.0)
Odontoma	0 (0.0)	2 (0.4)	0 (0.0)
Odontogenic myxoma	0 (0.0)	4 (0.7)	0 (0.0)
Cementoma	0 (0.0)	1 (0.2)	0 (0.0)
Brown Tumor	0 (0.0)	1 (0.2)	0 (0.0)
Papilloma	1 (0.1)	0 (0.0)	0 (0.0)
Blastomycosis	1 (0.1)	2 (0.4)	0 (0.0)

Table 4. Bivariate analyses of 10,325* periapical granulomas and radicular cysts.

	Histopathological diagnosis		
	Periapical granuloma (n=4,110)	Radicular cyst (n=6,215)	**p-value****
Variables	n (%)	n (%)	
Sex			
Female	2,528 (63.3)	3,258 (53.5)	
Male	1,468 (36.7)	2,833 (46.5)	< **0.001**
Age (years)			
13-19	431 (11.6)[a]	558 (9.9)[b]	
20-29	927 (24.9)	1,314 (23.3)	
30-39	966 (25.9)	1,402 (24.9)	
40-49	725 (19.5)	1,154 (20.5)	
50-59	414 (11.1)[a]	755 (13.4)[b]	
≥ 60	262 (7.0)	457 (8.1)	< **0.001**
Skin color			
White	2,435 (69.6)	3,678 (70.5)	
Non-white	1064 (30.4)	1538 (29.5)	0.364
Symptoms			
Asymptomatic	1,044 (65.0)	1,863 (68.3)	
Symptomatic	561 (35.0)	863 (31.7)	**0.027**
Lesion duration			
0-6 months	185 (20.2)	303 (20.9)	
7-12 months	188 (20.5)	319 (22.0)	
More than 1 year	545 (59.4)	830 (57.2)	0.548
Size			
Up to 10 mm	1,215 (87.4)	1,386 (55.9)	
> 10 mm	175 (12.6)	1,094 (44.1)	< **0.001**
Lesion location I			
Maxilla	2,475 (65.3)	3,734 (63.9)	
Mandible	1,314 (34.7)	2,108 (36.1)	0.163
Lesion location II			
Anterior	1,443 (38.1)	2,257 (40.1)	
Posterior	2,283 (60.3)[a]	2,859 (50.8)[b]	
Both	58 (1.5)[a]	511 (9.1)[b]	< **0.001**
Concordance between clinical and histopathological diagnosis			
Disagreement	1,349 (36.7)[a]	564 (10.0)[b]	
Agreement	1,537 (41.8)[a]	4,320 (76.5)[b]	
Nonspecific clinical diagnosis	792 (21.5)[a]	763 (13.5)[b]	< **0.001**

Note: *56 cases of periapical abscesses were not possible to include in the bivariate analyses because of their low prevalence (0.5%). **Pearson Chi-square test (Significance level $p < 0.05$). Different letters indicate a statistical difference using the z-test and Bonferroni correction (significance level of $p < 0.05$).

5 CONSIDERAÇÕES FINAIS

Os resultados do presente estudo apontaram que os cistos radiculares foram as lesões mais comuns. As lesões acometeram principalmente mulheres, adultos jovens e brancos. Clinicamente, eram geralmente assintomáticos, com evolução de mais de um ano, tamanho de até 10 mm e localizadas preferencialmente na maxila e na região posterior. Em comparação com os granulomas periapicais, os cistos radiculares eram maiores, com maior ocorrência de sintomatologia e maior frequência na região posterior. A possibilidade de discordância entre o diagnóstico clínico e histopatológico foi maior nos granulomas periapicais.

Apesar dos avanços na prevenção e controle da cárie dentária nas últimas décadas (MINISTRY OF HEALTH, 2012), as periapicopatias inflamatórias de origem endodôntica foram diagnósticos comuns nos serviços brasileiros de Patologia Oral, afetando principalmente adultos. Isso pode ser uma consequência da carga de cáries não tratadas em dentes permanentes (KASSEBAUM *et al*., 2015).

Portanto, sugere-se o efetivo investimento em medidas preventivas ou curativas de cárie dentária abrangendo todas as idades. Consequentemente, grande parte das periapicopatias inflamatórias de origem endodôntica seriam evitadas, o que resultaria em um grande impacto social e econômico no Brasil e em países de situação semelhante.

REFERÊNCIAS

Abbott, P. V. (2002). The Periapical Space - A Dynamic Interface. *Australian Endodontic Journal,* 28, 96–107.

Abbott, P. V. (2004). Classification, diagnosis and clinical manifestations of apical periodontitis. *Endodontic Topics,* 8, 36–54.

Ardenghi, T. M., Piovesan, C., & Antunes, J. L. F. (2013). Desigualdades na prevalência de cárie dentária não tratada em crianças pré-escolares no Brasil. *Revista de Saúde Pública,* 47(3 Suppl), 129–137. doi: 10.1590/S0034-8910.2013047004352

Becconsall-Ryan, K., Tong, D., & Love, R. M. (2010). Radiolucent inflammatory jaw lesions: a twenty-year analysis. *International Endodontic Journal,* 43, 859–865. doi: 10.1111/j.1365-2591.2010.01751.x

Berlinck, T., Tinoco, J. M. M., Carvalho, F. L. F., Sassone, L. M., & Tinoco, E. M. B. (2015). Epidemiological evaluation of apical periodontitis prevalence in an urban Brazilian population. *Brazilian Oral Research,* 29(1), 1–7. doi: 10.1590/1807-3107BOR-2015.vol29.0051

Carrillo, C., Peñarrocha, M., Bagán, J. V., & Vera, F. (2008). Relationship between histological diagnosis and evolution of 70 periapical lesions at 12 months, treated by periapical surgery. *Journal of Oral and Maxillofacial Surgery,* 66, 1606–1609. doi: 10.1016/j.joms.2007.12.014

Constante, H. M., Souza, M. L., Bastos, J. L., & Peres, M. A. (2014). Trends in dental caries among Brazilian schoolchildren: 40 years of monitoring (1971-2011). *International Dental Journal,* 64, 181–186. doi: 10.1111/idj.12103

Croitoru, I. C., CrăiŢoiu, Ş., Petcu, C. M., Mihăilescu, O. A., Pascu, R. M., Bobic, A. G., ... CrăiŢoiu, M. M. (2016). Clinical, imagistic and histopathological study of chronic apical periodontitis. *Romanian Journal of Morphology & Embryology,* 57(2 Suppl), 719–728.

Diegues, L. L., Colombo Robazza, C. R., Costa Hanemann, J. A., Costa Pereira, A. A., & Silva, C. O. (2011). Correlation between clinical and histopathological diagnoses in periapical inflammatory lesions. *Journal of Investigative and Clinical Dentistry,* 2, 184–186. doi: 10.1111/j.2041-1626.2011.00053.x

Diwan, A., Bhagavaldas, M. C., Bagga, V., & Shetty, A. (2015). Multidisciplinary Approach in Management of a Large Cystic Lesion in Anterior Maxilla - A Case Report. *Journal of Clinical and Diagnostic Research,* 9, ZD41–ZD43. doi: 10.7860/JCDR/2015/13540.5992

El-Naggar, A. K., Chan, J. K. C., Grandis, J. R., Takata, T., & Slootweg, P. J. (2017). *WHO classification of head and neck tumours* (4nd ed). Lyon, IARC.

Fierro-Garibay, C., Almendros-Marqués, N., Berini-Aytés, L., & Gay-Escoda, C. (2011). Prevalence of biopsied oral lesions in a Department of Oral Surgery (2007-2009). *Journal of Clinical and Experimental Dentistry,* 3, e73–e77. doi: 10.4317/jced.3.e73

GBD 2015 Disease and Injury Incidence and Prevalence Collaborators (2016). Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet,* 388, 1545–1602. doi: 10.1016/S0140-6736(16)31678-6

Georgopoulou, M. K., Spanaki-Voreadi, A. P., Pantazis, N., & Kontakiotis, E. G. (2005). Frequency and distribution of root filled teeth and apical periodontitis in a Greek population. *International Endodontic Journal,* 38, 105–111. doi: 10.1111/j.1365-2591.2004.00907.x

Gordis L. Epidemiologia. Rio de Janeiro: Revinter; 2009.

