ELTON GERALDO DE OLIVEIRA GÓIS

ESTUDO LONGITUDINAL DO DESENVOLVIMENTO DA OCLUSÃO ENTRE AS FASES DE DENTIÇÃO DECÍDUA E MISTA E A INFLUÊNCIA DOS HÁBITOS BUCAIS DELETÉRIOS E DA ADENÓIDE HIPERTRÓFICA

Faculdade de Odontologia
Universidade Federal de Minas Gerais
Belo Horizonte
2010

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ESTUDO LONGITUDINAL DO DESENVOLVIMENTO DA OCLUSÃO ENTRE AS FASES DE DENTIÇÃO DECÍDUA E MISTA E A INFLUÊNCIA DOS HÁBITOS BUCAIS DELETÉRIOS E DA ADENÓIDE HIPERTRÓFICA

Tese apresentada ao Colegiado do Programa de Pós-Graduação, da Faculdade de Odontologia da Universidade Federal de Minas Gerais, como requisito parcial para obtenção do grau de Doutor em Odontologia - área de concentração em Odontopediatria

Orientadora: Profa. Dra. Isabela Almeida Pordeus
Co-orientadora: Profa. Dra. Miriam Pimenta Parreira do Vale

Faculdade de Odontologia - UFMG
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Tese intitulada **"Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica",** área de concentração em Odontopediatria, apresentada pelo candidato **Elton Geraldo de Oliveira Góis**, para obtenção do grau de **Doutor em Odontologia, APROVADA** pela Comissão Examinadora constituída pelos seguintes professores:

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Orientadora
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Subcoordenadora do Colegiado do
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Belo Horizonte, 26 de fevereiro de 2010.

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Ata da Comissão Examinadora para julgamento da Tese de Doutorado em Odontologia, área de concentração em Odontopediatria, do candidato **Elton Geraldo de Oliveira Góis**. Aos 26 (vinte e seis) dias do mês de fevereiro de 2010, às 08h00min, na sala de Pós-Graduação (3403) da Faculdade de Odontologia, reuniu-se a Comissão Examinadora, composta pelos professores Dra. Miriam Pimenta Parreira do Vale - Co-Orientadora – FO-UFMG, Dra. Rosangela Almeida Ribeiro – UFJF, Dr. Leandro Silva Marques – UNINCOR, Dr. Mauro Henrique Nogueira Guimarães de Abreu – FO-UFMG e Dr. Saul Martins de Paiva – FO-UFMG. O Prof. Dr. Saul Martins de Paiva, Coordenador do CPGO abriu os trabalhos, apresentou a Comissão Examinadora e passou a presidência da sessão à Co-orientadora da Tese, Profa. Dra. Miriam Pimenta Parreira do Vale. Ao candidato foi dado o tempo de até 50 (cinquenta) minutos para fazer a exposição oral sobre o seu trabalho **"Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica"**. Encerrada a exposição, foi iniciada a argüição, dentro do limite de tempo de 30 (trinta) minutos, pelos Professores Rosangela Almeida Ribeiro, Leandro Silva Marques, Mauro Henrique Nogueira Guimarães de Abreu e Saul Martins de Paiva, com limite de 30 (trinta) minutos para a resposta. Terminadas as argüições, a presidente suspendeu os trabalhos por 10 minutos para que os examinadores pudessem decidir pelo resultado a ser dado ao candidato. A Comissão Examinadora opta pela APROVAÇÃO do candidato. Para constar, lavrou-se a presente ata, que vai assinada por mim e pela comissão Examinadora. Belo Horizonte, 26 de fevereiro de 2010, Zuleica de Matos Rabelo, Secretária do Colegiado do Programa de Pós-Graduação em Odontologia.

Profa. Dra. Miriam Pimenta Parreira do Vale
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Colegiado de Pós-Graduação
Faculdade de Odontologia da
UFMG
Confere com o original
26/02/2010
Zuleica de Matos Rabelo
Secretaria do Colegiado do
Programa de Pós Graduação em Odontologia
Assinatura

Dedicatória

Este trabalho é dedicado:

A Deus, por estar presente em toda a minha vida.

Aos meus pais, Góis e Edméa, por toda educação a mim transmitida, vibrando e torcendo por cada etapa vencida até a concretização deste momento único e valioso.

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RESUMO

RESUMO

O objetivo deste estudo foi determinar a incidência de maloclusão em um estudo longitudinal de 5 anos de crianças escolares e verificar a hipótese que indivíduos com maloclusão prévia são mais propensos em manter as mesmas características na transição da dentição decidua para a mista e associar com os fatores etiológicos. Os indivíduos, com idades entre 8 e 11 anos, foram selecionados aleatoriamente de uma amostra representativa. Os critérios de inclusão foram oclusão normal na dentição decídua (150 crianças) ou as seguintes maloclusões (150 crianças): mordida aberta anterior e/ou mordida cruzada posterior e/ou trespasse horizontal maior que 3mm, desde que não submetidas a tratamento ortodôntico. Durante o exame clinico, foi avaliado o padrão respiratório. A possibilidade de obstrução do espaço aéreo superior relacionado à adenóide foi analisada através da radiografia cefalométrica lateral. A presença e a duração dos hábitos de sucção digital e de chupeta foram verificadas através de questionários. Análise descritiva, teste qui-quadrado, risco relativo (RR) e regressão de Poisson, com variância robusta, foram realizados com índice de significância de 95%. Uma alta incidência de maloclusão foi identificada em crianças tanto com maloclusão (94,1%), quanto naquelas sem maloclusão (67,7%) prévia (RR=1,4 [1,2-1,6] p<0,001). Mordida aberta anterior (RR=3,1 [1,7-5,8] p<0,001), mordida cruzada posterior (RR=7,5 [4,9-11,5] p<0,001) e trespasse horizontal maior que 3mm (RR=5,2 [3,4-8,0] p<0,001) na dentição decídua foram fatores de risco para maloclusão na dentição mista precoce. Os fatores etiológicos determinantes para a ocorrência de maloclusão na dentição mista precoce foram: maloclusão na dentição decidua (RR=1,31 [1,13-1,52] p<0,001), respiração bucal (RR=1,15 [1,03-1,28] p<0,05) e hipertrofia adenoideana (RR=1,12 [1,00-1,26] p<0,05). O desenvolvimento de maloclusão na dentição mista precoce não foi estatisticamente associado com os hábitos de sucção de chupeta e dedo (p>0,05). A incidência de maloclusão foi consideravelmente alta. Indivíduos com mordida aberta anterior, trespasse horizontal aumentado e mordida cruzada posterior prévio possuíam maiores riscos de terem as mesmas características na dentição mista precoce. Os fatores etiológicos de risco foram a maloclusão na dentição decidua, a respiração bucal e a hipertrofia adenoideana das crianças na dentição decidua.

Palavras-Chave: Sucção digital; Sucção de chupeta; Respiração bucal; Adenóides; Maloclusão; Dentição decídua; Dentição mista.

ABSTRACT

ABSTRACT

Longitudinal study of occlusion development between primary and mixed dentitions and the influence of deleterious oral habits and hypertrophied adenoids

The aim of this study was to determine the incidence of malocclusion in a 5-year follow-up of school children and verify the hypothesis that individuals with previous malocclusion are more prone to maintain the same characteristics in the transition from primary to mixed dentition and associate to etiologic factors. The individuals, ages 8 to 11 years, were randomly selected from a representative sample. The inclusion criteria were the normal occlusion in primary dentition (150 children) or the following malocclusions (150 children): anterior open bite and/or posterior crossbite and/or overjet more than 3 mm, since that they did not being submitted to orthodontic treatment. During the clinical exam, it was assessed the breathing pattern. A possible upper airway obstruction related to the adenoids was analyzed through a lateral cephalometric radiograph. The presence and the duration of digit and pacifier-sucking habits were evaluated through questionnaires. Descriptive, chi-square, relative risk (RR), and Poisson regression, with robust variance analysis, were carried out at 95%CI. The greatest incidence of malocclusion was identified among children with previous malocclusion (94.1%) when compared with those without malocclusion (67.7%) (RR=1.4 [1.2-1.6] *P*<.001). Anterior open bite (RR=3.1 [1.7-5.8] *P*<.001), posterior crossbite (RR=7.5 [4.9-11.5] *P*<.001) and overjet greater than 3 mm (RR=5.2 [3.4-8.0] *P*<.001) in primary dentition are risk factors for malocclusion in early mixed dentition. It was verified that the anterior open bite corrected spontaneously in 70.1% of cases. Posterior crossbite and overjet greater than 3mm showed persistent in 87.8% and 72.9% of children. The risk factors for the occurrence of malocclusion in the early mixed dentition were the presence of malocclusion in the primary dentition (RR=1.31 [1.13-1.52] *P*<.001), mouth-breathing pattern (RR=1.15 [1.03-1.28] *P*<.05), and the hypertrophied adenoids (RR=1.12 [1.00-1.26] *P*<.05). The development of malocclusion in the early mixed dentition was not statistically associated to digit and pacifier-sucking habits (*P*>.05). Malocclusion incidence was high. Individuals with previous anterior open bite, greater overjet, and posterior crossbite had greater risks of having the same characteristics in the early mixed dentition. The malocclusion incidence increase from primary to mixed dentition was directly related to the presence of malocclusion in primary dentition, mouth-breathing pattern, and hypertrophied adenoids of children.

KEY WORDS: Digit-sucking; Pacifier-sucking; Mouth-breathing; Adenoids; Malocclusion; Primary dentition; Mixed dentition.

LISTA DE ABREVIATURAS E SIGLAS

ABEP – Associação Brasileira de Empresas de Pesquisa

CCEB – Critério de Classificação Econômica Brasil

COEP – Comitê de Ética em Pesquisa

DSB – Departamento de Saúde Bucal

DSSDA – Diretoria de Saúde, Saneamento e Desenvolvimento Ambiental

OR – razão das chances ou *odds ratio*

PJF – Prefeitura de Juiz de Fora

RR – Risco Relativo

SE/PJF – Secretaria de Educação da Prefeitura de Juiz de Fora

SPSS – *Statistical Package for the Social Sciences*

TCLE – Termo de Consentimento Livre e Esclarecido

UFJF – Universidade Federal de Juiz de Fora

UFMG – Universidade Federal de Minas Gerais

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CONSIDERAÇÕES INICIAIS

CONSIDERAÇÕES INICIAIS

Nos últimos 40 anos, ocorreram notáveis transformações nos padrões epidemiológicos das doenças e agravos à saúde bucal, fazendo com que a maloclusão ocupe no cenário atual a terceira posição, em uma escala de prioridades dos problemas bucais, proposta pela Organização Mundial de Saúde, em 1989 (PERES e TOMITA, 2006).

