UNIVERSIDADE FEDERAL DE SANTA MARIA
CENTRO DE CIÊNCIAS DA SAÚDE
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS ODONTOLÓGICAS

Maísa Casarin

**PREVALÊNCIA DE RECESSÃO GENGIVAL E FATORES
ASSOCIADOS EM UMA POPULAÇÃO RURAL DO SUL DO BRASIL**

Santa Maria, RS
2018

Maísa Casarin

PREVALÊNCIA DE RECESSÃO GENGIVAL E FATORES ASSOCIADOS EM UMA POPULAÇÃO RURAL DO SUL DO BRASIL

Tese apresentada ao Curso de Doutorado do Programa de Pós-Graduação em Ciências Odontológicas, Área de Concentração em Odontologia, ênfase em Periodontia, da Universidade Federal de Santa Maria (UFSM, RS), como requisito parcial para obtenção do título de **Doutor em Ciências Odontológicas.**

Orientador: Prof. Dr. Fabricio Batistin Zanatta

Santa Maria, RS
2018

Maísa Casarin

PREVALÊNCIA DE RECESSÃO GENGIVAL E FATORES ASSOCIADOS EM UMA POPULAÇÃO RURAL DO SUL DO BRASIL

Tese apresentada ao Curso de Doutorado do Programa de Pós-Graduação em Ciências Odontológicas, Área de Concentração em Odontologia, ênfase em Periodontia, da Universidade Federal de Santa Maria (UFSM, RS), como requisito parcial para obtenção do título de **Doutor em Ciências Odontológicas.**

Aprovado em 29 de janeiro de 2018:

Fabricio Batistin Zanatta, Dr. (UFSM)
(Presidente/Orientador)

Carlos Heitor Cunha Moreira, Dr. (UFSM)

Luísa Helena do Nascimento Tôrres, Dra. (UFSM)

Juliano Cavagni, Dr. (UFRGS)

Flavia Queiroz Pirih, Dra. (UCLA) - Videoconferência

Santa Maria, RS
2018

DEDICATÓRIA

Àqueles que mais amo nessa vida, Odir José, Maria Lêda, Fernando e Carolina

AGRADECIMENTOS

À Deus, pela vida, saúde e pelas oportunidades.

À Meu pai, **Odir José Casarin** (in memoriam), meu maior exemplo. Mesmo não estando fisicamente presente, sinto que me guias em todos os passos. Obrigada por todo o ensinamento. Certamente a graduação, o mestrado e o doutorado surgiram a partir de ti, dos teus sonhos, que acabaram se tornando os meus. Obrigada por me ensinar que a educação transforma tudo; que o importante na vida não é o que possuímos, mas sim o que somos e as pessoas que temos ao nosso lado. Saudades…saudades…saudades…

À minha mãe, **Maria Lêda Casarin**, meu suporte, meu exemplo de mulher guerreira. Sempre me apoiou em seguir estudando, independente de tudo e de todos. Obrigada por me amparar nos momentos difíces, me dar força para superar as dificuldade e apoiar minhas decisões. Obrigada pela dedicação e compreensão durante minhas ausências.

À Meu irmão, **Fernando Casarin**, meu orgulho e porto seguro. Obrigada por me ouvir, incentivar e amparar. Sempre disposto a fazer o possível e o impossível para ajudar. Por assumir a responsabilidade de pai, mesmo sendo apenas dois anos mais velho. Que você continue assim, um homem de poucas palavras mas de grandes gestos. Teu profissionalismo, tua garra e tua maneira de ser me espelham e me incentivam a ser cada vez melhor.
Tenho um enorme orgulho de ter vocês como família. Só tenho a agradecer pela confiança, amor, carinho e dedicação que depositam em mim. Amo vocês infinitamente. "E que sigamos todos juntos porque assim não caímos."

À minha afilhada, **Carolina Testa Bastiani,** que iluminou, coloriu e floriu minha vida com amor, paz e serenidade. Ela é a dona do meu sorriso fácil e de todo o meu amor. Com ela aprendi o verdadeiro significado da palavra amor. **ELA** é certamente a grande mudança e o melhor presente da minha vida. Obrigada por ser tudo isso e muito mais meu amor. A dinda estará sempre contigo.

À **Mirian Testa Bastiani** e **Eduardo Bastiani**, por me mostrarem o significado de amizade sincera e companheirismo. Por encontrar toda a força, carinho e serenidade na família que vocês estão constituindo. Minha vida fica mais leve e feliz com a presença de

vocês. Obrigada pelo presente único que tive a honra de receber, renovaram todas as energias que existiam em mim, me fazendo acreditar na vida e no mais puro amor que pudesse existir. **Que nossa princesa Carol** enalteça ainda mais o amor de vocês e engrandeça nossa amizade, companheirimo e cumplicidade.

Ao meu querido "amigo-orientador", **Fabricio Batistin Zanatta**. Obrigada por me permitir conviver e aprender contigo durante essa longa jornada, de graduação e pós graduação. Obrigada por incentivar e valorizar cada oportunidade que surgiu durante esse período. Teu profissionalismo é admirável, tens o dom de ensinar e incentivar. Saibas que uma grande parcela das conquistas que estão por vir, são méritos teus, que sempre me incentivou a buscar melhorar e evoluir. A tua dedicação como docente e periodontista serve de exemplo para mim. Que nossa parceria perdure ao longo dos anos. À você, todo meu respeito, admiração e gratidão.

À **Flavia Queiroz Pirih**, minha querida advisor. Nunca imaginei que em menos de 6 meses eu aprenderia tanto, seja como pessoa, como profissional e como pesquisadora convivendo contigo. Vivi uma das melhores experiencias de vida graças a senhora. Saibas que és fonte de inspiração e exemplo. Obrigada por abrir as portas da UCLA, do seu laboratorio, das suas pesquisas e do seu time para mim, alguém totalmente desconhecido. "Quero que meus alunos sejam melhores que eu", frase que levarei para vida e aplicarei na prática nos meus proximos desafios. À você, toda a minha admiração, gratidão e carinho.

À minha amada orientadadora de Graduação e da vida, **Raquel Pippi Antoniazzi**. Obrigada pelos ensinamentos, me mostrar a parte clínica da periodontia. Saiba que seu exemplo de mulher e profissional me guiará frente aos desafios que ainda terei na vida. À você, toda a minha gratidão, admiração e reconhecimento.

À **Mateus Rigon Moro**, que de uma maneira ou de outra sempre se faz presente na minha vida. Obrigada por me compreender e apoiar.

À **Jociana Boligon,** meu presente do Levantamento, e minha dupla dinâmica nos exames. Obrigada pela amizade, pelos conselhos, pela convivência e por sempre ter muita clareza e serenidade. Sempre disponivel a ouvir, a dar uma palavra de conforto, aquela que encoraja e vai junto se for preciso. Que eu tenha a tua amizade sempre, pra vida toda. Te

admiro muito e sou grata por todos os conselhos e pela energia que você me trasmite. És fonte de inspiração como profissional e pessoal.

À **Danusa Begnini,** aquela que sempre tem pensamento positivo em todas as situações. Que mesmo não estando perto se faz presente de alguma maneira. Estar ao teu lado e saber que posso contar contigo me fortalece, sou muito grata por sua amizade e por todos os momentos de convívio.

À **Antonio Marcos Fukes**, aquele do sorriso fácil, da palavra carinhosa e também verdadeira. Obrigada por acreditar que tudo daria certo, por sempre me incentivar dizendo: "vai seguir teus sonhos". Obrigada!

À minha amadinha **Marília Maroneze**, aquela que me deu um nos grande presents do doutorado: participar na clínica de adolescentes Não sei ao certo como nossa amizade começou, mas sei que ela é verdadeira e me fortalece. Estarei sempre torcendo pelas tuas conquistas pessoais e profissionais; obrigada de coração por me incentivar e não me deixar desistir.

À minha amiga e primeira coorientada, **Josiele Pazinatto**. Obrigada por tornar esse primeiro processo extremamente agradável e fácil, nossa parceria foi excelente. Acredito que eu aprendi muito mais contigo do que você comigo. Agradecer a ti é muito pouco. Estarei sempre torcendo por ti, independentemente de ser na perio ou não, tenho certeza do teu lindo futuro. E o que posso fazer para te retribuir além de torcer muito pelas tuas conquistas pessoais e profissionais, é que estarei sempre aqui, se você precisar.

À toda a "casinha" (velha e nova) e grupo de epidemio, Marilia, Fernandinha, Bruno, Bernardo, Gabriele, Jéssica e Gabriela. Obrigada por fazerem parte dos meus dias e tornarem essa jornada mais leve. Obrigada pelo companheirismo e pela ajuda. Juntos somos mais fortes.

À todo o "**Perio team**" da professora Flavia. Todos foram essenciais para meu crescimento e aprendizado. Nunca cresci tanto como pessoa e professional em tão pouco tempo com vocês. **VOCÊS** fizeram o meu doutorado sanduíche, a melhor experiência que ja tive. Sinto muito falta todos vocês, inclusive dos camundongos. Thanks for evething guys!!

Ao grupo "Perio" do levantamento epidemiológico, **Alessandra Greellmann**, **Jociana Boligon**, **Silvia de David e Ticiane de Mario,** pelo enfrentamento de todas as dificuldades, por toda a superação individual que esse trabalho exigiu de cada uma. Melhor equipe que poderia ter na execução deste trabalho! Em especial à **Janice Marin**, **Carlos Frederico Wolle** e **Carlos Alexandre Souza Bier**, meus dias foram mais tranquilos e divertidos com vocês na outra porta da unidade móvel. Obrigada por todo apoio incondicional!

À equipe e **família Oral Sin,** em especial à **Luiz Felipe Durand** e **Simone Pippi Antoniazzi,** obrigada pelos dois anos de aprendizados que fizeram e fazem toda a diferença na minha prática clínica. Se hoje me sinto muito mais segura, certamente foi pela oportunidade concedida. Muito obrigada!

À todos os professores da UNIFRA – pelo incentivo, conhecimentos transmitidos, amizade e respeito. Obrigada por toda a dedicação durante minha graduação, pois cada um, com sua particularidade me levou a certeza de ter escolhido a profissão certa e a amar a odontologia.

À minha banca examinadora, que da melhor forma possível contribuirá para aprimoração desse trabalho. Meu respeito e sincero agradecimento.

Aos professores **Carlos Heitor Cunha Moreira** e **Thiago Machado Ardenghi**, pelo incentivo na fase de doutorado sanduíche, desde as dúvidas até as inseguranças. Pelo exemplo de profissionalismo e seriedade como professores e pesquisadores.

À Funcionária **Jéssica Dalcin da Silva**, por sua total disponibilidade (seja a kilometros de distância ou via Whats), competência e agilidade na resolução dos mais diversos assuntos. Meus sincere agradecimento!

Aos voluntários que participaram da pesquisa, muito obrigada pela colaboração. Vocês tornaram possível a realização deste trabalho.

"Olhando o chão sob meus pés, vejo a vida correr. E, assim, a cada passo que der, tentarei fazer o melhor que puder. Aprendi. Não tanto quanto quis, mas vi que, conhecendo o universo ao meu redor, aprendo a me conhecer melhor, e, assim, escutarei o tempo, que ensinará a tomar a decisão certa em cada momento. E partirei em busca de muitos ideais. Hoje é um ponto de chegada, e, ao mesmo tempo, ponto de partida. De tudo ficarão três coisas: a certeza de estar sempre começando, a certeza de que é preciso continuar e a certeza de ser interrompido antes de terminar. Fazer da queda um passo de dança, do medo uma escada, do sonho uma ponte e da procura um encontro. Um simples encontro!"

Fernando Sabino

RESUMO

PREVALÊNCIA DE RECESSÃO GENGIVAL E FATORES ASSOCIADOS EM UMA POPULAÇÃO RURAL DO SUL DO BRASIL

AUTORA: Maísa Casarin
ORIENTADOR: Fabricio Batistin Zanatta

As Recessões Gengivais (RG) não tem sido consideradas uma maior preocupação na epidemiologia periodontal, apesar dos numerosos estudos de intervenção que avaliam abordagens estéticas. Além disso, estudos avaliando esse desfecho emu ma população são escassoz e possuem limitações metodológicas, como amostra de conveniencia e uso de protocolos de exames periodontais parciais Pesquisas epidemiológicas em odontologia permitem a investigação da condição de saúde bucal das populações e são consideradas fundamentais para que as metas de saúde bucal sejam atingidas e para a formulação de políticas de saúde efetivas. Assim, a presente tese é composta por dois artigos científicos, cujo tema principal é recessão gengival (RG) em uma amostra representativa da área rural. O primeiro artigo tem como objetivo analisar a prevalência e fatores associados com as RG em 617 individuos dentados ≥15 anos. Seis sítios por dentes foram avaliados clinicamente e três pontos de corte foram utilizados para realizar análise multinível, RG ≥1mm, ≥3mm e ≥5mm. A prevalência e a extensão de RG ≥1mm foi de 99,7%, e 14,17, respectivamente. Periodontite e idade foram associados com RG em todos os pontos de corte, enquanto baixa escolaridade foi associada com RG ≥1mm e ≥3mm, e baixa renda e fumantes ou ex fumantes foram associados com RG ≥3mm e ≥5mm. Além disso, frequência de escovação <2x/dia estava associada como fator protetor para RG ≥1mm. No artigo 2, o objetivo foi avaliar as estimativas e uma analise multinível dos indicadores de disco associados as RG em pacientes sem periodontite severa vivendo na área rural. Duzentos e oitenta e dois indivíduos sem periosontite severa com ≥20 dentes foram analisados. Dois pontos de corte para RG, foram utilizados, ≥1mm e ≥3mm. Além disso, na analise multinivel, maior idade, baixa escolaridade e dentes molares e pré molares foram associdos com RG ≥1mm e ≥3mm, e calculo supragengival e individuos fumantes e ou ex fumantes foram associados com RG ≥1mm e ≥3mm, respectivamente. Frequencia de escovação <2x/dia foi fator protetor para RG ≥1mm e ≥3mm. Os resultados encontrados nesse estudo servem como base para fornecer informações, visando gerar estrategias em saúde para reduzer a prevalência e as consequencias de RG em individuos vivendo da área rural.

Palavras-chave: Epidemiologia. Periodontite. Prevalência. População Rural. Recessão Gengival.

ABSTRACT

PREVALENCE OF GINGIVAL RECESSION AND ASSOCIATED FACTORS IN A RURAL POPULATION

AUTHOR: Maísa Casarin
ADVISOR: Fabricio Batistin Zanatta

Gingival recessions (GR) have not been considered a major concern in periodontal epidemiology, despite numerous intervention studies evaluating aesthetic approaches. In addition, studies evaluating this outcome in a population are scarce and have methodological limitations, such as a convenience sample and the use of partial periodontal examination protocols. Epidemiological research in dentistry allows the investigation of the oral health status of populations and is considered fundamental for oral health goals are reached and for the formulation of effective health policies. Thus, the present thesis is composed of two scientific articles, whose main theme is gingival recession (GR) in a representative sample of the rural area. The first article aims to analyze the prevalence and associated factors of 617 detate individuals ≥15 years. Six sites per tooth were clinically evaluated and three cut-off points were used to perform multilevel analysis, GR ≥1mm, ≥3mm and ≥5mm. The prevalence and extent of GR ≥ 1 mm was 99.7%, and 14.17, respectively. Periodontitis and age were associated with GR at all cut-off points, while low schooling was associated with RG ≥1mm and ≥3mm, and low income and smokers or former smokers were associated with RG ≥3mm and ≥5mm. In addition, brushing frequency <2x/day was associated as a protective factor for RG ≥1mm. In article 2, the objective was to evaluate the estimates and a multilevel analysis of the associated factors with GR in patients without severe periodontitis living in the rural area. Two hundred and eighty-two individuals without severe periodontitis with ≥20 teeth were analyzed. Two cut-off points for RG were used, ≥1mm and ≥3mm. In addition, in the multilevel analysis, older age, low schooling, and molar and pre molar teeth were associated with RG ≥1mm and ≥3mm, and supragingival calculus and individuals smokers and/or former smokers were associated with RG ≥1mm and ≥3mm, respectively. Frequency of brushing <2x/day was a protective factor for RG ≥1mm and ≥3mm. The results found in this study serve as a basis for providing information to generate health strategies to reduce the prevalence and consequences of GR in individuals living in rural areas.

Keywords: Epidemiology. Gingival Recession. Periodontitis. Prevalence. Rural Population.

SUMÁRIO

1   INTRODUÇÃO

Recessões gengivais (RG) são caracterizadas pela migração apical do tecido gengival e tem como consequência, a exposição da raiz dentária (KASSAB; COHEN, 2003; SMITH, 1997). As mesmas podem ser únicas, ou então, serem encontradas em vários dentes. RGs constituem um problema crescente na população e um desafio para o clínico tanto sob o ponto de vista terapêutico, e, principalmente preventivo, pois estão relacionadas diretamente com sensibilidade dentinária, (COSTA et al., 2014; DHALIWAL et al., 2012), alterações estéticas (KASSAB; COHEN, 2003; SMITH, 1997), aumento na prevalência de cárie radicular (BHARATEESH; KOKILA, 2014; KULARATNE; EKANAYAKE, 2007) e piora na qualidade de vida (NEEDLEMAN et al., 2004; WAGNER et al., 2016).

Um estudo longitudinal clássico da literatura periodontal, conduzido por Loe et al (1992), analisou RG. Neste estudo, os autores acompanharam por 20 anos duas amostras bastante distintas. Uma delas era composta por estudantes noruegueses com acesso a serviços de saúde odontológicos e com hábitos de higiene bucal adequados. A outra era constituída por plantadores de chá do Sri Lanka que nunca tinham tido acesso a qualquer serviço odontológico e que basicamente desconheciam escovação dentária como hábito de higiene. Ao avaliar os resultados das duas amostras separadamente, os autores relataram que os estudantes noruegueses apresentaram índices de placa e inflamação gengival extremamente baixos, e que a ocorrência de RG foi praticamente restrita as faces vestibulares. Já os plantadores de chá do Sri Lanka tiveram altos índices de placa e gengivite, e sua RG foi generalizada. Os autores hipotetizaram então que estas duas amostras apresentaram dois tipos de recessão: uma relacionada à doença periodontal e outra relacionada a fatores mecânicos, como a escovação dentária (LÖE et al., 1992).

Vários fatores podem estar associados com o aparecimento da RG: deficiências ósseas (WATSON, 1984), posição atípica do dente no arco (GORMAN, 1967), escovação traumática (KHOCHT et al., 1993) inserção anormal do freio labial (STONER; MAZDYASNA, 1980) e movimentação ortodôntica (MORRIS et al., 2017). Outro fator associado ao estabelecimento da RG é perda de inserção clínica resultante da doença periodontal (KASSAB; COHEN, 2003). Em consequência disso, RG é associada a indicadores de risco comuns também à periodontite, como idade, hábitos de higiene e fumo (ALBANDAR; KINGMAN, 1999; HOLTFRETER et al., 2009; LÖE et al., 1992; RIOS et al., 2014; SARFATI et al., 2010; SUSIN et al., 2004)

Desde os estudos clássicos de Loe et al. (1992) na Noruega e no Sri Lankan, outros estudos de base populacional tendo RG como desfecho primário demonstraram que as mesmas podem afetar uma proporção significativa de sujeitos e de dentes por indivíduo. Dados do NHANES III demonstraram que 57.9% da população adulta dos Estados Unidos apresenta RG ≥1 mm (ALBANDAR; KINGMAN, 1999). Estimativas mais elevadas foram observadas na França, onde 84,6% dos indivíduos apresentaram pelo menos um dente com RG nas faces vestibulares (SARFATI et al., 2010). No Brasil RG mais severas (≥3 mm) ocorreram em 51.6% da população (SUSIN, CRISTIANO; HAAS; et al., 2004) e em um estudo mais recente em 75.4% dos indivíduos avaliados (RIOS et al., 2014).

Outros dois estudos de base populacional avaliaram RG, porém de forma secundária e superficial. O primeiro deles, por meio de uma coorte de nascimento de 26 anos na Nova Zelândia, demonstrou que 71.0% dos participantes tinham ao menos um dente com RG ≥1mm (THOMSON; HASHIM; PACK; 2000). Enquando um estudo realizado na Polônia, relatou apenas valores de média de RG que aumentou de acordo com a idade (HOLTFRETER et al., 2009).

Alguns estudos longitudinais também avaliaram a incidência de RG (AGUDIO et al., 2016; DAPRILE; GATTO; CHECCHI, 2007; MATAS; SENTIS; MENDIETA, 2011; SERINO; WENNSTRÖM; LINDHE; ENEROTH; et al., 1994; SHIP; BECK, 1996). Daprile et al. (2007) demonstrou que dentre os indivíduos que não apresentavam recessão no baseline, 67,0% desenvolveram RG ao longo de cinco anos. Matas et al. (2011) apresentaram uma prevalência de RG no baseline de 85,0%, que não se alterou em 10 anos de acompanhamento. Porém, a média do número de dentes por indivíduo com RG passou de 5,1 (baseline) para 6,6 (após 10 anos). Serino et al. (1994) demonstrou uma prevalência de 44.0% no inicio do estudo em indivíduos de 18 a 29 anos, essa prevalência aumentou para 88.0% após 12 anos. Outro estudo relatou um aumento médio de RG de 0.41mm após 10 anos (SHIP; BECK, 1996). Dados de um estudo de boca dividida em que os sítios tratados com recobrimento radicular foram comparados aos sítios homólogos contralaterais não tratados, ao longo do tempo, demonstrou que 24, 6 e 1 unidade dos sítios tiveram aumento de RG de 1mm, 2mm e 3mm, respectivamente, ao longo do tempo (entre 18 e 35 anos) (AGUDIO et al., 2016). Estes estudos longitudinais devem ser interpretados com cautela, visto que os 5 estudos com esse delineamento possuem como característica comum, a amostra de conveniência (AGUDIO et al., 2016; DAPRILE; GATTO; CHECCHI, 2007; MATAS; SENTIS; MENDIETA, 2011; SERINO; WENNSTRÖM; LINDHE; ENEROTH; et al., 1994; SHIP; BECK, 1996),

limitando a validade externa dos resultados.

Os dados epidemiológicos acerca da ocorrência de doenças/alterações bucais nos diferentes cenários populacionais incluem, na sua grande maioria, populações urbanas (RIOS et al., 2014; SARFATI et al., 2010; SUSIN, CRISTIANO; HAAS; et al., 2004). Há poucos dados disponíveis comparando populações urbanas e rurais, porém, os dados até o momento de estudos transversais, demonstram que residentes da área rural apresentam piores condições periodontais (AHN et al., 2011; WANG et al., 2007). Possíveis explicações para essas discrepâncias podem estar relacionadas às diferenças sóciodemográficas e comportamentais como escolaridade, renda, hábitos alimentares, higiene oral, intensidade do trabalho e condições médicas (WANG et al., 2007), bem como dificuldade de acesso aos serviços de saúde (AHN et al., 2011; DAVID; YEE; LAMA, 2011; JORDAN et al., 2011).

Diante desse cenário, Rosário do Sul é uma cidade localizada na região da fronteira oeste do estado do Rio Grande do Sul, localizado na parte sul do Brasil, vizinha de Argentina e Uruguai. Esta cidade tem aproximadamente 4,4 mil km^2 de terra e 40000 habitantes, dos quais 4776 vivem na área rural9. A densidade demográfica rural de Rosário do Sul é de aproximadamente um habitante por quilometro (dados não oficiais fornecidos pelo escritório do Instituto Brasileiro de Geografia e Estatística (IBGE), responsável pelo Rosário do Sul), destacando seu pequeno número de indivíduos em relação ao extensão territorial e a dificuldade de acesso a essa população. A maioria das áreas rurais está distante do centro urbano e as estradas rurais geralmente estão em condições precárias, dificultando o acesso à cidade e, conseqüentemente, restringem o uso de serviços urbanos, como cuidados de saúde dessa população, como demonstrados em estudo prévios (AHN et al., 2011; DAVID; YEE; LAMA, 2011; JORDAN et al., 2011).