Jamshidi, S., Shojaei, S., Roshanaei, G., Modabbernia, S., & Bakhtiary, E. (2015). Jaw Intraosseous Lesions Biopsied Extracted From 1998 to 2010 in an Iranian Population. *Iranian Red Crescent Medical Journal,* 17, e20374. doi: 10.5812/ircmj.17(5)2015.20374

Jepsen, S., Blanco, J., Buchalla, W., Carvalho, J. C., Dietrich, T., Dörfer, C., … Machiulskiene, V. (2017). Prevention and control of dental caries and periodontal diseases at individual and population level: consensus report of group 3 of joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *Journal of Clinical Periodontology,* 44(Suppl 18), S85–S93. doi: 10.1111/jcpe.12687

Kassebaum, N. J, Bernabé, E., Dahiya, M., Bhandari, B., Murray, C. J. L., & Marcenes, W. (2015). Global burden of untreated caries: a systematic review and metaregression. *Journal of Dental Research,* 94, 650–658. doi: 10.1177/0022034515573272

Koivisto, T., Bowles, W. R., & Rohrer, M. (2012). Frequency and distribution of radiolucent jaw lesions: a retrospective analysis of 9,723 cases. *Journal of Endodontics,* 38, 729–732. doi: 10.1016/j.joen.2012.02.028.

Lima, Gda. S., Fontes, S. T., de Araújo, L. M. A., Etges, A., Tarquinio, S. B. C., & Gomes, A. P. N. (2008). A survey of oral and maxillofacial biopsies in children: a single-center retrospective study of 20 years in Pelotas-Brazil. *Journal of Applied Oral Science,* 16, 397–402.

Lin, H. P, Chen, H. M., Yu, C. H., Kuo, R. C., Kuo, Y. S., & Wang, Y. P. (2010). Clinicopathological study of 252 jaw bone periapical lesions from a private pathology laboratory. *Journal of the Formosan Medical Association,* 109, 810–818. doi: 10.1016/S0929-6646(10)60126-X.

Lo Muzio, L., Mascitti, M., Santarelli, A., Rubini, C., Bambini, F., Procaccini, M., ... Nocini, P. F. (2017). Cystic lesions of the jaws: a retrospective clinicopathologic

study of 2030 cases. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology,* 124, 128–138. doi: 10.1016/j.oooo.2017.04.006.

Márton, I. J., & Kiss, C. (2000). Protective and destructive immune reactions in apical periodontitis. *Oral Microbiology and Immunology,* 15, 139–150.

Ministry of Health. Guidelines of Oral Health National Policy. Brasília: Ministry of Health, 2004.

Ministry of Health. SB BRAZIL 2010: National Research on Oral Health: main results. Brasília: Ministry of Health, 2012.

Mohanty, S., Gulati, U., Mediratta, A., & Ghosh, S. (2013). Unilocular radiolucencies of anterior mandible in young patients: A 10 year retrospective study. *National Journal of Maxillofacial Surgery,* 4, 66–72. doi: 10.4103/0975-5950.117885

Nair, P. N. (1997). Apical periodontitis: a dynamic encounter between root canal infection and host response. *Periodontology 2000,* 13, 121–148.

Nair, P. N. (2004). Pathogenesis of apical periodontitis and the causes of endodontic failures. *Critical Reviews in Oral Biology & Medicine,* 15, 348–381.

Natkin, E., Oswald, R.J., & Carnes, L. I. (1984). The relationship of lesion size to diagnosis, incidence, and treatment of periapical cysts and granulomas. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology,* 57, 82–94.

Neville, B. W., Damm, D. D., Allen, C. M., & Bouquot, J. E. (2009). *Patologia Oral e Maxilofacial* (Trad. 3nd ed). Rio de Janeiro, Elsevier.

Ochsenius, G., Escobar, E., Godoy, L., & Peñafiel, C. (2007). Odontogenic cysts: analysis of 2,944 cases in Chile. *Medicina Oral Patologia Oral y Cirugia Bucal,* 12, E85–E91.

Peters, E., & Lau, M. (2003). Histopathologic examination to confirm diagnosis of periapical lesions: a review. *Journal of the Canadian Dental Association,* 69, 598–600.

Petersson, K., Söderström, C., Kiani-Anaraki, M., & Lévy, G. (1999). Evaluation of the ability of thermal and electrical tests to register pulp vitality. *Endodontics & Dental Traumatology,* 15, 127–131.

Ricucci, D, Pascon, E. A., Ford, T. R., & Langeland, K. (2006). Epithelium and bacteria in periapical lesions. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology,* 101, 239–249. doi: 10.1016/j.tripleo.2005.03.038

Rosenberg, P. A, Frisbie, J., Lee, J., Lee, K., Frommer, H., Kottal, S., … Fisch, G. (2010). Evaluation of pathologists (histopathology) and radiologists (cone beam computed tomography) differentiating radicular cysts from granulomas. *Journal of Endodontics,* 36, 423–428. doi: 10.1016/j.joen.2009.11.005

Rózyło-Kalinowska, I. (2007). Digital radiography density measurements in differentiation between periapical granulomas and radicular cysts. *Medical Science Monitor,* 13(Suppl 1), 129–136.

Safi, L., Adl, A., Azar, M. R., & Akbary, R. (2008). A Twenty-year Survey of Pathologic Reports of Two Common Types of Chronic Periapical Lesions in Shiraz Dental School. *Journal of Dental Research Dental Clinics Dental Prospects,* 2, 63–70. doi: 10.5681/joddd.2008.013

Seyferth, G. (2002). Colonização, imigração e a questão racial no Brasil. *Revista USP,* 117–149. doi: 10.11606/issn.2316-9036.v0i53p117-149

Shahravan, A., & Haghdoost, A. A. (2014). Endodontic epidemiology. *Iranian Endodontic Journal,* 9, 98–108.

Stockdale, C. R., Chandler, N. P. (1988). The nature of the periapical lesion-a review of 1108 cases. *Journal of Dentistry,* 16, 123–129.

Tavares, D. P., Rodrigues, J. T., Dos Santos, T. C. R. B., Armada, L., & Pires, F. R. (2017). Clinical and radiological analysis of a series of periapical cysts and periapical granulomas diagnosed in a Brazilian population. *Journal of Clinical and Experimental Dentistry,* 9, e129–e135. doi: 10.4317/jced.53196

Van der Veken, D., Curvers, F., Fieuws, S., & Lambrechts, P. (2017). Prevalence of apical periodontitis and root filled teeth in a Belgian subpopulation found on CBCT images. *International Endodontic Journal,* 50, 317–329. doi: 10.1111/iej.12631

Vengerfeldt, V., Mändar, R., Nguyen, M. S., Saukas, S., & Saag, M. (2017). Apical periodontitis in southern Estonian population: prevalence and associations with quality of root canal fillings and coronal restorations. *BMC Oral Health,* 17, 147. doi: 10.1186/s12903-017-0429-7

Zain, R. B., Roswati, N., & Ismail, K. (1989). Radiographic evaluation of lesion sizes of histologically diagnosed periapical cysts and granulomas. *Ann Dent,* 48, 3–5.

Zero, D. T., Zandona, A. F., Vail, M.M., & Spolnik, K. J. (2011). Dental caries and pulpal disease. *Dental Clinics of North America,* 55, 29–46. doi: 10.1016/j.cden.2010.08.010

ANEXO A – Parecer de aprovação do Comitê de Ética em Pesquisa da Universidade Federal de Minas Gerais (COEP-UFMG)

UNIVERSIDADE FEDERAL DE MINAS GERAIS
COMITÊ DE ÉTICA EM PESQUISA - COEP

Projeto: CAAE - 87761518.7.1001.5149

Interessado(a): Profa. Maria Cássia Ferreira de Aguiar
Depto. Odontologia Social e Preventiva
Faculdade de Odontologia - UFMG

DECISÃO

O Comitê de Ética em Pesquisa da UFMG – COEP aprovou, no dia 09 de maio de 2018, o projeto de pesquisa intitulado **"Periapicopatias inflamatórias de origem endodôntica: estudo transversal multicêntrico"**.

O relatório final ou parcial deverá ser encaminhado ao COEP um ano após o início do projeto através da Plataforma Brasil.

Profa. Dra. Vivian Resende
Coordenadora do COEP-UFMG

ANEXO B – Autorização da Universidade Estadual da Paraíba (UEPB)

UEPB

UNIVERSIDADE ESTADUAL DA PARAÍBA
CENTRO DE CIÊNCIAS BIOLÓGICAS E DA SAÚDE
DEPARTAMENTO DE ODONTOLOGIA
LABORATÓRIO DE HISTOPATOLOGIA ORAL

TERMO DE AUTORIZAÇÃO

Eu, Cassiano Francisco Weege Nonaka, na qualidade de responsável pelo Laboratório de Histopatologia Oral do Departamento de Odontologia da Universidade Estadual da Paraíba (UEPB), autorizo a realização da pesquisa intitulada "*Periapicopatias inflamatórias de origem endodôntica: estudo transversal multicêntrico*". A referida pesquisa será conduzida sob responsabilidade da Profa. Dra. Maria Cássia Ferreira de Aguiar, orientadora da aluna de doutorado em Odontologia com área de concentração em Endodontia da Faculdade de Odontologia da Universidade Federal de Minas Gerais (UFMG), Aline Maria do Couto, responsável pela coleta de dados nos arquivos do Laboratório de Histopatologia Oral do Departamento de Odontologia da UEPB. Esta autorização é válida apenas no caso de haver parecer favorável do Comitê de Ética em Pesquisa da UFMG para a referida pesquisa.