Angle, em 1899, definiu oclusão como as relações normais entre os planos inclinados oclusais dos dentes, quando os maxilares estão cerrados. Já o termo maloclusão foi definido de modo abrangente por Moyers (1959), sessenta anos depois, como “desvios de crescimento e desenvolvimento do complexo bucofacial e desvios de posições dentais que podem originar as deformidades dentofaciais” (PERES e TOMITA, 2006).

O estabelecimento e manutenção de uma oclusão normal constituem um dos mais importantes objetivos do tratamento ortodôntico, seja preventivo, interceptativo ou corretivo, sendo que o entendimento das mudanças ântero-posteriores, verticais e transversais que ocorrem na oclusão entre a dentição decídua e permanente é essencial para o diagnóstico e tratamento precoce das maloclusões (MOURA et al., 1993).

A supervisão do desenvolvimento da oclusão deve fazer parte da rotina de tratamento de todo cirurgião-dentista que atende crianças e adolescentes (DEAN et al., 2001).

Desde 1990, a Academia Americana de Odontopediatria vem elaborando diretrizes para o controle da dentição em desenvolvimento na clínica odontopediátrica. Em sua última revisão de 2009, a seguinte posição foi tomada:

> A orientação da erupção e desenvolvimento das dentições decídua, mista e permanente é parte integrante da odontopediatria. Esta orientação deveria contribuir para o desenvolvimento da dentição permanente, para que se obtenha uma oclusão aceitável, harmoniosa, funcional e estética. Os odontopediatras têm a responsabilidade de reconhecer, diferenciar e, também, supervisionar apropriadamente ou identificar anormalidades na dentição em desenvolvimento, como estabelecido pela complexidade do problema e do treinamento clínico individual, conhecimento e experiência. O diagnóstico precoce e o sucesso do tratamento da maloclusão em desenvolvimento podem ter benefícios a longo e a curto prazos, quando forem alcançadas as metas de harmonia oclusal, função e estéticas facial e dentária (AMERICAN ACADEMY OF PEDIATRIC DENTISTRY, 2009).

Na época correspondente à fase de dentadura mista, ocorrem grandes alterações nos arcos dentários. Observa-se que é uma fase dinâmica, de intenso crescimento da criança, na qual alguns desvios da normalidade podem se instalar. Desta forma, o Odontopediatra tem um papel fundamental no diagnóstico e tratamento das alterações morfológicas e funcionais desta fase de desenvolvimento da dentição (ZANETTI, 2003).

As alterações no trespasse vertical e horizontal são muito importantes quando presentes na dentição mista precoce. Ela está diretamente relacionada com a estética facial e isso afeta psicologicamente a criança, pois ela é vítima de apelidos e brincadeiras nas atividades sociais em geral, além de aumentar os riscos de traumatismos dentários (CANTARINO; ASSUMPÇÃO-JÚNIOR, 2005). Condições que afetam a estética dental têm uma influência no bem-estar psicológico e nas interações sociais em crianças, tais como, apinhamento ou diastema superior interincisal maior ou igual a 2mm, nível sócio-econômico baixo ou intermediário e necessidade normativa de tratamento ortodôntico altamente desejável (MARQUES et al., 2006; MARQUES et al., 2009). Ocorrem, também, problemas de ordem funcional, que podem levar a distúrbios na articulação temporomandibular. Deve-se intervir precocemente nestes casos para restabelecer a estética e função e permitir o crescimento e desenvolvimento normal ósseo, neuromuscular e dentário (CANTARINO; ASSUMPÇÃO-JÚNIOR, 2005).

Pesquisar a evolução do trespasse vertical e horizontal de uma determinada população com e sem maloclusão e fazer associações com determinadas características oclusais (relação intermolar e intercanina) e faciais, assim como, os hábitos orais de sucção, o padrão respiratório e as obstruções nasofaringeanas, são importantes para determinar o plano de tratamento a ser seguido e solucionar o problema precocemente ou atuar de forma preventiva (ASSUMPÇÃO-JÚNIOR, 1998; GÓIS, 2005; GÓIS et al., 2008).

Dessa forma, diversos desenhos de estudos epidemiológicos têm sido propostos na pesquisa odontológica: os estudos de intervenção (experimentais) e os observacionais. Os principais estudos observacionais (não-experimentais) em epidemiologia, quando o objetivo é a investigação etiológica dos problemas de saúde, são o estudo de coorte (longitudinal) e o estudo caso-controle (GRIMES e SCHULZ, 2002; COSTA e NADANOVSKY, 2005).

Apesar do aumento no número de pesquisas que utilizam métodos em estudos longitudinais, ainda se faz necessário novos estudos para avaliar a incidência de agravos à saúde no Brasil, muitos deles decorrentes de profundas mudanças demográficas e culturais ocorridas no país nas últimas décadas. Além disso, no contexto brasileiro, a realização de estudos longitudinais deve levar em conta a diversidade de cenários e dificuldades crônicas de financiamento, buscando soluções criativas, que permitam, ao mesmo tempo, acompanhar os avanços metodológicos na área (CARVALHO e LOPES, 2005).

Dentro desta perspectiva, este trabalho tem como objetivo enfatizar e direcionar a supervisão da oclusão em desenvolvimento, entre as fases de dentadura decídua e mista, em crianças com idades atuais de 8 a 11 anos. O presente desenho de estudo é do tipo longitudinal, que faz parte de um

acompanhamento prospectivo de um estudo prévio do tipo caso-controle, em crianças com e sem maloclusão, realizado em 2004, na cidade de Juiz de Fora – MG (Góis, 2005; Góis et al., 2008). Alguns fatores etiológicos das maloclusões foram avaliados: os hábitos de sucção não-nutritiva de dedo e chupeta, a respiração bucal e a hipertrofia adenoideana. Este tipo de estudo epidemiológico baseia-se na importância que a presença de hábitos bucais saudáveis e uma oclusão normal têm para com a saúde geral do paciente infantil.

A revisão bibliográfica a respeito do tema proposto compreendeu uma pesquisa na base de dados da Biblioteca Virtual em Saúde: *Medline* – Literatura Internacional em Ciências da Saúde (1966-1996 / 1997-2010); COCHRANE; LILACS – Literatura Latino-Americana e do Caribe; BBO – Biblioteca Brasileira de Odontologia e na Biblioteca Nacional de Medicina dos Estados Unidos - *United States National Library of Medicine (PubMed)*. Não houve restrição à língua escrita e os artigos selecionados incluíam os seguintes descritores: hábitos de sucção não nutritiva; respiração bucal; adenóide hipertrófica; hábitos orais deletérios; dentição decídua; dentição mista; estudo de coorte; estudo longitudinal; desenvolvimento oclusal; maloclusão; além de artigos clássicos da Odontologia sobre o tema.

ARTIGO 1

Influence of deleterious oral habits and adenoid hypertrophy in the development of malocclusion among Brazilian children: a five-year longitudinal study

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ABSTRACT

Objective: To investigate the malocclusion incidence and identify the main factors considering the nonnutritive sucking habits, mouth-breathing pattern and hypertrophied adenoids in the transition from primary to early mixed dentition.

Materials and Methods: A longitudinal study from primary to early mixed dentition was carried out in Juiz de Fora, Brazil, involving 212 school children, ages 8 to 11 years, in 2009, selected from a representative sample of a case-control study of 300 preschool children, ranging from 3 to 6 years old, in 2004 and their parents/guardians. The malocclusion was characterized by the presence of the following alterations: anterior/ posterior open bite, anterior/posterior crossbite, overjet or overbite greater than 3mm, primary canines or first permanents molars in Class II or III, terminal plane of primary second molars in distal step and anterior dental crowding greater than 2mm. During the clinical exam, it was assessed the breathing pattern. A possible upper airway obstruction related to the adenoids was analyzed through a lateral cephalometric radiograph. The presence and duration of pacifier and digit-sucking habits were evaluated through questionnaires answered by parents/guardians. Descriptive, chi-square, relative risk (RR), and Poisson regression analyses, with robust variance, were carried out, considering a statistical significance of 95%.

Results: The greatest incidence of malocclusion was found in children with malocclusion (94.1%), when compared with those without malocclusion (67.7%) (RR=1.39 [1.20-1.61]) *P*<.001). In the multivariate analysis, malocclusion in the primary dentition (RR=1.31 [1.13-1.52]), mouth-breathing pattern (RR=1.15 [1.03-1.28]), and the hypertrophied adenoids (RR=1.12 [1.00-1.26]) persisted in the final model, after the adjusting of confounding variables: gender, age and economic status. The development of malocclusion in the early mixed dentition was not statistically associated to the pacifier and digit-sucking habits (*P* >.05).

Conclusions: The malocclusion incidence increase from primary to early mixed dentition was directly related to the presence of malocclusion in primary dentition, mouth-breathing pattern and hypertrophied adenoids of children.

KEY WORDS: Digit-sucking; Pacifier-sucking; Mouth-breathing; Adenoids; Malocclusion; Primary dentition; Mixed dentition.