Um estudo em Morongo na Tanzânia demonstrou que os indivíduos > 45 anos de idade apresentaram um elevado número de dentes com recessão gengival ≥ 3mm na área rural (3,2 dentes) comparado a urbana (1,2 dentes) (LEMBARITI; FRENCKEN; PILOT, 1988). Outro estudo demonstrou que sujeitos vivendo em zonas rurais apresentaram 20% de RG comparado a 15% dos moradores da área sub-urbana e 11% na região urbana (MUMGHAMBA; MARKKANEN; HONKALA, 1995). Na Índia, Bharateesh e Kokila, (2014) encontraram uma prevalência de 94.7% de RG ≥ 1mm em pelo menos um dente, e desses, 41.9% apresentavam cárie radicular. No Brasil, dados de populações rurais estão disponíveis (DE MACEDO et al., 2006), porém, RG não foi avaliada. Ronderos, Pihlstrom e Hodges, (2001) demonstraram em uma população indígena na Amazônia que 55.6% dos

indivíduos apresentavam RG (≥ 1mm), indicando que as perdas de inserção clínicas encontradas estavam associadas mais a apenas RG do que à profundidade de sondagem. Todas as investigações previamente expostas utilizaram amostras de conveniência, e, em sua maioria, protocolos de exames periodontais parciais (BHARATEESH; KOKILA, 2014; DE MACEDO et al., 2006; LEMBARITI; FRENCKEN; PILOT, 1988; MUMGHAMBA; MARKKANEN; HONKALA, 1995; RONDEROS; PIHLSTROM; HODGES, 2001) Portanto, até o momento, não há nenhum estudo representativo de uma população rural avaliando a prevalência de RG e fatores associados através de exame periodontal completo.

Alguns indicadores de risco se mostraram associados às RG, como idade avançada, cálculo dentário (ALBANDAR; KINGMAN, 1994; RIOS et al., 2014; SUSIN, CRISTIANO; HAAS; et al., 2004), sexo, raça (ALBANDAR; KINGMAN, 1994), tabagismo (RIOS et al., 2014; SARFATI et al., 2010; SUSIN, CRISTIANO; HAAS; et al., 2004), auto-cuidado de higiene oral (HEASMAN et al., 2015) e histórico de tratamento de doença periodontal (RIOS et al., 2014). No entanto, há escassez de evidência para apoiar a associação com outros fatores, como diferentes práticas de higiene oral e diferentes dispositivos de escovação principalmente em uma população sem doença periodontal mais avançada (ADDY; HUNTER, 2003; KASSAB; COHEN, 2003; RAJAPAKSE et al., 2007)

Hirschfeld (1934) associou RG com escovação traumática, especialmente com o uso de escovas dentais com cerdas duras. Há especulações sobre a possibilidade de que trauma gengival durante a escovação possa ser um fator que contribua para a RG, embora evidências que confirmem essa hipótese sejam inconsistentes e contraditórias (ADDY; HUNTER, 2003; HEASMAN et al., 2015; ROSEMA et al., 2014). Page e Sturdivant (2002) propuseram distinguir esse tipo de RG relacionadas ou não com as lesões periodontais destrutivas associadas à placa dental (ex: gengivite associada à placa, periodontite crônica). Embora ambas apresentem perda de inserção como manifestação comum, as RG não relacionadas à doença periodontal seriam caracterizadas clinicamente como perda de inserção generalizada e reabsorção do osso alveolar em vários dentes, sem um histórico de inflamação, ou quando presentes, encontradas de forma discreta, sem a formação de bolsas periodontais profundas. Os indivíduos afetados geralmente possuem boa condição de saúde e excelente higiene oral, comumente ocorrendo entre os 20-40 anos de idade. Essas lesões podem afetar todos os dentes, ou a região de dentes posteriores ou anteriores. A maioria dos indivíduos com essa condição realiza higiene bucal diária, frequente e de forma agressiva, apresentando baixos índices de placa, exposição da junção cemento-esmalte e da raiz dentária (PAGE;

STURDIVANT, 2002).

Embora os mecanismos de RG não relacionadas à doença periodontal não tenham sido investigados diretamente, sugere-se que eles sejam semelhantes aos das periodontites. A diferença estaria na produção de prostaglandinas e metaloproteinases da matriz (MMP) que seria desencadeada e perpetuada por fatores não infecciosos (PAGE; STURDIVANT, 2002). Os mediadores inflamatórios seriam produzidos por células como os fibroblastos e alguns macrófagos (histiócitos) que compreendem a população celular predominante na gengiva clinicamente saudável, ao invés do infiltrado inflamatório (SCHROEDER; MÜNZEL-PEDRAZZOLI; PAGE, 1973). Estas células podem ser ativadas pela aplicação de forças crônicas anormais (como procedimentos agressivos de higiene bucal), produzindo citocinas, prostaglandinas e MMP (ARCHAMBAULT et al., 2002; SKUTEK et al., 2001). Os fibroblastos residentes poderiam, portanto, servir como fonte de moléculas que mediariam a reabsorção do osso alveolar, a destruição dos tecidos gengivais e do ligamento periodontal (PAGE; STURDIVANT, 2002).

Nesse sentido, alguns estudos tem sugerido que as RGs associadas com escovação agressiva poderiam causar lesão traumática aguda nos tecidos (AXÉLL; KOCH, 1982; GILLETTE; VAN HOUSE, 1980; PAGE; STURDIVANT, 2002; SMUKLER; LANDSBERG, 1984). Sangnes (1976) avaliou a prevalência de lesões nos tecidos moles e duros relacionados a procedimentos de higiene bucal e encontrou que as áreas mais frequentemente afetadas por lesões gengivais exibiam maior prevalência de perda de inserção. Por outro lado, Rosema et al. (2014) em um estudo transversal não encontraram nenhuma associação entre lesões nos tecidos moles e RG como resultado da escovação.

Estudos demonstram que indivíduos com alto padrão de higiene oral apresentam uma prevalência de RG variando entre 47.8% a 85.0% (CHECCHI et al., 1999; MATAS; SENTIS; MENDIETA, 2011). Serino et al, (1994) encontrou uma prevalência de 44.0% em indivíduos entre 18 a 29 anos de idade. Após 12 anos de acompanhamento acorreu um aumento na prevalência para 88.0%. No entanto, a maioria desses estudos não considerou fatores associados a RG, não usou critérios de definifição de periodontite, e analisou amostras de conveniência. Portanto, até o momento, dados sobre RG associados à escovação são poucos, limitados à populações urbanas e com resultados inconclusivos (RAJAPAKSE et al., 2007).

Em um recente documento da Organização Internacional do Trabalho, pertencente a Organização das Nações Unidas (OIT/ONU), foi relatado que 56% das pessoas que vivem em áreas rurais em todo o mundo continuam a ser privadas de acesso a saúde

(INTERNATIONAL LABOUR OFFICE, 2015), ressaltando a importância de pesquisas, para o conhecimento das condições de saúde dessas populações. Fortalecendo a justificativa para a realização de estudos com populações com essa característica. Considerando a escassez de evidências epidemiológicas acerca da prevalência, extensão e severidade das RG, bem como seus fatores associações em um estudo de base populacional rural, um estudo nessa temática ajuda a preencher esta lacuna tornando-se importante para avançar na fronteiro do conhecimento relacionado ao tópico. Esses dados auxiliaram a proposição e a implementação de políticas públicas que visem melhorar o acesso aos serviços odontológicos desses indivíduos, enfatizando sua relevância não somente para o conhecimento científico, mas também para a saúde pública.

Na presente tese serão apresentados dois artigos. O primeiro artigo relata a prevalência de RG em toda a amostra e seus fatores associados em uma população da área rural do sul do Brasil. O segundo artigo descreve estimativas e uma análise multinível de RG apenas em participantes sem doença periodontal severa residindo na área rural, demonstrando os fatores associados a esses desfecho.

2 ARTIGO 1 – PREVALÊNCIA DE RECESSÃO GENGIVAL E FATORES ASSOCIADOS EM UM POPULAÇÃO RURAL DO SUL DO BRASIL

Este artigo será submetido ao periódico *Journal of Periodontology*, ISSN: 0022-3492, Fator de impacto = 2.844; Qualis A1.

Prevalence of gingival recession and associates factors in the rural population of Southern Brazil

Running Title: Gingival recession in a rural population

Maísa Casarin DDS, MS[*]; Jociana Boligon DDS, PhD[*], Ticiane de G. Mario[*], Carlos H. C. Moreira DDS, PhD[*], Thiago M. Ardenghi DDS, PhD[*], Paulo M. Camargo DDS, MS, MBA[†], Flavia Q. Pirih DDS, PhD[†], Fabricio B. Zanatta DDS, PhD[*],

[*] Federal University of Santa Maria, Department of Stomatology, Santa Maria, Rio Grande do Sul, Brazil

[†] University of California, Los Angeles, Section of Periodontics, Los Angeles, California

Corresponding author:

Fabricio Batistin Zanatta

Address: Marechal Floriano Peixoto St., 1184, 97015-372, Santa Maria, RS, Brazil. Tel./Fax: +55 55 3220.9284.

E-mail address: fabriciobzanatta@gmail.com

Summary: High prevalence of GR, older age and periodontitis was associated GR in a population living in rural area.

ABSTRACT

Background:

Gingival recessions (GR) are a growing health problem. However, the epidemiology and association factors have been little explored in individuals living in rural area. The objective of this study is to assess the prevalence, extension, severity and risk indicators of GR in a representative population living in a rural area.

Methods: A population-based representative sample of the individuals living in a rural area of Southern Brazil was investigated. The 617 dentate individuals were clinically assessed for GR at six sites per tooth. The prevalence, extension and severity were assessment. Three different cut-off points, ≥1mm ≥3mm and ≥5mm were used to classify individuals and risk indicators of GR with a multilevel analysis.

Results: 617 individuals dentate livings in a rural are were analyzed. The prevalence of Gingival Recession ≥1mm, ≥3mm and ≥5mm was 99.7%, 80.1% and 52.5%, respectively. The average of teeth of 14.17 with GR ≥1 mm was observed. The overall mean GR for all sites was 1.07 mm. The prevalence, extent and severity, increased with increasing age. In the adjusted multilevel model age and periodontitis was associated with all the cut-off points. Low Schooling was associated with RG ≥1mm and GR ≥3mm, and frequency toothbrush <2x/day was associated with protection in RG ≥1mm. Besides, income and former/current smoker was associated with RG ≥3mm and ≥5mm.

Conclusions:

The results showed a high prevalence of GR in a population living in rural area. Besides in all the cut-off points, ≥1mm ≥3mm and ≥5mm, older age and periodontitis was associated GR.

Keywords: Gingival recession, Prevalence, Epidemiology, Risk indicators, Periodontitis, Brazil

INTRODUCTION

Gingival recession (GR) is defined as the displacement of the gingival margin apically to the enamel-cemental junction [1]. Can be unique or found in several teeth and are a growing problem in the different populations [2]. Although it has been demonstrated that GR may lead to esthetic [3], dentin hypersensitivity [4,5], increase the risk of root caries [6,7], and poor oral health-related quality of life [8], its epidemiology has been little explored.

The prevalence of GR ≥3mm is between 22.4% [9] and 75.4% [10] as primary outcome using representative sample in urban population. In rural populations, only studies with convenience sample and partial periodontal exam analyzed the prevalence of GR, that is between 55.6% in indigenous people [11] until 94.7% in a older population from India [7]. Mumghamba et al., (2009) [12] showed that subjects living in rural areas had 20% of GR compared to 15% of suburban residents and 11% in urban areas. Besides, another study in Morongo – Tanzania showed that individuals > 45 years old presented a high number of teeth with gingival recession >3 mm in the rural area (3.2 teeth) compared to urban (1.2 teeth) [13].

There is a lack of data about RG in rural populations, but the data show that rural residents presented worst periodontal conditions [14,15]. This fact may be due to the divergences in the health care access [16], the exposure to different environmental and behavioral risk factors, and other contextual factors [14] that highlights the importance of investigating the prevalence and indicator factors of RG in individuals who live in these areas. The few studies analyzing GR in rural population used convenience samples, partial periodontal examination and none showed the associated factors with RG. Considering the neediness of evidence, this study aimed to assess the prevalence, extent, severity and associated factors with gingival recession in a representative sample of individuals living in a rural area.

MATERIALS AND METHODS

Study design and sample

This cross-sectional study was part of a larger epidemiological survey whose target population was ≥15years individuals living in the rural area of Rosário do Sul; the Rio Grande do Sul State, Brazil. In order to calculate sample size, we considered a rural population aged 15 years and older of approximately 4000 inhabitants [17], and the "worst case scenario" of the main outcome, periodontal disease (i.e. 50% prevalence). We used a 4% precision level and 1.3 design effect for the 95% confidence interval. The sample size calculation was adjusted for finite populations using a standard formula [n adjusted= n/ 1+(n/N); "n" is the calculated size, "N" is the population size], and it was estimated that 580 subjects were needed. The

sample was increased by 15% (to 667 individuals) to account for non-response.

Sampling Procedures

The representative sample of the individuals aged 15 years and older living in the rural area of Rosário do Sul was obtained using a multistage probability sampling method. Rosário do Sul has six districts and 36 rural census sectors. IBGE did not show data about individuals aged ≥15 years of six sectors having less than five permanent households, to protect census informers [18]. These territorial units were excluded from study sampling. The remaining 30 sectors were divided into three strata (small, medium and large), according to household number. Three randomized sequences were generated in Research Randomizer program [19] to select 17 sectors (three small, seven medium and seven large), and it enabled all six districts that would be evaluated.

Seven randomized sectors had community health workers, which had local household lists, allowing random selection[19] of eligible households. In the others sectors, the most densely populated area was established through houses clusters viewed on maps (viewed with Google Earth program) provided by IBGE [20], and this region was confirmed locally by researchers to be the starting point for the selection of households. Since the starting point, all households from the right and from the left, consecutively, in a straight line within sector area, were eligible, until the pre-specified number of households or subjects were obtained. First, households at right were accessed and, if necessary, the team went back at the starting point to go to the left direction. After the establishment of the direction, all households at right and left of the road were considered eligible. When the household numbers necessary for the sample were not obtained with these strategies, secondary roads were accessed until the distance of five kilometers at right or left of the major road.

All individuals 15 years and older living at eligible households were considered eligible to study sample. Exclusion criteria were presence of systemic disease/condition that contraindicates clinical examination or requirement a prophylactic regimen of antibiotics before it, diagnosis/ family report of psychiatric or mental problems, and alcohol or drug intoxication.

Interview and clinical examination

Two trained dentists performed the interviews, individually for each participant, to gather demographic, socioeconomic, smoking status, oral habits, and dental visits data. Clinical examination was conducted in a mobile unit equipped with a complete dental unit

(dental chair, artificial light, and others basic amenities) by two Two trained and calibrate examiners (JB and MC) performed the clinical examination between March 2015 and May 2016.

All permanent fully erupted teeth (six sites per tooth: mesiobuccal, mid-buccal, distobuccal, distolingual, mid-lingual and mesiolingual), excluding third molars, were examined with a manual periodontal probe. The following parameters were achieved: visible plaque [VPI, [21]], marginal gingival bleeding [GBI, [21]], retentive plaque factors (RPF), probing pocket depth (PPD), bleeding on probing (BoP), clinical attachment loss (CAL) and GR. The GR was calculated as difference between CAL and PPD. Measurements were made in mm and were rounded to the lower whole mm.

Measurement of reproducibility

The examiners were trained for conducting all evaluations. The training comprehended definitions of clinical, measuring instruments, and correct measuring techniques. First, the examiners received theoretical training that was divided into four one-hour sessions. Each session was used to discuss the indexes and variables that would be evaluated and to define diagnostic criteria. In the second stage, the team participated in practical and clinical activities. VPI, GBI, BoP and furcation degrees were trained in five individuals, with the presence of an experienced examiner. The examiners were trained and were calibrated in performing the clinical evaluations, before and during the study. Measurements reproducibility was assessed using replicated periodontal measures in ≥1000 sites. The values of intra-class correlation coefficient ranged before the study was between 0.92 and 0.96 for PPD, and it ranged between 0.91 and 0.93 for CAL. During the study the values of intra-class correlation coefficient ranged between 0.88 and 0.90 for PPD, and it ranged between 0.88 and 0.89 for CAL.

Ethical considerations

The study was approved by the Ethics Committee in Research of Federal University of Santa Maria (CAAE: 37862414.5.0000.5346) and was performed following the Declaration of Helsinki. Subjects who agreed to participate signed an informed consent form. Individuals <18 years old needed the authorization of responsible, through signature in a specific informed consent form.

Data Analysis

The outcome was GR in at least 1 site per teeth considering the various cut-off point ≥1mm, ≥3mm and ≥5mm. Prevalence of GR was defined by the percentage of dentate individuals presenting at least one tooth with one site with GR of the several cut-off point. Extent of GR was defined as the average of teeth number within each dentate individual presenting GR. Mean GR was used to estimate the severity of the condition. All descriptive analysis were run considering the sample weight using STATA's "SVY" command for complex samples. A manual conference of the entire database was performed.

The independent variables were gender (female/male), self-reported skin color (White/non-white), age in years (tercil: ≤39/40-54/≥55), income [based on <1.0/≥1.0 Brazilian monthly minimum wage (BMMW), which was R$750.00, equivalent to approximately US$250 during the study period], schooling (≤8/>8 completed years of study – corresponding to a primary school education in Brazil), smoking status (non-smokers [never smokers] / former and current smokers), Tooth brushing frequency was categorized into ≥2 time/day and <2 times. Dental visit was categorized into ≥1 year and < 1 year. Type of teeth (anterior/molar/pre molar) and severe periodontitis was defined ≥2 interproximal sites with clinical attachment level ≥6 mm (not on same tooth) and ≥1 interproximal site with PD ≥5 mm [22].

A multilevel logistic regression analysis was performed to assess the association between the covariables (demographic and socio-economic characteristics: gender, skin color, age, income and schooling; behavioural characteristics: smoking, frequency toothbrush and dental visit; clinical variable: type of teeth and periodontitis) and the GR outcome. The prevalence ratio (PR; 95% confidence interval [CI]) was calculated based on dichotomous outcome (GR ≥1mm, ≥3mm and ≥5mm). Univariable models were fitted for each independent variable and those presenting P values <0.20 were entered in the multilevel model. In our data, the teeth (first level) and individual (second level) were nested in district (third level). Data analysis was performed with the software STATA 14 (Stata Corporation; College Station, TX, USA). The level of significance was 5%.

RESULTS

A total of 1092 patients were initially eligible for examination. Five individuals were excluded and 399 did not participate of the study. The response rate was 63% (688/1087). The reasons for non-participation are presented in the flowchart of the study (Figure 1). Then, 688 individuals were clinically examined, of which 617 were dentate.

Patients were predominately white (67.17%) and had income >1.0 BMWM (72.18). The schooling in years was mostly ≤ 8 years (74.63%). Almost half of the samples were formers or current smokers (49.94%). Besides individuals who toothbrush ≥2x/day (93.92%) and had no periodontitis (66.29%) were predominant (table 1).

The prevalence of GR ≥1mm was 99.7%. Additionally, 80,1% and 52.5% of the individuals presented at least one tooth with GR ≥3mm and ≥5mm, respectively. A high mean of teeth (14.17) with GR ≥1 mm was observed. The overall mean GR for all sites was 1.07 mm. The prevalence, extent and severity of GR basically, increased with increasing age (table 2).

The unadjusted multilevel model showed that male, non-white skin color, age between 40-54 and ≥55 years, income ≤1.0 BMWM, schooling ≤ 8 years, former/current smoker, and periodontitis was associated with RG ≥1mm, ≥3mm and ≥5mm (table 3, 4 and 5). The frequency toothbrush <2x/day was associated with protection with RG ≥1mm only (table 3).

In the adjusted multilevel model age and periodontitis was associated with GR ≥1mm, ≥3mm and ≥5mm (table 3, 4 and 5). Schooling ≤ 8 years was associated with RG ≥1mm and GR ≥3mm, and frequency toothbrush <2x/day was associated with protection in RG ≥1mm. Besides, income ≤1.0 BMWM and former/current smoker was associated with RG ≥3mm and ≥5mm.

DISCUSSION

Our data showed that individuals living in the rural area presented a high prevalence of GR ≥1, ≥3 and ≥5mm, affecting 99.7%, 80.1% and 52.5%, respectively. In the multilevel analysis older age, periodontitis, smoking and low income were independent risk indicators for GR, whereas toothbrush frequency <2x/day had a protective effect only in GR ≥1mm.

This is the first epidemiological study analyzing the RG in a rural population with a representative sample. The place of residence largely determines the access to health care and according with the global evidence on inequities in rural health protection, more than half of the rural populations have not had health coverage [23].

Lembariti et al., 1988 [13] showed that individuals >45 years old presented a high number of teeth with GR >3mm in rural area (3.2 teeth) compared to urban residents (1.2 teeth). Furthermore, to live in the countryside has been associated with socioeconomic and behavior differences when compared with urban population [15]. Besides, the difficulty to access the health care is another particularity of individuals living in rural area, that can increased the prevalence of GR.

Plaque-induced periodontal diseases and trauma from tooth brushing are the two major causes of GR [24]. GR is highly prevalent around the world and has been associated with some risk indicators, most of them common to periodontitis, such as age, oral hygiene habits, low income and smoking [9,10,25–28]. Our data showed that periodontitis was a risk indicator of 1.29, 2.78 and 4.95 to GR $\geq$1, $\geq$3 and $\geq$5mm, respectively, corroborating finding from Van der Velden et al.[29] that found an association between RG and periodontitis severity. Furthermore, to live in the countryside has been associated with two times more chance to have severe periodontitis when compared to reside in urban areas [30]. This outcome, together with our results, may indicate a bidirectional association between gingival recession and periodontitis severity, rather than a causal relationship. It may be assumed that the inflammatory reaction to the dental biofilm can be the predominant biologic feature shared by gingival recessions and periodontitis [28].

Older age is a strongly associated with clinical attachment loss, i.e. destructive periodontal disease, in epidemiological studies [31–33]. This may be a result of the cumulative nature of periodontal breakdown over time or a real biological effect of aging in the periodontium. In our study, significant associations between older age and presence of RG in all the cut-off point were observed, corroborating with other studies in urban population [9,10,26,28].

In our study, RG was associated with low income or low schooling or both of then in the different the cut-off point. The low socioeconomic status impacts on health [34] and it has been associated with worse periodontal status [35,36], and GR[12]. There is an inequitable resource sharing between rural and urban areas, which results in socioeconomic differences. The informality and self-employment, common in the evaluated rural area, could aggravate the situation because they cannot generate sufficient income to afford basic goods and services such as health [23].

Cross-sectional and longitudinal studies consistently showed that smoking negatively interferes on periodontal health [37,38] and is a risk factor to periodontitis [37,39]. This is also true for cross-sectional studies evaluating GR [10,26]. In our study we found that former and current smokers were associated with RG $\geq$3 and $\geq$5mm, corroborated the dates from previously study [10,26].