Campina Grande, 27 de março de 2018.

Prof. Dr. Cassiano Francisco Weege Nonaka
Responsável pelo Laboratório de Histopatologia Oral
Matrícula – 125049-4

Prof. Dr. Cassiano Francisco Weege Nonaka
Departamento de Odontologia - UEPB
Matrícula: 125049-4

ANEXO C – Autorização da Universidade Federal de Goiás (UFG)

UNIVERSIDADE FEDERAL DE GOIÁS - FACULDADE DE ODONTOLOGIA
Centro Goiano de Doenças da Boca – Laboratório de Patologia Bucal
Praça Universitária, s/n, Setor Leste Universitário, Goiânia-GO, CEP 74605-220
Fone/ Fax: (062) 3209 6067/ 6327

UFG

Eu, Aline Carvalho Batista, na qualidade de coordenadora do Laboratório de Patologia Bucal da Faculdade de Odontologia da Universidade Federal de Goiás (Registrado no SIGAA/UFG com código n. J554-201; intitulado "Diagnóstico microscópico das doenças bucais na cidade de Goiânia e região"), autorizo a realização da pesquisa intitulada **"Periapicopatias inflamatórias de origem endodôntica: estudo transversal multicêntrico"**, a ser conduzida sob a responsabilidade da pesquisadora Profa. Dra. Maria Cássia Ferreira de Aguiar, orientadora da aluna de doutorado em Odontologia com área de concentração em Endodontia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, Aline Maria do Couto, responsável pela coleta de dados nos arquivos do Laboratório supracitado. Esta declaração é válida apenas no caso de haver parecer favorável do Comitê de Ética em Pesquisa da UFMG para a referida pesquisa.

Goiânia, 27 de Março de 2018.

Profa. Dra. Aline Carvalho Batista

Profa. Dra. Aline Carvalho Batista
CGDB/FO/UFG - CRO 7220

ANEXO D – Autorização da Universidade Federal de Minas Gerais (UFMG)

UNIVERSIDADE FEDERAL DE MINAS GERAIS
Faculdade de Odontologia
Colegiado do Programa de Pós-Graduação em Odontologia
Av. Pres. Antônio Carlos, 6627 – Pampulha
Belo Horizonte – MG – 31.270-901 – Brasil
Tel. (31) 3409-2470 Fax: (31) 3409-2472
Site: www.odonto.ufmg.br – posgrad@odonto.ufmg.br

DECLARAÇÃO

Eu, Patrícia Carlos Caldeira, na qualidade de sub-coordenadora do Laboratório de Patologia Bucomaxilofacial da Faculdade de Odontologia da Universidade Federal de Minas Gerais (LPBM-FOUFMG), autorizo a realização da pesquisa intitulada **"Periapicopatias inflamatórias de origem endodôntica: estudo transversal multicêntrico"**, a ser conduzida sob a responsabilidade da pesquisadora Profa. Dra. Maria Cássia Ferreira de Aguiar, orientadora da aluna de doutorado em Odontologia com área de concentração em Endodontia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, Aline Maria do Couto, responsável pela coleta de dados nos arquivos do LPBM. Esta declaração é válida apenas no caso de haver parecer favorável do Comitê de Ética em Pesquisa da UFMG para a referida pesquisa.

Belo Horizonte, 02 de Abril de 2018.

Profa. Dra. Patrícia Carlos Caldeira

Patrícia Carlos Caldeira
Cirurgiã Dentista
Patologista Bucal
CRO-MG: 26414

ANEXO E – Autorização da Universidade Federal de Pelotas (UFPel)

CENTRO DE DIAGNÓSTICO DAS DOENÇAS DA BOCA
FACULDADE DE ODONTOLOGIA

DECLARAÇÃO

Eu, Ana Paula Neutzling Gomes, na qualidade de coordenadora do Laboratório de Histopatologia do Centro de Diagnóstico das Doenças da Boca da Faculdade de Odontologia da Universidade Federal de Pelotas – CDDB/FOUFPel), autorizo a realização da pesquisa intitulada **"Periapicopatias inflamatórias de origem endodôntica: estudo transversal multicêntrico"**, a ser conduzida sob a responsabilidade da pesquisadora Profa. Dra. Maria Cássia Ferreira de Aguiar, orientadora da aluna de doutorado em Odontologia com área de concentração em Endodontia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, Aline Maria do Couto, responsável pela coleta de dados nos arquivos do Laboratório do CDDB da FOUFPel. Esta declaração é válida apenas no caso de haver parecer favorável do Comitê de Ética em Pesquisa da UFMG para a referida pesquisa.

Pelotas, 10 de Abril de 2018.

Profa. Dra. Ana Paula Neutzling Gomes

Dra. Ana Paula N. Gomes
Patologia Bucal CDDB FO-UFPel
CRO-RS 10922

ANEXO F – Normas para publicação no periódico *Oral Diseases*

Author Guidelines

The median processing time from submission to first decision for manuscripts submitted to *Oral Diseases* in the prior 12 months is 22 days.

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

Relevant Documents: **Online Open Order Form**, **Standard Release Form for photographic consent**

Useful Websites: **Submission Site**, **Articles Published in *Oral Diseases***, **Author Services**, **Wiley-Blackwell's Ethical Guidelines**, **Guidelines for Figures**

1. GENERAL

The editors encourage submissions of original articles, review articles, reports of meetings, book reviews and correspondence in the form of letters to the editor. *Oral Diseases* does not accept case reports.

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

Avoiding allegations of plagiarism

The journal to which you are submitting your manuscript employs text matching software (iThenticate) to ensure against plagiarism. By submitting your manuscript to this journal you accept that your manuscript may be screened for plagiarism against previously published work. Authors should consider whether their manuscript may raise concerns via iThenticate, which will signal whether a paper is likely in any way to be plagiarized in a formal sense. iThenticate will also, however, signal whether a paper may be plagiarized by repeating work of the submitting authors and thus be regarded as duplicate or redundant publication. Experience shows that, on occasion, large sections of submitted manuscripts can be close to verbatim in word choice from that seen in other papers from the authors' group. This has nothing to do with simple repetition of names/affiliations, but does involve common (not necessarily "standard") phrases that are more appropriately referenced instead of repeating. Alternatively, they can be rephrased differently. Previously published results, including numerical information and figures or images, should be labeled to make it clear where they were previously reported. Papers that present new analyses of results that have already been published (for example, subgroup analyses) should identify the primary data source, and include a full reference to the related primary publications. *Oral Diseases* will review and publish accepted mansucripts that report data included in conference proceedings in abstract form. In such cases, authors must be clear to readers that part of all of the manuscript's data have already been published in abstract form by so indicating using a footnote to the title that states the confrence proceedings in which the relevant abstract was published. For full guidance on text matching and plagiarism, please refer to Section 3 ('Research Integrity') of Wiley's Ethics Guidelines at **https://authorservices.wiley.com/ethics-guidelines/index.html**.

2. ETHICAL GUIDELINES

Oral Diseases adheres to the ethical guidelines given below for publication and research.

2.1. Authorship and Acknowledgements

Authorship: *Oral Diseases* adheres to the **International Standards for Authors** published by the Committee on Publication Ethics (COPE). All authors named on a paper should agree to be named on the paper, and all authors so named should agree to the submission of the paper to *Oral Diseases* and approve the submitted and accepted versions of the publication. Any change to the author list should be approved by all authors, including any author who has been removed from the list.

Oral Diseases also adheres to the **definition of authorship** set up by The International Committee of Medical Journal Editors (ICMJE). According to the ICMJE authorship criteria should be based on 1) substantial contributions to conception and design of, or acquisition of data or analysis and interpretation of data, 2) drafting the article or revising it critically for important intellectual content and 3) final approval of the version to be published. Authors should meet conditions 1, 2 and 3.

It is a requirement that the corresponding author submit a short description of each individual's contribution to the research and its publication. Upon submission of a manuscript all co-authors should also be registered with a correct e-mail addresses. If any of the e-mail addresses supplied are incorrect, the corresponding author will be contacted by the Journal Administrator.

Acknowledgements: Authors must acknowledge individuals who do not qualify as authors but who contributed to the research. Authors must acknowledge any assistance that they have received (e.g. provision of writing assistance, literature searching, data analysis, administrative support, supply of materials). If/how this assistance was funded should be described and included with other funding information. “Acknowledgements” should be brief and should not include thanks to anonymous referees and editors. Where people are acknowledged, a covering letter demonstrating their consent must be provided.

2.2. Ethical Approvals

Human Subjects: Experimentation involving human subjects will only be published if such research has been conducted in full accordance with ethical principles, including the World Medical Association**Declaration of Helsinki** (version 2002) and the additional requirements, if any, of the country where the research has been carried out. Manuscripts must be accompanied by a statement that the experiments were undertaken with the understanding and written consent of each subject and according to the above mentioned principles. A statement regarding the fact that the study has been independently reviewed and approved by an ethical board should also be included.