INTRODUCTION

In the last 40 years, there have been notable changes in the epidemiological patterns of diseases and health problems in the mouth, causing the malocclusion to rank, in the current scenario, the third position on a scale of oral health priorities proposed by the World Health Organization in 1989.[1,2]

The orientation of the eruption and the development of primary, mixed and permanent dentition is essential to obtain an acceptable occlusion, harmonious, functional and aesthetic. Clinicians should recognize, differentiate and also supervise, as appropriate, or identify abnormalities in dentition development, and establish a plan based on the complexity of the problem and the individual clinical training, knowledge and experience. Early diagnosis and successful treatment of developing malocclusion may have benefits in the long and short term, when they achieved the goals of occlusal harmony, functional, and aesthetic facial and dental.[3]

At the time corresponding to the mixed dentition, there are large changes in the dental arches. It is identified by a dynamic phase of intense growth of the child, in which some deviations from normality can be installed. Changes in overbite and overjet can have great impact on children when they are present in the early mixed dentition and in fact that are directly related to problems in the functional and aesthetic facial. In some cases psychologically affect the child, who becomes the target of jokes and nicknames for their social activities.[4,5] Conditions that affect dental aesthetics have an influence on psychological well-being and social interactions in children such as crowding, or diastema upper interincisal greater than or equal to 2 mm,[4] socio-economic status[4] or intermediate,[5] low self-esteem,[5] and normative need of elective orthodontic treatment[5] and highly desirable,[4,5] negative self-perception of oral aesthetics,[5] and being female.[5] It is therefore important that the professional performing any intervention at this stage, seeking to restore functional and esthetic aspects in order to allow the normal bone growth and development, dental and neuromuscular.[4,5]

A large number of studies include the identification of changes in the normal pattern around the possible etiologic factors.[1,2,6-30] Sucking habits are recognized as responsible for affecting the occlusion and the characteristics of the dental arches.[1,2,6-16] Several authors have demonstrated an association between pacifier[1,2,7-14] and finger[1,2,6,7,9,11,12] sucking habits with the presence of malocclusion in the primary and mixed dentition. Several studies highlighted the effects that prolonged non-nutritive sucking habits influence on certain characteristics of the dental arches. Among them, there is a high prevalence of anterior open bite,[7-15] posterior crossbite,[7-12] and greater overjet.[7,8,10-12,15] On the other hand, some

researchers said they did not find any statistically significant association between the presence of pacifier[15,17,18] and finger[8,10,13,16,18] sucking habits and some types of malocclusion, and others advise the use of pacifiers in the first year of life to reduce the risk of the childhood sudden death syndrome.[19,20]

When considering a possible causal relationship between the habit of mouth-breathing and the presence of adenoid hypertrophy with the pattern of growth and the development of malocclusion, it appears that by the time this issue is still unclear. Therefore, inferences are still made.[21-30]

The breathing pattern depends on the interaction between genetic and environmental factors. May influence the development of transverse relationship, causing the development of posterior crossbite,[10,16,21,24,29] anterior open bite,[10,21,23,24,29] and crowding.[24,29] Some authors, however, disagree with the fact that the mouth-breathing affects the shape of the jaw or malocclusion produces.[25,26]

An association between the upper airway obstruction, the enlarged tonsils and nasal resistance with the development of dento-skeletal abnormalities is evidenced in several studies.[21,27-29] Other research, however, claim that the adenoids have no cause-effect relationship with the development of malocclusion or mouth-breathing.[10,16,24,26,30] Therefore, the etiologic role of adenoid hypertrophy remains unclear so far and there aren't longitudinal studies in this area.

Within this perspective, the purpose of this study was to investigate the incidence of malocclusion among the phases of primary and mixed dentition in children aged 8-11 years and to determine the risk between the presence of non-nutritive sucking habits, mouth-breathing, adenoid hypertrophy and malocclusion in primary dentition with the development of malocclusion in early mixed dentition.

MATERIALS AND METHODS

A longitudinal study was carried out to verify the malocclusion incidence and identify the main factors considering the nonnutritive sucking habits, mouth-breathing pattern and hypertrophied adenoids in the transition from primary to early mixed dentition. It was held in the city of Juiz de Fora, located in southeastern Brazil, with a population of around 580,000 inhabitants, being developed in two periods: from May 2004 (first phase) to May 2009 (second phase) (Figure 1).

In order to be examined in the actual phase of occlusal development, 300 children, randomly selected from a representative sample, now ages 8 and 11 years and being early

mixed dentition (upper and lower incisors and first permanent molars erupted), were again contacted, along with their parents/guardians.[10] Children were tracked through a questionnaire, thereby allowing the participants to be located in current schools, and by means of telephone numbers and correspondence.

The exclusion criteria were: children with health problems, with previous orthodontic treatment, with adenoidectomy and any primary tooth affected integrity of the mesiodistal diameter in relation to dental caries. All children had the four upper and lower incisors and the four first permanent molars fully erupted, and absence of congenitally missing or supernumerary primary or permanent teeth.

The individuals' rights were protected, and informed consent and assent were obtained in accordance with the Human Research Ethics Committee of the Federal University of Minas Gerais.

Economic Status Evaluation

Participants were matched for gender, age and economic status.[10] Economic classification was based on the possession of the items by the surveyed families and level of education of the head of the household, according to ABEP criteria,[31] and was dichotomized into two class: most favored (A, B and C) and less favored (D and E).

Dental Arch Evaluation

All children received a clinical examination by a unique previously calibrated and blinded orthodontist to the original group allocation in the primary dentition (control or malocclusion). Evaluations included overjet and overbite measurements, classification of primary canines and second molars, first permanent molar relationships, and the presence or absence of malocclusions in centric occlusion.

Measurements were then made directly using a bucal mirror, tongue blade, and a millimeter probe to record the amount of overjet and overbite.[32,33] Criteria for evaluating the primary canines and second molars, and first permanent molars relationships in Class I, Class II, or Class III, and for posterior and anterior crossbite or open bite were based on previously described methods.[32,33] The anterior dental crowding was measured directly to the patient's mouth using a millimeter probe.[34] All biosafety precepts were followed.

The child was considered with normal occlusion in early mixed dentition when all these characteristics were present: overbite and overjet from 1 to 3mm,[32] primary canines in Class I,[32,33] distal terminal plane of the primary second molars

in mesial step or straight,[32,33] the first permanent molars in Class I or flush,[32,34] and anterior dental crowding up to 2mm.[23,34] Malocclusion was identified in the presence of any of the following changes: anterior/posterior open bite or crossbite, overbite or overjet greater than 3mm or less than 1mm, primary canines or first permanent molars in Class II or III, terminal plane of the primary second molars in distal step, and upper or lower anterior dental crowding more than 2mm. No discrimination was made between unilateral and bilateral for any type of malocclusion.

Evaluation of Nonnutritive Sucking Habits

All information regarding the history and duration of existing pacifier-sucking and digit-sucking habits came from the questionnaire answered by the parents or guardians and applied by the examiner in the previous study in 2004 at the school.[10]

Mouth-breathing Analysis

Clinical assessment of mouth-breathing was performed, based on data obtained in the previous study by Góis et al., in 2004,[10] in accordance with the Moyers criteria,[32] later used by Bresolin et al.,[22] Melsen et al.,[23] and Lopatiene and Babarskas.[29]

During the exam, the following factors were considered all together for the diagnosis of mouth-breathing: lip incompetence, dry lips, and fogging on the lower side of a double-faced mirror.[10]

Upper Airway Analysis

The same way as the deleterious oral habits, assessment of severity of obstruction of the upper airway in relation to adenoids was based on information obtained from the radiographic criteria used in the previous study of 2004, through computerized cephalometric tracing using the Radiocef 4 program.[10,35] For this purpose, all data from the first cephalometric radiography performed in 2004, during the primary dentition of children participating in this study, were recorded and checked again to undergo the appropriate statistical analysis.

Statistical Analysis

Data analysis was performed using the Statistical Package for Social Sciences (SPSS for Windows, version 15.0, SPSS Inc, Chicago, IL, USA) and performed univariate analysis using the chi-square test and obtaining the relative risk (*P*<.05). The dependent variable was the presence or absence of malocclusion in mixed dentition. The independent variables were: malocclusion in primary dentition, finger and pacifier-sucking habits, breathing pattern, and adenoid size measured during the primary dentition. Poisson regression with robust variance was used in multivariate analysis. The criterion for inclusion in the model was a significance level lower than 25% of the results of univariate analysis (*P*<.25) Then a backward stepwise procedure was performed. Therefore, the independent variable "adenoid size" for presenting *P* value more than 0.10, was included in the model by having a strong epidemiological link with the dependent variable.

Assessment of Intraobserver Consistency

The reliability of radiographic and clinical measures was determined by calculating the intraexaminer Cohen kappa concordance index (k) between the first and second measurements within an interval of 14 days. This phase included the participation of 30 children of the main study. The intraexaminer concordance was assessed as very good, since the kappa values ranged from 0.82 (anterior open bite and overbite) to 1.00 (crossbite, overjet and cephalometric adenoid tracing).

RESULTS

Descriptive Analysis

Of the 300 participants contacted after an interval of 5 years, 241 parents/guardians agreed that her son again participate in research, with a return rate of 80.3% (241/300). Losses during the study (59/19.7%) occurred for the following reasons: the 35 non-responsible (11.7%) and failure to locate 24 participants (8%) for change of school, address, phone number, city, or lack address and / or telephone on data from the first questionnaire (Figure 1).

The final sample had 212 children, considering that 23 students (7.7%) were excluded because they are using or have used braces and 6 (2%) to have been undergoing treatment for adenoidectomy (Figure 1).

Among the 212 children examined, there was a gender balance, with slight predominance of females (111/52.4%) compared to males (101/47.6%). Regarding age, nine

children were 8 years (4.3%), 59 of them with 9 years (27.8%), 112 children had 10 years (52.8%), and 32 had 11 years of age (15.1%), with a mean age of 9.8 (±0.8) years.

From the children evaluated, 175 had malocclusion (82.5%). With respect to matching variables: age, gender and economic status, there was maintenance of homogeneity among the groups of children with and without malocclusion (*P*>.05), confirming the lack of influence of these variables in the final result (Table 1).

The incidence of malocclusion in mixed dentition was 67.7% (n=63) in the group with no malocclusion in primary dentition, with an increase with age, with 17 students (27%) of 8 and 9 years and 46 students (73%) of 10 and 11 years of age.

Children with malocclusion in primary dentition had around 40% additional risk (RR=1.39 [1.20-1.61]) presenting malocclusion in early mixed dentition than subjects without malocclusion in primary dentition (*P*<.001) (Table 2).