Although many studies argue that traumatic tooth brushing is considered one of causes of GR [3,40–43], data from systematic review concluded that the association beteew toothbrush and GR are lacking and inconclusive [45]. The cross-sectional study of Rosema et al. (2014)[46] found no association between soft tissue and RG injuries as a result of brushing. Our results showed

that frequency toothbrush <2x/day was a protective effect in RG ≥1mm, but not for the other cut-off points. These findings suggests that a higher frequency of toothbrushing is mainly associated with the beginning of the gingival recession, and may not have a significant effect on its progression. However, this hypothesis should be analyzed carefully, due to our study don't present longitudinal analysis. In terms of the design, cross-sectional observations for GR yield only information on associations for hypotheses to be made[10] and are insufficient for understanding how the GR appear and increase. Longitudinal studies should be conducted to determine which are the risk indicators and how the RG can increase in different populations. Besides, we did not analized the gingival biotype, one important outcome to RG.

The results found in this study may be used as a basis for preventive strategies focusing on GR in individuals living in the rural area. Oral health is a public health problem, however, it needs to be included as a priority on the universal health coverage debate and policy development [47]. The policies formulation and oral health goals may be more effective if based on descriptive epidemiology of quality [48]. However, this kind of research, with a representative population-based sample, is lacking in the rural areas, especially in Latin America [16]. The investigation of health conditions of rural inhabitants is necessary principally due to the difficult access to medical and oral care of these populations [14], once the improvement of oral conditions is strongly associated with better health care access [49]. The International Labor Office (2015) [23] has reported that 56% of people living in rural areas around the world continue to be deprived of access to health, emphasizing the importance of research, for the knowledge of health conditions and populations. These data would help to design and implement public policies aimed to improve access to dental services, emphasizing their relevance not only for scientific knowledge but also for public health.

Conclusion

It may be concluded that GR was highly prevalent in individuals living in rural area. Age, income and/or schooling, former or current smoke and periodontitis were identified as risk indicator of GR. The results found in this study maybe used as a basis for preventive strategies focusing in GR in individuals living in rural.

CONFLICT OF INTEREST AND FUNDING SOURCE

The authors declare no conflicts of interest

‡ UNC-15, Neumar®, São Paulo, Brazil;

REFERENCES

1   American Academy of Periodontitis. Glossary of Periodontal Terms - AAP Connect. 2001.

2   Dhaliwal JS, Palwankar P, Khinda PK, Sodhi SK. Prevalence of dentine hypersensitivity: A cross-sectional study in rural Punjabi Indians. *J Indian Soc Periodontol* 2012;16:426–429.

3   Smith RG. Gingival recession reappraisal of an enigmatic condition and a new. *J Clin Periodontol* 1997;24:203–205.

4   West NX, Sanz M, Lussi A, Bartlett D, Bouchard P, Bourgeois D. Prevalence of dentine hypersensitivity and study of associated factors: a European population-based cross-sectional study. *J Dent* 2013;41:841–451.

5   Costa RSA, Rios FS, Moura MS, Jardim JJ, Maltz M, Haas AN. Prevalence and risk indicators of dentin hypersensitivity in adult and elderly populations from Porto Alegre, Brazil. *J Periodontol* 2014;85:1247–1258.

6   Kularatne S, Ekanayake L. Root surface caries in older individuals from sri lanka. *Caries Res* 2007;41:252–256.

7   Bharateesh JV, Kokila G. Association of root caries with oral habits in older individuals attending a rural health centre of a dental hospital in India. *J Clin Diagn Res* 2014;8:80-82.

8   Wagner TP, Costa RSA, Rios FS, et al. Gingival recession and oral health-related quality of life: A population-based cross-sectional study in Brazil. *Community Dent Oral Epidemiol* 2016;44:390–399.

9   Albandar JM, Kingman A. Gingival recession, gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988-1994 *. 1994;70:1988–1994.

10   Rios FS, Costa RSA, Moura MS, Jardim JJ, Maltz M, Haas AN. Estimates and multivariable risk assessment of gingival recession in the population of adults from Porto Alegre, Brazil. *J Clin Periodontol* 2014;41:1098–1107.

11   Ronderos M, Pihlstrom BL, Hodges JS. Periodontal disease among indigenous people in the Amazon rain forest. *J Clin Periodontol* 2001;28:995–1003.

12   Mumghamba EGS, Honkala S, Honkala E, Manji KP. Gingival recession, oral hygiene and associated factors among Tanzanian women. *East Afr Med J* 2009;86:125–132.

13   Lembariti BS, Frencken JE, Pilot T. Prevalence and severity of periodontal conditions among adults in urban and rural Morogoro, Tanzania. *Community Dent Oral Epidemiol* 1988;16:240–243.

14   Ahn S, Burdine JN, Smith ML, Ory MG, Phillips CD. Residential Rurality and Oral Health Disparities: Influences of Contextual and Individual Factors. *J Prim Prev* 2011;32:29–41.

15   Wang Q-T, Wu Z-F, Wu Y-F, Shu R, Pan Y-P, Xia J-L. Epidemiology and preventive direction of periodontology in China. *J Clin Periodontol* 2007;34:946–51.

16   Skillman SM, Doescher MP, Mouradian WE, Brunson DK. The challenge to delivering oral health services in rural America. *J Public Health Dent* 2010;70:49-57.

17   Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption--II. *Addiction* 1993;88:791–804.

18   Slade GD. Derivation and validation of a short-form oral health impact profile. *Community Dent Oral Epidemiol* 1997;25:284–290.

19   Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health*

Soc Behav 1983;24:385–96.

20   Trapnell PD, Campbell JD. Private self-consciousness and the five-factor model of personality: distinguishing rumination from reflection. *J Pers Soc Psychol* 1999;76:284–304.

21   Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. *Int Dent J* 1975;25:229–235.

22   Eke PI, Page RC, Wei L, Thornton-Evans G, Genco RJ. Update of the Case Definitions for Population-Based Surveillance of Periodontitis. *J Periodontol* 2012;83:1449–1454.

23   International Labor Office (ILO). Extension of Social Security Global evidence on inequities in rural health protection New data on rural deficits in health coverage for 174 countries. Xenia Scheil-Adlung (ed.) S. P. Department. Geneva: International Labour Office (2015).

24   Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. *J Am Dent Assoc* 2003;134:220–225.

25   Löe H, Anerud a, Boysen H. The natural history of periodontal disease in man: prevalence, severity, and extent of gingival recession. *J Periodontol* 1992;63:489–495.

26   Susin C, Haas AN, Oppermann R V., Haugejorden O, Albandar JM. Gingival recession: epidemiology and risk indicators in a representative urban Brazilian population. *J Periodontol* 2004;75:1377–1386.

27   Holtfreter B, Schwahn C, Biffar R, Kocher T. Epidemiology of periodontal diseases in the Study of Health in Pomerania. *J Clin Periodontol* 2009;36:114–123.

28   Sarfati A, Bourgeois D, Katsahian S, Mora F, Bouchard P. Risk assessment for buccal gingival recession defects in an adult population. *J Periodontol* 2010;81:1419–1425.

29   Van der Velden U, Abbas F, Armand S, et al. Java project on periodontal diseases. The natural development of periodontitis: risk factors, risk predictors and risk determinants. *J Clin Periodontol* 2006;33:540–548.

30   Zhang Q, Li Z, Wang C, et al. Prevalence and predictors for periodontitis among adults in China, 2010. *Glob Health Action* 2014; 8:1–7.

31   Machtei EE, Hausmann E, Dunford R, et al. Longitudinal study of predictive factors for periodontal disease and tooth loss. *J Clin Periodontol* 1999;26:374–380.

32   Timmerman MF, Van der Weijden GA, Abbas F, et al. Untreated periodontal disease in Indonesian adolescents. Longitudinal clinical data and prospective clinical and microbiological risk assessment. *J Clin Periodontol* 2000;27:932–942.

33   Neely AL, Holford TR, Löe H, Ånerud Å, Boysen H. The Natural History of Periodontal Disease in Man. Risk Factors for Progression of Attachment Loss in Individuals Receiving No Oral Health Care. *J Periodontol* 2001;72:1006–1015.

34   Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep* 2014;2:19–31.

35   Susin C, Dalla Vecchia CF, Oppermann R V, Haugejorden O, Albandar JM. Periodontal attachment loss in an urban population of Brazilian adults: effect of demographic, behavioral, and environmental risk indicators. *J Periodontol* 2004;75:1033–1041.

36   Susin C, Haas AN, Valle PM, Oppermann R V, Albandar JM. Prevalence and risk indicators for chronic periodontitis in adolescents and young adults in south Brazil. *J Clin Periodontol* 2011;38:326–333.

37   Bergström J. Periodontitis and Smoking: An Evidence-Based Appraisal. *J Evid Based Dent Pract* 2006;6:33–41.

38   Haas AN, Wagner MC, Oppermann RV, Rösing CK, Albandar JM, Susin C. Risk factors for the progression of periodontal attachment loss: a 5-year population-based study in South Brazil. *J Clin Periodontol* 2014;41:215–223.

39   Gelskey SC. Cigarette smoking and periodontitis: methodology to assess the strength of evidence in support of a causal association. *Community Dent Oral Epidemiol* 1999;27:16–24.

40   Kallestal C, Uhlin S. Buccal attachment loss in Swedish adolescents. *J Clin Periodontol* 1992;19:485–491.

41   Joshipura KJ, Kent RL, DePaola PF. Gingival recession: intra-oral distribution and associated factors. *J Periodontol* 1994;65:864–871.

42   Addy M, Hunter ML. Can tooth brushing damage your health? Effects on oral and dental tissues. *Int Dent J* 2003;53:177–186.

43   Litonjua LA, Andreana S, Bush PJ, Cohen RE. Toothbrushing and gingival recession. *Int Dent J* 2003;53:67–72.

44   Sangnes G. Traumatization of teeth and gingiva related to habitual tooth cleaning procedures. *J Clin Periodontol* 1976;3:94–103.

45   Rajapakse PS, McCracken GI, Gwynnett E, Steen ND, Guentsch A, Heasman PA. Does tooth brushing influence the development and progression of non- inflammatory gingival recession? A systematic review. *J Clin Periodontol* 2007;34:1046–1061.

46   Rosema NAM, Adam R, Grender JM, der Sluijs E, Supranoto SC, der Weijden GA. Gingival abrasion and recession in manual and oscillating-rotating power brush users. *Int J Dent Hyg* 2014;12:257–266.

47   Marthur MR, Williams DM, Reddy KS, Watt RG. Universal health coverge: a unique policy opportunity for oral health. *J Dent Res* 2015; 94Suppl3:3S–5S.

48   Oppermann RV, Haas AN, Rosing CK, Susin C. Epidemiology of periodontal diseases in adults from Latin America. *Periodontol 2000* 2015; 67:13-33.

49   Ewing, JA. Detecting alcoholism: the CAGE Questionnaire. *JAMA* 252:1905- 1907.

1092 eligible individuals

Excluded (n=5):
1 (0.1%) Requirement of antibiotic prophylactics
4 (%0.4) Psychiatric or mental problems

1087 individuals

Non-respoder (n=399):
249 (62.4%) Refused to participate
67 (16.8%) Could not move to the exam unit
19 (4.8%) Were not at home after three attempts
2 (0.5%) Only answered the questionnaires
62 (15.5%) Other reasons not specified

688 included individuals

71 (10.3%) Individuals edentulous

617 dentate individuals

Figure1. Study flowchart

Tabl 1: Demographic, socio-economic, behavioral and clinic characteristics of sample**.**

Variables	N	%
Sex		
Female	302	48.19
Male	315	51.81
Skin color		
White	421	67.17
Non-white	195	32.83
Age*		
≤ 39 years	213	34.52
40-54 years	211	34.20
≥ 55 years	193	31.28
Income (BMWM)†		
≤1.0	170	27.82
>1.0	441	72.18
Schooling (years)		
>8 years	144	25.37
≤8 years	471	74.63
Smoke		
Non-smoker	311	50.06
Formers/ Current Smoker	304	49.94
Frequency Toothbrush		
≥ 2x/day	579	93.92
< 2x/day	37	6.08
Dental Visit		
≥ 1x/year	272	44.16
< 1x/year	344	55.84
Periodontitis		
No	409	66.29
Yes	208	33.71

* Tercile

†BMMW: Brazilian monthly minimum wage % US$250 during study period.

Table 2: Prevalence (percentage of subjects) extent (mean number of teeth) and severity (mean) of gingival recession according to age strata considering all sites.

All site	Age (years)							
	≤ 39 years		40-54 years		≥ 55 years		Total	
	Estimate (n=213)	SE	Estimate (n=211)	SE	Estimate (n=193)	SE	Estimate (n=282)	SE
Prevalence (% subjects [n])								
≥1mm	99.0 (211)	0.01	100.0 (211)	0.00	100.0 (193)	0.00	99.7	0.01
≥3mm	62.4 (133)	0.03	86.7(183)	0.02	94.8 (183)	0.01	80.1	0.01
≥5mm	34.7 (74)	0.03	52.1 (110)	0.03	72.5 (140)	0.03	52.5	0.21
Extension (mean teeth number)								
≥1mm	14.77	0.51	15.19	0.44	12.39	0.53	14.17	0.29
≥ 3mm	3.07	0.29	5.87	0.38	7.26	0.38	5.34	0.21
≥5mm	1.54	0.23	2.13	0.24	2.98	0.25	2.19	0.14
Severity (mm)	0.39	0.05	1.02	0.09	1.68	0.10	1.07	0.38

Table 3: Association between gingival recession $\geq$ 1mm, demographic, socio-economic, behavioral and clinical variables.

Variables	PR (95%CI) Crude	P*	PR (95%CI) Adjusted	P**
Sex				
Female	1	**0.053**	1	0.818
Male	1.08 (0.00-1.16)		0.99 (0.93-1.06)	
Skin color				
White	1	0.505	-	
Non-white	0.97 (0.89-1.06)			
Age$^£$				
$\leq$ 39 years	1	**0.000**	1	
40 - 54 years	1.37 (1.26-1.48)		1.24 (1.15-1.34)	**0.000**
$\geq$ 55 years	1.71 (1.57-1.87)	**0.000**	1.47 (1.34-1.61)	**0.000**
Income (BMWM)$^{£\,†}$				
>1.0	1	**0.058**	1	0.122
≤1.0	1.08 (0.99-1.18)		1.06 (0.98-1.14)	
Schooling (years)				
>8 years	1	**0.000**	1	**0.005**
≤8 years	1.35 (1.24-1.48)		1.13 (1.04-1.23)	
Smoke				
Non-smoker	1		1	
Former/current Smoker	1.26 (1.17-1.35)	**0.000**	1.05 (0.98-1.13)	0.139
Frequency Toothbrush				
$\geq$ 2x/day	1	**0.068**	1	**0.013**
< 2x/day	0.86 (0.73-1.01)		0.44 (0.23-0.84)	
Dental Visit				
$\geq$ 1 year	1	0.995	-	
< 1 year	1.00 (0.76-1.31)			
Teeth				
Anterior	1			
Molar	0.98 (0.93-1.03)	0.492	-	
Pre molar	1.01 (0.97-1.07)	0.469		
Periodontitis				
No	1	**0.000**	1	**0.000**
Yes	1.50 (1.39-1.61)		1.29 (1.19-1.38)	

$^£$ Tercile
†BMMW: Brazilian monthly minimum wage % US$250 during study period.
Multilevel logistic regression crude* and adjusted ** (-Variables that remained not retained in the final model)

Table 4: Association between gingival recession ≥ 3mm, demographic, socio-economic, behavioral and clinical variables.

Variables	PR (95%CI) Crude	P*	PR (95%CI) Adjusted	P**
Sex				
Female	1	**0.000**	1	0.395
Male	1.55 (1.24-1.94)		1.07 (0.91-1.26)	
Skin color				
White	1	0.862	-	
Non-white	0.98 (0.77-1.25)			
Age£				
≤ 39 years	1	**0.000**	1	
40 - 54 years	3.02 (2.40-3.80)		2.05 (1.67-2.52)	**0.000**
≥ 55 years	7.13 (5.65-8.99)	**0.000**	3.94 (3.16-4.92)	**0.000**
Income (BMWM)£ †				
>1.0	1	**0.036**	1	**0.025**
≤1.0	1.31 (1.02-1.69)		1.22 (1.03-1.46)	
Schooling (years)				
>8 years	1	**0.000**	1	**0.007**
≤8 years	3.00 (2.30-3.92)		1.33 (1.08-1.65)	
Smoke				
Non-smoker	1		1	
Former/current Smoker	2.43 (1.96-3.01)	**0.000**	1.22 (1.04-1.45)	**0.018**
Frequency Toothbrush				
≥ 2x/day	1	0.264	-	
< 2x/day	0.76 (0.46-1.23)			
Dental Visit				
≥ 1 year	1	0.508	-	
< 1 year	1.33 (0.57-3.10)			
Teeth				
Anterior	1			
Molar	0.98 (0.90-1.06)	0.603	-	
Pre molar	1.02 (0.94-1.11)	0.618		
Periodontitis				
No	1	**0.000**	1	**0.000**
Yes	4.78 (3.94-5.79)		2.78 (2.34-3.31)	

£Tercile
†BMMW: Brazilian monthly minimum wage % US$250 during study period.
Multilevel logistic regression crude* and adjusted ** (-Variables that remained not retained in the final model)

Table 5: Association between gingival recession ≥ 5mm, demographic, socio-economic, behavioral and clinical variables.

Variables	PR (95%CI) Crude	P*	PR (95%CI) Adjusted	P**
Sex				
Female	1	**0.000**	1	0.521
Male	1.86 (1.33-2.60)		1.10 (0.81-1.49)	
Skin color				
White	1	0.966	-	
Non-white	0.99 (0.69-1.43)			
Age$^£$				
≤ 39 years	1	**0.000**	1	
40 - 54 years	2.48 (1.67-3.70)		1.36 (0.92-2.02)	**0.122**
≥ 55 years	8.63 (5.80-12.84)	**0.000**	3.65 (2.43-5.50)	**0.000**
Income (BMWM)$^{£ †}$				
>1.0	1	**0.023**	1	**0.033**
≤1.0	1.55 (1.06-2.25)		1.43 (1.03-1.98)	
Schooling (years)				
>8 years	1	**0.000**	1	0.350
≤8 years	3.43 (2.25-5.22)		1.21 (0.81-1.80)	
Smoke				
Non-smoker	1		1	**0.009**
Former/current Smoker	3.40 (2.44-4.74)	**0.000**	1.52 (1.11-2.08)	
Frequency Toothbrush				
≥ 2x/day	1	0.241	-	
< 2x/day	0.64 (0.29-1.35)			
Dental Visit				
≥ 1 year	1	0.266	-	
< 1 year	2.05 (0.58-7.26)			
Teeth				
Anterior	1			
Molar	1.04 (0.91-1.19)	0.528	-	
Pre molar	1.02 (0.89-1.16)	0.895		
Periodontitis				
No	1	**0.000**	1	**0.000**
Yes	8.59 (6.25-11.82)		4.95 (3.58-6.83)	

$^£$Tercile

†BMMW: Brazilian monthly minimum wage % US$250 during study period.

Multilevel logistic regression crude* and adjusted ** (-Variables that remained not retained in the final model)

3 ARTIGO 2 – ESTIMATIVAS E ANALISE MULTINÍVEL DE RECESSÃO GENGIVAL EM INDIVÍDUOS SEM PERIODONTITE SEVERA VIVENDO NA ÁREA RURAL

Este artigo será submetido ao periódico *Journal of Clinical Periodontology*, ISSN: 1600-051X, Fator de impacto = 3.477; Qualis A1.

Estimates and multilevel assessment of gingival recession in patients without severe periodontitis living in rural area

Running title: Gingival recession in periodontal health

Maísa Casarin[1], Jociana Boligon[1], Janice Almerinda Marin[1], Carlos Heitor Cunha Moreira[1], Paulo Camargo[2] Flavia Queiroz Pirih[2], Fabricio Batistin Zanatta[1]

[1] Postgraduate Program in Dentistry, Federal University of Santa Maria, Santa Maria, Brazil;

[2] Sections of Periodontics, University of California, Los Angeles, United States;

Keywords: gingival recession, rural population, epidemiology, prevalence, periodontal disease.

Corresponding author:

Fabricio Batistin Zanatta

Rua Marechal Floriano Peixoto – 1148 – Centro, CEP 97015372, Santa Maria - RS / Brazil

Universidade Federal de Santa Maria

Phone number: +55-55-32208000

Email: fabriciobzanatta@gmail.com

Clinical Relevance

Scientific reasons for the study: There are no studies assessing gingival recession in individuals without severe periodontitis living in the rural area.

Main findings: Gingival recession affected significant proportions of the population and was associated with several risk indicators, as age, low schooling, smoke exposure, type of tooth, and frequency of toothbrushing.

Practical implications: Needs of an oral health strategy that contemplates dental care and the prevention of GR in areas isolated and distant from large centers.

ABSTRACT

Aim: To assess, the prevalence, extent, severity and risk indicators of gingival recession (GR) in a representative sample of individuals without periodontitis living in a rural area.

Material & Methods: A representative sample of 282 individuals without periodontitis with ≥20 teeth were clinically assessed for GR at six sites per tooth. Two different cut off points, ≥1mm and ≥3mm were used to classify individuals and risk indicators of GR.

Results: GR ≥1 mm affected 96.5% of subjects. The percentage of subjects with ≥1 tooth with buccal GR ≥3 mm and ≥5 mm was 39.0% and 7.8%, respectively. The average of teeth showed 11.38, 0.89 and 0.09 of GR ≥1 mm, ≥3 mm and ≥5 mm, respectively. Older age, low schooling, premolar and molar tooth were significant risk indicators for GR ≥1 and ≥3mm. Calculus was associated with GR ≥1mm and smoker exposure was associated with GR ≥3mm. Frequency of toothbrushing <2x/day was a protector factor to GR in both cut off points.

Conclusions: The results showed a high prevalence of gingival recession in individuals without severe periodontitis living in rural area. Strategic plans in health are necessary to reduce the prevalence and the consequences of the GR in rural population.

Keywords: gingival recession, rural population, epidemiology, prevalence, periodontal disease.

INTRODUCTION

Gingival recession (GR) is characterized by the apical migration of the gingival margin resulting in the exposure of the root surface (Smith, 1997; Kassab and Cohen, 2003; Du *et al*, 2009). The presence of gingival recession may bring many negative effects, such as functional (Bharateesh & Kokila, 2014; Costa et al., 2014; Dhaliwal, Palwankar, Khinda, & Sodhi, 2012; Kularatne & Ekanayake, 2007) and aesthetic problems (Smith, 1997; Kassab and Cohen, 2003).

The prevalence of GR ≥1 mm in epidemiological studies is between 57.9% (Albandar e Kingman *et al*, 1999) and 99.7% (Rios et al., 2014) for urban populations. Individuals with high standard of oral hygiene have a prevalence of 47.8% to 85% of GR (Checchi, Daprile, Gatto, & Pelliccioni, 1999; Matas, Sentis, & Mendieta, 2011) However, almost all studies with high standard of oral hygiene analyzed dental students, using a convenience sample, urban populations and did not define the case definition of periodontitis.

Socio-demographic, behavioral and clinical risk indicators have been associated with GR in epidemiological studies in urban population. Nevertheless, the majority failed to account for confounding (Albandar & Kingman, 1999; Brown, Brunelle, & Kingman, 1996; Löe, Ånerud, & Boysen, 1992; Serino, Wennström, Lindhe, & Eneroth, 1994; Slutzkey & Levin, 2008; Toker & Ozdemir, 2009; Van Palenstein, Lembariti, Van der Weijden, & van 't Hof, 1998), with very few studies applying multivariable models (Rios et al., 2014; Sarfati, Bourgeois, Katsahian, Mora, & Bouchard, 2010; Susin, Haas, Oppermann, Haugejorden, & Albandar, 2004) and no one applying multilevel models. Overall, no study evaluated individuals without severe periodontitis living in the rural area with a multilevel analysis, that consists of integrating individual and contextual factors in the epidemiological analysis of health conditions (Porta, 2008), considering associated factors.