Photographs of People: Oral Diseases follows current HIPAA guidelines for the protection of patient/subject privacy. If an individual pictured in a digital image or photograph can be identified, his or her permission is required to publish the image. The corresponding author must either submit a letter signed by the patient authorizing Oral Diseases to publish the image/photo, or complete the 'Standard Release Form for photographic consent' available at the top of this page or by clicking the “instructions and Forms” link on the ScholarOne Manuscripts submission site. The approval must be received by the Editorial Office prior to final acceptance of the manuscript for publication. Otherwise, the image/photo must be altered such that the individual cannot be identified (black bars over eyes, tattoos, scars, etc.). Oral Diseases will not publish patient photographs that will in any way allow the patient to be identified, unless the patient has given their express consent.

Editors reserve the right to reject papers if there are doubts as to whether appropriate procedures have been used.

Animal Study: When experimental animals are used the methods section must clearly indicate that adequate measures were taken to minimize pain or discomfort. Experiments should be carried out in accordance with the Guidelines laid down by the National Institute of Health (NIH) in the USA regarding the care and use of animals for experimental procedures or with the European Communities Council Directive of 24 November 1986 (86/609/EEC) and in accordance with local laws and regulations.

2.3 Clinical Trials

Clinical Trials should be reported using the CONSORT guidelines available at **www.consort-statement.org**. A **CONSORT checklist** and **flowchart** should also be included in the submission material. Clinical trials can be registered in any free, public clinical trials registry such as **http://www.clinicaltrials.gov** or **http://isrctn.org/**. A list of further registries is available at **http://www.who.int/ictrp/network/primary/en/**. As stated in an editorial published in *Oral Diseases***(12:217-218), 2006)**, all manuscripts reporting results from a clinical trial must indicate that the trial was fully registered at a readily accessible website. The clinical trial registration number and name of the trial register will be published with the paper.

2.4 DNA Sequences and Crystallographic Structure Determinations

Papers reporting protein or DNA sequences and crystallographic structure determinations will not be accepted without a Genbank or Brookhaven accession number, respectively. Other supporting data sets must be made available on the publication date from the authors directly.

2.5 Conflict of Interest and Source of Funding

All sources of institutional, private and corporate financial support for the work within the manuscript must be fully acknowledged, and any potential grant holders should be listed. Authors are also required to disclose any possible conflict of interest. These include financial (for example patent, ownership, stock ownership, consultancies, speaker's fee). Information on sources of funding and any potential conflict of interest should be disclosed at submission under the heading "Acknowledgements".

2.6 Appeal of Decision

The decision on a paper is final and cannot be appealed.

2.7 Permissions

If all or parts of previously published illustrations are used, permission must be obtained from the copyright holder concerned. It is the author's responsibility to obtain these in writing and provide copies to the Publishers.

2.8 Copyright and OnlineOpen

If your paper is accepted, the author identified as the formal corresponding author for the paper will receive an email prompting them to login into Author Services; where via the Wiley Author Licensing Service (WALS) they will be able to complete the license agreement on behalf of all authors on the paper. The corresponding author MUST submit the CTA as it is a requirement for publication.

For authors signing the copyright transfer agreement

If the OnlineOpen option is not selected the corresponding author will be presented with the copyright transfer agreement (CTA) to sign. The terms and conditions of the CTA can be previewed in the samples associated with the Copyright FAQs below:
CTA Terms and Conditions **http://exchanges.wiley.com/authors/copyright-and-permissions_333.html**.

Online Open

OnlineOpen is available to authors of primary research articles who wish to make their article available to non-subscribers on publication, or whose funding agency requires grantees to archive the final version of their article. With OnlineOpen, the author, the author's funding agency, or the author's institution pays a fee to ensure that the article is made available to non-subscribers upon publication via Wiley InterScience, as well as deposited in the funding agency's preferred archive. For the full list of terms and conditions, see **http://olabout.wiley.com/WileyCDA/Section/id-406241.html.** Any authors wishing to send their paper OnlineOpen will be required to complete the payment form available from our website at: **https://authorservices.wiley.com/bauthor/onlineopen_order.asp**. Prior to acceptance there is no requirement to inform an Editorial Office that you intend to publish your paper OnlineOpen if you do not wish to. All OnlineOpen articles are treated in the same way as any other article. They go through the journal's standard peer-review process and will be accepted or rejected based on their own merit.

For authors choosing OnlineOpen

If the OnlineOpen option is selected the corresponding author will have a choice of the following Creative Commons License Open Access Agreements (OAA):

Creative Commons Attribution License OAA
Creative Commons Attribution Non-Commercial License OAA
Creative Commons Attribution Non-Commercial -NoDerivs License OAA

To preview the terms and conditions of these open access agreements please visit the Copyright FAQs hosted on Wiley Author Services **http://exchanges.wiley.com/authors/copyright-and-permissions_333.html** and visit**http://www.wileyopenaccess.com/details/content/12f25db4c87/Copyright--License.html**.

If you select the OnlineOpen option and your research is funded by The Wellcome Trust and members of the Research Councils UK (RCUK) you will be given the opportunity to publish your article under a CC-BY license supporting you in complying with Wellcome Trust and Research Councils UK requirements.

For more information on this policy and the Journal's compliant self-archiving policy please visit: **http://www.wiley.com/go/funderstatement**.

Additionally. authors are themselves responsible for obtaining permission to reproduce copyright material from other sources.

3. MANUSCRIPT SUBMISSION PROCEDURE

Oral Diseases only accepts online submission of manuscripts. Manuscripts should be submitted at the online submission site: **http://mc.manuscriptcentral.com/odi**. Complete instructions for submitting a manuscript are available at the site upon creating an account. Assistance for submitting papers can be sought with the editorial assistant Lisa Walton at: **odiedoffice@wiley.com**

Upon successful submission, the journal administrator will check that all parts of the submission have been completed correctly. If any necessary part is missing or if the manuscript does not fulfil the requirements as specified below, the corresponding author will be asked either to adjust the submission according to specified instructions or to submit their paper to another journal.

3.1. Getting Started

Launch your web browser (supported browsers include Internet Explorer 5.5 or higher, Safari 1.2.4, or Firefox 1.0.4 or higher) and go to the journal's online Submission Site: **http://mc.manuscriptcentral.com/odi**

- Log-in or, if you are a new user click on 'register here'.
- If you are registering as a new user.
  - After clicking on 'register here', enter your name and e-mail information and click 'Next'. Your e-mail information is very important.
  - Enter your institution and address information as appropriate, and then click 'Next.'
  - Enter a user ID and password of your choice (we recommend using your e-mail address as your user ID), and then select your areas of expertise. Click 'Finish'.
- If you are registered as user, but have forgotten your log in details, enter your e-mail address under 'Password Help'. The system will send you an automatic user ID and a new temporary password.
- Log-in and select 'Corresponding Author Centre'.

3.2. Submitting Your Manuscript

After you have logged into your 'Corresponding Author Centre', submit your manuscript by clicking the submission link under 'Author Resources'.

- Enter data and answer questions as appropriate. You may copy and paste directly from your manuscript and you may upload your pre-prepared covering letter.
- Click the 'Next' button on each screen to save your work and advance to the next screen.
- You are required to register all of your co-authors with a functioning e-mail address. If the e-mail address is incorrect, you will be contacted by the journal administrator.
- You are required to upload your files: Click on the 'Browse' button and locate the file on your computer. Select the designation of each file in the drop down next to the Browse button. When you have selected all files you wish to upload, click the 'Upload Files' button.
- Review your submission (in HTML and PDF format) before completing your submission by sending it to the Journal. Click the 'Submit' button when you are finished reviewing.

Data protection: 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**.

3.3. Manuscript Files Accepted

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

3.4. Blinded Review

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

3.5. Suggest a Reviewer

Oral Diseases attempts to keep the review process as short as possible to enable rapid publication of new scientific data. In order to facilitate this process, you must suggest the names and current e-mail addresses of from 2-4 potential reviewers whom you consider capable of reviewing your manuscript in an unbiased way.

3.6. Suspension of Submission Mid-way in the Submission Process

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

3.7. E-mail Confirmation of Submission

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

3.8. Manuscript Status

The average time from submission to first decision for manuscripts submitted to *Oral Diseases* is 20 days. You can access ScholarOne Manuscripts (formerly known as Manuscript Central) any time to check your 'Author Centre' for the status of your manuscript. The Journal will inform you by e-mail once a decision has been made.