Other results of univariate analysis revealed a statistically significant relative risk among children who stopped the habit of pacifier-sucking after 2 years of age (RR=1.31 [1.15-1.51], *P*<.001) and had mouth-breathing pattern (RR=1.30 [1.16-1.45], *P*<.001) in the primary dentition with the presence of malocclusion in early mixed dentition. Moreover, students who had adenoid hypertrophy and digit-sucking in the primary dentition had no greater risk of developing malocclusion in early mixed dentition (*P*>.05) (Table 2).

Multivariate Analysis

Risk factors for the development of malocclusion in early mixed dentition, verified by Poisson regression with robust variance, were: malocclusion in primary dentition (*P*<.001), mouth-breathing pattern (*P*<.05) and hypertrophied adenoid (*P*<.05). Children with malocclusion in primary dentition, mouth-breathing pattern and hypertrophied adenoid in primary dentition were 31% (RR=1.31 [1.13-1.52]), 15% (RR=1.15 [1.03-1. 28]) and 12% (RR=1.12 [1.00-1.26]) increased risk of developing malocclusion in mixed dentition, respectively, when compared with children without these characteristics identified in question (Table 3).

Moreover, those children with digit or pacifier-sucking habits did not have elevated risks of presenting malocclusion in early mixed dentition (*P*>.05).

Figure 2 illustrates the influence of etiologic factors in the development of malocclusion between the primary and early mixed dentition, relating to studies in 2004,[10] and 2009.

DISCUSSION

The design of a longitudinal study is considered the most suitable model for observational epidemiological studies that seek to identify the incidence and natural history of disease, being used to examine multiple outcomes from a single exposure.[36,37] The quality of the data produced can be considered excellent, because recall bias is small and the chronological order between exposure and outcome is clearly identified,[36] besides being able to obtain the relative risk.[37] On the other hand, is observed in most scientific research, a resistance to this model due to difficulty in its implementation and operating costs, combined with a high utilization of the odds ratio, which can lead to detection of false-positive results, overestimating results.[37] Finally, there are great advantages of this study design, considering that most of the published scientific literature about the non-nutritive sucking habits, mouth-breathing, adenoid hypertrophy and malocclusion, among others, is done through models of cross-sectional studies.[6-9,11-18,21-30,37]

The amount of losses during the follow-up between the two phases of the study were within acceptable standards, less than 20% of the original sample and was evenly distributed (random loss) in both instances. Likewise, the 29 excluded children were homogeneously distributed among groups with and without malocclusion. However, these losses did not affect the results of research and thus not affecting the internal validity of the study.

Extensive discussion in most of the literature has reached a consensus that the relative risk is preferable to the odds ratio for most prospective studies. To estimate the relative risk directly, log-binomial regression and Poisson are usually recommended. When Poisson regression is applied to binary data, the expected error for the relative risk will be overestimated. However, in the present study, this problem has been adjusted through the use of robust variance procedure.[38,39] Another relevant aspect is that Poisson regression is a statistical method widely used to estimate the relative risk in cohort studies of common outcomes (>10%) using the SPSS (generalized linear models),[40] thus indicated in this study, since the prevalence of malocclusion in mixed dentition was above 80%.

The incidence of malocclusion in mixed dentition in children examined without malocclusion in primary dentition was 67.7%, increasing with age, and with a prevalence of 27.4% at ages 8 and 9 years old and 55.2% at ages 10 and 11 years. These findings are consistent with the study by Frazão et al.[41] who found an increased prevalence of occlusal problems from 49% in the primary dentition to 71.3% in permanent dentition and Legovic and Mady[42] who observed a 72.7% incidence of malocclusion in the transition from primary to permanent dentition. Therefore, the fact that some malocclusions not self correcting in the

transition from primary to mixed dentition, even with the cessation of deleterious habits, is expected to occur a trend toward increasing incidence of malocclusion in these individuals.[7,18]

The results of univariate analysis revealed a statistically significant association between pacifier use after 2 years of age, mouth-breathing and malocclusion in primary dentition with the presence of malocclusion in early mixed dentition and a lack of association for digit-sucking and adenoid hypertrophy. As reported in other studies,[7,9,10] these data proved that the duration of nonnutritive sucking habits and mouth-breathing is more important than the magnitude (frequency and intensity), ie, the more time that force is retained, the greater the impact in dental position and malocclusion incidence.

Findings in the multivariate analysis showed that children who had malocclusion in primary dentition showed an increased risk for developing malocclusion in mixed dentition (RR=1.31). Likewise, students who breathed through the mouth and had adenoid hypertrophy had 15% and 12% higher risk of having malocclusion in mixed dentition, respectively. The habit of pacifier-sucking after 2 years of age has not been maintained as a risk factor for malocclusion in mixed dentition because the existence of collinearity among the variables: pacifier-sucking and malocclusion in primary dentition ($P<.05$), only the latter remained in the final model. Similarly, several studies have confirmed the existence of an association between pacifier-sucking habits[1,2,7-10,12,14,20] and mouth-breathing pattern[10,11,13,21-24] with the presence of malocclusion. Moreover, some research,[17,18,25,26] showed adverse findings, which can be explained by the large variability in research methodologies, as well as the frequency, intensity and duration of habits are not always evaluated reliably and consistently.

These results point out the importance of harmful habits of pacifier-sucking being diagnosed early and stopped as soon as possible, since the age of habit cessation was essential for the occurrence of malocclusion in primary dentition,[7,9,10,20] and this in turn with the persistence of malocclusion in mixed dentition. Following the same reasoning, mouth-breathing and adenoid hypertrophy by prove as determinants of malocclusion in mixed dentition should also be diagnosed and treated early. Even if the removal of old habit is before the mixed dentition, the risk of malocclusion perpetuate itself along the occlusal development is highly significant. Moreover, being a representative sample, the results of this study can be extrapolated to a population of a city with 500,000 inhabitants, which makes them even more relevant.

In this study, adenoidal hypertrophy in primary teeth contributed to the increased risk of children having malocclusion in mixed dentition. However, other etiological factors may also be involved with respiratory problems that were not evaluated in this research, such as,

genetic influence,[21,23] allergic and chronic rhinitis, sinusitis, asthma, palatine tonsil (amygdala) and turbinate hypertrophy, polyps and septal deviation.[21] This association was observed, probably because it is expected that the size of the adenoids (pharyngeal tonsil) increases with age until the beginning of the pubertal growth spurt. These findings corroborate with the literature that shows an appreciable influence between adenoid hypertrophy and the development of malocclusion.[21,27-29] Otherwise, different scientific reports contradict these findings,[10,16,21,23,27] among them, those of Oulis et al.[16] that found an association of posterior cross bite just for the palatine tonsil.

In relation to digit-sucking, in this study this variable was not constituted as a risk factor for the development of malocclusion in early mixed dentition, corroborating with the scientific literature.[8,10,13,14,16] This association was not observed, probably due to the fact that only a small number of children had this habit (15/7.1%) or to methodological differences between this study and others who have observed such an association. We did not observe whether there was the presence of calluses or warts on any finger, but only the report about the habit by parents in the questionnaire.[32] In this case, information or recall bias could occur, because the digit-sucking habit is not socially acceptable in Brazil and often discriminated. However, the effect of sucking on the occlusion after 4 years of age was clearly demonstrated in some studies in literature,[1,2,7,9,11,12,15] appearing to be correlated with the direction of the force, duration and intensity of habit, as well as the resistance of the jaws to displacement.[6]

This study was unique in fact that the sample represented a defined population of school children in Juiz de Fora, matched for age, gender and economic class, proportionally and randomly selected from each administrative region of the city, accompanied from the transition of primary dentition to early mixed dentition. The homogeneity of the sample (groups with and without malocclusion) remained in the longitudinal study, showing that these possible confounding variables were controlled, minimizing the potential biases. We used clear criteria, and measurable goals for both the outcome (malocclusion) and the exposure, besides the researcher and the radiologist are under blinding. The outcome did not need much time to occur, making the study economically viable. Recall bias was minimized because of the short time elapsed in relation to information supplied by parents/guardians in the questionnaire and the occurrence of habits.

Although the study design is strong, it had some limitations: the sample had a relatively small number of individuals with finger sucking habit; data on sucking habits were reported by parents and could not be validated directly, and not have been evaluated the frequency and intensity of such habits; and mouth-breathing pattern was selected based on visual criteria rather than functional. In addition, other etiological factors of malocclusion that

were not evaluated in this study could also have an appreciable influence, such as heredity, the facial patterns, the type of feeding and carious lesions. Finally, there are limitations when evaluating a three-dimensional space (nasopharynx obstruction/adenoid size) based on lateral cephalometric radiographs (two dimensional), since the golden standard to diagnosis is a videoendoscopy or nasofibroscopy.

CONCLUSIONS

- There was a high incidence of malocclusion in the transition from primary to early mixed dentition in school children in the city of Juiz de Fora.
- Children with mouth-breathing pattern, adenoid hypertrophy, and malocclusion in primary dentition had higher risks for the development of malocclusion in early mixed dentition.
- Digital and pacifier-sucking habits in primary dentition were not risk factors for the development of malocclusion in early mixed dentition.
- These results suggest that the etiologic factors should be considered since the first visit to the dentist, as they have an important role in the development and maintenance of malocclusion in later ages.