The aim of the present study was to assess the prevalence, extent, severity and associated factors with GR in a representative sample of individuals without severe periodontitis living in a rural area, using a multilevel analysis.

MATERIALS AND METHODS
Study Design

A cross-sectional study was conducted with a representative sample of the rural area of Rosario do Sul - RS, South of Brazil. For this study, it was analyzed a subsample that included individuals without severe periodontitis (Tonetti & Claffey, 2005) and with ≥ 20 teeth (Franco Neto *et al,* 2008).

Sample Size

The sample size was calculated considering a rural population aged 15 years and older of approximately 4000 inhabitants [Brazilian Institute of Geography and Statistics (IBGE) 2010], and the "worst case scenario" of the main outcome, periodontal disease (i.e. 50% prevalence). We used a 4% precision level and 1.3 design effect for the 95% confidence interval. The sample size calculation was adjusted for finite populations using standard formula: "N set = n / 1 + (n / N)" (where "n" is the calculated size and "N" is the size of the population), and it was estimated that 580 subjects were needed. The sample was increased by 15% (to 667 individuals) to account for non-response." We only analyzed individuals without severe periodontitis (Tonetti & Claffey, 2005), so the final sample was 282 subjects. The sample's power to prevalence of GR ≥1mm is 99%.

Sampling Procedures

A population-weighted draw was carried out based on information provided by IBGE (IBGE 2010). According to the IBGE, there are 6 districts and 36 rural sectors. Six sectors, which had no data from individuals with 15 years of age or older were not included. The remaining 30 sectors were initially grouped in three strata (small, medium and large) according with the number of households (small: 6-35, medium: 36-61, large: 62-189). Three randomized sequences were generated in the program Research Randomizer (available at http://www.randomizer.org/form.htm) for selection of 17 sectors (3 small, 7 medium and 7 large) allowing the 6 districts were evaluated. The number of individuals examined in each sector should be weighed against the total number of households and individuals living in this sector (IBGE 2010). In the sectors where community health workers were present, the place to be examined was allocated according to the list of households. In sectors without this performance, densely populated areas were established through maps provided by the IBGE, being this place previously confirmed by the researchers to be the starting

point for the selection of households and individuals. From the point of view of departure, all houses on the right and left straight (main road) were assessment until the pre-determined number of households or been contacted. When the numbers of households or individuals were not obtained with this strategy, secondary roads were accessed up to 5 kilometers to the right or left of the main road, in order to achieve the number of individuals required.

Study population

Individuals with periodontal health and ≥20 teeth living in the rural area of the municipality of Rosario do Sul-RS (Brazil) were eligible to participate in the study. Exclusion criteria were: individuals with systemic diseases that contraindicated the clinical examination, as well as those who needed antimicrobial prophylaxis to perform the tests, and individuals diagnosed with psychiatric or drug intoxication problems.

Ethical Considerations

This study received approval from the Human Research Ethics Committee of the Federal University of Santa Maria (process number 37862414.5.0000.5346). All patients agreed and provided informed consent.

Operational Procedures

All the clinical examinations were performed in a mobile unit that consisted of a trailer equipped with a complete dental unit (dental chair, light, compressor, dental x- ray, and others basic equipment's). The unit was moved to a central point in each rural sector according to survey schedule. Two calibrate examiners (JB and MC) performed the clinical examination between March 2015 and May 2016.

Clinical Examination

All erupted teeth (except third molars) were evaluated using a Williams periodontal probe with millimeters (mm) markings (Williams, Neumar, São Paulo, SP, Brazil). Visible plaque index (VPI) (Ainamo & Bay, 1975), marginal bleeding index (MBI) (Ainamo & Bay, 1975) and bleeding on probing (BoP) were collected as present/absent. Plaque retentive factors were considered as the presence of calculus,

residual roots, presence of poorly adapted restorations and caries (cavities). Probing depth (PD) was defined as the distance from the free gingival margin to the bottom of the pocket/sulcus. Periodontal attachment loss (CAL) was defined as the distance from the CEJ to the bottom of the pocket/sulcus. The gingival recession was calculated as difference between CAL and PPD. Measurements were made in mm and were rounded to the lower whole mm.

Measurement Reproducibility

Two examiners (JB and MC) were trained for clinical data VPI, GBI and BOP. A calibration was performed for PD and CAL, and intra-examiner reproducibility was measured by repeated examinations. An experienced examiner was considered as the gold standard for inter-examiner calibration. The training and calibration procedures were performed until satisfactory reproducibility was obtained, defined as a minimum of 80% agreement between repeated measurements [ICC > 0.80]. The exams were performed before and during the study. Where it resulted in the intra-examiner analysis in an intraclass correlation coefficient for PD of 0.926 / CAL of 0.915 (before) and PD of 0.887 / CAL of 0.879 (during) for the examiner 1. For the examiner 2, PD of 0.958 / NIC of 0.931 and PD of 0.900 / CAL of 0.895 (during). The results of the inter-examiner exam were 0.889 for PD and 0.845 for CAL before the study and 0.956 for PD and 0.914 for CAL during the study.

Data Analysis

The primary outcome was GR in buccal sites. Prevalence of GR was defined by the percentage of dentate individuals presenting at least one tooth with buccal GR of various cut-off points. Extent of GR was defined as the average of teeth within each dentate individual presenting GR of various thresholds. Mean GR was used to estimate the severity of the condition. All descriptive analysis were run considering the sample weight using STATA's "SVY" command for complex samples.

The independent variables were gender (female/male), self-reported skin color (white/non-white), age in years (median: ≤35/>35, and divided by tercil in descriptive analise), income [based on >1.0/≤1.0 Brazilian monthly minimum wage (BMMW), which was R$750.00, equivalent to approximately US$250 during the study period], schooling (≤8/>8 completed years of study – corresponding to a primary school

education in Brazil), cigarette smoking status [non-smokers (never smoker) /former and/or current smokers]. Tooth brushing frequency was categorized into ≥2 time/day and <2 times and type of teeth (anterior/molar/premolar). Toothbrush bristles type was categorized into extra soft/soft and medium/hard, use of toothpaste and proximal hygiene [yes (use)/no(no use)]. Gingivitis was dichotomized into low and high using the median (15%) of the percentage of bleeding sites and calculus into low and high using the median (22%). Non-carious cervical lesions were categorized between present/absent. Self-reported orthodontic treatments were assessed dichotomously.

A multilevel logistic regression analysis was performed to assess the association between the variables (demographic and socio-economic characteristics: gender, skin color, age, income and schooling; behavioral characteristics: smoking, frequency toothbrush, toothbrush – bristles type, toothpaste and proximal hygiene - use; clinical variable: Type of teeth, orthodontic treatment, calculus, gingivitis and non-carious cervical lesion and gingival recession outcome. The odds ratio [OR; 95% confidence interval (CI)] was calculated based on dichotomous outcome (GR ≥1mm and ≥3mm). Univariable models were fitted for each independent variable and those presenting P values <0.20 were entered in the multi-level model. In our data, the teeth (first level) and individual (second level) were nested in district (third level). Data analysis was performed with the software STATA 14 (Stata Corporation; College Station, TX, USA). The level of significance was 5%.

RESULTS

Six hundred and eighty-eight individuals were clinically examined in the whole epidemiological survey. A total of 282 individuals without severe periodontitis and with ≥ 20 teeth, were included in the study. The reasons for non-participation are presented in the flowchart (Figure 1). Table 1 summaries the characteristics of the participants. Female (50.61%), white skin color (70.61%), income >1.0 Brazilian monthly minimum wage (81.20%), schooling ≤ 8 years (58.53%) and non-smoker (65.62%) were predominant (Table 1).

Gingival recession ≥1 mm was a universal finding (96.5%) (Table 2). Additionally, 39.0%, and 7.8% of the individuals presented at least one tooth with GR ≥3mm and ≥5mm. While 11.83% of the teeth had GR ≥1 mm, the percentages of GR

≥3 mm and ≥5 mm was more than ten times smaller (0.89 and 0.09, respectively). The overall mean of GR for all sites was 1.07 mm. The prevalence, extent and severity of GR increased with age.

The prevalence and extension of GR was higher in individuals reporting frequency of toothbrushing ≥2 times/day and in individuals that used medium or hard toothbrush (Table 3). Individuals with higher percentages of calculus presented higher prevalence and extension of GR.

The unadjusted multilevel model showed that higher presence of calculus and non-carious cervical lesion was associated only with GR ≥1 mm, while male gender and medium/hard toothbrush with ≥3 mm. Moreover, age > 35 years, schooling ≤8 years, former/current smokers, molar/premolar teeth and toothbrushing frequency ≥ 2 times/day were associated with both RG ≥1 mm and ≥3 mm (table 4 and 5).

In the adjusted multilevel model smoking habit and medium/hard toothbrush were no longer associated with RG ≥1 mm and ≥3 mm, respectively. However, the other variables remained significantly associated with both RG ≥1 mm and ≥3 mm cut-off points (table 4 and 5).

DISCUSSION

The present population-based study demonstrated that the prevalence of GR ≥1 and ≥3mm affecting 96.5% and 39.0% of population living in the rural area. Age > 35 years old, schooling ≤8 years and molar/premolar teeth were found to be statistically significant risk indicators, whilst lower frequency of toothbrushing was a protective effect for both GR ≥1 and ≥3mm. In addition, calculus and smoking were associated only with ≥ 1mm and ≥ 3mm, respectively.

Numerous interventional studies have evaluated aesthetic approaches about GR (Chambrone et al., 2010; da Silva, Joly, de Lima, & Tatakis, 2004; De Castro Pinto et al., 2010; Tatakis & Chambrone, 2016). These data considered GR a major concern in the periodontal epidemiology. The paradox is that there are few epidemiological data available on this topic. Only four population-based studies assessed GR as the primary outcome, and three of them used urban population (Susin *et al*, 2004; Sarfati *et al*, 2010; Rios *et al*, 2014). To the best of our knowledge, this is the first study to assess the GR prevalence and associated factors in a rural population,

adding new information to the field. Moreover, exclusion of severe periodontitis and multilevel model strategy distinguishes our study from those previously published.

Studies from individuals with high standard of oral hygiene (L Checchi, Daprile, Gatto, & Pelliccioni, 1999; Serino et al., 1994), reported lower prevalence and extent of GR compared with our data. These differences in the estimates of GR may be explained, at least in part, by methodological differences. Both studies used different examination protocols and convenience samples (L Checchi et al., 1999; Serino et al., 1994). Epidemiological data in urban populations found a prevalence of GR ≥1mm between 57.9 (Albandar and Kingman, 1999) and 99.7 (Rios et al., 2014) in all sites. Our prevalence findings were closer to Rios *et al*, (2014) findings. We have assessed individuals without severe periodontitis, and have only analyzed buccal sites. This approach may more accurately measure the prevalence of gingival recession, which etiology can possibly be explained by indicators (i.e. toothbrush frequency) other than the traditional ones (i.e. higher age, lower schooling, smoke, calculus) (Greggianin, Oliveira, Haas, & Oppermann, 2013; Kassab & Cohen, 2003; Litonjua, Andreana, Bush, & Cohen, 2003). On the other hand, when the studies need understand periodontal diseases proximal sites are essentials to be analyzed.

Interestingly calculus was associated only on GR ≥1mm in our study. Rios et al., 2014 showed that calculus was associated with RG ≥5mm. Another study, demonstrated in different ages that higher percentage of teeth with supragingival calculus had a significantly higher prevalence and percentage of teeth showing recession (Susin et al., 2004). Probably this difference is because we did not analyzed individuals with severe periodontitis, and calculus (used as a surrogate for longterm exposure to biofilm) have been associated with periodontal attachment loss ≥5mm (Corraini et al., 2008; Ronderos et al., 2001).

Rios *et al*, (2014), found that high educational level was significantly associated with higher odds ratio of buccal GR ≥5mm. Our results do not corroborate to these findings. Individuals with ≤ 8 years of schooling exhibited higher chances to have GR ≥1 and ≥3mm. These disagreements can be explained because we analyzed individuals without severe periodontitis living in the rural area, ≥15 years old, using a full mouth periodontal examination. Besides, low schooling is associated with difficult access to health services (Zangiabadi, Costanian, & Tamim, 2017), and it is possible that these individuals traumatize more the gingival tissue by the incorrect use

of oral devices throughout life (Jati, Furquim, & Consolaro, 2016, Kassab & Cohen, 2003).

Smoking was strongly associated with GR in three previous studies with representative samples, (Rios et al., 2014; Sarfati et al., 2010; Susin et al., 2004) while others did not assess the effect of smoking on GR (Albandar & Kingman, 1999; Brown et al., 1996; Holtfreter, Schwahn, Biffar, & Kocher, 2009; Thomson, Hashim, & Pack, 2000). Studies with non-representative samples had conflicting results (Minaya-Sánchez et al., 2012; Toker & Ozdemir, 2009). In this study, smoking was associated with higher odds of GR ≥3 mm providing additional evidence for the detrimental effect of smoking in the marginal periodontal tissues in individuals without severe periodontitis.

Different teeth have not been evaluated as risk indicator in several studies (Rios et al., 2014; Sarfati et al., 2010; Susin et al., 2004). However, studies analyzing the high standard of oral hygiene found that molar and premolar tooth were the most commonly affected with GR (20-25%) (Serino et al., 1994). Checchi *et al*, (1999) showed that bicuspids teeth had the highest number of GR. Our results corroborate with these results. We found that molar and premolar teeth had similar chance to have RG ≥1mm. However, premolars had the highest chance to have GR ≥3mm when compared to molars.

Several factors have been associated with the occurrence of GR in buccal surfaces, including traumatic toothbrushing (Litonjua et al., 2003), hardness of tooth brushing's tuff (Greggianin et al., 2013), bone dehiscence (Kassab & Cohen, 2003), frequency of toothbrushing (Sangnes, 1976) and orthodontic treatment (Renkema, Fudalej, Renkema, Bronkhorst, & Katsaros, 2013). In general, clinical (L Checchi et al., 1999; Daprile, Gatto, & Checchi, 2007; Greggianin et al., 2013; Joshipura, Kent, & DePaola, 1994; Serino et al., 1994) and histological (Hallmon, Waldrop, Houston, & Hawkins, 1986) evidences indicate a positive correlation between high standards of oral hygiene, traumatic oral hygiene and buccal GR. Our results corroborated these findings, we showed that frequency of toothbrushing <2x/day, low standard of oral hygiene, was a protector to GR ≥1 and ≥3mm. However, little is known about the association between oral hygiene and GR on a population without severe periodontitis, or with periodontal health.

This study has limitations that should be addressed. We used the severe cut-

off-point to classify periodontitis (Tonetti et al., 2005). Some individuals with mild periodontitis were included in the analysis, probably in some cases, the GR maybe was associated with mild periodontitis (Van der Velden et al., 2006), however, the percentage of gingivitis and calculus was low in the sample. We did not analyze gingival biotype, an important outcome to GR, however, there are no gold standard protocol to do this measurement. In terms of the design, cross-sectional observations for GR yield only information on associations for hypotheses to be made (Rios et al., 2014) and are insufficient for understanding how the GR appear and increase. Longitudinal studies should be conducted to determine which are the risk indicators and how the GR can increase in different populations.

It can be concluded that GR is highly prevalent in these individuals without severe periodontitis and living in the rural. Older age, lower schooling, smoking, toothbrushing frequency and premolars/molars were risk indicators for GR. Furthermore, another studies with periodontal health are important to elucidate different protocols and devices to toothbrush associated with RG.

References

A Dictionary of Epidemiology. (n.d.). Retrieved from
http://irea.ir/files/site1/pages/dictionary.pdf

Ainamo, J., & Bay, I. (1975). Problems and proposals for recording gingivitis and
plaque. *Int Dent J*, *25*(4), 229–235. Retrieved from
http://www.ncbi.nlm.nih.gov/pubmed/1058834

Albandar, J. M. M., & Kingman, A. (1999). Gingival recession, gingival bleeding,
and dental calculus in adults 30 years of age and older in the United States,
1988-1994. *Journal of Periodontology*, *70*(1), 30–43.
http://doi.org/10.1902/jop.1999.70.1.30

Bharateesh, J. V., & Kokila, G. (2014). Association of root caries with oral habits in
older individuals attending a rural health centre of a dental hospital in India.
Journal of Clinical and Diagnostic Research : JCDR, *8*(11), ZC80-2.
http://doi.org/10.7860/JCDR/2014/8771.5165

Brown, L. J. J., Brunelle, J. A. A., & Kingman, A. (1996). Periodontal status in the
United States, 1988-1991: prevalence, extent, and demographic variation.
Journal of Dental Research, *75 Spec No*(2_suppl), 672–683.
http://doi.org/10.1177/002203459607502S07

Chambrone, L., Sukekava, F., Araújo, M. G., Pustiglioni, F. E., Chambrone, L. A., &
Lima, L. A. (2010). Root-Coverage Procedures for the Treatment of Localized
Recession-Type Defects: A Cochrane Systematic Review. *Journal of
Periodontology*, *81*(4), 452–478. http://doi.org/10.1902/jop.2010.090540

Checchi, L., Daprile, G., Gatto, M. R., & Pelliccioni, G. A. (1999). Gingival recession
and toothbrushing in an Italian School of Dentistry: a pilot study. *Journal of
Clinical Periodontology*, *26*(5), 276–280. Retrieved from
http://www.ncbi.nlm.nih.gov/pubmed/10355616

Checchi, L., Montevecchi, M., Gatto, R. M., Moreschi, A., & Checchi, V. (2007).
Clinical efficacy of two toothbrushes with different bristles. *International
Journal of Dental Hygiene*, *5*(4), 242–246. http://doi.org/10.1111/j.1601-
5037.2007.00258.x

Corraini, P., Baelum, V., Pannuti, C. M., Pustiglioni, A. N., Romito, G. A., &
Pustiglioni, F. E. (2008). Periodontal attachment loss in an untreated isolated
population of Brazil. *Journal of Periodontology*, *79*(4), 610–620.
http://doi.org/10.1902/jop.2008.070294

Costa, R. S. A., Rios, F. S., Moura, M. S., Jardim, J. J., Maltz, M., & Haas, A. N.
(2014). Prevalence and risk indicators of dentin hypersensitivity in adult and
elderly populations from Porto Alegre, Brazil. *Journal of Periodontology*, *85*(9),
1247–1258. http://doi.org/10.1902/jop.2014.130728

da Silva, R. C., Joly, J. C., de Lima, A. F. M., & Tatakis, D. N. (2004). Root coverage
using the coronally positioned flap with or without a subepithelial connective
tissue graft. *Journal of Periodontology*, *75*(3), 413–419.
http://doi.org/10.1902/jop.2004.75.3.413

Daprile, G., Gatto, M. R., & Checchi, L. (2007). The evolution of buccal gingival
recessions in a student population: a 5-year follow-up. *Journal of
Periodontology*, *78*(4), 611–614. http://doi.org/10.1902/jop.2007.060277

De Castro Pinto, R. C. N., Colombini, B. L., Ishikiriama, S. K., Chambrone, L.,
Pustiglioni, F. E., & Romito, G. A. (2010). The subepithelial connective tissue
pedicle graft combined with the coronally advanced flap for restoring missing
papilla: a report of two cases. *Quintessence International (Berlin, Germany :*

1985), *41*(3), 213–220.

Dhaliwal, J. S., Palwankar, P., Khinda, P. K., & Sodhi, S. K. (2012). Prevalence of dentine hypersensitivity: A cross-sectional study in rural Punjabi Indians. *Journal of Indian Society of Periodontology*, *16*(3), 426–429. http://doi.org/10.4103/0972-124X.100924

Du, M., Jiang, H., Tai, B., Zhou, Y., Wu, B., & Bian, Z. (2009). Root caries patterns and risk factors of middle-aged and elderly people in China. *Community Dentistry and Oral Epidemiology*, *37*(3), 260–266. http://doi.org/10.1111/j.1600-0528.2009.00461.x

Franco Neto, C. A., Parolo, C. C. F., Rösing, C. K., & Maltz, M. (n.d.). Comparative analysis of the effect of two chlorhexidine mouthrinses on plaque accumulation and gingival bleeding. *Brazilian Oral Research*, *22*(2), 139–44. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18622483

Greggianin, B. F., Oliveira, S. C., Haas, A. N., & Oppermann, R. V. (2013). The incidence of gingival fissures associated with toothbrushing: crossover 28-day randomized trial. *Journal of Clinical Periodontology*, *40*(4), 319–326. http://doi.org/10.1111/jcpe.12072

Hallmon, W. W. W., Waldrop, T. T. C., Houston, G. D. G., & Hawkins, B. B. F. (1986). Flossing clefts. Clinical and histologic observations. *J Periodontol*, *57*(8), 501–504. http://doi.org/10.1902/jop.1986.57.8.501

Heitz-Mayfield, L. J ., Shalätze, M., Löe, H., Bürgin, W., Anerud, A., Vboysen, H., & Lang, N. P. (2003). Clinical course of chronic periodontitis II . Incidence , characteristics and time of occurrence of initial periodontal lesion. *J Clin Periodontol*, *30*(10), 902–908.

Holtfreter, B., Schwahn, C., Biffar, R., & Kocher, T. (2009). Epidemiology of periodontal diseases in the Study of Health in Pomerania. *Journal of Clinical Periodontology*, *36*(2), 114–123. http://doi.org/10.1111/j.1600-051X.2008.01361.x

IBGE :: Instituto Brasileiro de Geografia e Estatística. (n.d.). Retrieved January 27, 2017, from http://www.ibge.gov.br/home/

Jati, A. S., Furquim, L. Z., & Consolaro, A. (2016). Gingival recession: its causes and types, and the importance of orthodontic treatment. *Dental Press Journal of Orthodontics*, *21*(3), 18–29. http://doi.org/10.1590/2177-6709.21.3.018-029.oin

Joshipura, K. J. K., Kent, R. L. R., & DePaola, P. F. P. F. (1994). Gingival recession: intra-oral distribution and associated factors. *J Periodontol*, *65*(9), 864–871. http://doi.org/10.1902/jop.1994.65.9.864

Kassab, M. M., & Cohen, R. E. (2003). The etiology and prevalence of gingival recession. *Journal of the American Dental Association (1939)*, *134*(2), 220–5. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12636127

Khocht, A., Simon, G., Person, P., & Denepitiya, J. L. (1993). Gingival recession in relation to history of hard toothbrush use. *Journal of Periodontology*, *64*(9), 900–905. http://doi.org/10.1902/jop.1993.64.9.900

Kularatne, S., & Ekanayake, L. (2007). Root surface caries in older individuals from sri lanka. *Caries Research*, *41*(4), 252–256. http://doi.org/10.1159/000101913

Litonjua, L. A., Andreana, S., Bush, P. J., & Cohen, R. E. (2003). Toothbrushing and gingival recession. *International Dental Journal*, *53*(2), 67–72. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12731692

Löe, H., Ånerud, Å., & Boysen, H. (1992). The Natural History of Periodontal Disease in Man: Prevalence, Severity, and Extent of Gingival Recession. *Journal of Periodontology*, *63*(6), 489–495. http://doi.org/10.1902/jop.1992.63.6.489

Matas, F., Sentis, J., & Mendieta, C. (2011). Ten-year longitudinal study of gingival recession in dentists. *Journal of Clinical Periodontology*, *38*(12), 1091–1098. http://doi.org/10.1111/j.1600-051X.2011.01799.x

Minaya-Sánchez, M., Medina-Solís, C.-E., Vallejos-Sánchez, A.-A., Marquez-Corona, M.-L., Pontigo-Loyola, A.-P., Islas-Granillo, H., & Maupomé, G. (2012). Gingival recession and associated factors in a homogeneous Mexican adult male population: a cross-sectional study. *Medicina Oral, Patologia Oral Y Cirugia Bucal*, *17*(5), e807-13. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/22549678

Rajapakse, P. S., McCracken, G. I., Gwynnett, E., Steen, N. D., Guentsch, A., & Heasman, P. A. (2007). Does tooth brushing influence the development and progression of non-inflammatory gingival recession? A systematic review. *Journal of Clinical Periodontology*, *34*(12), 1046–1061. http://doi.org/10.1111/j.1600-051X.2007.01149.x

Renkema, A. M., Fudalej, P. S., Renkema, A., Bronkhorst, E., & Katsaros, C. (2013). Gingival recessions and the change of inclination of mandibular incisors during orthodontic treatment. *European Journal of Orthodontics*, *35*(2), 249–255. http://doi.org/10.1093/ejo/cjs045

Rios, F. S., Costa, R. S. A., Moura, M. S., Jardim, J. J., Maltz, M., & Haas, A. N. (2014). Estimates and multivariable risk assessment of gingival recession in the population of adults from Porto Alegre, Brazil. *Journal of Clinical Periodontology*, *41*(11), 1098–1107. http://doi.org/10.1111/jcpe.12303

Ronderos, M., Pihlstrom, B. L., & Hodges, J. S. (2001). Periodontal disease among indigenous people in the Amazon rain forest. *Journal of Clinical Periodontology*, *28*(11), 995–1003.