3.9. Submission of Revised Manuscripts

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

4. MANUSCRIPT TYPES ACCEPTED

Original Research Articles: Manuscripts reporting laboratory investigations, well-designed and controlled clinical research, and analytical epidemiology are invited. Studies related to aetiology, pathogenesis, diagnosis, prevention and treatment are all of interest, but all papers must be based on rigorous hypothesis-driven research. Areas of interest includediseases affectin any structures of the mouth; cancer and pre-cancerous conditions; saliva and salivary glands; bone and hard tissues; relationasip between oral, periodontal, and dental conditions and general health; pain; behaviotal dentistry; chemosensory, developmental, geriatric, and motor disorders.

Randomised trials must adhere to the **CONSORT guidelines**, and a **CONSORT checklist** and **flowchart**must be submitted with such papers. Please also refer to the notes under section 2.3 above.
Oral Diseases supports the ALLTRIALS initiative and encourages authors submitting manuscripts reporting a clinical trial to register the trials in any of the following free, public clinical trials registries: **www.clinicaltrials.gov**, **http://clinicaltrials.ifpma.org/clinicaltrials/**, **http://isrctn.org/**. The clinical trial registration number and name of the trial register will then be published with the paper.

Observational studies must adhere to the **STROBE guidelines**, and a **STROBE checklist** must be submitted with such papers. Diagnostic accuracy studies must adhere to the **STARD guidelines**, and a**STARD checklist** must be submitted with such papers.

Preprint policy: This journal will consider for review articles previously available as preprints on non-commercial servers such as ArXiv, bioRxiv, psyArXiv, SocArXiv, engrXiv, etc. Authors may also post the submitted version of a manuscript to non-commercial servers at any time. Authors are requested to update any pre-publication versions with a link to the final published article.

Review Papers: *Oral Diseases* commissions review papers and also welcomes uninvited reviews. Systematic reviews with or without meta-analyses must adhere to the **PRISMA guidelines**, and a**PRISMA checklist** and **flowchart** must be submitted with such papers. The word limit for Review Papers is 4,000 words, with a maximum of two tables or images and 50 references.

Letters to the Editors:Letters, if of broad interest, are encouraged. They may deal with material in papers published in Oral Diseases or they may raise new issues, but should have important implications. Only one letter may be submitted by any single author or group of authors on any one published paper. The word limit for Letters to the Editors is 500 words, with a maximum of 1 figure and 10 references.

Case Reports: *Oral Diseases* does not accept case reports and instead recommends that authors submit to ***Clinical Case Reports*** an open access journal published by Wiley.

Meeting Reports: Will be considered by the editors for publication only if they are of wide and significant interest.

Short Communications: These are brief papers of any topic within the scope of *Oral Diseases*about significant and novel advances that are complete in research endeavor but not suitable for full publications. Short Communications should not include an abstract and is limited to 1000 words, with a maximum of 3 figures and 20 references.

Invited Concise Reviews: These may be submitted by invitation of the Senior Editors only, and consist of around 2500-2750 words, with a maximum of one table or image and 25 references.

Invited Medical Reviews: These may be submitted by invitation of the Senior Editors only, and consist of around 2500-2750 words, with a maximum of one table or image and 25 references.

Invited Commentaries: These may be submitted by invitation of the Senior Editors only.

Invited Editorials: These may be submitted by invitation of the Senior Editors only.

Invited Book Reviews: These may be submitted by invitation of the Senior Editors only.

5. MANUSCRIPT FORMAT AND STRUCTURE

5.1. Page Charge

Articles exceeding 6 published pages, including title page, abstract, references, table/figure legends and tables and figures, are subject to a charge of GBP70 per additional page. As a guide, one published page amounts approximately to 850 words, or two to four small tables/figures. Additional supplementary material (including text and figures), which does not fit within the page limits, can be published online only as supporting information.

5.2. Format

Language: Authors should write their manuscripts in British English using an easily readable style. Authors whose native language is not English should have a native English speaker read and correct their manuscript. Spelling and phraseology should conform to standard British usage and should be consistent throughout the paper. A list of independent suppliers of editing services can be found at **http://authorservices.wiley.com/bauthor/english_language.asp**. All services are

paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication.

Presentation: Authors should pay special attention to the presentation of their findings so that they may be communicated clearly. The background and hypotheses underlying the study as well as its main conclusions should be clearly explained. Titles and abstracts especially should be written in language that will be readily intelligible to any scientist.

Technical jargon: should be avoided as much as possible and clearly explained where its use is unavoidable.

Abbreviations: Oral Diseases adheres to the conventions outlined in Units, Symbols and Abbreviations: A Guide for Medical and Scientific Editors and Authors. Non-standard abbreviations must be used three or more times and written out completely in the text when first used.

5.3. Structure: All papers submitted to *Oral Diseases* should include:

- Title Page
- Structured Abstract
- Main text
- References
- (Figures)
- (Figure Legends)
- (Tables)

Title Page: should be part of the manuscript uploaded for review and include:

- A title of no more than 100 characters including spaces
- A running title of no more than 50 characters
- 3-6 keywords
- Complete names and institutions for each author
- Corresponding author's name, address, email address and fax number
- Date of submission (and revision/resubmission)

Abstract: is limited to 200 words in length and should contain no abbreviations. The abstract should be included in the manuscript document uploaded for review as well as separately where specified in the submission process. The abstract should convey the essential purpose and message of the paper in an abbreviated form set out under:

- Objective(s),
- Subject(s) (or Materials) and Methods,
- Results,
- Conclusions(s).

The Main Text of Original Research Articles should be organised as follows

Introduction: should be focused, outlining the historical or logical origins of the study and not summarize the results; exhaustive literature reviews are inappropriate. It should close with the explicit statement of the specific aims of the investigation.

Materials and Methods must contain sufficient detail such that, in combination with the references cited, all clinical trials and experiments reported can be fully reproduced. As a condition of publication, authors are required to make materials and methods used freely

available to academic researchers for their own use. This includes antibodies and the constructs used to make transgenic animals, although not the animals themselves. Other supporting data sets must be made available on the publication date from the authors directly.

(i) Clinical trials: As noted above, these should be reported using the CONSORT guidelines available at **www.consort-statement.org**. A **CONSORT checklist** should also be included in the submission material. Clinical trials can be registered in any of the following free, public clinical trials
registries: **www.clinicaltrials.gov**, **http://clinicaltrials.ifpma.org/clinicaltrials/**, **http://isrctn.org/**.As stated in an editorial published in *Oral Diseases* (12:217-218), 2006), all manuscripts reporting results from a clinical trial must indicate that the trial was fully registered at a readily accessible website. The clinical trial registration number and name of the trial register will be published with the paper.

(ii)Experimental subjects: As noted above, experimentation involving human subjects will only be published if such research has been conducted in full accordance with ethical principles, including the World Medical Association **Declaration of Helsinki** (version 2002) and the additional requirements, if any, of the country where the research has been carried out. Manuscripts must be accompanied by a statement that the experiments were undertaken with the understanding and written consent of each subject and according to the above mentioned principles. A statement regarding the fact that the study has been independently reviewed and approved by an ethical board should also be included.Editors reserve the right to reject papers if there are doubts as to whether appropriate procedures have been used. When experimental animals are used the methods section must clearly indicate that adequate measures were taken to minimize pain or discomfort. Experiments should be carried out in accordance with the Guidelines laid down by the National Institute of Health (NIH) in the USA regarding the care and use of animals for experimental procedures or with the European Communities Council Directive of 24 November 1986 (86/609/EEC) and in accordance with local laws and regulations.

***(iii) Suppliers*:** Suppliers of materials should be named and their location (town, state/county, country) included.

Results: should present the observations with minimal reference to earlier literature or to possible interpretations.

Discussion: may usually start with a brief summary of the major findings, but repetition of parts of the abstract or of the results sections should be avoided. The section should end with a brief conclusion and a comment on the potential clinical relevance of the findings. Statements and interpretation of the data should be appropriately supported by original references.

Acknowledgements: Should be used to provide information on sources of funding for the research, any potential conflict of interest and to acknowledge contributors to the study that do not qualify as authors. All sources of institutional, private and corporate financial support for the work within the manuscript must be fully acknowledged, and any potential grant holders should be listed. Acknowledgements should be brief and should not include thanks to anonymous referees and editors. Where people are acknowledged, a covering letter demonstrating their consent must be provided.

5.4. References

References should be prepared according to the *Publication Manual of the American Psychological Association* (6th edition). This means in-text citations should follow the author-date method whereby the author's last name and the year of publication for the source should appear in the text, for example, (Jones, 1998). For references with three to five authors, all authors should be listed only on the first occurrence of the in-text citation, and in subsequent in-text occurrences

only the first author should be listed followed by '*et al.*'. The complete reference list should appear alphabetically by name at the end of the paper.

A sample of the most common entries in reference lists appears below. Please note that a DOI should be provided for all references where available. For more information about APA referencing style, please refer to the **APA website**. Please note that for journal articles, issue numbers are not included unless each issue in the volume begins with page one.