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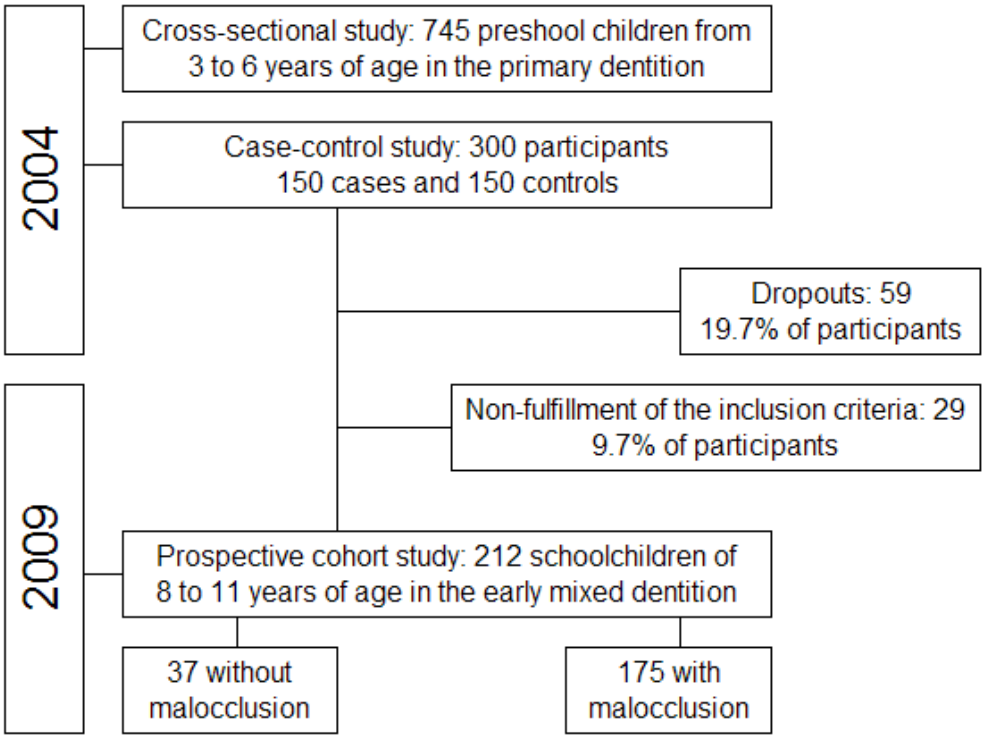

Figure 1. Flowchart displaying study phases and number of participants involved in each phase.

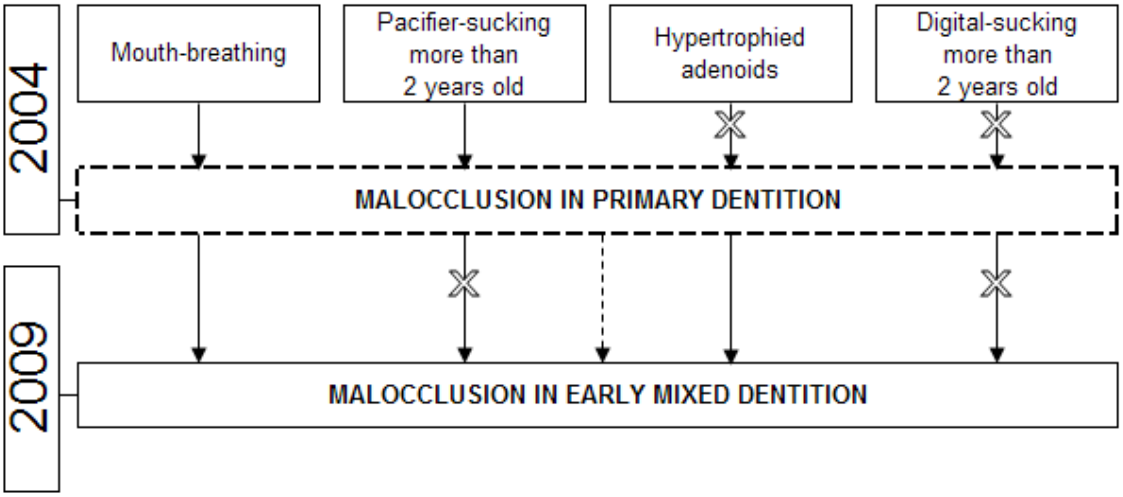

Figure 2. Flowchart displaying the etiology factors with the development of malocclusion in primary and mixed dentitions

Table 1. Univariate Analysis of Relative Risk Between the Confounding Variables in the Primary Dentition and the Malocclusion in the Early Mixed Dentition

Variable (Primary Dentition)	Malocclusion in Early Mixed Dentition			*P*	RR (95% CI)
	Yes n (%)	No n (%)	Total n (%)		
Age, years					
5 and 6	64 (84.2)	12 (15.8)	76 (100.0)	.633*	1.03 (0.91-1.17)
3 and 4	111 (81.6)	25 (18.4)	136 (100.0)		1
Gender					
Female	94 (84.7)	17 (15.3)	111 (100.0)	.390*	1.06 (0.93-1.20)
Male	81 (80.2)	20 (19.8)	101 (100.0)		1
Economic status					
Less favorable	49 (81.7)	11 (18.3)	60 (100.0)	.832*	0.99 (0.86-1.13)
More favorable	126 (82.9)	26 (17.1)	152 (100.0)		1
Total	175 (82.5)	37 (17.5)	212 (100.0)		

* *P*>.05.

Table 2. Univariate Analysis of Relative Risk Between Independent Variables in the Primary Dentition and Malocclusion in Early Mixed Dentition

Variable	Malocclusion in Early Mixed Dentition			*P*	RR (95% CI)
	Yes n (%)	No n (%)	Total n (%)		
Malocclusion in primary dentition					
Yes	112 (94.1)	7 (5.9)	119 (100.0)	.000*	1.39 (1.20-1.61)
No	63 (67.7)	30 (32.3)	93 (100.0)		1
Pacifier-sucking time					
More than 2 years old	105 (92.9)	8 (7.1)	113 (100.0)	.000*	1.31 (1.15-1.51)
0 to 2 years old	70 (70.7)	29 (29.3)	99 (100.0)		1
Digital-sucking time					
More than 2 years old	2 (66.7)	1 (33.3)	3 (100.0)	.465**	0.81 (0.36-1.80)
0 to 2 years old	173 (82.8)	36 (17.2)	209 (100.0)		1
Breathing pattern					
Mouth	83 (95.4)	4 (4.6)	87 (100.0)	.000*	1.30 (1.16-1.45)
Nasal	92 (73.6)	33 (26.4)	125 (100.0)		1
Adenoids' size					
With hypertrophy	80 (87.0)	12 (13.0)	92 (100.0)	.139**	1.10 (0.97-1.24)
Without hypertrophy	95 (79.2)	25 (20.8)	120 (100.0)		1
Total	175 (82.5)	37 (17.5)	212 (100.0)		

**P*<.001; ***P*>.05

Table 3. Multivariate Analysis of Poisson Regression with Robust Variance Between Independent Variables and the Study Group, With and Without Malocclusion in Early Mixed Dentition (Final Model) – Sample of 212 School Children in Juiz de Fora, MG, Brazil

Variable	RR adjusted (95% CI)	*P**
Malocclusion in primary dentition	1.31 (1.13-1.52)	.000**
Yes	1	
No		
Breathing pattern	1.15 (1.03-1.28)	.011***
Mouth	1	
Nasal		
Adenoids' size	1.12 (1.00-1.26)	.049***
With hypertrophy	1	
Without hyperthophy		

*Adjusted for age, gender and economic status; **$P<.001$; ***$P<.05$

ARTIGO 2

Incidence of malocclusion between primary and mixed dentitions among Brazilian children: a five-year longitudinal study

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ABSTRACT

Objective: To determine the incidence of malocclusion in a 5-year follow-up of school children and verify the hypothesis that individuals with previous malocclusion are more prone to maintain the same characteristics in the transition from primary to mixed dentition.

Materials and Methods: School children, ages 8 to 11 years participated. The inclusion criteria were normal occlusion in primary dentition or subsequent malocclusions: anterior open bite and/or posterior crossbite and/or overjet measuring more than 3 mm, and that they had not submitted to orthodontic treatment and adenoidectomy. The data collection based on the evaluation of the occlusion in school children in the actual stage of mixed dentition. Descriptive, chi-square and relative risk (RR) 95%CI analyses were carried out.

Results: The greatest incidence of malocclusion was found in children with previous malocclusion (94.1%), when compared with those without malocclusion (67.7%) (RR=1.4 [1.2-1.6]) *P*<.001). Anterior open bite (RR=3.1 [1.7-5.8]), posterior crossbite (RR=7.5 [4.9-11.5]), and overjet greater than 3 mm (RR=5.2 [3.4-8.0]) in primary dentition are risk factors for malocclusion in early mixed dentition. Spontaneous correction of the anterior open bite was confirmed in 70.1% of the cases. Posterior crossbite and overjet greater than 3mm was persistent in 87.8% and 72.9% of the children.

Conclusions: Malocclusion incidence was high. Individuals with previous anterior open bite, greater overjet, and posterior crossbite had greater risk of having the same characteristics in the mixed dentition.

KEY WORDS: Cohort studies; Malocclusion; Primary dentition; Mixed dentition.

INTRODUCTION

Primary occlusion may improve or worsen as an individual moves from primary to the mixed and permanent dentition.[1,2] Longitudinal studies indicated that, in most patients, a diagnosis of malocclusion and a fairly consistent prediction of the development of the mixed and permanent dentitions can be based on several occlusal features of primary dentition.[3]

Accordingly, the key clinical question is whether these changes persist into mixed dentition and to what degree. The available literature suggests that some occlusal characteristics persist into mixed dentition.[4,14] Conversely, the anterior open bite can be self-correcting in some cases.[4,14-16]

A large number of studies have included the identification of changes in the normality pattern among the etiologic factors. Prolonged duration of nonnutritive sucking might have consequences for occlusion development.[12,16-28] Thus, studies are needed to clarify these assumptions and new data are required from primary to mixed dentition to fully understand this biogenetic course.

This study aimed to estimate the incidence of malocclusion in the mixed dentition among groups with and without previous malocclusion in primary dentition during a follow-up period of up to 5 years and confirm the presumption that individuals with previous malocclusion are more prone to retain the same characteristics in mixed dentition.

MATERIALS AND METHODS

A longitudinal study was carried out to verify the incidence of malocclusion and the occurrence of self-correction of malocclusion during a 5-year follow-up period from May 2004 to May 2009. Two hundred forty-one school children were contacted. Two hundred twelve children, aged from 8 to 11 years, were randomly selected from a representative sample to participate.[26] The exclusion criteria were: children with health problems, with previous orthodontic treatment, with adenoidectomy and any primary tooth affected integrity of the mesiodistal diameter in relation to dental caries. All children had the four upper and lower incisors and the four first permanent molars fully erupted, and absence of congenitally missing or supernumerary primary or permanent teeth.