Sangnes, G. (1976). Traumatization of teeth and gingiva related to habitual tooth cleaning procedures. *Journal of Clinical Periodontology*, *3*(2), 94–103. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/1064598

Sarfati, A., Bourgeois, D., Katsahian, S., Mora, F., & Bouchard, P. (2010). Risk assessment for buccal gingival recession defects in an adult population. *Journal of Periodontology*, *81*(10), 1419–1425. http://doi.org/10.1902/jop.2010.100102

Serino, G., Wennström, J. L., Lindhe, J., & Eneroth, L. (1994). The prevalence and distribution of gingival recession in subjects with a high standard of oral hygiene. *Journal of Clinical Periodontology*, *21*(1), 57–63. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/8126246

Slutzkey, S., & Levin, L. (2008). Gingival recession in young adults: Occurrence, severity, and relationship to past orthodontic treatment and oral piercing. *American Journal of Orthodontics and Dentofacial Orthopedics*, *134*(5), 652–656. http://doi.org/10.1016/j.ajodo.2007.02.054

Smith, R. G. (1997). Gingival recession. Reappraisal of an enigmatic condition and a new index for monitoring. *Journal of Clinical Periodontology*, *24*(3), 201–205. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9083906

Susin, C., Haas, A. N., Oppermann, R. V., Haugejorden, O., & Albandar, J. M. (2004). Gingival recession: epidemiology and risk indicators in a representative urban Brazilian population. *Journal of Periodontology*, *75*(10), 1377–1386. http://doi.org/10.1902/jop.2004.75.10.1377

Tatakis, D. N., & Chambrone, L. (2016). The Effect of Suturing Protocols on Coronally Advanced Flap Root-Coverage Outcomes: A Meta-Analysis. *Journal of Periodontology*, *87*(2), 148–155. http://doi.org/10.1902/jop.2015.150394

Thomson, W. M., Hashim, R., & Pack, A. R. (2000). The prevalence and intraoral

distribution of periodontal attachment loss in a birth cohort of 26-year-olds. *Journal of Periodontology*, *71*(12), 1840–1845. http://doi.org/10.1902/jop.2000.71.12.1840

Toker, H., & Ozdemir, H. (2009). Gingival recession: epidemiology and risk indicators in a university dental hospital in Turkey. *International Journal of Dental Hygiene*, *7*(2), 115–120. http://doi.org/10.1111/j.1601-5037.2008.00348.x

Tonetti, M. S., Claffey, N., & European Workshop in Periodontology group C. (2005). Advances in the progression of periodontitis and proposal of definitions of a periodontitis case and disease progression for use in risk factor research. Group C Consensus report of the 5th European workshop in periodontology. *Journal of Clinical Periodontology*, *32*(s6), 210–213. http://doi.org/10.1111/j.1600-051X.2005.00822.x

Van der Velden, U., Abbas, F., Armand, S., Loos, B. G., Timmerman, M. F., Van der Weijden, G. A., … Winkel, E. G. (2006). Java project on periodontal diseases. The natural development of periodontitis: risk factors, risk predictors and risk determinants. *Journal of Clinical Periodontology*, *33*(8), 540–548. http://doi.org/10.1111/j.1600-051X.2006.00953.x

van Palenstein Helderman, W. H., Lembariti, B. S., van der Weijden, G. A., & van 't Hof, M. A. (1998). Gingival recession and its association with calculus in subjects deprived of prophylactic dental care. *Journal of Clinical Periodontology*, *25*(2), 106–11. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9495609

Vehkalahti, M. (1989). Occurrence of gingival recession in adults. *Journal of Periodontology*, *60*(11), 599–603. http://doi.org/10.1902/jop.1989.60.11.599

Yoneyama, T., Okamoto, H., Lindhe, J., Socransky, S. S., & Haffajee, A. D. (1988). Probing depth, attachment loss and gingival recession. Findings from a clinical examination in Ushiku, Japan. *Journal of Clinical Periodontology*, *15*(9), 581–591.

Zangiabadi, S., Costanian, C., & Tamim, H. (2017). Dental care use in Ontario: the Canadian community health survey (CCHS). *BMC Oral Health*, *17*(1), 165. http://doi.org/10.1186/s12903-017-0453-7
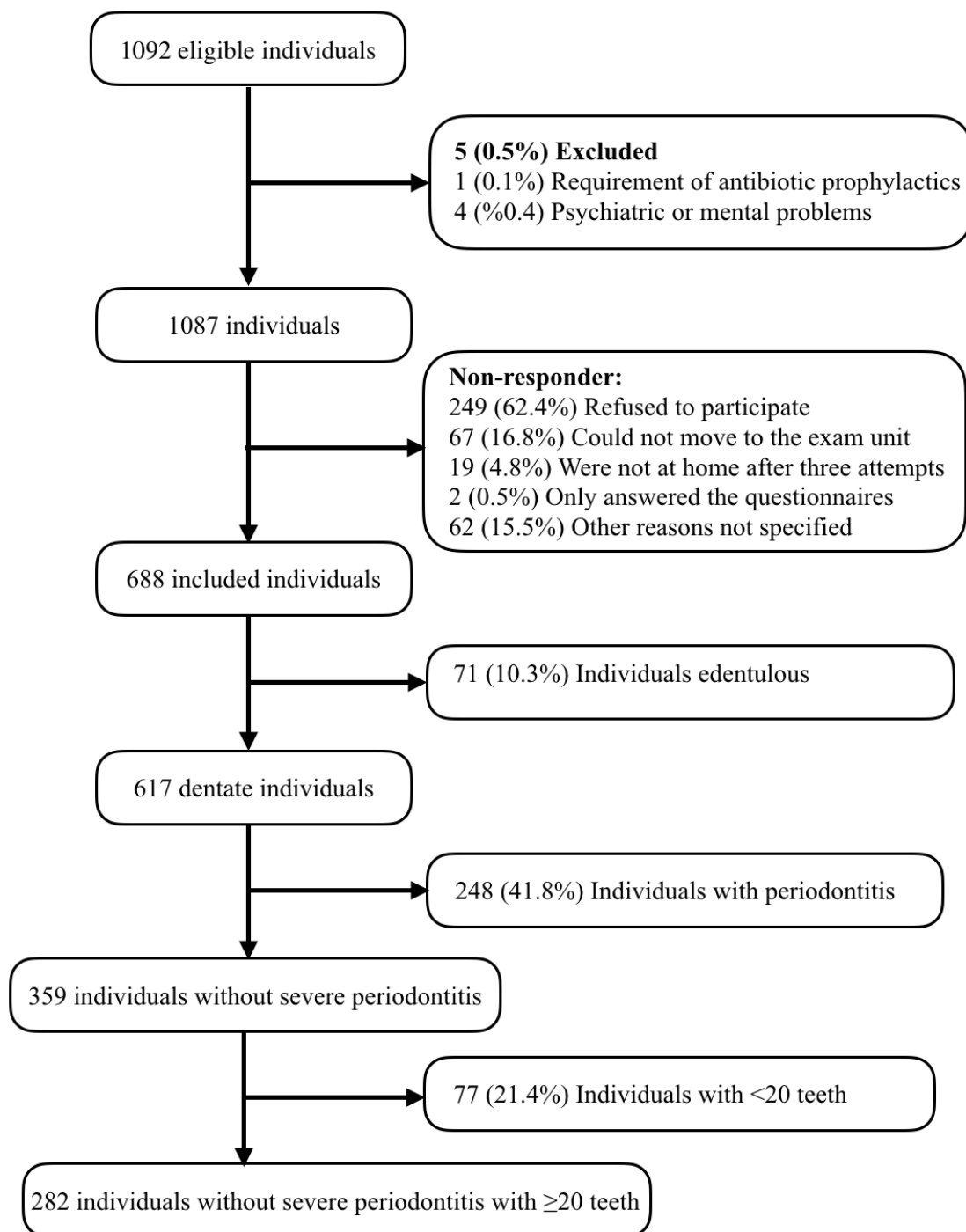
Figure1. Study flowchart

Table 1: Demographic, socio-economic and behavioral characteristics of sample**.**

Variables	N	%
Sex		
Female	149	50.61
Male	133	49.39
Skin color		
White	201	70.61
Non-white	81	29.39
Age*		
≤ 35 years	148	49.10
> 35 years	134	50.90
Income (BMWM)†		
>1.0	214	81.20
≤1.0	64	18.80
Schooling (years)		
>8 years	111	41.47
≤8 years	171	58.53
Smoke		
Non-smoker	191	65.62
Former/Current smoker	90	34.38
Frequency Toothbrush		
≥ 2x/day	266	94.14
< 2x/day	16	5.86
Toothbrush (Type)		
Extra soft/soft	149	53.99
Medium/Hard	132	46.01
Proximal Hygiene		
Yes	253	88.86
No	29	11.14
Orthodontic treatment		
No	262	93.43
Yes	20	6.57
Calculus		
≤ 22%	142	47.06
>22%	140	52.94
Gingivitis		
≤ 15%	137	47.98
>15%	145	52.02
Non-carious cervical lesion		
No	256	94.12
Yes	16	5.88

* Median
†BMMW: Brazilian monthly minimum wage % US$250 during study period.

Table 2: Prevalence (percentage of subjects) extent (mean number of teeth) and severity (mean) of gingival recession according to age strata considering buccal site.

Buccal site	Age (years)							
	≤ 29 years		30-41 years		≥ 42 years		Total	
	Estimate (n=95)	SE	Estimate (n=98)	SE	Estimate (n=89)	SE	Estimate (n=282)	SE
Prevalence (% subjects [n])								
≥1mm	91.6 (87)	0.28	98.0 (96)	0.01	100.0 (89)	0.00	96.5	0.01
≥3mm	16.8 (16)	0.04	43.9 (43)	0.05	57.3 (51)	0.05	39.0	0.03
≥5mm	2.1 (02)	0.01	7.1 (07)	0.03	14.6 (13)	0.04	7.8	0.01
Extension (mean teeth number)								
≥1mm	8.72	0.64	13.37	0.62	13.46	0.58	11.83	0.38
≥ 3mm	0.31	0.08	0.85	0.13	1.58	0.25	0.89	0.10
≥5mm	0.02	0.01	0.10	0.04	0.15	0.04	0.09	0.02
Severity (mm)	0.41	0.03	0.73	0.04	2.14	1.21	1.07	0.38

Table 3. Prevalence (percentage of subjects) and extent (mean number of teeth) in different thresholds of gingival recession according to oral hygiene variables.

	Brushing Frequency				Toothbrush type				Calculus			
	≥2/day		<2/day		Extra soft/soft		Mild/hard		<22%		≥22%	
	Estimative (n=266)	SE	Estimative (n=16)	SE	Estimative (n=150)	SE	Estimative (n=132)	SE	Estimative (n=142)	SE	Estimative (n=140)	SE
Buccal site Prevalence (% subjects)												
≥ 1mm	96.6 (257)	0.01	93.8 (15)	0.06	96.7 (145)	0.01	96.2 (127)	0.02	95.1 (135)	0.02	97.9 (137)	0.01
≥ 3mm	39.8 (106)	0.03	25.0 (04)	0.11	33.3 (50)	0.04	45.5 (60)	0.04	36.6 (52)	0.04	41.4 (58)	0.04
≥ 5mm	8.3 (22)	0.02	0.0 (00)	0.00	6.0 (9)	0.02	9.8 (13)	0.03	7.0 (10)	0.02	8.6 (12)	0.02
Extension (mean teeth number)												
≥ 1mm	12.04	0.38	12.60	0.57	11.10	0.50	12.59	0.57	10.89	0.53	12.71	0.53
≥ 3mm	9.35	0.10	3.12	0.15	7.78	0.14	10,38	0.15	8.22	0.13	9.78	0.15
≥ 5mm	0.98	0.02	0.00	0.00	0.74	0.02	1.13	0.03	0.85	0.03	1.00	0.03

SE: Standard Error

Table 4: Association between gingival recession ≥ 1mm (buccal site), demographic, socio-economic, behavioral and clinical variables.

Variables	OR (95%CI) Crude	P*	OR (95%CI) Adjusted	P**
Sex				
Female	1	0.552	-	
Male	0.97 (0.88-1.07)			
Skin color				
White	1	0.416	-	
Non-white	0.86 (0.60-1.23)			
Age[£]				
≤ 35 years	1	**0.000**	1	**0.000**
> 35 years	2.86 (2.13-3.83)		2.59 (1.92-3.50)	
Income (BMWM)[£ †]				
>1.0	1	0.290	-	
≤1.0	1.23 (0.84-1.80)			
Schooling (years)				
>8 years	1	**0.001**	1	**0.004**
≤8 years	1.69 (1.23-2.33)		1.55 (1.15-2.09)	
Smoke				
Non-smoker	1	**0.088**	1	0.418
Former/current Smoker	1.34 (0.95-1.89)		1.14 (0.82-1.58)	
Teeth				
Anterior	1		1	
Molar	2.17 (1.88-2.49)	**0.000**	2.22 (1.93-2.56)	**0.000**
Pre molar	2.13 (1.87-2.43)	**0.000**	2.16 (1.89-2.47)	**0.000**
Frequency Toothbrush				
≥ 2x/day	1	**0.022**	1	**0.013**
< 2x/day	0.45 (0.23-0.89)		0.44 (0.23-0.84)	
Toothbrush (Type)				
Extra soft/soft	1	**0.149**	1	0.110
Medium/Hard	1.26 (0.92-1.73)		1.27 (0.94-1.70)	
Toothpaste (use)				
Yes	1	0.392	-	
No	0.31 (0.02-4.44)			
Proximal Hygiene				
Yes	1	0.404		
No	1.25 (0.73-2.12)		-	
Orthodontic treatment				
No	1	0.809	-	
Yes	1.00 (0.99-1.00)			
Calculus				
≤ 22%	1		1	**0.019**
>22%	1.74 (1.27-2.38)	**0.000**	1.43 (1.06-1.94)	
Gingivitis				
≤ 15%	1		-	
>15%	0.96 (0.71-1.32)	0.847		
Non-carious cervical lesion				
No	1	**0.098**	0.93 (0.74-1.16)	0.542
Yes	1.19 (0.96-1.48)			

[‡]Median; [†]BMMW: Brazilian monthly minimum wage % US$250 during study period.
Multilevel logistic regression crude* and adjusted ** (-Variables that remained not retained in the final model)

Table 5: Association between gingival recession ≥ 3mm (buccal site), demographic, socio-economic, behavioral and clinical variables.

Variables	OR (95%CI) Crude	P*	OR (95%CI) Adjusted	P**
Sex				
Female	1	**0.092**	1	0.130
Male	1.53 (0.93-2.53)		1.44 (0.89-2.33)	
Skin color				
White	1	0.501	-	
Non-white	0.82 (0.47-1.44)			
Age$^£$				
≤ 35 years	1	**0.000**	1	**0.000**
> 35 years	4.11 (2.51-6.75)		3.56 (2.16-5.87)	
Income (BMWM)$^{£\,†}$				
>1.0	1	0.480	-	
≤1.0	1.23 (0.69-2.19)			
Schooling (years)				
>8 years	1	**0.033**	1	**0.029**
≤8 years	1.75 (1.05-2.94)		1.74 (1.06-2.86)	
Smoke				
Non-smoker	1	**0.003**	1	**0.016**
Former/current Smoker	2.12 (1.28-3.52)		1.84 (1.12-3.01)	
Teeth				
Anterior	1		1	
Molar	2.07 (1.42-3.01)	**0.000**	2.11 (1.45-3.07)	**0.000**
Pre molar	3.63 (2.63-5.01)	**0.000**	3.61 (2.62-4.98)	**0.000**
Frequency Toothbrush				
≥ 2x/day	1	**0.099**	1	**0.041**
< 2x/day	0.33 (0.08-1.23)		0.26 (0.07-0.94)	
Toothbrush (Type)				
Extra soft/soft	1	**0.093**	1	0.064
Medium/Hard	1.53 (0.93-2.52)		1.56 (0.97-2.50)	
Toothpaste (use)				
Yes	1	0.391	-	
No	2.18 (0.06-79.71)			
Proximal Hygiene				
Yes	1	0.618		
No	0.80 (0.34-1.88)		-	
Orthodontic treatment				
No	1	0.780	-	
Yes	0.99 (0.99-1.00)			
Calculus				
≤ 22%	1		-	
>22%	1.26 (0.77-2.07)	0.357		
Gingivitis				
≤ 15%	1		-	
>15%	1.16 (0.71-1.91)	0.550		
Non-carious cervical lesion				
No	1	0.340	-	
Yes	0.75 (0.41-1.35)			

$^£$Median; †BMMW: Brazilian monthly minimum wage ≈ US$250 during study period.
Multilevel logistic regression crude* and adjusted ** (-Variables that remained not retained in the final model).

4 DISCUSSÃO

Essa tese apresentou dois estudos sobre as RG. O primeiro abordando a prevalência e os fatores associados com as RG, e o outro as estimativas e análise multinivel de RG e fatores associados em indivíduos sem periodontite severa, ambos em uma amostra representative da área rural. A metodologia empregada foi criteriosa, visando superar deficiências observadas em outras pesquisas epidemiológicas relacionadas a Periodontia e apontadas em estudos recentes (LEROY; EATON; SAVAGE, 2010; OPPERMANN et al., 2015).

A utilização de estudos epidemiológicos na pesquisa de prevalência, extensão e severidade de doenças bucais vem sendo utilizados ao longo dos séculos. Enquanto estudos avaliando fatores associados vem sendo realizados ao longo das ultimas décadas (DYE, 2012). Indubitavelmente estudos abordando doenças relacionadas ao periodonto se encarregam de uma parcela significativa desses trabalhos que apesar das dificuldades de execução mostra resultados, se bem executado metodologicamente, com um alto nível de evidência.

Porém não basta apenas ser um estudo epidemiológico, mas conseguir trazer a representatividade da população em estudo é o que se busca com êxito nestes trabalhos. Ter a possibilidade de extrapolar os resultados obtidos naquela amostra fornece resultados que certamente ajudarão a desenvolver condutas preventivas e terapêuticas adequadas para o bem-estar da população em geral.

Os dois estudos demonstraram elevadas prevalências de RG. Outros estudos comparando residentes da área urbana com a área rural encontraram maior prevalência de RG em indivíduos vivendo na área rural (LEMBARITI; FRENCKEN; PILOT, 1988; MUMGHAMBA, et al., 2009). Ao adicionar-se a questão de indivíduos residentes em áreas rurais desprovidos de atendimento à saúde, há carência significativas de informações (AHN et al., 2011; SKILLMAN et al., 2010).

Os resultados apresentados no artigo "Prevalence of gingival recession and associates factors in the rural population of Southern Brazil – a multilevel analysis" além de indicarem uma alta prevalência de RG, demonstrou que aumento da idade e periodontite estavam associados com RG ≥1mm, ≥3mm and ≥5mm. Além disso, baixa escolaridade foi associada com RG ≥1mm e RG ≥3mm, assim como baixa renda e fumantes e ex-fumantes estavam associados com RG ≥3mm e ≥5mm. Enquanto menor frequência de escovação estava associada com proteção em RG ≥1mm.

Algumas explicações para essas associação podem ser dadas pelos mesmos fatores associados com as doenças periodontais. Aumento da idade é um fator associado para perda de inserção clínica, podendo ser resultado dos efeitos cumulativos do tempo sobre o periodonto (MACHTEI et al., 1999; NEELY et al., 2001; TIMMERMAN et al., 2000) e podendo influenciar na RG. Fumo é um fator de risco para periodontite ja cedimento pela literatura (BERGSTRÖM, 2006; GELSKEY, 1999) e demonstrado em estudos avaliando RG (RIOS et al., 2014; SARFATI et al., 2010; SUSIN, CRISTIANO; HAAS; et al., 2004). Baixa renda e baixa escolaridade tem siso associadas com piores condições periodontais (SUSIN, C et al., 2011; SUSIN, CRISTIANO; DALLA VECCHIA; et al., 2004).

Além das doenças periodontais, trauma derivado de escovação dentaria é um dos outros fatores relacionados com as RG (KASSAB; COHEN, 2003). Um estudo longitudinal clássico da literatura periodontal, conduzido por Loe et al. (1992), analisou duas populações distintas. Uma delas era composta por estudantes noruegueses com acesso a serviços de saúde odontológicos e com hábitos de higiene bucal adequados. A outra era constituída por plantadores de chá do Sri Lanka que não possuiam acesso a qualquer serviço odontológico e que basicamente desconheciam escovação dentária como hábito de higiene. Ao avaliar os resultadosos autores relataram que os estudantes noruegueses apresentaram índices de placa e inflamação gengival baixos, porém os indivíduos apresentavam RG. Já os plantadores de chá do Sri Lanka tiveram altos índices de placa, gengivite e RG. Os autores concluíram então que estas duas amostras apresentaram dois tipos de recessão: uma relacionada a doença periodontal e outra relacionada a fatores mecânicos, como a escovação dentária (LÖE et al., 1992). Frequencia de escovação < 2x/dai foi fator protetor em RG ≥1mm no primeiro estudo, assim como no segundo estudo em RG ≥1mm e RG ≥3mm, onde indivíduos sem periodontite severe foram avaliados. Diversos estudos na literatura demonstram que escovaçãoo traumática pode ser uma das causas de RG (ADDY; HUNTER, 2003; JOSHIPURA; KENT; DEPAOLA, 1994; KÄLLESTÅL et al., 1992; SMITH, 1997). Porém ainda existe controversa (ROSEMA et al., 2014), tornando os dados ainda inconclusivos.

Além da frequência de escovação <2x/dia ser associado como fator de proteção para RG e a prevalência de RG ser elevada no segundo estudo intitulado "Estimates and multilevel assessment of gingival recession in patients without severe periodontitis living in rural área", maior idade e baixa escolaridade também foram associados com RG. Interessantemente, dentes molares pré molares também estavam associados com RG nos dois pontos de corte avaliados, RG ≥1 and ≥3mm. Esses resultados corroboram os resultados de estudos com

amostras de conveniência em indivíduos com alto padrão de higiene bucal (CHECCHI et al., 1999; SERINO; WENNSTRÖM; LINDHE; ENEROTH; et al., 1994).

Esse é o primeiro estudo representativo a avaliar RG em indivíduos residentes da área rural. Além de demonstrar elevadas prevalências de RG em ambos os estudos, os fatores associados como periodontite, baixa escolaridade e baixa renda ressaltam importância de pesquisas, para o conhecimento das condições de saúde dessas populações. Podendo auxiliar a proposição e a implementação de políticas públicas, que visem melhorar o acesso aos serviços odontológicos desses indivíduos, enfatizando sua relevância não somente para o conhecimento científico, mas também para a saúde pública.