Journal article

Example of reference with 2 to 7 authors

Beers, S. R., & De Bellis, M. D. (2002). Neuropsychological function in children with maltreatment-related posttraumatic stress disorder. *The American Journal of Psychiatry, 159*, 483–486. doi: 10.1176/appi.ajp.159.3.483

Ramus, F., Rosen, S., Dakin, S. C., Day, B. L., Castellote, J. M., White, S., & Frith, U. (2003). Theories of developmental dyslexia: Insights from a multiple case study of dyslexic adults. *Brain, 126*(4), 841–865. doi: 10.1093/brain/awg076

Example of reference with more than 7 authors

Rutter, M., Caspi, A., Fergusson, D., Horwood, L. J., Goodman, R., Maughan, B., … Carroll, J. (2004). Sex differences in developmental reading disability: New findings from 4 epidemiological studies. *Journal of the American Medical Association, 291*(16), 2007–2012. doi: 10.1001/jama.291.16.2007

Book edition

Bradley-Johnson, S. (1994). *Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school* (2nd ed.). Austin, TX: Pro-ed.

5.5. Tables, Figures and Figure Legends

Figures: All figures and artwork must be provided in electronic format. Please save vector graphics (e.g. line artwork) in Encapsulated Postscript Format (EPS) and bitmap files (e.g. half-tones) or clinical or in vitro pictures in Tagged Image Format (TIFF).

Detailed information on our digital illustration standards can be found at **http://authorservices.wiley.com/bauthor/illustration.asp**.

Check your electronic artwork before submitting it: **http://authorservices.wiley.com/bauthor/eachecklist.asp**.

Unnecessary figures and parts (panels) of figures should be avoided: data presented in small tables or histograms, for instance, can generally be stated briefly in the text instead. Figures should not contain more than one panel unless the parts are logically connected.

Figures divided into parts should be labelled with a lower-case, boldface, roman letter, a, b, and so on, in the same type size as used elsewhere in the figure. Lettering in figures should be in lower-case type, with the first letter capitalized. Units should have a single space between the number and unit, and follow SI nomenclature common to a particular field. Unusual units and abbreviations should be spelled out in full or defined in the legend. Scale bars should be used rather than magnification factors, with the length of the bar defined in the legend rather than on the bar itself. In general visual cues (on the figures themselves) are preferred to verbal explanations in the legend (e.g. broken line, open red triangles etc).

Color figures

Color figures may be published online free of charge; however, the journal charges for publishing figures in colour in print. If the author supplies colour figures at Early View publication, they will be invited to complete a colour charge agreement in RightsLink for Author Services. The author

will have the option of paying immediately with a credit or debit card, or they can request an invoice. If the author chooses not to purchase color printing, the figures will be converted to black and white for the print issue of the journal.

Guidelines for Cover Submissions

If you would like to send suggestions for artwork related to your manuscript to be considered to appear on the cover of the journal, please **follow these general guidelines.**

Video Abstracts

Bring your research to life by creating a video abstract for your article! Wiley partners with Research Square to offer a service of professionally produced video abstracts. Learn more about video abstracts at **www.wileyauthors.com/videoabstracts** and purchase on for your article at **https://www.researchsquare.com/wiley/** or through your Author Services Dashboard. If you have any questions, please direct them to **videoabstracts@wiley.com**.

6. AFTER ACCEPTANCE

Upon acceptance of a paper for publication, the manuscript will be forwarded to the Production Editor who is responsible for the production of the journal.

Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website. A working e-mail address must therefore be provided for the corresponding author. The proof can be downloaded as a PDF (portable document format) file from this site.

Acrobat Reader will be required in order to read this file. This software can be downloaded (free of charge) from the following website: **www.adobe.com/products/acrobat/readstep2.html** . This will enable the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof. Hard copy proofs will be posted if no e-mail address is available; in your absence, please arrange for a colleague to access your e-mail to retrieve the proofs.

Proofs must be returned to the Production Editor within **three days** of receipt.

As changes to proofs are costly, we ask that you only correct typesetting errors. Excessive changes made by the author in the proofs, excluding typesetting errors, will be charged separately. Other than in exceptional circumstances, all illustrations are retained by the publisher. Please note that the author is responsible for all statements made in their work, including changes made by the copy editor.

Early View (Publication Prior to Print)

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

Author Services

Online production tracking is available for your article once it is accepted by registering with **Wiley-Blackwell's Author Services**.

PRODUÇÃO CIENTÍFICA DURANTE O DOUTORADO (2015-2019)

Artigos publicados ou aceitos para publicação:

- **COUTO AM,** ESPALADORI MC, LEITE APP, MARTINS CC, AGUIAR MCF., ABREU, LG. A systematic review on pulp revascularization using a triple antibiotic paste. Pediatric Dentistry, 2019.
- TOLEDO AON, **COUTO AM**, MADEIRA MFM, CALDEIRA PC, QUEIROZ-JUNIOR CM, AGUIAR MCF. Cytokines and chemokines associated with Treg/Th17 response in chronic inflammatory periapical disease. Brazilian Oral Research, 2019.
- **COUTO AM,** ALEVATO AB, ANDRADE CO, DEVITO KL, SALVIO LA. Análise da microinfiltração de restaurações em dentes posteriores hibridizados com adesivo autocondicionante após armazenagem. Revista da Sociedade Portuguesa de Estomatologia e Medicina Dentária, v. 57, p. 46-50, 2016.

Artigos submetidos em processo de avaliação:

- **COUTO AM,** MEIRELLES DP, VALERIANO AT, ALMEIDA DS, MORAES E, TARQUÍNIO SBC, BATISTA AC, MENDONÇA EF, COSTA NL, ALVES PM, NONAKA CFW, AGUIAR MCF. Apical periodontitis: a multicentre study of 10,381 cases in Brazil. Oral Diseases, 2019.
- CLASEN CV, KIRSCHNICK LB, **COUTO AM,** SCHUCH LF, AGUIAR MCF, SANTOS JN, PAPPEN FG, UCHOA VASCOCELOS AC. A Brazilian retrospective multicentre study of periapical lesions misdiagnosed as endodontic origin. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology, 2019.
- SILVA KD, COELHO LV, **COUTO AM,** TARQUÍNIO SBC, GOMES APN, MENDONÇA EF, BATISTA AC, SENA LSB, ALVES PM, NONAKA CFW, KIMURA TNL, CÂMARA J, LOUREDO BVR, AGUIAR, MCF, CALDEIRA, PC. Oral lymphoepithelial cyst: a multicentric retrospective study of the clinical, histopathological, and immunohistochemical features. Histopatology, 2019.

- **COUTO AM,** GOIS EGO, LEITE ICG, ABREU LG, CHAVES MGAM. Fatores associados à percepção de pais/cuidadores com relação à necessidade de tratamento ortodôntico em crianças. Cadernos Saúde Coletiva, 2018.

Apresentações de Trabalhos:

- **COUTO AM,** VALERIANO AT, MEIRELLES DP, AGUIAR MCF. Periapicopatias inflamatórias de origem endodôntica: estudo transversal em uma população pediátrica. 2019. XXVI Jornada Mineira de Estomatologia – JOME.
- VALERIANO AT, **COUTO AM**, MEIRELLES DP, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: estudo transversal em crianças. 2019. XXVI Jornada Mineira de Estomatologia – JOME.
- MEIRELLES DP, **COUTO AM**, VALERIANO AT, AGUIAR MCF. Periapicopatias inflamatórias de origem endodôntica: estudo transversal envolvendo 4.520 casos. XXVI Jornada Mineira de Estomatologia – JOME.
- **COUTO AM,** TARQUÍNIO SBC, MENDONÇA EF, NONAKA CFW, KIMURA TNL, CALDEIRA PC. Cisto linfoepitelial oral: um estudo multicêntrico de 77 casos. XXVI Jornada Mineira de Estomatologia – JOME.
- **COUTO AM,** TOLEDO AON, MADEIRA MFM, CALDEIRA PC, QUEIROZ-JUNIOR CM, AGUIAR MCF. Participação de citocinas relacionadas às respostas th17/treg no desenvolvimento das lesões periapicais inflamatórias crônicas. 2018. 35ª Reunião anual da Sociedade Brasileira de Pesquisa Odontológica - SBPqO.
- **COUTO AM,** MEIRELLES DP, VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica. 2018. 56ª Semana Acadêmica da Faculdade de Odontologia da Universidade Federal de Pelotas.
- VALERIANO AT, **COUTO AM,** MEIRELLES DP, AGUIAR MCF. Periapicopatias inflamatórias de origem endodôntica no laboratório de Patologia Bucomaxilofacial da FOUFMG: uma análise de 20 anos. 2018.

Semana do Conhecimento - XXVII Semana de Iniciação Científica / PRPq - Universidade Federal de Minas Gerais.

- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: análise de 20 anos. 2018. 1º Congresso Internacional de Odontologia de Diamantina.
- VALERIANO AT, **COUTO AM,** MEIRELLES DP, AGUIAR MCF. Levantamento epidemiológico de periapicopatias inflamatórias de origem endodôntica. 2018. 1º Congresso Internacional de Odontologia de Diamantina.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Levantamento epidemiológico de periapicopatias inflamatórias de origem endodôntica: uma análise de 20 anos. 2018. I Fórum Científico e Tecnológico em Odontologia de Juiz de Fora.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: análise de 20 anos. 2018. I Fórum Científico e Tecnológico em Odontologia de Juiz de Fora.
- VALERIANO AT, **COUTO AM,** MEIRELLES DP, AGUIAR MCF. Periapicopatias inflamatórias endodônticas no laboratório de Patologia Bucomaxilofacial da FOUFMG. 2018. XIV Encontro Científico da Faculdade de Odontologia da Universidade Federal de Minas Gerais.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: análise de 20 anos. 2018. XIV Encontro Científico da Faculdade de Odontologia da Universidade Federal de Minas Gerais.
- **COUTO AM,** GOIS EGO, LEITE, ICG, CHAVES, MGAM. Percepção da necessidade de tratamento ortodôntico por crianças e responsáveis comparada à necessidade normativa. 2018. 36º CIOSP- Congresso Internacional de Odontologia de São Paulo.
- **COUTO AM,** ESPALADORI MC, OLIVEIRA PY, TAVARES LCT, LEITE A PP, RIBEIRO SOBRINHO AP. Procedimento de revascularização pulpar como opção de tratamento à apicificação convencional - Revisão de literatura. 2017.

20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.

- **COUTO AM,** GOIS EGO., LEITE ICG, CHAVES MGAM. Comparação da percepção da necessidade de tratamento ortodôntico por crianças e responsáveis com a necessidade de tratamento normativa. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.
- **COUTO AM,** GOIS EGO, LEITE ICG, ABREU LG, PINHO MLA, CHAVES MGAM. Prevalência das maloclusões e seus desvios funcionais de normalidade em estudantes de 12 anos da rede de ensino pública de Juiz de Fora. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.
- CRUZ PV, **COUTO AM,** ALEVATO AB, MOTA-VELOSO I, CHAVES MGAM. Diagnóstico diferencial entre hiperqueratose focal e líquen plano: Revisão de literatura e relato de caso clínico. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.
- OLIVEIRA PY, LACERDA GP, GIRELLI CFM, GIRELLI RC, **COUTO AM,** LACERDA MFLS. Efetividade da terapia fotodinâmica na eliminação de Enterococcus faecalis no preparo de canais radiculares: uma revisão integrativa. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.
- OLIVEIRA PY, LACERDA GP, GIRELLI CFM, GIRELLI RC, **COUTO AM,** LACERDA MFLS. Estudo comparativo in vitro da localização do ápice radiográfico e do forame apical na raiz distal do primeiro molar inferior permanente. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.
- CRUZ PV, MOTA-VELOSO I, **COUTO AM,** CERQUEIRA DF. Dente impactado por traumatismo dentário na primeira infância: Relato de caso clínico. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do

Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.

- TAVARES LCT, **COUTO AM,** SANTOS PAXO, SANTOS MAX. O. Utilização da magnificação visual associada ao ultrassom para auxílio na remoção de instrumento fraturado: Relato de caso clínico. 2017. 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais.
- MAIA LM, **COUTO AM,** SANTA-ROSA CC, DINIZ JMB, RESENDE RC, RIBEIRO-SOBRINHO AP, VIEIRA LQ. Efeito do MTA Fillapex sobre a atividade de macrófagos peritoneais M1 e M2. 2016. 39° Jornada Odontológica da Universidade de Itaúna.
- MAIA LM, **COUTO AM,** SANTA-ROSA CC, DINIZ JMB, MOREIRA-JÚNIOR G, TOUBES KM, SILVEIRA FF. Protocolo clínico de revascularização pulpar como alternativa de tratamento para dentes com rizogênese incompleta que sofreram necrose pulpar- Revisão de literatura. 2016. 39° Jornada Odontológica da Universidade de Itaúna.
- **COUTO AM,** LEITE APP, RIBEIRO SOBRINHO AP. Revascularização pulpar como opção de tratamento para dentes necrosados com rizogênese incompleta- revisão de literatura. 2016. 34º CIOSP- Congresso Internacional de Odontologia de São Paulo.
- **COUTO AM,** GÓIS EGO, LEITE ICG, CHAVES MGAM. Avaliação da prevalência de maloclusão e sua relação com aspectos psicossociais em estudantes de 12 anos da rede pública de Juiz de Fora. 2016. 33ª Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica- SBPqO.
- **COUTO AM,** ALEVATO AB, DEVITO KL, SALVIO LA. Comparação in vitro da microinfiltração de restaurações em dentes posteriores após um ano de armazenagem. 2016. 34º CIOSP- Congresso Internacional de Odontologia de São Paulo.
- **COUTO AM,** GÓIS EGO, LEITE ICG, CHAVES MGAM. Comparação da percepção da necessidade de tratamento ortodôntico por crianças e responsáveis com a necessidade de tratamento normativa. 2016. XIII Encontro Científico da Faculdade de Odontologia da UFMG.

Resumos publicados em anais de eventos:

- **COUTO AM,** VALERIANO AT, MEIRELLES DP, AGUIAR MCF. Periapicopatias inflamatórias de origem endodôntica: estudo transversal em uma população pediátrica. In: Anais da XXVI Jornada Mineira de Estomatologia – JOME, 2019.
- VALERIANO AT, **COUTO AM**, MEIRELLES DP, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: estudo transversal em crianças. In: Anais da XXVI Jornada Mineira de Estomatologia – JOME, 2019.
- MEIRELLES DP, **COUTO AM**, VALERIANO AT, AGUIAR MCF. Periapicopatias inflamatórias de origem endodôntica: estudo transversal envolvendo 4.520 casos. In: Anais da XXVI Jornada Mineira de Estomatologia – JOME, 2019.
- **COUTO AM,** TARQUÍNIO SBC, MENDONÇA EF, NONAKA CFW, KIMURA TNL, CALDEIRA PC. Cisto linfoepitelial oral: um estudo multicêntrico de 77 casos. In: Anais da XXVI Jornada Mineira de Estomatologia – JOME, 2019.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: análise de 20 anos. In: Revista interdisciplinar de estudos experimentais: animais e humanos – Interdisciplinary Journal of Experimental Studies, 2019.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Levantamento epidemiológico de periapicopatias inflamatórias de origem endodôntica: uma análise de 20 anos. In: Revista interdisciplinar de estudos experimentais: animais e humanos – Interdisciplinary Journal of Experimental Studies, 2019.
- **COUTO AM,** MEIRELLES DP, VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica. In: Anais da 56ª Semana Acadêmica da Faculdade de Odontologia da Universidade Federal de Pelotas – UFPel, 2018.
- **COUTO AM,** TOLEDO AON, MADEIRA MFM, CALDEIRA PC, QUEIROZ-JUNIOR CM, AGUIAR MCF. Participação de citocinas relacionadas às

respostas th17/treg no desenvolvimento das lesões periapicais inflamatórias crônicas. In: Brazilian Oral Research, 35th SBPqO Annual Meeting, 2018.

- VALERIANO AT, **COUTO AM,** MEIRELLES DP, AGUIAR MCF. Periapicopatias inflamatórias de origem endodôntica no laboratório de Patologia Bucomaxilofacial da FOUFMG: uma análise de 20 anos. In: XXVII Semana de Iniciação Científica / PRPq – Universidade Federal de Minas Gerais, 2018.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: análise de 20 anos. In: Anais do 1º Congresso Internacional de Odontologia de Diamantina, 2018.
- VALERIANO AT, **COUTO AM,** MEIRELLES DP, AGUIAR MCF. Levantamento epidemiológico de periapicopatias inflamatórias de origem endodôntica. In: Anais do 1º Congresso Internacional de Odontologia de Diamantina, 2018.
- VALERIANO AT, **COUTO AM,** MEIRELLES DP, AGUIAR MCF. Periapicopatias inflamatórias endodônticas no laboratório de Patologia Bucomaxilofacial da FOUFMG. In: XIV Encontro Científico da Faculdade de Odontologia da Universidade Federal de Minas Gerais, 2018.
- MEIRELLES DP, **COUTO AM,** VALERIANO AT, AGUIAR MCF. Concordância entre o diagnóstico clínico e histopatológico em periapicopatias inflamatórias de origem endodôntica: análise de 20 anos. In: XIV Encontro Científico da Faculdade de Odontologia da Universidade Federal de Minas Gerais, 2018.
- OLIVEIRA PY, **COUTO AM,** GIRELLI CFM, GIRELLI RC, LACERDA GP, LACERDA MFLS. Estudo comparativo in vitro da localização do ápice radiográfico e do forame apical na raiz distal do primeiro molar inferior permanente. In: VI Semana da Integração: Ensino, Pesquisa e Extensão da UFVJM - VI SINTEGRA, Pesquisar para Transformar, realizada pela Universidade Federal dos Vales do Jequitinhonha e Mucuri – UFVJM, 2018.
- **COUTO AM,** GOIS EGO, LEITE ICG, ABREU LG, CHAVES MGAM. Percepção dos responsáveis acerca da necessidade de tratamento ortodôntico em crianças de 12 anos e fatores associados: estudo transversal. In: VI Semana da Integração: Ensino, Pesquisa e Extensão da UFVJM - VI

SINTEGRA, Pesquisar para Transformar, realizada pela Universidade Federal dos Vales do Jequitinhonha e Mucuri – UFVJM, 2018.