Children were tracked through a questionnaire, thereby allowing the participants to be located in current schools, and by means of telephone numbers and correspondence. The individuals' rights were protected, and informed consent and assent were obtained in accordance with the Human Research Ethics Committee of the Federal University of Minas Gerais.

Economic Status Evaluation

Economic classification was based on the possession of the items by the surveyed families and level of education of the head of the household, according to ABEP criteria.[29]

Dental Arch Evaluation

All children received a clinical examination by a unique previously calibrated *(*kappa values ranging from 0.82 for anterior open bite and overbite to 1.00 for posterior crossbite and overjet) and an orthodontist blinded to the original group allocation in the primary dentition (control or malocclusion). Evaluations included overjet and overbite measurements, classification of primary canines and second molars, first permanent molar relationships, and the presence or absence of malocclusions in centric occlusion.

Measurements were then made directly using a bucal mirror, tongue blade, and a millimeter probe to record the amount of overjet and overbite.[30,31] Criteria for evaluating the primary canines and second molars, and first permanent molars relationships in Class I, Class II, or Class III, and for posterior and anterior crossbite or open bite were based on previously described methods.[30,31] The anterior dental crowding was measured directly to the patient's mouth using a millimeter probe.[32] All biosafety precepts were followed.

The eligibility criteria for normal occlusion in the mixed dentition were positive overjet and overbite from 1 to 3mm, the primary canines' relationship in normal occlusion (Class I), distal terminal plane of the primary second molars in mesial step or vertical plane, first permanent molars in straight or Class I relationship, anterior dental crowding up to 2mm, and the absence of any malocclusions.[31,32] Children with malocclusion had at least one of the following alterations: anterior or posterior open bite and/or crossbite, overjet and/or overbite greater than 3mm or less than 1mm, primary canines or first permanent molars in Class II or III relationships, distal terminal plane of primary second molars in distal step, and upper and/or lower anterior dental crowding more than 2mm.[32] No discrimination was made between unilateral and bilateral for any type of malocclusion.

Assessment of Nonnutritive Sucking Habits

All information regarding the history and duration of existing pacifier-sucking and digit sucking habits came from the questionnaire answered by the parents or guardians and applied by the examiner in the previous study in 2004 at the school.[26] The participating

children were categorized into groups to analyze the results: those who had never used a pacifier, those who used one up to the age of 2 years of age, 4 years, 6 years, and more than 6 years of age. The probability of self correction of the malocclusion was evaluated considering the first examination and five-year follow-up.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows, version 17.0, SPSS Inc, Chicago, IL, USA). Bivariate analysis was the initial analytic strategy (Pearson's chi-square test and Relative Risk – 95% CI). These tests evaluated the risk factors between the main variables in the transition from primary to mixed dentition. The level of significance was set at α=0.05.

RESULTS

A total of 241 schoolchildren from 20 schools in Juiz de Fora, Brazil, was enrolled in the study. The response rate was 80.3% (92.6% in the malocclusion group and 68% in the non-malocclusion group). The final sample was composed of 212 children (119 with malocclusion and 93 without malocclusion). It was verified, however, that non-agreed participants presented the same characteristics as those in the sample, i.e., dropouts occurred at random. There were no statistically significant differences with regard to the following confounding variables for dental malocclusion in the primary dentition and malocclusion development in mixed dentition: gender (*P*=.390), age (*P*=.633), and economic status (*P*=.832) (Table 1).

The sample comprised 111 (52.4%) girls. Children were 7 (4.3%), 8 (27.8%), 9 (52.8%) and 10 (15.1%) years old. Categorized occlusal variables are displayed in Table 2. The confounding variables of gender, age, and economic status in the primary dentition were not considered risk factors for developing malocclusion in early mixed dentition (*P*>.05). Incidence of malocclusion in early mixed dentition was 94.1% for the group with previous malocclusion and 67.7% for the group with no previous malocclusion. When normal occlusion frequency was evaluated, only 17.5% of the children retained such classification. Otherwise, the likelihood of schoolchildren with malocclusion rose from 56.1% to 82.5% between primary and early mixed dentition. Participants who had anterior malocclusion in primary dentition had a 1.4 times greater risk of having malocclusion in early mixed dentition

than participants without anterior malocclusion (RR [95%CI] = 1.4 [1.2-1.6]) (*P*<.001) (Table 3).

Prevalence of malocclusion in the primary and early mixed dentition was 36.3% and 17% for anterior open bite (Table 4), 19.3% and 26.4% for posterior crossbite (Table 4), and 33% and 33.5% for greater overjet (Table 4), respectively.

In univariate analysis, a statistically significant association was found between primary and mixed dentitions for anterior open bite, posterior crossbite, and greater overjet (*P*<0.001). Children who had anterior open bite in primary dentition had a 3.1 times greater risk (RR [95%CI] = 3.1 [1.7-5.8]) of presenting this malocclusion in mixed dentition than did children without anterior open bite in primary dentition. Furthermore, children with previous anterior open bite showed 70.1% of self-correcting in the early mixed dentition (Table 4).

Conversely, children who had posterior crossbite in primary dentition had a 7.5 times greater risk (RR [95% CI] = 7.5 [4.9-11.5]) of retaining this malocclusion in early mixed dentition. Crossbite was persistent in 87.8% of the children, with new cases occurring in 20 children (35.7%) (Table 4). Likewise, children with overjet more than 3mm in primary dentition had a 5.2 times greater risk of retaining this malocclusion in early mixed dentition (RR [95% CI] = 5.2 [3.4-8.0]). According to this, overjet, more than 3mm was persistent in 72.9% of the children; moreover, new cases appeared in 20 participants (28.2%) (Table 4).

It was further confirmed that pacifier-sucking time played a significant role in the spontaneous correction of the anterior open bite (70.1%) (*P*<.05), adversely in posterior crossbite (12.2%), and greater in overjet (27.1%) (*P*>.05) (Table 5).

DISCUSSION

Although the data collection had been thoroughly planned, we confirmed a 19.7% dropout rate. Dropouts occurred at random and produced no significant effect on the results. Dropouts presented similar characteristics to those in the sample, with no statistically significant differences with regard to confounding variables for malocclusion (gender, age, and economic status). Thus, the final sample may be considered a representative sample of schoolchildren from 8 to 11 years of age in Juiz de Fora, Brazil, and the results could be generalized for the entire population.

The study design makes the occurrence of recall bias unlikely since the information used was collected during or shortly after exposure, leading to short recall periods. Observation bias is unlikely to have occurred, since the observer was unaware of the children's exposure status when conducting the oral examination. Moreover, the accuracy of

the examinations was greater in clinical context, owing to the fact that natural and artificial lights were used and a dental chair was available.

We confirmed the hypotheses that individuals having anterior malocclusion in primary dentition presented greater risks of having malocclusion in mixed dentition than those without anterior malocclusion.

The general proportion rate for malocclusion (82.5%) in mixed dentition was significant to the point of being a public health problem. The risk is notable and its reduction would, therefore, be of value for maintaining more acceptable social and financial support levels. In our investigation, the prevalence of anterior open bite in mixed dentition was similar to previous data.[4,16] A survey of the literature provided evidence confirming this hypothesis with regard to the etiologic factors of malocclusion. The causes of malocclusion are complex, being influenced by hereditary and environment factors. Only 5% of them arise from specific known causes.[32]

The effect of nonnutritive sucking habits on the development of occlusion has been under investigation for a number of decades.[12,14,16,19-21,23,26,28] The main question arising from these studies is whether such conditions disappear once the risk factors for malocclusion have been identified and removed. The limited amount of data in the literature show that anterior open bite tends to disappear when the habit is abandonedt,[4,14-16] while the same does not occur in the case of posterior crossbite[4,5,8,11,12,14] and Class II malocclusion with increased overjet.[4,6,7,9,10,12,13,19]

In the majority of cases in this study (70.1%), it was observed that anterior open bite tends to self-correcting (n=54) in the transition from primary to mixed dentition. In the light of our findings, it appears advisable to recommend that pacifier-sucking habits be abandoned before the age of 6 years, i.e., before the eruption of the upper permanent incisors, to facilitate a spontaneous correction of the anterior open bite in most children. Other investigators have presented similar data for this assumption.[4,14-16]

According to univariate analysis, children with posterior crossbite and greater overjet in primary dentition had greater risks of having these malocclusions in early mixed dentition, respectively, when compared to individuals without these anterior malocclusions. It was further observed that the prevalence of posterior crossbite increased in the transition from primary to mixed dentition. In fact, greater overjet remained remarkably stable. Moreover, the occurrence of 20 new cases of posterior crossbite may be explained by ectopic eruption of permanent first molars, dental changes in the position of primary canines, and the appearance of unilateral posterior crossbite.

To intercept the development of crossbite and excessive overjet in mixed dentition, the developing occlusion should be observed in the primary dentition in children with prolonged digit or pacifier habits.[12,18,20,21,23,26-28] The vertical, saggital, and transverse occlusal

relationship should be evaluated at 2 or 3 years of age, particularly in children with nonnutritive sucking habits.[12,16,18,20,21,23,26-28] If there are interfering contacts of the primary canines or the presence of a negative overbite or an excessive overjet, the parents should be instructed to reduce pacifier or finger-sucking time, and seek appropriate treatment , if required.[16,21,23,26-28] Adverse dental effects of nonnutritive sucking habits may occur after the age of 2 years,[12,26] 3 years,[16,20,23] or 4 years.[21,27,28] Our results also discouraged pacifier or digit-sucking habits.

The transition period from primary to early mixed dentition is suitable for environmental and genetic factors to interfere with normal occlusal development. Defining the exact stage of intervention is of utmost importance for deciding upon and administering the appropriate orthodontic therapy. Starting treatment in the early mixed dentition could be advisable when lip or tongue functions are markedly altered. Psychological conditions related to esthetic problems and prevention of upper incision fractures after trauma can also influence the decision in favor of an earlier intervention.[19]

CONCLUSIONS

- Children with previous malocclusion presented greater risk of developing malocclusion in the early mixed dentition.
- Individuals with posterior crossbite and greater overjet in the primary dentition are more prone to maintain the same characteristics in the early mixed dentition.
- Anterior open bites tended to self-correct in the transitions from the primary to the early mixed dentition if non-nutritive sucking habits were not/ no longer present.