5 CONCLUSÃO

Apesar das dificuldades inerentes a levantamentos epidemiológicos, principalmente se tratando de áreas rurais, foi possível obter uma amostra robusta a qual possibilitou alcançar todos os objetivos previamente traçados, tornando este o único estudo de base populacional no mundo a abordar prevalência, extensão, severidade e fatores associados com recessão gengival emu ma mostra representativa da área rural.

Com base nas investigações científicas apresentadas nessa tese, conclui-se que:

a) A prevalência de RG foi alta, quase a totalidade da amostra aprosentava pelo menos um dente com RG ≥1mm. A prevalência, extensão e severidade de RG aumentaram com a idade. Idade e periodontite foram associadas com RG nos três pontos de corte, ≥1mm, ≥3mm e ≥5mm.

b) Há uma alta prevalência de RG em individulas sem periodontite severa vivendo na área rural. Além disso, após análise multinivel considerando fatores associados, idade avançada, baixa escolaridade, dentes pré-molares e molares foram indicadores de risco para RG ≥1mm e ≥3mm. Enquanto frequência de escovação <2x/dia foi um fator protetor para RG nos dois pontos de corte

REFERÊNCIAS

ADDY, M.; HUNTER, M. L. Can tooth brushing damage your health? Effects on oral and dental tissues. **International dental journal,** v. 53 Suppl 3, p. 177–86, 2003.

AGUDIO, G. et al. Periodontal Conditions of Sites Treated With Gingival-Augmentation Surgery Compared to Untreated Contralateral Homologous Sites: A 18- to 35-Year Long-Term Study. **Journal of periodontology,** v. 87, n. 12, p. 1–14, 2016.

AHN, S. et al. Residential Rurality and Oral Health Disparities: Influences of Contextual and Individual Factors. **The Journal of Primary Prevention,** v. 32, n. 1, p. 29–41, 2011.

ALBANDAR, J.M.; KINGMAN, A. Gingival recession, gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988-1994. **Journal of periodontology,** v. 70, n. 1, p. 30–43, 1999.

ARCHAMBAULT, J. et al. Stretch and interleukin-1β induce matrix metalloproteinases in rabbit tendon cells in vitro. **Journal of Orthopaedic Research,** v. 20, n. 1, p. 36–39, 2002.

AXÉLL, T.; KOCH, G. Traumatic ulcerative gingival lesion. **Journal of Clinical Periodontology,** v. 9, n. 3, p. 178–183, 1982.

BERGSTRÖM, J. Periodontitis and Smoking: An Evidence-Based Appraisal. **Journal of Evidence Based Dental Practice,** v. 6, n. 1, p. 33–41, 2006.

BHARATEESH, J. V.; KOKILA, G. Association of root caries with oral habits in older individuals attending a rural health centre of a dental hospital in India. **Journal of clinical and diagnostic research,** v. 8, n. 11, p. 80-28, 2014.

CHECCHI, L. et al. Gingival recession and toothbrushing in an Italian School of Dentistry: a pilot study. **Journal of clinical periodontology,** v. 26, n. 5, p. 276–280, 1999.

COSTA, R. S. et al. Prevalence and Risk Indicators of Dentin Hypersensitivity in Adult and Elderly Populations From Porto Alegre, Brazil. **Journal of periodontology,** v.86, n.9, p. 1247-1258, 2014.

DAPRILE, G.; GATTO, M. R.; CHECCHI, L. The evolution of buccal gingival recessions in a student population: a 5-year follow-up. **Journal of periodontology,** v. 78, n. 4, p. 611–614, 2007.

DAVID, J.; YEE, R.; LAMA, D. The periodontal health of adult Nepalese. **Oral health & preventive dentistry**, v. 9, n. 1, p. 67–81, 2011.

DE MACEDO, T. C. N. et al. Factors related to periodontal disease in a rural population. **Brazilian oral research**, v. 20, n. 3, p. 257–262, 2006.

DHALIWAL, J. S. et al. Prevalence of dentine hypersensitivity: A cross-sectional study in rural Punjabi Indians. **Journal of Indian Society of Periodontology,** v. 16, n. 3, p. 426–429, 2012.

DYE, B. A. Global periodontal disease epidemiology. **Periodontology 2000**, v. 58, n. 1, p. 10–25, 2012.

International Labor Office, S. P . D. **Global evidence on inequities in rural health protection: New data on rural deficits in health coverage for 174 countries.** Geneva: Xenia Scheild-Adlung 2015.

GELSKEY, S C. Cigarette smoking and periodontitis: methodology to assess the strength of evidence in support of a causal association. **Community dentistry and oral epidemiology,** v. 27, n. 1, p. 16–24, 1999.

GILLETTE, W B; VAN HOUSE, R L. Ill effects of improper oral hygeine procedure. **Journal of the American Dental Association**, v. 101, n. 3, p. 476–480, 1980.

GORMAN, W J. Prevalence and etiology of gingival recession. **Journal of periodontology,** v. 38, n. 4, p. 316–322, 1967.

HEASMAN, P. A et al. Evidence for the occurrence of gingival recession and non-carious cervical lesions as a consequence of traumatic toothbrushing. **Journal of clinical periodontolog***y*, v. 42 Suppl 1, p. 237-55, 2015.

HIRSHFELD, I. The toothbrush its use and abuse: traumatization of the soft tissue by the toothbrush. **Dental Items of Interest,** v. 56, p. 159, 1934.

HOLTFRETER, B. et al. Epidemiology of periodontal diseases in the Study of Health in Pomerania. **Journal of clinical periodontology,** v. 36, n. 2, p. 114–123, 2009.

JORDAN, R. A. et al. Pilot pathfinder survey of oral hygiene and periodontal conditions in the rural population of The Gambia (West Africa). **International journal of dental hygiene,** v. 9, n. 1, p. 53–9, 2011.

JOSHIPURA, K. J. KJ; KENT, R. L.; DEPAOLA, P. F. Gingival recession: intra-oral distribution and associated factors. **Journal of Periodontology,** v. 65, n. 9, p. 864–871, 1994.

KÄLLESTÅL, C et al. Buccal attachment loss in Swedish adolescents. **Journal of clinical periodontology**, v. 19, n. 7, p. 485–491, 1992.

KASSAB, M. M.; COHEN, R. E. The etiology and prevalence of gingival recession. **The Jounal of American Dental Association**, v. 134, n. 2, p. 220–225, 2003.

KHOCHT, A et al. Gingival recession in relation to history of hard toothbrush use. **Journal of periodontology**, v. 64, n. 9, p. 900–905, 1993.

KULARATNE, S.; EKANAYAKE, L. Root surface caries in older individuals from sri lanka. **Caries Research,** v. 41, n. 4, p. 252–256, 2007.

LEMBARITI, B S; FRENCKEN, J E; PILOT, T. Prevalence and severity of periodontal conditions among adults in urban and rural Morogoro, Tanzania. **Community dentistry and oral epidemiology,** v. 16, n. 4, p. 240–243, 1988.

LEROY, R.; EATON, K. A.; SAVAGE, . Methodological issues in epidemiological studies of periodontitis - how can it be improved? **BMC Oral Health,** v. 10, n. 1, p. 8, 21 dez. 2010.

LÖE, H. et al. The natural history of periodontal disease in man: prevalence, severity, and extent of gingival recession. **Journal of periodontology,** v. 63, n. 6, p. 489–495, 1992.

MACHTEI, E. E. et al. Longitudinal study of predictive factors for periodontal disease and tooth loss. **Journal of clinical periodontology,** v. 26, n. 6, p. 374–80, 1999.

MATAS, F.; SENTIS, J.; MENDIETA, C. Ten-year longitudinal study of gingival recession in dentists. **Journal of clinical periodontology,** v. 38, n. 12, p. 1091–1098, dez. 2011.

MORRIS, J. W. et al. Prevalence of gingival recession after orthodontic tooth movements. **American Journal of Orthodontics and Dentofacial Orthopedic***s*, v. 151, n. 5, p. 851–859, 2017.

MUMGHAMBA, E G; MARKKANEN, H A; HONKALA, E. Risk factors for periodontal diseases in Ilala, Tanzania. **Journal of clinical periodontology,** v. 22, n. 5, p. 347–354, 1995.

MUMGHAMBA, E. G. S. et al. Gingival recession, oral hygiene and associated factors among Tanzanian women. **East African medical journal**, v. 86, n. 3, p. 125–132, 2009.

NEEDLEMAN, I. et al. Impact of oral health on the life quality of periodontal patients. **Journal of clinical periodontology,** v. 31, n. 6, p. 454–457, 2004.

NEELY, A. L. et al. The Natural History of Periodontal Disease in Man. Risk Factors for Progression of Attachment Loss in Individuals Receiving No Oral Health Care. **Journal of Periodontology,** v. 72, n. 8, p. 1006–1015, 2001.

OPPERMANN, R. V. et al. Epidemiology of periodontal diseases in adults from Latin America. **Periodontology 2000**, v. 67, n. 1, p. 13–33, 2015.

PAGE, R. C.; STURDIVANT, E. C. Noninflammatory destructive periodontal disease (NDPD). **Periodontology 2000,** v. 30, p. 24–39, 2002.

RAJAPAKSE, P. S. et al. Does tooth brushing influence the development and progression of non-inflammatory gingival recession? A systematic review. **Journal of clinical periodontology**, v. 34, n. 12, p. 1046–1061, 2007.

RIOS, F. S. et al. Estimates and multivariable risk assessment of gingival recession in the population of adults from Porto Alegre, Brazil. **Journal of clinical periodontology,** v. 41, n. 11, p. 1098–1107, 2014.

RONDEROS, M.; PIHLSTROM, B. L.; HODGES, J. S. Periodontal disease among indigenous people in the Amazon rain forest. *J***ournal of clinical periodontology,** v. 28, n. 11, p. 995–1003, 2001.

ROSEMA, N. A. M. et al. Gingival abrasion and recession in manual and oscillating-rotating power brush users. **International journal of dental hygiene**, v. 12, n. 4, p. 257–266, 2014.

SARFATI, A. et al. Risk assessment for buccal gingival recession defects in an adult population. **Journal of periodontology,** v. 81, n. 10, p. 1419–1425, 2010.

SCHROEDER, H E; MÜNZEL-PEDRAZZOLI, S; PAGE, R. Correlated morphometric and biochemical analysis of gingival tissue in early chronic gingivitis in man. **Archives of oral biology,** v. 18, n. 7, p. 899–923, 1973.

SERINO, G; WENNSTRÖM, J L; LINDHE, J; ENEROTH, L; *et al.* The prevalence and distribution of gingival recession in subjects with a high standard of oral hygiene. **Journal of clinical periodontology,** v. 21, n. 1, p. 57–63, 1994.

SHIP, J. A.; BECK, J. D. Ten-year longitudinal study of periodontal attachment loss in healthy adults. **Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics**, v. 81, n. 3, p. 281–290, 1996.

SKILLMAN, S. M. et al. The challenge to delivering oral health services in rural America. **Journal of public health dentistry,** v. 70 Suppl 1, p. 49-57, 2010.

SKUTEK, M. et al. Cyclic mechanical stretching modulates secretion pattern of growth factors in human tendon fibroblasts. **European Journal of Applied Physiology**, v. 86, n. 1, p. 48–52, 2001.

SMITH, R. G. Gingival recession Reappraisal of an enigmatic condition and a new. **Journal of Clinical Periodontololy**, v. 24, n. 3, p. 203–205, 1997.

SMUKLER, H.; LANDSBERG, J. The toothbrush and gingival traumatic injury. **Journal of periodontology**, v. 55, n. 12, p. 713–719, 1984.

STONER, J. E.; MAZDYASNA, S. Gingival recession in the lower incisor region of 15-year-old subjects. **Journal of periodontology,** v. 51, n. 2, p. 74–76, 1980.

SUSIN, C. et al. Prevalence and risk indicators for chronic periodontitis in adolescents and young adults in south Brazil. **Journal of Clinical Periodontology,** v. 38, n. 4, p. 326-333, 2011.

SUSIN, C. et al. Gingival recession: epidemiology and risk indicators in a representative urban Brazilian population. **Journal of periodontology,** v. 75, n. 10, p. 1377–1386, 2004.

SUSIN, C. et al. Periodontal attachment loss in an urban population of Brazilian adults: effect of demographic, behavioral, and environmental risk indicators. **The Journal of periodontology,** v. 75, n. 7, p. 1033–1041, 2004.

TIMMERMAN, M. F. et al. Untreated periodontal disease in Indonesian adolescents. Longitudinal clinical data and prospective clinical and microbiological risk assessment. **Journal of clinical periodontology,** v. 27, n. 12, p. 932–942, 2000.

THOMSON, W. M., HASHIM, R., PACK, A. R. The prevalence and intraoral distribution of periodontal attachment loss in a birth cohort of 26-year-olds. **Journal of Periodontology,** n.71, p. 1840–1845, (2000).

WAGNER, T. P. et al. Gingival recession and oral health-related quality of life: a population-based cross-sectional study in Brazil. **Community dentistry and oral epidemiology,** v. 44, n. 4, p. 390–399, 2016.

WANG, Q. et al. Epidemiology and preventive direction of periodontology in China. **Journal of Clinical Periodontology,** v. 34, n. 11, p. 946–951, 2007.

WATSON, P J. Gingival recession. **Journal of dentistry,** v. 12, n. 1, p. 29–35, 1984.

APÊNDICE A – TERMOS DE ASSENTIMENTO PARA MENORES DE 18 ANOS

Universidade Federal de Santa Maria
Centro de Ciências da Saúde
Programa de Pós-Graduação em Ciências Odontológicas

TERMO DE ASSENTIMENTO

Título do projeto: Levantamento epidemiológico na área rural de Rosário do Sul-RS
Pesquisador responsável: Carlos Heitor Cunha Moreira
Instituição/Departamento: Universidade Federal de Santa Maria / Programa de Pós-Graduação em Ciências Odontológicas.
Telefone para contato (inclusive a cobrar): (55) 9106-4673
Pesquisadores participantes: Jociana Boligon e Ticiane de Góes Mário.
Telefone para contato (inclusive a cobrar): (55) 9978-0866 e (55) 9903-5101

❖ Você está sendo convidado(a) a participar, como voluntário, em uma pesquisa. Você precisa decidir se quer participar ou não. Por favor, não se apresse em tomar a decisão. Leia cuidadosamente o que se segue e pergunte ao responsável pelo estudo qualquer dúvida que você tiver. O presente termo tem por objetivo estabelecer acordo mediante o qual a criança ou o adolescente receberá por parte de seu (sua) responsável autorização para ser examinado (a) pelas Cirurgiãs-dentistas integrantes do presente projeto com finalidade de avaliar sua condição bucal. Após serem esclarecidos (as) sobre as informações a seguir, no caso de aceitarem fazer parte do estudo, você e seu responsável deverão assinar ao final deste documento, que está em duas vias. Uma delas é sua e a outra é do pesquisador responsável. Em caso de recusa vocês não serão penalizados de forma alguma.

❖ Essa pesquisa justifica-se pela necessidade de conhecimento das condições periodontais e saúde geral de uma população que, pela localização geográfica, extensão territorial, diversidades socioeconômicas e culturais, tem dificuldade de acesso à assistência médica e odontológica integral.

❖ A sua participação nesse estudo será no sentido de permitir a avaliação da sua boca, de suas medidas corporais e de responder a alguns questionários. Serão anotados dados sobre a quantidade de dentes perdidos, restaurados, obturados e cariados; a presença de placa (tecido amolecido amarelo-esbranquiçado) e cálculo dentário (tecido duro de cor mais escura) formados sobre seus dentes; a ocorrência de sangramento ou pus na sua gengiva e medidas de perda de osso ao redor dos seus dentes, quando encostamos um instrumento odontológico (sonda periodontal milimetrada) entre essas duas estruturas e se há alteração na gengiva após esta ser corada com uma substância inofensiva à sua saúde. Você responderá a questionários, de rápida execução, sobre consultas ao dentista, presença de doenças ou alterações em seu organismo, uso de remédios, hábitos alimentares e comportamentais, nível de educação, renda familiar e qualidade de vida. Seu peso e sua altura serão medidos para análise do seu Índice de Massa Corporal. Também mediremos a circunferência da sua cintura e verificaremos sua pressão arterial.

❖ Você poderá se sentir cansado e ter algum desconforto nos exames em que um instrumento odontológico é passado entre sua gengiva e seus dentes, além de haver um risco mínimo de se machucar com o instrumento caso ocorra um movimento brusco de sua parte ou do examinador. Após os exames você poderá ficar com dor leve em sua gengiva. Desconforto também poderá ser sentido durante a coleta de material sanguíneo. Além disso, você poderá se sentir constrangido ou cansado em responder as questões dos questionários ou, ainda durante medição do seu peso, altura e pressão arterial. Caso haja dano odontológico com a pesquisa você terá direito a assistência odontológica gratuita garantida pelos pesquisadores.

❖ O benefício direto a você, participante, será um relatório odontológico detalhado sobre a condição de sua boca e, se necessário, encaminhamento para tratamento odontológico no Serviço de Saúde Municipal ou nas Clínicas Odontológicas da Universidade Federal de Santa Maria e uma avaliação complementar do seu estado de saúde geral.

❖ Você terá acesso aos profissionais responsáveis pela pesquisa para esclarecimento de eventuais dúvidas em qualquer etapa do estudo. É garantido o livre acesso a todas as informações e, sendo de seu interesse, você será mantido atualizado sobre os resultados finais da pesquisa após a publicação da mesma.

❖ Se você concordar em participar do estudo, seu nome e identidade serão mantidos em sigilo. A menos que requerido por lei ou por sua solicitação, somente a equipe do estudo e o Comitê de Ética terão acesso a suas informações. As informações do estudo serão divulgadas apenas em eventos ou publicações científicas sem identificação dos voluntários. As fichas clínicas e os questionários, após analisados, ficarão guardados na Clínica de Periodontia da UFSM Santa Maria/RS. (Antigo Prédio da Reitoria, Rua Marechal Floriano Peixoto, número 1184, 7º andar, sala 710) por 5 anos, a fim de possibilitar esclarecimentos posteriores ao término do estudo, conforme nova resolução do CNS 466/12, e, depois, imediatamente destruídos por incineração. Exames de sangue serão fornecidos ao paciente, nós ficaremos com uma cópia do mesmo, que será armazenada como descrito acima.

❖ Você pode se recusar a participar do estudo, ou retirar seu consentimento e sair da pesquisa a qualquer momento, mesmo durante o exame, sem precisar justificar.

Eu, _____, de nacionalidade _____, com _____ anos de idade, estado civil _____, profissão _____, residente em _____, RG nº_____, responsável pelo menor _____ _____ autorizo-o a participar do estudo, acima nominado e resumidamente descrito, como sujeito. Fui suficientemente informado (a) a respeito das informações que li ou que foram lidas para mim, descrevendo o estudo **"Levantamento epidemiológico na área rural de Rosário do Sul - RS".** Eu discuti com a pesquisadora _____ sobre a minha decisão em participar nesse estudo. Ficaram claros para mim quais são os propósitos do estudo, os procedimentos a serem realizados, seus desconfortos e riscos, as garantias de confidencialidade e de esclarecimentos permanentes. Estou totalmente ciente de que não há nenhum valor econômico, a receber ou pagar, por minha participação. Ficou claro também que minha participação é isenta de despesas. Concordo voluntariamente em participar deste estudo e poderei retirar o meu consentimento a qualquer momento, antes ou durante o mesmo, sem penalidades ou prejuízo.

Rosário do Sul, _____ de _____ de 201__.

_____
Nome e Assinatura do responsável

Eu _____, concordo em ser atendido pelas cirurgiãs-dentistas participantes deste Projeto, de acordo com o que foi explicado a mim e a meus responsáveis.

_____
Nome e Assinatura do sujeito

Declaro que obtive de forma apropriada e voluntária o Consentimento Livre e Esclarecido deste sujeito de pesquisa ou representante legal para a participação neste estudo:

_____
Nome e assinatura do pesquisador responsável

_____
Se você tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato: Comitê de Ética em Pesquisa – UFSM - Cidade Universitária - Bairro Camobi, Av. Roraima, nº1000 - CEP: 97.105.900 Santa Maria – RS. Telefone: (55) 3220-9362 – Fax: (55)3220-8009 Email: comiteeticapesquisa@smail.ufsm.br. Web: www.ufsm.br/cep

APÊNDICE B – TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO PARA MAIORES DE 18 ANOS

Universidade Federal de Santa Maria
Centro de Ciências da Saúde
Programa de Pós-Graduação em Ciências Odontológicas

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Título do projeto: Levantamento epidemiológico na área rural de Rosário do Sul-RS
Pesquisador responsável: Carlos Heitor Cunha Moreira
Instituição/Departamento: Universidade Federal de Santa Maria / Programa de Pós-Graduação em Ciências Odontológicas.
Telefone para contato (inclusive a cobrar): (55) 9106-4673
Pesquisadores participantes: Jociana Boligon e Ticiane de Góes Mário.
Telefone para contato (inclusive a cobrar): (55) 9978-0866 e (55) 9903-5101

❖ Você está sendo convidado(a) para participar, como voluntário, em uma pesquisa. Você precisa decidir se quer participar ou não. Por favor, não se apresse em tomar a decisão. Leia cuidadosamente o que se segue e pergunte ao responsável pelo estudo qualquer dúvida que você tiver. Após ser esclarecido sobre as informações a seguir, no caso de aceitar fazer parte do estudo, assine ao final deste documento, que está em duas vias. Uma delas é sua e a outra é do pesquisador responsável. Em caso de recusa você não será penalizado de forma alguma.

❖ Essa pesquisa justifica-se pela necessidade de conhecimento das condições periodontais e saúde geral de uma população que, pela localização geográfica, extensão territorial, diversidades socioeconômica e cultural, tem dificuldade de acesso à assistência médica e odontológica integral.

❖ A sua participação nesse estudo será no sentido de permitir a avaliação da sua boca, de suas medidas corporais e de responder a alguns questionários. Serão anotados dados sobre a quantidade de dentes perdidos, restaurados, obturados e cariados; a presença de placa (tecido amolecido amarelo-esbranquiçado) e cálculo dentário (tecido duro de cor mais escura) formados sobre seus dentes; a ocorrência de sangramento ou pus na sua gengiva e medidas de perda de osso ao redor dos seus dentes, quando encostamos um instrumento odontológico (sonda periodontal milimetrada) entre essas duas estruturas e se há alteração na gengiva após esta ser corada com uma substância inofensiva à sua saúde. Você responderá a questionários, de rápida execução, sobre consultas ao dentista, presença de doenças ou alterações em seu organismo, uso de remédios, hábitos alimentares e comportamentais, nível de educação, renda familiar e qualidade de vida. Seu peso e sua altura serão medidos para análise do seu Índice de Massa Corporal. Também mediremos a circunferência da sua cintura e verificaremos sua pressão arterial, e um técnico em enfermagem capacitado (de um laboratório conveniado da prefeitura do município) coletará amostras de sangue para melhor avaliarmos sua saúde geral.

❖ Você poderá se sentir cansado e ter algum desconforto nos exames em que um instrumento odontológico é passado entre sua gengiva e seus dentes, além de haver um risco mínimo de se machucar com o instrumento caso ocorra um movimento brusco de sua parte ou do examinador. Após os exames você poderá ficar com dor leve em sua gengiva. Desconforto também poderá ser sentido durante a coleta de material sanguíneo. Além disso, você poderá se sentir constrangido ou cansado em responder as questões dos questionários ou, ainda durante medição do seu peso e altura. Caso haja dano odontológico com a pesquisa você terá direito a assistência odontológica gratuita garantida pelos pesquisadores.