- TAVARES LCT, **COUTO AM**, SANTOS MAXO, SANTOS PAXO. Utilização da magnificação visual associada ao ultrassom para auxílio na remoção de instrumento fraturado: Relato de caso clínico. In: VI Semana da Integração: Ensino, Pesquisa e Extensão da UFVJM - VI SINTEGRA, Pesquisar para Transformar, realizada pela Universidade Federal dos Vales do Jequitinhonha e Mucuri – UFVJM, 2018.
- **COUTO AM,** GOIS EGO, LEITE ICG, CHAVES MGAM. Percepção da necessidade de tratamento ortodôntico por crianças e responsáveis comparada à necessidade normativa. In: Revista da APCD - Associação Paulista de Cirurgiões-Dentistas. Resumos expandidos do 36º CIOSP - Congresso Internacional de Odontologia de São Paulo, 2018.
- **COUTO AM,** GOIS EGO, LEITE ICG, CHAVES MGAM. Percepção da necessidade de tratamento ortodôntico por crianças e responsáveis comparada à necessidade normativa. In: 36º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2018, São Paulo- SP. 36º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2018.
- **COUTO AM,** LEITE APP, RIBEIRO SOBRINHO AP. Revascularização pulpar como opção de tratamento para dentes necrosados com rizogênese incompleta- revisão de literatura. In: 34º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2016, São Paulo- SP. 34º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2016.
- **COUTO AM,** ALEVATO AB, DEVITO KL, SALVIO LA. Comparação in vitro da microinfiltração de restaurações em dentes posteriores após um ano de armazenagem. In: 34º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2016, São Paulo- SP. 34º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2016.
- **COUTO AM**, GOIS EGO, LEITE ICG, CHAVES MGAM. Avaliação da prevalência de maloclusão e sua relação com aspectos psicossociais em estudantes de 12 anos da rede pública de Juiz de Fora. In: 33ª Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica- SBPqO, 2016, Campinas-SP. Brazilian Oral Research, 2016.

- **COUTO AM,** GOIS EGO, LEITE ICG, CHAVES MGAM. Comparação da percepção da necessidade de tratamento ortodôntico por crianças e responsáveis com a necessidade de tratamento normativa. In: XIII Encontro Científico da Faculdade de Odontologia da Universidade Federal de Minas Gerais, 2016, Belo Horizonte- MG. Arquivos em Odontologia, 2016.

Atuação em pesquisas e estudos multicêntricos:

- Periapicopatias inflamatórias de origem endodôntica: estudo multicêntrico na população brasileira.
- Periapicopatias inflamatórias de origem endodôntica na população pediátrica: estudo multicêntrico no Brasil.
- Levantamento clínico-epidemiológico das osteomielites do complexo maxilo mandibular: estudo multicêntrico na população brasileira.
- Frequência das lesões periapicais inflamatórias nos arquivos do Laboratório de Patologia Bucomaxilofacial da Faculdade de Odontologia da UFMG: estudo envolvendo a população pediátrica.
- Estudo multicêntrico retrospectivo brasileiro de lesões periapicais diagnosticadas erroneamente como de origem endodôntica.
- Frequência das lesões proliferativas não neoplásicas nos arquivos do Laboratório de Patologia Bucomaxilofacial da Faculdade de Odontologia da UFMG.
- Características clínicas, demográficas e microscópicas do cisto linfoepitelial oral: estudo multicêntrico no Brasil.
- Lesões orais relacionadas ao HPV: papiloma escamoso oral, verruga vulgar, condiloma acuminado e hiperplasia epitelial multifocal– estudo multicêntrico no Brasil.
- Levantamento clínico-epidemiológico dos linfangiomas orais: estudo multicêntrico no Brasil.
- Um estudo colaborativo brasileiro dos tumores orais da bainha do nervo periférico.
- Levantamento clínico-epidemiológico dos fibromas desmoplásicos: estudo retrospectivo multicêntrico no Brasil.

- Levantamento clínico-epidemiológico dos fibroblastomas desmoplásicos: estudo multicêntrico brasileiro.
- Levantamento clínico-epidemiológico do tumor neuroectodérmico melanocítico da infância: estudo multicêntrico no Brasil.
- Revisão sistemática acerca da revascularização pulpar utilizando a pasta tripla antibiótica.
- Citocinas e quimiocinas associadas à resposta Treg/Th17 na doença periapical inflamatória crônica.

Premiações:

- Menção Honrosa pela apresentação do trabalho "Prevalência das maloclusões e seus desvios funcionais de normalidade em estudantes de 12 anos da rede de ensino pública de Juiz de Fora", na 20ª Jornada Odontológica e 8º Encontro de Pesquisa da Pontifícia Universidade Católica de Minas Gerais - PUC- MG, 2017.

Participação em bancas de comissões julgadoras:

- Avaliadora “Ad hoc” dos trabalhos submetidos e apresentados durante a VI Semana da Integração do Ensino, Pesquisa e Extensão da Universidade Federal dos Vales do Jequitinhonha e Mucuri – UFVJM, em Diamantina, 2018.
- Avaliadora de pôsteres no III Encontro Científico de Odontologia da Faculdade de Estudos Administrativos de Minas Gerais – FEAD, 2017.
- Avaliadora “Ad hoc” dos trabalhos submetidos e apresentados durante a V Semana da Integração do Ensino, Pesquisa e Extensão da Universidade Federal dos Vales do Jequitinhonha e Mucuri – UFVJM, em Diamantina, 2017.

Formação Complementar:

- Realização de estágio de doutorado sanduíche na Universidade Estadual da Paraíba, pelo período de um mês (08/2018), como bolsista do Programa Nacional de Cooperação Acadêmica – PROCAD, objetivando a realização de coletas de dados.
- Realização de estágio de doutorado sanduíche na Universidade Federal de Goiás, pelo período de um mês (10/2018), objetivando a realização de coletas de dados.
- Realização de estágio de doutorado sanduíche na Universidade Federal de Pelotas, pelo período de um mês (11/2018), objetivando a realização de coletas de dados.
- Palestra ministrada na Universidade Estadual da Paraíba, intitulada “Relato de experiência no Programa de Pós-Graduação em Odontologia da Universidade Federal de Minas Gerais, 2018.
- Curso Produção e Apresentação de Trabalho Científico do CAED - Universidade Federal de Minas Gerais (Carga horária: 30h), 2017.
- Aula de “Traumatismo Dentário” ministrada no curso de Formação de Auxiliar em Saúde Bucal - ASB da Faculdade de Odontologia da Universidade Federal de Minas Gerais, 2017.
- Curso de Atualização em Introdução a Revisões Sistemáticas da Faculdade de Odontologia da Universidade Federal de Minas Gerais (Carga horária: 45h), 2016.

Organizações de eventos científicos:

- Participação na organização do Canal – Congresso Mundial de Endodontia, 2018.
- Participação como membro da Comissão Organizadora, atuando como “Staff” na Apresentação dos Trabalhos da Área de Ciências da Saúde da V Semana da Integração do Ensino, Pesquisa e Extensão da Universidade Federal dos Vales do Jequitinhonha e Mucuri – UFVJM, em Diamantina, 2017.

Participação em eventos científicos:

- XXVI Jornada Mineira de Estomatologia, 2019.
- 56ª Semana Acadêmica da Faculdade de Odontologia da Universidade Federal de Pelotas – UFPel, 2018.
- 35ª Reunião anual da Sociedade Brasileira de Pesquisa Odontológica – SBPqO, 2018.
- Canal - Congresso Mundial de Endodontia, 2018.
- 36º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2018.
- 20ª Jornada Odontológica e 8º Encontro de Pesquisa do Departamento de Odontologia da Pontifícia Universidade Católica de Minas Gerais, 2017.
- 35º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2017.
- 69ª Reunião Anual da Sociedade Brasileira para o Progresso da Ciência- SBPC, 2017.
- 33ª Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica – SBPqO, 2016.
- 34º CIOSP- Congresso Internacional de Odontologia de São Paulo, 2016.
- XIII Encontro Científico da Faculdade de Odontologia – UFMG, 2016.
- I Encontro dos Egressos do Programa de Pós-Graduação em Odontologia da UFMG, 2016.