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Table 1. Univariate Analysis of Relative Risk Between the Confounding Variables in the Primary Dentition and the Malocclusion in the Early Mixed Dentition

Variable (Primary Dentition)	Malocclusion (Early Mixed Dentition)			*P* Value	RR - CI (95%)
	Yes n (%)	No n (%)	Total n (%)		
Age, years					
5 and 6	64 (84.2)	12 (15.8)	76 (100.0)	.633*	1.0 (0.9-1.2)
3 and 4	111 (81.6)	25 (18.4)	136 (100.0)		1
Gender					
Female	94 (84.7)	17 (15.3)	111 (100.0)	.390*	1.1 (0.9-1.2)
Male	81 (80.2)	20 (19.8)	101 (100.0)		1
Economic status					
Less favorable	49 (81.7)	11 (18.3)	60 (100.0)	.832*	1.0 (0.9-1.1)
More favorable	126 (82.9)	26 (17.1)	152 (100.0)		1
Total	175 (82.5)	37 (17.5)	212 (100.0)		

*$P>.05$.

Table 2. Sample Distribution in Relation to Occlusal Variables in the Early Mixed Dentition

Variable	n	%
Occlusion		
Normal	18	8.5
Angle Class I	115	54.2
Angle Class II	60	28.3
Angle Class III	19	9.0
Posterior crossbite		
No	150	70.8
Yes	62	29.2
Anterior crossbite		
No	205	96.7
Yes	7	3.3
Overjet		
Normal (1 to 3 mm)	135	63.7
Increased (> 3 mm)	71	33.5
Reduced (< 1 mm)	6	2.8
Overbite		
Normal (1 to 3 mm)	111	52.4
Increased (> 3 mm)	60	28.3
Reduced (< 1 mm)	41	19.3
Anterior open bite		
No (> 0 mm)	176	83.0
Yes (< 0 mm)	36	17.0
Dental crowding		
No or physiologic (≤ 2 mm)	138	65.1
Yes (> 2 mm)	74	34.9
Total	212	100.0

Table 3. Univariate Analysis of Children With and Without Malocclusion Between Primary and Early Mixed Dentitions

Variable	Early Mixed Dentition			*P Value*	RR (95% CI)
	With malocclusion n (%)	Without malocclusion n (%)	Total n (%)		
Primary Dentition					
With malocclusion	112 (94.1)	7 (5.9)	119 (100.0)	.000*	1.4 (1.2-1.6)
Without malocclusion	63 (67.7)	30 (32.3)	93 (100.0)		1
Total	175 (82.5)	37 (17.5)	212 (100.0)		

*P<.001.

Table 4. Univariate Analysis of Anterior Open Bite, Posterior Crossbite and Greater Overjet Between Primary and Early Mixed Dentitions

Variable (Primary Dentition)	Anterior Open Bite (Early Mixed Dentition)			*P Value*	RR (95% CI)
	Yes n (%)	No n (%)	Total n (%)		
Anterior Open Bite					
Yes	23 (29.9)	54 (70.1)	77 (100.0)	.000*	3.1 (1.7-5.8)
No	13 (9.6)	122 (90.4)	135 (100.0)		1
Total	36 (17.0)	176 (83.0)	212 (100.0)		

Variable (Primary Dentition)	Posterior Crossbite (Early Mixed Dentition)			*P Value*	RR (95% CI)
	Yes n (%)	No n (%)	Total n (%)		
Posterior Crossbite					
Yes	36 (87.8)	5 (12.2)	41 (100.0)	.000*	7.5 (4.9-11.5)
No	20 (11.7)	151 (88.3)	171 (100.0)		1
Total	56 (26.4)	156 (73.6)	212 (100.0)		

Variable (Primary Dentition)	Greater Overjet (Early Mixed Dentition)			*P Value*	RR (95% CI)
	Yes n (%)	No n (%)	Total n (%)		
Greater Overjet					
Yes	51 (72.9)	19 (27.1)	70 (100.0)	.000*	5.2 (3.4-8.0)
No	20 (14.1)	122 (85.9)	142 (100.0)		1
Total	71 (33.5)	141 (66.5)	212 (100.0)		

*$P<.001$

Table 5. Univariate Analysis of Malocclusions Self-Correcting According to the Pacifier-Sucking Time

Variable	Anterior Open Bite Self-Correcting		Posterior Crossbite Self-Correcting		Greater Overjet Self-Correcting	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Pacifier-sucking time						
No	-	-	-	1 (100.0)	1 (25.0)	3 (75.0)
Up to 2 years old	3 (75.0)	1 (25.0)	3 (37.5)	5 (62.5)	1 (14.3)	6 (85.7)
Up to 4 years old	17 (85.0)	3 (15.0)	2 (14.3)	12 (85.7)	7 (35.0)	13 (65.0)
Up to 6 years old	27 (77.1)	8 (22.9)	-	14 (100.0)	9 (34.6)	17 (65.4)
More than 6 years old	7 (38.9)	11 (61.1)	-	4 (100.0)	1 (7.7)	12 (92.3)
*P V*alue	.010*		.113**		.350**	
Total	54 (70.1)	23 (29.9)	5 (12.2)	36 (87.8)	19 (27.1)	51 (72.9)

*$P<.05$; **$P>.05$.

CONSIDERAÇÕES FINAIS

CONSIDERAÇÕES FINAIS

Do nascimento até a idade adulta, a oclusão dentária do homem sofre influência do processo de desenvolvimento, cujos principais eventos são o crescimento dos ossos maxilares, a formação e a erupção dentária. Esses deverão ser coordenados e qualquer falha em um deles ou em sua interação poderá dar início a um desvio, que é a maloclusão (UETANABARO et al., 2005).

O cirurgião-dentista que cuida de crianças e adolescentes deve conhecer bem as características morfológicas e dimensionais que caracterizam as dentaduras decídua e mista em condições normais, e estar atento para identificar, o mais cedo possível, qualquer indício de maloclusão (UETANABARO et al., 2005).

Embora a relação entre os arcos dentários seja estabelecida ainda na infância, certas mudanças ocorrem com a idade, caracterizando a oclusão dentária como uma relação dinâmica sob influências ontogenéticas e ambientais (UETANABARO et al., 2005).

Neste contexto, este trabalho demonstrou que houve uma alta incidência de maloclusão na transição da dentição decídua para a mista em escolares na cidade de Juiz de Fora. Esse dado caracteriza que a maloclusão é um problema bucal bastante comum e de grande repercussão na saúde pública. O desenvolvimento de maloclusão em 67,7% das crianças examinadas na dentição mista revelou que medidas preventivas e interceptativas em relação à saúde bucal precisam ser tomadas com a maior urgência possível para diminuir esses patamares para níveis mais aceitáveis socialmente e sustentáveis economicamente (FRAZÃO et al., 2004).

Na análise univariada, relacionando a etiologia desses problemas oclusais, no que diz respeito às influências ambientais, crianças que possuíam sucção de chupeta após os 2 anos de idade, padrão de respiração bucal e maloclusão na dentição decídua apresentaram maiores riscos para o desenvolvimento de maloclusão na dentição mista. Já o hábito de sucção digital e o quadro de hipertrofia adenoideana não foram fatores de risco para o desenvolvimento de maloclusão na dentição mista.

Já com relação à análise multivariada, permaneceram no modelo final a presença de maloclusão na dentição decídua, o padrão de respiração bucal e a adenóide hipertrófica. Uma hipótese para a associação entre tamanho da adenóide e maloclusão na dentição mista é a faixa etária pesquisada de 8 a 11 anos. Sabe-se que a adenóide tende a aumentar antes do pico do surto de crescimento puberal e diminuir de tamanho após esta fase e esse dado pode ter influenciado o resultado encontrado. Já a sucção digital não se comportou como fator de risco para o desenvolvimento de maloclusão na dentição mista, provavelmente, pelo pouco número de crianças inseridas em tal padrão. Uma das possíveis razões para essa assertiva se deve à falta de avaliação direta da presença de calosidades ou verrugas nos dedos dos participantes (TOLEDO e BEZERRA, 2005). Da mesma forma, a sucção de chupeta não permaneceu no modelo final, devido ao fato de ela influenciar o desenvolvimento da maloclusão na dentição decídua, sendo que uma vez seu efeito tendo atuado em uma idade mais precoce, ele se perpetua nas idades posteriores. Ocorreu uma neutralização do seu risco na presença, no modelo final, da variável maloclusão na dentição decídua. Muito embora os hábitos de sucção digital e de chupeta não terem se mostrado estatisticamente significantes na análise multivariada através da regressão de Poisson, com variância robusta, eles devem

sempre ser pesquisados. Primeiramente, devido à sua associação com as maloclusões observadas em outros estudos, além do envolvimento psicológico que acarreta a sucção digital nestes indivíduos. Estes resultados corroboraram em parte com os achados de Góis et al., em 2008.

Portanto, de uma maneira geral, os hábitos bucais deletérios podem causar anormalidades na oclusão, principalmente aqueles que persistem até o período da dentadura mista. A maloclusão resultante será caracterizada por espaçamento dos incisivos superiores, inclinação lingual dos incisivos inferiores, mordida aberta anterior, arco superior atrésico e mordida cruzada posterior. A constrição do arco maxilar que comumente acompanha os hábitos bucais deletérios parece ser conseqüência da alteração do equilíbrio entre as pressões da bochecha e da língua. Quando a mandíbula é abaixada, a língua deixa de pressionar a superfície lingual dos dentes superiores posteriores, ao mesmo tempo, aumenta a pressão com contração do músculo bucinador. A gravidade da maloclusão dependerá da freqüência, da intensidade e da duração da pressão exercida (PROFFIT e FIELDS Jr., 2007).