❖ O benefício direto a você, participante, será um relatório odontológico detalhado sobre a condição de sua boca e, se necessário, encaminhamento para tratamento odontológico no Serviço de Saúde Municipal ou nas Clínicas Odontológicas da Universidade Federal de Santa Maria e uma avaliação complementar do seu estado de saúde geral.

❖ Você terá acesso aos profissionais responsáveis pela pesquisa para esclarecimento de eventuais dúvidas em qualquer etapa do estudo. É garantido o livre acesso a todas as informações e, sendo de seu interesse, você será mantido atualizado sobre os resultados finais da pesquisa após a publicação da mesma.

❖ Se você concordar em participar do estudo, seu nome e identidade serão mantidos em sigilo. A menos que requerido por lei ou por sua solicitação, somente a equipe do estudo e o Comitê de Ética terão acesso a suas informações. As informações do estudo serão divulgadas apenas em eventos ou publicações científicas sem identificação dos voluntários. As fichas clínicas e os questionários, após analisados, ficarão guardados na Clínica de Periodontia da UFSM Santa Maria/RS. (Antigo Prédio da Reitoria, Rua Marechal Floriano Peixoto, número 1184, 7º andar, sala 710) por 5 anos, a fim de possibilitar esclarecimentos posteriores ao término do estudo, conforme nova resolução do CNS 466/12, e, depois, imediatamente destruídos por incineração. Exames de sangue serão fornecidos ao paciente, nós ficaremos com uma cópia do mesmo, que será armazenada como descrito acima.

❖ Você pode se recusar a participar do estudo, ou retirar seu consentimento e sair da pesquisa a qualquer momento, mesmo durante o exame, sem precisar justificar.

Eu, _____, de nacionalidade _____, com _____ anos de idade, estado civil _____, profissão _____, residente em _____, RG nº _____, abaixo assinado, concordo em participar do estudo como sujeito. Fui suficientemente informado (a) a respeito das informações que li ou que foram lidas para mim, descrevendo o estudo **"Levantamento epidemiológico na área rural de Rosário do Sul-RS".** Eu discuti com a pesquisadora _____ sobre a minha decisão em participar nesse estudo. Ficaram claros para mim quais são os propósitos do estudo, os procedimentos a serem realizados, seus desconfortos e riscos, as garantias de confidencialidade e de esclarecimentos permanentes. Estou totalmente ciente de que não há nenhum valor econômico, a receber ou pagar, por minha participação. Ficou claro também que minha participação é isenta de despesas. Concordo voluntariamente em participar deste estudo e poderei retirar o meu consentimento a qualquer momento, antes ou durante o mesmo, sem penalidades ou prejuízo.

Rosário do Sul, _____ de _____ de 201__.

_____
Nome e Assinatura do sujeito

Declaro que obtive de forma apropriada e voluntária o Consentimento Livre e Esclarecido deste sujeito de pesquisa ou representante legal para a participação neste estudo:

_____
Nome e assinatura do pesquisador responsável

_____
Se você tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato: Comitê de Ética em Pesquisa – UFSM - Cidade Universitária - Bairro Camobi, Av. Roraima, nº1000 - CEP: 97.105.900 Santa Maria – RS. Telefone: (55) 3220-9362 – Fax: (55)3220-8009 Email: comiteeticapesquisa@smail.ufsm.br. Web: www.ufsm.br/cep

APÊNDICE C – FICHA DE EXAME SUPRAGENGIVAL

Data: ____/____/ 20____   Nº: _____

Nome: _____ Gênero: ☐ F ☐ M
Idade: _____ anos. Data de nascimento: ____/____/_____
Telefone(s): _____
Nome e contato de um parente: _____

Distrito: ☐ Campo Seco   ☐ Caverá   ☐ Mangueiras   ☐ Rosário   ☐ São Carlos   ☐ Touro Passo

EXAME PERIODONTAL SUPRAGENGIVAL

	17			16			15			14			13			12			11			21			22			23			24			25			26			27		
	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D
IPV																																										
ISG																																										
FRP																																										
	D	P	M	D	P	M	D	P	M	D	P	M	D	P	M	D	P	M	D	P	M	M	P	D	M	P	D	M	P	D	M	P	D	M	P	D	M	P	D	M	P	D
IPV																																										
ISG																																										
FRP																																										

	47			46			45			44			43			42			41			31			32			33			34			35			36			37		
	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D
IPV																																										
ISG																																										
FRP																																										
	D	L	M	D	L	M	D	L	M	D	L	M	D	L	M	D	L	M	D	L	M	M	L	D	M	L	D	M	L	D	M	L	D	M	L	D	M	L	D	M	L	D
IPV																																										
ISG																																										
FRP																																										

PRESENTES:

☐ 18   ☐ 28
☐ 48   ☐ 38

USO DE PRÓTESES: ☐ Sim   ☐ Não

Superior: ☐ PT   ☐ PPR (___ elementos)

Inferior: ☐ PT   ☐ PPR (___ elementos)

(PT: Prótese total/ PPR: Prótese parcial removível)

APÊNDICE D – FICHA DE EXAME SUBGENGIVAL

Data: ____/____/ 20____   Nº: _____

Nome: _____Gênero: ☐ F ☐ M
Idade: _____ anos.   Data de nascimento: ____/____/_____
Telefone(s): _____
Nome e contato de um parente:_____

Distrito: ☐ Campo Seco   ☐ Caverá   ☐ Mangueiras   ☐ Rosário   ☐ São Carlos   ☐ Touro Passo

EXAME PERIODONTAL SUBGENGIVAL

	17			16			15			14			13			12			11			21			22			23			24			25			26			27		
	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D
PS																																										
SS																																										
NIC																																										
	D	P	M	D	P	M	D	P	M	D	P	M	D	P	M	D	P	M	D	P	M	M	P	D	M	P	D	M	P	D	M	P	D	M	P	D	M	P	D	M	P	D
PS																																										
SS																																										
NIC																																										

	47			46			45			44			43			42			41			31			32			33			34			35			36			37		
	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	D	V	M	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D	M	V	D
PS																																										
SS																																										
NIC																																										
	D	L	M	D	L	M	D	L	M	D	L	M	D	L	M	D	L	M	D	L	M	M	L	D	M	L	D	M	L	D	M	L	D	M	L	D	M	L	D	M	L	D
PS																																										
SS																																										
NIC																																										

Lesões de furca:

17	V: 0 1 2 3	16	V: 0 1 2 3	V: 0 1 2 3	26	V: 0 1 2 3	27
	M: 0 1 2 3		M: 0 1 2 3	M: 0 1 2 3		M: 0 1 2 3	
	D: 0 1 2 3		D: 0 1 2 3	D: 0 1 2 3		D: 0 1 2 3	

47	V: 0 1 2 3	48	V: 0 1 2 3	V: 0 1 2 3	36	V: 0 1 2 3	37
	L: 0 1 2 3		L: 0 1 2 3	L: 0 1 2 3		L: 0 1 2 3	

APÊNDICE E – QUESTIONÁRIOS SOCIODEMOGRÁFICO E SOBRE HÁBITOS

Data: ____/____/ 20____

Nº: _____

Nome:_____ Gênero: ☐ F ☐ M
Idade: _____ anos. Data de nascimento: ____/____/_____
Telefone(s): _____
Nome e contato de um parente:_____

Distrito: ☐ Campo Seco ☐ Caverá ☐ Mangueiras ☐ Rosário ☐ São Carlos ☐ Touro Passo
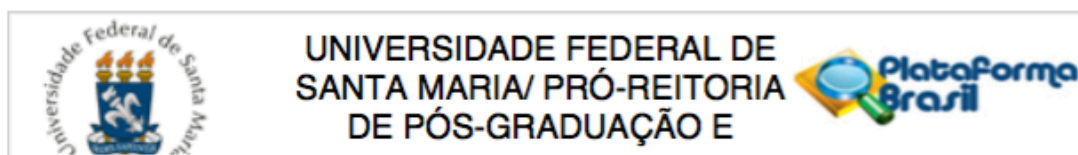
MEDIDAS ANTROPOMÉTRICAS:

Peso: _____kg + _____kg/2 = _____kg

Altura: _____m + _____m/2 = _____m

Circunferência da cintura: _____cm + _____cm/2 = _____cm

IMC: _____

Pressão arterial: _____mm/Hg + _____mm/Hg/2 = _____ mm/Hg

Saliva (quantidade em ml/ peso): _____ml _____g

QUESTIONÁRIO SOCIODEMOGRÁFICO: NS= não sei

1) Qual a sua cor/raça? Branca Parda Preta Amarela Indígena NS _____
2) Qual é a renda mensal da sua família (reais)? _____
3) Quantos anos você estudou? 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 _____
4) Qual é o seu grau de escolaridade?
   ( ) Ensino Fundamental Incompleto   ( ) Ensino Fundamental Completo
   ( ) Ensino Médio Incompleto   ( ) Ensino Médio Completo
   ( ) Ensino Superior Incompleto   ( ) Ensino Superior Completo

QUESTIONÁRIO SOBRE HÁBITOS: NS= não sei

1) Quantas vezes você escova seus dentes por dia? 0 1 2 3 4 5 6 7 8 NS _____
2) Quanto tempo você gasta para escovar os dentes (minutos)? 1 2 3 4 5 6 7 8 NS _____
3) Que tipo de escova usa? Extra-macia Macia Média Dura NS
4) Quanto tempo você demora em trocar de escova (meses)? 1 2 3 4 5 6 + de 6 NS _____
5) Faz uso de pasta de dente? Sim Não. Qual? _____ NS.
   Em que quantidade (mostrar fotos)? Grande Média Razoável Pequena
6) Faz uso de algum dispositivo para limpar entre seus dentes? Sim Não. Qual? Fio Fita Superfloss
   Escova interdental Palito _____
7) Com que frequência você usa esse dispositivo (vezes/dia)? 1 2 3 4 5 6 7 8 _____
8) Faz uso de alguma solução para bochecho? Sim Não. Qual? _____ NS
9) Sente sensibilidade nos dentes? Sim Não Às vezes NS
10) Você costuma ir ao dentista? Sim Não. Quantas vezes por ano? 1 2 3 4 5 _____.
    Por quais motivos? Dor Revisão _____
11) Percebe gengivas inchadas? Sim Não Às vezes NS
12) Percebe se sangra sua gengiva? Sim Não Às vezes NS

APÊNDICE F – QUESTIONÁRIOS MÉDICO

Data: ____/____/ 20____   Nº: _____

Nome:_____Gênero: ☐ F   ☐ M
Idade: _____ anos. Data de nascimento: ____/____/_____
Telefone(s): _____
Nome e contato de um parente:_____

Distrito: ☐ Campo Seco   ☐ Caverá   ☐ Mangueiras   ☐ Rosário   ☐ São Carlos   ☐ Touro Passo

QUESTIONÁRIO 2: NS= não sei

1) Você usa algum medicamento regularmente? Sim   Não. Se sim, qual (is)? _____
   _____   Não lembro   NS

2) Você tem alguma doença de ordem geral? Sim   Não. Qual (is)? _____
   _____

3) Você já quebrou algum osso? Sim   Não   NS. Se sim, qual osso? _____
   e com quantos anos?_____   NS

4) Seu pai ou sua mãe quebraram o osso do quadril ou o fêmur? Sim   Não   NS

5) Você fuma? Sim   Não. Quantos cigarros por dia? _____Há quanto tempo? _____

6) É ex-fumante? Sim   Não. Há quanto tempo parou de fumar? _____

7) Utiliza algum outro tipo de fumo? Sim   Não. Qual? Cachimbo   Charuto   Palheiro _____

(MULHERES)

8) Qual era a sua idade quando veio a primeira menstruação? 9   10   11   12   13   14   15   16   17 ___ anos. NS

9) Você menstrua 8 (oito) ou mais vezes por ano? Sim   Não   Minha menstruação é irregular   NS

10) Com que idade você parou de menstruar? 41   42   43   44   45   46   47   48   49   50   51   52 ___ anos. NS

11) Faz terapia de reposição hormonal? Sim   Não. Já fez? Sim   Não. Se sim, quando? _____
    e por quanto tempo? _____   NS

12) Você tem ou teve problemas de aumento de pelos no corpo (face, abdômen, tronco, pernas, costas) antes
    dos 45 anos de idade? Sim   Não   NS

ANEXO A – APROVAÇÃO DO COMITÊ DE ÉTICA EM PESQUISA

UNIVERSIDADE FEDERAL DE SANTA MARIA/ PRÓ-REITORIA DE PÓS-GRADUAÇÃO E

PlataForma Brasil

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: LEVANTAMENTO EPIDEMIOLÓGICO NA ÁREA RURAL DE ROSÁRIO DO SUL/RS
Pesquisador: CARLOS HEITOR CUNHA MOREIRA
Área Temática:
Versão: 2
CAAE: 37862414.5.0000.5346
Instituição Proponente: Universidade Federal de Santa Maria/ Pró-Reitoria de Pós-Graduação e
Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 979.743
Data da Relatoria: 10/03/2015

Apresentação do Projeto:
Doenças periodontais compreendem condições infecciosas e inflamatórias resultantes da interação entre biofilme bacteriano e resposta do hospedeiro. Essa relação é modulada
por uma variedade de fatores, dentre eles, diabetes e fumo, capazes de alterar o início e a progressão dessas afecções. A doença periodontal também pode acarretar alterações
sistêmicas, como na doença cardiovascular e no controle da glicemia, e comprometimento
funcional e estético. O entendimento de uma pequena quantidade de fatores de risco pode ter potencial impacto no encargo de muitas doenças, com custo reduzido e maior eficiência e efetividade que abordagens específicas para cada condição isolada. Assim, esse projeto
objetiva avaliar condições bucais, parâmetros inflamatórios e microbiológicos associados,
indicadores e fatores de risco às doenças periodontais, impacto desses parâmetros na
qualidade de vida, além de questões relacionadas à saúde geral, como obesidade, diabetes
e hipertensão, na zona rural de Rosário do Sul - RS.

Realizaremos um censo das crianças de 10 a 14 anos, para avaliação de cárie e fluorose. E uma amostra representativa dos indivíduos, maiores de 15 anos, residentes na área rural desse município (N= 828) receberá exame bucal completo (periodonto, dentes, mucosas, saliva e análise microbiológica de biofilme), avaliações antropométricas (pressão arterial, peso, altura,

Endereço: Av. Roraima, 1000 - prédio da Reitoria - 2° andar
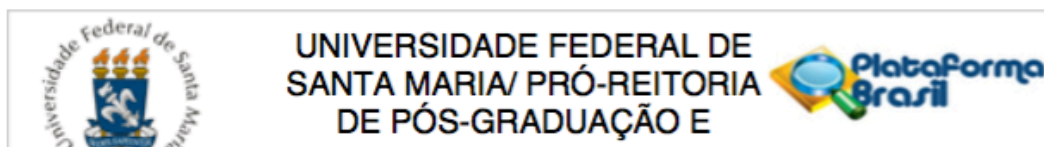**Bairro:** Camobi   **CEP:** 97.105-970
UF: RS   **Município:** SANTA MARIA
Telefone: (55)3220-9362   **E-mail:** cep.ufsm@gmail.com

Página 01 de 04

circunferência da cintura) e exames sanguíneos (hemograma completo, hemoglobina glicada, proteína C-reativa ultrassensível e continina plasmática).

Adicionalmente, os moradores que aceitarem participar do estudo, mediante a assinatura de
termo de consentimento livre e esclarecido, responderão a questionários sobre qualidade de vida, características médicas e sociodemográficas e hábitos de higiene bucal.

Esperamos que, através do conhecimento gerado após a análise dos resultados desse projeto, medidas de controle e/ou erradicação dos problemas encontrados possam ser adotadas, visando melhorias na saúde dos indivíduos dessa área. Caso essas estratégias
sejam implementadas, avaliações posteriores poderão ser realizadas a fim de verificar a
efetividade das mesmas. Além disso, com a obtenção de resultados positivos/benéficos, há a possibilidade de extensão para outras populações, na tentativa de melhorar as condições
globais de saúde.

Objetivo da Pesquisa:
Objetivo geral: realizar um levantamento epidemiológico em uma amostra representativa da
população rural de Rosário do Sul/ RS.

Objetivos específicos
- Avaliar a condição periodontal (prevalência, extensão e gravidade de doença) dessa população;
- Buscar associações entre condição periodontal e parâmetros inflamatórios e icrobiológicos;
- Avaliar a presença de fatores de risco (fumo e diabetes) para as doenças periodontais;
- Verificar possíveis indicadores de risco para doença periodontal;
- Investigar o impacto da utilização de protocolos de exame parciais em comparação com exames de toda a boca em prevalência, gravidade e extensão de doença periodontal;
- Avaliar prevalência, extensão e gravidade de recessão gengival (RG);
- Avaliar a associação de potenciais indicadores de risco com a ocorrência de RG;
- Avaliar prevalência, extensão e gravidade de abrasão gengival (AG);
- Avaliar a associação de potenciais indicadores de risco com a ocorrência de AG;
- Verificar a associação entre AG e RG, identificando se o aumento na prevalência de AG pode gerar aumento na prevalência de RG;
- Verificar a associação entre fatores demográficos (sexo, renda, idade e raça), comportamentais (fumo, presença de cálculo...) e as condições de abrasão e recessão gengivais encontradas;

UNIVERSIDADE FEDERAL DE SANTA MARIA/ PRÓ-REITORIA DE PÓS-GRADUAÇÃO E
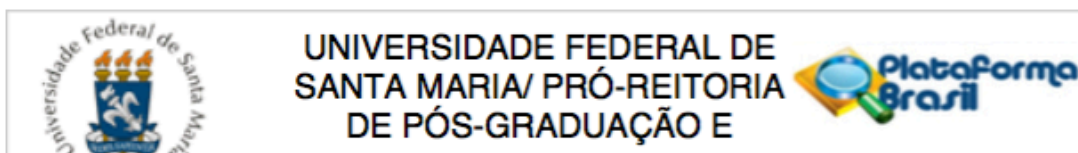
Continuação do Parecer: 979.743

- Avaliar o impacto da periodontite como condição clínica preditora de uma pior qualidade de vida relacionada à saúde bucal (OHRQoL);
- Investigar as condições clínicas associadas a uma pior OHRQoL;
- Avaliar a correlação entre dois instrumentos sócio-dentais, OHIP-14 e GOHAI, para avaliação da OHRQoL;
- Avaliar o efeito da avaliação periodontal em boca reduzida realizada por meio de diferentes protocolos parciais nas medidas de associação com a OHRQoL.
- Avaliar a condição cariológica das crianças e jovens com idades compreendidas entre 10 e 14 anos;
- Buscar associação entre a presença de lesões cariosas ativas e o grau eruptivo dos segundos molares permanentes;
- Avaliar os indicadores de risco para cárie dentária;
- Avaliar a presença de fluorose dentária.

Avaliação dos Riscos e Benefícios:
Previstos de modo suficiente.

Comentários e Considerações sobre a Pesquisa:
.

Considerações sobre os Termos de apresentação obrigatória:
Apresentados de modo suficiente.

Recomendações:
Veja no site do CEP - http://w3.ufsm.br/nucleodecomites/index.php/cep - na aba "orientações gerais", modelos e orientações para apresentação dos documentos. Acompanhe as orientações disponíveis, evite pendências e agilize a tramitação do seu projeto.

Conclusões ou Pendências e Lista de Inadequações:
.

UNIVERSIDADE FEDERAL DE
SANTA MARIA/ PRÓ-REITORIA
DE PÓS-GRADUAÇÃO E
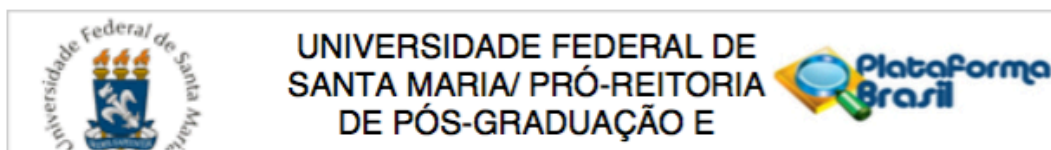
Continuação do Parecer: 979.743

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

Considerações Finais a critério do CEP:

SANTA MARIA, 10 de Março de 2015

Assinado por:
CLAUDEMIR DE QUADROS
(Coordenador)

ANEXO B – NORMAS REVISTA JOURNAL OF PERIODONTOLOGY

Instructions

MANUSCRIPT CATEGORIES AND SPECIFIC FORMATS

Submissions to the *Journal of Periodontology* should be limited to one of the categories defined below. Specific information regarding length and format is provided for each category. Please also refer to the instructions provided under General Format and Style. All manuscripts will be reviewed by the Editors for novelty, potential to extend knowledge, and relevance to clinicians and researchers in the field. Some manuscripts will be returned without review, based on the Editors' judgment of the appropriateness of the manuscript for the *Journal of Periodontology*.

ORIGINAL ARTICLES

These are papers that report significant clinical or basic research on the pathogenesis, diagnosis, and treatment of the different forms of periodontal disease. Papers dealing with design, testing, and other features of dental implants are also included.

Format

Original articles must be limited to 4,000 words (excluding the abstract, references, and figure legends). The reference list should not exceed 50 references, and the total combined number of figures and tables must be six or fewer. Multi-panel figures are acceptable.

Abstract

All original articles should be submitted with a structured abstract, consisting of no more than 250 words and the following four paragraphs:

Background: Describes the problem being addressed.

Methods: Describes how the study was performed.

Results: Describes the primary results.

Conclusion(s): Reports what authors have concluded from these results, and notes their clinical implications.

Introduction

The Introduction contains a concise review of the subject area and the rationale for the study. More detailed comparisons to previous work and conclusions of the study should appear in the Discussion section.

Materials and Methods

This section lists the methods used in the study in sufficient detail so that other investigators would be able to reproduce the research. When established methods are

used, the author need only refer to previously published reports; however, the authors should provide brief descriptions of methods that are not well known or that have been modified. Identify all drugs and chemicals used, including both generic and, if necessary, proprietary names and doses. The populations for research involving humans should be clearly defined and enrollment dates provided.

Results

Results should be presented in a logical sequence with reference to tables, figures, and supplemental material as appropriate.

Discussion

New and possible important findings of the study should be emphasized, as well as any conclusions that can be drawn. The Discussion should compare the present data to previous findings. Limitations of the experimental methods should be indicated, as should implications for future research. New hypotheses and clinical recommendations are appropriate and should be clearly identified. Recommendations, particularly clinical ones, may be included when appropriate.

GENERAL FORMAT

Manuscripts must be submitted in Microsoft Word. Margins should be at least 1" on both sides and top and bottom and all text should be double-spaced. Materials should appear in the following order:

Title   Page Abstract   (or   Introduction)   and   Key   Words Text Footnotes Acknowledgment(s) References Figure Legends Tables

Figures should not be embedded in the manuscript. Please see the *Journal of Periodontology* Digital Art Guidelines for more information on submitting figures.

Authors should retain a copy of their manuscript for their own records.

TITLE PAGE

The title page should contain:

1. a concise but informative title;

2. first name, middle initial, and last name of each author, with the highest academic degree and the current institutional affiliation, including department, for each (please use footnote symbols in the sequence *, †, ‡, §, ‖, ¶, #, **, etc. to identify authors and their corresponding institutions);

3. disclaimers, if any;

4. the name and address (including fax number and e-mail) of the author responsible for correspondence (please indicate whether fax number and e-mail can be published);

5. word count and number of figures, tables, and references in the manuscript;

6. a short running title of no more than 60 characters, including spaces;

7. a one-sentence summary describing the key finding(s) from the study.

KEY WORDS

A maximum of six key words or short phrases, drawn from MeSH documentation, to facilitate indexing should be listed below the abstract.

ACKNOWLEDGMENT(S) AND CONFLICTS OF INTEREST

Acknowledgment(s)

Following the Discussion, acknowledgments may be made to individuals who contributed to the research or the manuscript preparation at a level that did not qualify for authorship. This may include technical help or participation in a clinical study. Authors are responsible for obtaining written permission from persons listed by name. Acknowledgments must also include a statement that includes the source of any funding for the study, and defines the commercial relationships of each author.

Conflicts of Interest

In the interest of transparency and to allow readers to form their own assessment of potential biases that may have influenced the results of research studies, the *Journal of Periodontology* requires that all authors declare potential competing interests relating to papers accepted for publication. Conflicts of interest are defined as those influences that may potentially undermine the objectivity or integrity of the research, or create a perceived conflict of interest.

Authors are required to submit:

1. A statement in the acknowledgments section of the manuscript that includes the source of any funding for the study, and defines the commercial relationships of each author. If an author has no commercial relationships to declare, a statement to that effect should be included. This statement should include financial relationships that may pose a conflict of interest or potential conflict of interest. These may include financial support for research (salaries, equipment, supplies, travel reimbursement); employment or anticipated employment by any organization that may gain or lose financially through publication of the paper; and personal financial interests such as shares in or ownership of companies affected by publication of the research, patents or patent applications whose value may be affected by this publication, and consulting fees or royalties from organizations which may profit or lose as a result of publication. An example is shown below.

2. A conflict of interest and financial disclosure form for each author. A link to this electronic form will be e-mailed to each author after manuscript submission.

Conflict of interest information will not be used as a basis for suitability of the manuscript for publication.

Example of Conflict of Interest Statement

This study was supported by a grant from the Acme Implant Corporation, Seoul, Korea. Dr. Lee is on the scientific advisory board for Acme Implant Corporation and gives lectures sponsored by the company. Dr. Smith is a consultant and shareholder of the Brownstone Implant Corporation, Boston, Massachusetts. Dr. Wang is employed full-time as chief technical officer of the Acme Implant Corporation. Drs. Able, Kim, and Bruce report no conflicts of interest related to this study.

REFERENCES

References should be numbered consecutively in the order in which they appear in the text. A journal, magazine, or newspaper article should be given only one number; a book should be given a different number each time it is mentioned, if different page numbers are cited.

All references are identified, whether they appear in the text, tables, or legends, by Arabic numbers in superscript. Journal title abbreviations should be those used by the U.S. National Library of Medicine. If you are uncertain about the correct abbreviation for a journal title, please search for the journal at http://www.ncbi.nlm.nih.gov/nlmcatalog.

Journals

Standard journal reference. Note: list all authors if six or fewer; when seven or more, list only first three and add et al. Kurita- Ochiai T, Seto S, Suzuki N, et al. Butyric acid induces apoptosis in inflamed fibroblasts. *J Dent Res* 2008;87:51-55.

Corporate author. Federation Dentaire Internationale. Technical report no. 28. Guidelines for antibiotic prophylaxis of infective endocarditis for dental patients with cardiovascular disease. *Int Dent J* 1987;37:235.

Books and Other Monographs

Personal author(s). Tullman JJ, Redding SW. *Systemic Disease in Dental Treatment*. St. Louis: The CV Mosby Company; 1983:1-5.

Electronic Citations

Note: DOIs are preferred for journal articles. If a DOI is not available, please provide a URL and access date.

Online-only article. Rasperini G, Acunzo R, Limiroli E. Decision making in gingival recession treatment: Scientific evidence and clinical experience. *Clin Adv Periodontics* 2011;1:41-52. doi:10.1902/cap.2011.100002.

TABLES

Tables should be numbered consecutively in Arabic numbers in the order of their appearance in the text. A brief descriptive title should be supplied for each. Explanations, including abbreviations, should be listed as footnotes, not in the heading. Every column should have a heading. Statistical measures of variations such as standard deviation or standard error of the mean should be included as appropriate in the footnotes. Do not use internal horizontal or vertical rules.

FIGURES

Please see the *Journal of Periodontology* Digital Art Guidelines for detailed instructions on submitting high-quality images.

Figure Legends

Legends should be typed double-spaced with Arabic numbers corresponding to the figure. When arrows, symbols, numbers, or letters are used, explain each clearly in the legend; also explain internal scale, original magnification, and method of staining as appropriate. Panel labels should be in capital letters. Legends should not appear on the same page as the actual figures.

FOOTNOTES

Footnotes should be used only to identify author affiliations; to explain symbols in tables and illustrations; and to identify manufacturers of equipment, medications, materials, and devices. Use the following symbols in the sequence shown: *, †, ‡, §, ‖, ¶, #, **, ††, etc.

SUPPLEMENTARY MATERIAL

The *Journal of Periodontology* includes supplementary material in the online Journal (www.joponline.org). All supplemental material should be called out in the text.

Supplementary Figures and Tables

Journal of Periodontology articles are limited to a combined total of six figures and tables in the print publication. Any additional figures and tables should be submitted as supplementary files. Each supplementary figure or table should be submitted as a separate file. Please follow the guidelines regarding resolution, format, etc. for printed figures (see Digital Art Guidelines) and tables (see above) when preparing supplementary figures and tables. In summary, each figure, table, or multimedia file

should be uploaded separately and the file names should clearly identify the file (i.e., SupplementaryFigure1.tif, SupplementaryTable1.xls, etc.). If file size limitations prevent you from uploading your supplemental material, please e-mail jerry@perio.org.

STYLE

Please follow the guidelines below when preparing a manuscript:

Be sure to put the genus and species of an organism and journal names in the reference section in italics. Do not italicize common Latin terms such as in vitro, in vivo, e.g., or i.e. Use a block style; do not tabulate or indent material. Refer to the newest edition of the Glossary of Periodontal Terms published by the American Academy of Periodontology for preferred terminology. Authors are encouraged to use the disease classification as outlined in the Annals of Periodontology, volume 4 (1999 International Workshop for a Classification of Periodontal Diseases and Conditions). Create equations as text, treating any mathematical symbols as special characters and assigning them the Symbol font. Measurements of length, height, weight, and volume should be reported in metric units or their decimal multiples. Temperatures should be given in degrees Celsius and blood pressure in millimeters of mercury. Statistical methods should be described such that a knowledgeable reader with access to the original data could verify the results. Wherever possible, results should be quantified and appropriate indicators of measurement error or uncertainty given. Sole reliance on statistical hypothesis testing or normalization of data should be avoided. Data in as close to the original form as reasonable should be presented. Details about eligibility criteria for subjects, randomization, methods for blinding of observations, treatment complications, and numbers of observations should be included. Losses to observations, such as dropouts from a clinical trial, should be indicated. General-use computer programs should be listed. Statistical terms, abbreviations, and symbols should be defined. Detailed statistical, analytical procedures can be included as an appendix to the paper if appropriate.

AUTHORSHIP

Individuals identified as authors must meet all of the following criteria established by the International Committee of Medical Journal Editors: 1) substantial contributions to conception and design, or acquisition, analysis, or interpretation of data; 2) drafting the article or revising it critically for important intellectual content; 3) final approval of the version to be published; and 4) agreement to be accountable for all aspects of the work

in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest and Financial Disclosure Forms

A conflict of interest and financial disclosure form must be submitted by each author. A link to this electronic form will be e-mailed to each author after manuscript submission. Due to this, **all authors are required to have accounts with valid e-mail addresses in ScholarOne Manuscripts** and be listed as authors for the submitted paper. Submitting authors are able to create accounts for co-authors.

CLINICAL TRIALS

If your manuscript is reporting a randomized clinical trial, you are required to submit a CONSORT checklist with your manuscript. More information can be found at www.consort-statement.org.

All clinical trials must be registered prior to submission to the *Journal of Periodontology* at one of the registration sites listed below. The registration number and date of registration should be included in the Materials and Methods section. **Starting January 1, 2016, all clinical trials must be registered prior to initiation (i.e., recruitment) of the trial.** Please see http://www.clinicaltrials.gov/ct2/about-studies/learn#WhatIs for more information regarding clinical trials.

ANIMAL AND HUMAN TRIALS

All manuscripts reporting the use of human subjects must include a statement that the protocol was approved by the author's institutional review committee for human subjects **AND** that the study was conducted in accordance with the Helsinki Declaration of 1975, as revised in 2013. Do not use any designation in tables, figures, or photographs that would identify a patient, unless written consent from the patient is submitted.

For research involving the use of animals, it is necessary to indicate that the protocol was approved by the author's institutional experimentation committee or was in accordance with guidelines approved by the Council of the American Psychological Society (1980) for the use of animal experiments.

REVISED MANUSCRIPTS

Revised manuscripts should be submitted online at ScholarOne Manuscripts by the same author who submitted the original manuscript. Authors have 30 days to submit a revision. Additionally:

A detailed response to each reviewer comment for the original manuscript should be

included. This response should also describe what changes were made in the manuscript to address each comment in the reviews.

Only the most recent version of each file should be uploaded. You may have to delete older files from the Author Center.

Please upload a version of the manuscript with changes highlighted or track changes enabled. This should be uploaded as a supplemental file.

Figures and tables should be resubmitted with revised manuscripts, even if they were not revised.

REVIEW PROCESS

Peer Review

The *Journal of Periodontology* is a peer-reviewed publication. All manuscripts, including Reviews, Commentaries, and Case Series are submitted to a minimum of two reviewers and, when appropriate, to a statistical reviewer. Authors are given reviewer comments and additional information or observations as the Editor believes would be helpful. Revised manuscripts are due within 30 days of receipt of the Editor's communication.

MANUSCRIPT ACCEPTANCE

All manuscripts accepted for publication become the property of the American Academy of Periodontology. All authors are required to sign a copyright form. An e-mail with a link to this electronic form will be sent to all authors upon acceptance.

Once all forms are received by the editorial office, an unedited version of the accepted manuscript will appear online ahead of print at http://www.joponline.org/toc/jop/0/0. Once a manuscript is online ahead of print, it is fully citable based on the Digital Object Identifier (DOI) assigned to the manuscript. Manuscripts will be copyedited, published online, and printed (unless online-only) in an issue of the *Journal* approximately 4 to 5 months after acceptance. Authors will be notified about a final publication date by the Editorial Office.

Funding Agency Requirements

Consistent with current policies, authors who have papers based on funded research accepted for publication in the *Journal of Periodontology* may make their final accepted paper or published article available to agency depositories. However, authors should indicate that the paper may not be released publicly until 12 months following final publication in an issue.

Authors are responsible for complying with all funding agency requirements.

ANEXO C – NORMAS REVISTA JOURNAL OF CLINICAL PERIODONTOLOGY

Author Guidelines Content of Author Guidelines:

The journal to which you are submitting your manuscript employs a plagiarism detection system. By submitting your manuscript to this journal you accept that your manuscript may be screened for plagiarism against previously published works.

1. GENERAL

Journal of Clinical Periodontology publishes original contributions of high scientific merit in the fields of periodontology and implant dentistry. Its scope encompasses the physiology and pathology of the periodontium, the tissue integration of dental implants, the biology and the modulation of periodontal and alveolar bone healing and regeneration, diagnosis, epidemiology, prevention and therapy of periodontal disease, the clinical aspects of tooth replacement with dental implants, and the comprehensive rehabilitation of the periodontal patient. Review articles by experts on new developments in basic and applied periodontal science and associated dental disciplines, advances in periodontal or implant techniques and procedures, and case reports which illustrate important new information are also welcome.

2. ETHICAL GUIDELINES

Journal of Clinical Periodontology adheres to the below ethical guidelines for publication and research.

Acknowledgements: Under acknowledgements please specify contributors to the article other than the authors accredited.

2.1. Ethical Approvals

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 (http://www.wma.net/en/20activities/10ethics/10helsinki/index.html) (version 2008) 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.

All studies using human or animal subjects should include an explicit statement in the Material and Methods section identifying the review and ethics committee approval for each study, if applicable. Editors reserve the right to reject papers if there is doubt as to whether appropriate procedures have been used.

2.2 Clinical Trials

Clinical trials should be reported using the CONSORT guidelines available at www.consort-statement.org (http://www.consort- statement.org). A CONSORT checklist (http://www.consort-statement.org/index.aspx?o=2964) should also be included in the submission material.

Journal of Clinical Periodontology encourages authors submitting manuscripts reporting from a clinical trial to register the trials in any of the following free, public clinical trials registries: www.clinicaltrials.gov (http://www.clinicaltrials.gov), http://clinicaltrials.ifpma.org/clinicaltrials/

2.3 Conflict of Interest and Source of Funding

Journal of Clinical Periodontology requires that all authors (both the corresponding author and co-authors) disclose any potential sources of conflict of interest. Any interest or relationship, financial or otherwise that might be perceived as influencing an author's objectivity is considered a potential source of conflict of interest. These must be disclosed when directly relevant or indirectly related to the work that the authors describe in their manuscript. Potential sources of conflict of interest include but are not limited to patent or stock ownership, membership of a company board of directors, membership of an advisory board or committee for a company, and consultancy for or receipt of speaker's fees from a company. If authors are unsure whether a past or present affiliation or relationship should be disclosed in the manuscript, please contact the editorial office at cpeedoffice@wiley.com (cpeedoffice@wiley.com). The existence of a conflict of interest does not preclude publication in this journal.

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

Conflict of Interest Disclosure Form (Wiley_Author_CoI_Disclosure_form.zip)

3. MANUSCRIPT SUBMISSION PROCEDURE

Manuscripts should be submitted electronically via the online submission site http://mc.manuscriptcentral.com/jcpe (http://mc.manuscriptcentral.com/jcpe). The use of an online submission and peer review site enables immediate distribution of manuscripts and consequentially speeds up the review process. It also allows authors to track the status of their own manuscripts.

3.1. Manuscript Files Accepted

Main manuscripts should be uploaded as Word (.doc) or Rich Text Format (.rft) files (not write-protected). The text file must contain the entire manuscript including title page, abstract, clinical reference, main text, references, acknowledgement, statement of source of funding and any potential conflict of interest, tables, and figure legends, but no embedded figures. In the text, please reference any figures as for instance 'Figure 1', 'Figure 2' etc. to match the tag name you choose for the individual figure files uploaded.

Figure files should be uploaded separately to the main text. GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing.

3.2. Blinded Review

All manuscripts submitted to *Journal of Clinical Periodontology* will be reviewed by two or more experts in the field. Papers that do not conform to the general aims and scope of the journal will, however, be returned immediately without review. *Journal of Clinical Periodontology* uses single blinded review. The names of the reviewers will thus not be disclosed to the author submitting a paper.

3.3. Suggest a Reviewer

Journal of Clinical Periodontology attempts to keep the review process as short as possible to enable rapid publication of new scientific data. In order to facilitate this process, please suggest the name and current email address of one potential international reviewer whom you consider capable of reviewing your manuscript. In addition to your choice the editor will choose one or two reviewers as well.

4. MANUSCRIPT TYPES ACCEPTED

Journal of Clinical Periodontology publishes **original research articles**, **reviews**, **clinical innovation reports** and **case reports**. The latter will be published only if they provide new fundamental knowledge and if they use language understandable to the clinician. It is expected that any manuscript submitted represents unpublished original

research.

Original Research Articles must describe significant and original experimental observations and provide sufficient detail so that the observations can be critically evaluated and, if necessary, repeated. Original articles will be published under the heading of clinical periodontology, implant dentistry or pre-clinical sciences and must conform to the highest international standards in the field.

5. MANUSCRIPT FORMAT AND STRUCTURE

5.1. Format

Language: The language of publication is English. Authors for whom English is a second language may choose to have their manuscript professionally edited before submission to improve the English. It is preferred that manuscript is professionally edited.

Abbreviations, Symbols and Nomenclature: *Journal of Clinical Periodontology* adheres to the conventions outlined in Units, Symbols and Abbreviations: A Guide for Medical and Scientific Editors and Authors. Abbreviations should be kept to a minimum, particularly those that are not standard. Non-standard abbreviations must be used three or more times and written out completely in the text when first used.

5.2. Structure

All articles submitted to Journal of Clinical Periodontology should include:

Title Page Conflict of Interest and Source of Funding Clinical Relevance Abstract Introduction Materials and Methods Results Discussion References Tables (where appropriate) Figure Legends (where appropriate) Figures (where appropriate and uploaded as separate files)

All manuscripts should emphasize clarity and brevity. Authors should pay special attention to the presentation of their findings so that they may be communicated clearly. Technical jargon should be avoided as much as possible and be clearly explained where its use is unavoidable.

Title Page: The title must be concise and contain no more than 100 characters including spaces. The title page should include a running title of no more than 40 characters; 5-10 key words, complete names of institutions for each author, and the name, address, telephone number, fax number and e-mail address for the corresponding author.

Conflict of Interest and Source of Funding: Authors are required to disclose all sources of institutional, private and corporate financial support for their study.

Suppliers of materials (for free or at a discount from current rates) should be named in the source of funding and their location (town, state/county, country) included. Other suppliers will be identified in the text. If no funding has been available other than that of the author's institution, this should be specified upon submission. Authors are also required to disclose any potential conflict of interest. These include financial interests (for example patent, ownership, stock ownership, consultancies, speaker's fee,) or provision of study materials by their manufacturer for free or at a discount from current rates. Author's conflict of interest (or information specifying the absence of conflicts of interest) and the sources of funding for the research will be published under a separate heading entitled "Conflict of Interest and Source of Funding Statement".

Abstract: is limited to 200 words in length and should not contain abbreviations or references. The abstract should be organized according to the content of the paper.

For Original Research Articles the abstract should be organized with **aim, materials and methods, results and conclusions**. For clinical trials, it is encouraged that the abstract finish with the clinical trial registration number on a free public database such as clinicaltrials.gov. **Clinical Relevance**: This section is aimed at giving clinicians a reading light to put the present research in perspective. It should be no more than 100 words and should not be a repetition of the abstract. It should provide a clear and concise explanation of the rationale for the study, of what was known before and of how the present results advance knowledge of this field. If appropriate, it may also contain suggestions for clinical practice.

It should be structured with the following headings: **scientific rationale for study, principal findings, and practical implications**.

Authors should pay particular attention to this text as it will be published in a highlighted box within their manuscript; ideally, reading this section should leave clinicians wishing to learn more about the topic and encourage them to read the full article.

Acknowledgements: Under acknowledgements please specify contributors to the article other than the authors accredited.

5.3. Original Research Articles

These must describe significant and original experimental observations and provide sufficient detail so that the observations can be critically evaluated and, if necessary, repeated. Original articles will be published under the heading of clinical periodontology, implant dentistry or pre-clinical sciences and must conform to the

highest international standards in the field.

The word limit for original research articles is 3500 words, and up to 7 items (figures and tables) may be included.

Main Text of **Original Research Articles** should be organized with

Introduction, Materials and Methods, Results and Discussion. References.

The background and hypotheses underlying the study, as well as its main conclusions, should be clearly explained. Please see Sample Manuscript.

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

Material 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.

 (a) Statistical Analysis: As papers frequently provide insufficient detail as to the performed statistical analyses, please describe with adequate detail. For clinical trials intention to treat analyses are encouraged (the reasons for choosing other types of analysis should be highlighted in the submission letter and clarified in the manuscript).

 (b) Experimental 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 (http://www.wma.net/en/20activities/10ethics/10helsinki/index.html) (version 2008) 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.

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 subjects should include an explicit statement in the Material and Methods section identifying the review and ethics committee approval for each study, if applicable. Editors reserve the right to reject papers if there is doubt as to whether appropriate procedures have been used.

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

Discussion: may usefully start with a brief summary of the major findings, but repetition of parts of the abstract or of the results section should be avoided. The discussion 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.

Summary of key finding * Primary outcome measure(s) * Secondary outcome measure(s) * Results as they relate to a prior hypothesis Strengths and Limitations of the Study * Study Question * Study Design * Data Collection * Analysis * Interpretation * Possible effects of bias on outcomes Interpretation and Implications in the Context of the Totality of Evidence * Is there a systematic review to refer to? * If not, could one be reasonably done here and now? * What this study adds to the available evidence * Effects on patient care and health policy * Possible mechanisms Controversies Raised by This Study Future Research Directions * For this particular research collaboration * Underlying mechanisms * Clinical research

5.4. References

It is the policy of the Journal to encourage reference to the original papers rather than to literature reviews. Authors should therefore keep citations of reviews to the absolute minimum. 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). 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 FAQ (http://www.apastyle.org/). Please note that for journal articles, issue numbers are not included unless each issue in the volume begins with page one.

5.5. Tables, Figures and Figure Legends

Tables: should be double-spaced with no vertical rulings, with a single bold ruling beneath the column titles. Units of measurements must be included in the column title. Figures: All figures should be planned to fit within either 1 column width (8.0 cm), 1.5 column widths (13.0 cm) or 2 column widths (17.0 cm), and must be suitable for photocopy reproduction from the printed version of the manuscript. Lettering on figures should be in a clear, sans serif typeface (e.g. Helvetica); if possible, the same typeface should be used for all figures in a paper. After reduction for publication, upper-case text and numbers should be at least 1.5-2.0 mm high (10 point Helvetica). After reduction symbols should be at least 2.0-3.0 mm high (10 point). All half-tone photographs should be submitted at final reproduction size. In general, multi-part figures should be arranged as they would appear in the final version. Each copy should be marked with the figure number and the corresponding author's name. Reduction to the scale that will be used on the page is not necessary, but any special requirements (such as the separation distance of stereo pairs) should be clearly specified.

Preparation of Electronic Figures for Publication

Although low quality images are adequate for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit EPS (lineart) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented programmes. Scans (TIFF only) should have a resolution of 300 dpi (halftone) or 600 to 1200 dpi (line drawings) in relation to the reproduction size (see below). EPS files should be saved with fonts embedded (and with a TIFF preview if possible). For scanned images, the scanning resolution (at final image size) should be as follows to ensure good reproduction: lineart: >600 dpi; half-tones (including gel photographs): >300 dpi; figures containing both halftone and line images: >600 dpi.

Guidelines for Cover Submission

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 guidelines.

Figure Legends: should be a separate section of the manuscript, and should begin with a brief title for the whole figure and continue with a short description of each panel and the symbols used; they should not contain any details of methods.

5.9. Supplementary Material

Supplementary material, such as data sets or additional figures or tables that will not be

published in the print edition of the Journal but which will be viewable in the online edition, can be uploaded as 'Supporting information for review and online publication only'.

Please see **http://authorservices.wiley.com/bauthor/suppmat.asp** (http://authorservices.wiley.com/bauthor/suppmat.asp) for further information on the submission of Supplementary Materials.

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.

6.1 Proof Corrections

The corresponding author will receive an email alert containing a link to a web site. A working email 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 Web site: www.adobe.com/products/acrobat/readstep2.html

(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 his work, including changes made by the copy editor.

6.2 Early View (Publication Prior to Print)

The Journal of Clinical Periodontology 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.

6.4 Accepted Articles

'Accepted Articles' have been accepted for publication and undergone full peer review but have not been through the copyediting, typesetting, pagination and proofreading process. Accepted Articles are published online a few days after final acceptance, appear in PDF format only (without the accompanying full-text HTML) and are given a Digital Object Identifier (DOI), which allows them to be cited and tracked. The DOI remains unique to a given article in perpetuity. More information about DOIs can be found online at http://www.doi.org/faq.html (http://www.doi.org/faq.html). Given that Accepted Articles are not considered to be final, please note that changes will be made to an article after Accepted Article online publication, which may lead to differences between this version and the Version of Record. The Accepted Articles service has been designed to ensure the earliest possible circulation of research papers after acceptance. Given that copyright licensing is a condition of publication, a completed copyright form is required before a manuscript can be processed as an Accepted Article.

Accepted articles will be indexed by PubMed; therefore the submitting author must carefully check the names and affiliations of all authors provided in the cover page of the manuscript, as it will not be possible to alter these once a paper is made available online in Accepted Article format.

8. Copyright Assignment

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.