Da mesma forma, uma vez que a função respiratória determina a postura da mandíbula e da língua, parece lógico que possa também alterar o desenvolvimento mandibular e a forma dos arcos dentários. Ackerman e Klapper (1981) relataram que a respiração bucal, como conseqüência de bloqueio nasofaríngeo (hipertrofia adenoideana), pode provocar não apenas mordida aberta, mas também, uma série de modificações neuromusculares que acarretam alterações no padrão de crescimento facial.

Esses resultados sugerem que os fatores etiológicos devem ser considerados desde a primeira visita ao dentista, uma vez que tem um importante papel no desenvolvimento e manutenção da maloclusão em idades tardias.

Em qualquer caso de tratamento de um hábito bucal, é necessária, além da compreensão da criança, a colaboração dos pais ou responsáveis. É imprescindível que eles aceitem a orientação prescrita pelo profissional e não interfiram desfavoravelmente (TOLEDO e BEZERRA, 2005). É importante notar, também, o aspecto psicológico que pode estar envolvido em certos hábitos, tais como, a sucção digital. Condições que afetam a estética dental têm uma influência no bem-estar psicológico e nas interações sociais que envolvem crianças (MARQUES et al., 2006; 2009). Além disso, aspectos posturais nos casos de padrão respiratório bucal devem ser investigados (SOUKI et al., 2009).

É impossível estabelecer uma idade para o início do tratamento de um hábito bucal indesejável. O momento oportuno varia de indivíduo para indivíduo, de acordo com o desenvolvimento da criança e a gravidade do hábito. Pode-se ter como norma, contudo, que se um hábito de sucção se prolongar além dos dois anos (GÓIS, 2005; GÓIS et al., 2008; PERES et al., 2007a; 2007b; WARREN e BISHARA, 2002; WARREN et al., 2005), 3 anos (WARREN et al., 2005) e, em alguns casos, quatro anos de idade (TOLEDO e BEZERRA, 2005), é aconselhável avaliar a necessidade de tratamento. No caso da respiração bucal, deve-se ter em mente que uma série de fatores, atuando juntos ou separadamente, podem estar envolvidos, sendo causa ou conseqüência da respiração, tais como: rinite alérgica, sinusite, amígdalas e adenóides hipertrofiadas, desvios de septo, pólipos nasais, dentre outros (EMSLIE, 1952).

Faz-se, então, necessário a realização de um diagnóstico preciso e, sobretudo, um planejamento e tratamento multidisciplinar dentre as várias especialidades médicas: otorrinolaringologia, odontologia, fonoaudiologia, fisioterapia e psicologia visando o bem-estar biopsicossocial do indivíduo através de uma visão holística do paciente e da integralidade de ações.

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APÊNDICES

APÊNDICE 1

Faculdade de Odontologia

UNIVERSIDADE FEDERAL DE MINAS GERAIS
FACULDADE DE ODONTOLOGIA
DEPARTAMENTO DE ODONTOPEDIATRIA E ORTODONTIA

CARTA DE ESCLARECIMENTO AOS PAIS

Prezados pais ou responsáveis,

Meu nome é Elton Geraldo de Oliveira Góis, sou cirurgião-dentista formado há 13 anos pela Faculdade de Odontologia da Universidade Federal de Juiz de Fora (UFJF) e especialista em Odontopediatria e Ortodontia. Estou entrando em contato novamente com vocês, pais ou responsáveis, visto eu ter examinado clinicamente a boca de seus filhos, em 2004, na escola em que eles estudavam, quando da realização do meu Mestrado pela UFMG.

A qualidade de vida e o bem estar do seu filho dependem de uma boa saúde geral. Pensando nisso e procurando melhorar o atendimento odontológico infantil em nossa comunidade, estou continuando a pesquisa feita em 2004, voltada para os problemas na posição dos dentes (dentes tortos), devido ao uso de chupeta, ao hábito de chupar dedo, à respiração bucal, além de verificar, também, a presença de cáries e problemas gengivais.

Para essa pesquisa, estaremos realizando novamente um exame odontológico simples, rápido e **sem custo** nos seus filhos que será realizado no consultório do dentista, mediante o agendamento da consulta pelos pais, através do telefone: **3236-4949**. Precisamos, também, de informações sobre a história médica da criança ao longo desses anos e o relato de hábitos de sucção de chupeta e dedo. Além disso, devemos ter algumas informações sobre o tipo de respiração das crianças, já que a respiração pela boca pode levar a várias alterações nos dentes, como deixar a arcada dentária torta e estreita, além de cárie e gengivites. Outro problema causado pela respiração somente pela boca é a falta de concentração nas aulas, o que dificulta o aprendizado e o desempenho escolar da criança.

Caso você permita novamente a realização dessa pesquisa, você estará dando uma grande contribuição para a ciência e a saúde. Além disso, palestras educativas para as crianças e os responsáveis serão ministradas pelo pesquisador. Os pacientes que necessitarem de tratamento ortodôntico (aparelho) ou clínico (cárie) serão encaminhados para os Cursos de Especialização em Ortodontia (Suprema) e Odontopediatria (UFJF), respectivamente. Já os que possuírem respiração bucal, serão encaminhados para o Serviço de Otorrinolaringologia do Hospital Universitário da UFJF. Caberá aos pais o interesse em levar as crianças para tratamento na época em que forem agendadas as consultas.

Lembro, mais uma vez, que todos os procedimentos serão realizados **sem nenhum gasto** para os responsáveis e todas as informações serão mantidas sob sigilo, não sendo reveladas a ninguém.

Se você concorda que seu filho e você participem dessa pesquisa, leia e assine o Termo de Consentimento, enviado junto a esta carta. Finalizando, lembro que esta pesquisa foi autorizada pela escola, pelas Secretarias Estadual e Municipal de Educação, pelo Departamento de Saúde Bucal da Prefeitura de Juiz de Fora, assim como, pelo Comitê de Ética e Pesquisa da UFMG.

Agradeço antecipadamente sua atenção. Cordialmente,

Elton Geraldo de Oliveira Góis (Professor da UFJF e Suprema) – Tels: 3236-4949 / 9113-9990
- Doutorando em Odontopediatria pela Faculdade de Odontologia da UFMG –

APÊNDICE 2

UNIVERSIDADE FEDERAL DE MINAS GERAIS
FACULDADE DE ODONTOLOGIA
DEPARTAMENTO DE ODONTOPEDIATRIA E ORTODONTIA

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Por este instrumento, eu _____ responsável pelo menor _____ de ___ anos de idade, declaro ter sido esclarecido(a) que o objetivo deste estudo é conhecer os hábitos de saúde do meu filho. Declaro ter sido esclarecido(a) que será feito um exame clínico simples na boca de meu filho na própria escola para observar se existe alteração na posição dos dentes. Caso necessário e desejado, meu filho será encaminhado para tratamento posteriormente. Fui esclarecido(a) que responderei um questionário contendo questões pessoais minhas e de meu filho. Sei que os dados deste questionário serão utilizados para pesquisa científica. Os dados serão manipulados apenas pelo pesquisador e poderão se tornar públicos em revistas científicas. Minha identidade, assim como a de meu filho não serão reveladas em nenhuma hipótese. Minha participação e autorização para a participação de meu filho mostram meu interesse em colaborar com a pesquisa. **É minha a escolha de participar ou não, podendo desistir a qualquer época, sem prejuízo no caso de minha desistência**. Por fim, afirmo saber que esta pesquisa foi aprovada pela escola, pelo Comitê de Ética em Pesquisa da Universidade Federal de Minas Gerais, pelas Secretarias Estadual e Municipal de Educação e pelo Departamento de Saúde Bucal da Prefeitura de Juiz de Fora. Quaisquer imprevistos decorrentes da pesquisa serão ressarcidos pelo pesquisador.

IMPORTANTE: Mesmo aquelas crianças que já fizeram ou fazem tratamento odontológico podem participar, pois o pesquisador não fará nenhum tipo de tratamento, apenas o exame clínico simples.

Em caso de dúvida, ligar para:

Pesquisadores:

Isabela Almeida Pordeus (Orientadora e Pesquisadora Responsável). Av. Presidente Antônio Carlos, 6627. Faculdade de Odontologia. Campus Pampulha. Cep: 31270-901. Belo Horizonte-MG. Telefone: (31) 3409-2470. E-mail: isabela@netuno.lcc.ufmg.br
Elton Geraldo de Oliveira Góis (Pesquisador). Rua Dr. Constantino Paleta, 90/1002. Centro. Cep: 36015-450. Juiz de Fora-MG. Telefones: (32) 3236-4949 / (32) 9113-9990. E-mail: gois@nextwave.com.br
Comitê de Ética em Pesquisa (COEP) – UFMG: Av. Presidente Antônio Carlos, 6627, Unidade Administrativa II (prédio da Fundep), 2º andar, sala 2005. Campus Pampulha. Cep: 31270-901. Belo Horizonte-MG. Telefone/Fax: (31) 3409-4592. E-mail: coep@prpq.ufmg.br

Juiz de Fora, ____ de _____ de 2008.

_____ _____

Assinatura do responsável Assinatura da criança

APÊNDICE 3

Faculdade de Odontologia

QUESTIONÁRIO DIRIGIDO AOS PAIS

Solicitamos aos responsáveis que, por favor, respondam o questionário abaixo. É importante saber que não existem respostas certas ou erradas. OBRIGADO!

Nome da criança:_____Sexo: ___ Data de nascimento: __/__/___
Grau de parentesco com a criança: ☐mãe ☐pai ☐avó ☐avô ☐tio ☐tia ☐ outro
Nome do responsável: _____ Data de nascimento: __/__/____
Telefone: _____Celular: _____ Endereço: _____

1. Seu filho apresenta algum tipo de doença? ☐ sim ☐ não. Qual? _____

2. Seu filho já usou ou está usando aparelho ortodôntico nos dentes? ☐ sim ☐ não

3. Como seu filho respira mais? ☐ pelo nariz
☐ pela boca

4. Seu filho baba no travesseiro ao dormir? ☐ sim ☐ sim, às vezes ☐ não

5. Seu filho ronca durante a noite? ☐ sim ☐ sim, às vezes ☐ não

6. Seu filho dorme com a mão debaixo do travesseiro? ☐ sim ☐ não

7. Seu filho já operou a garganta? ☐ Sim (amígdalas) ☐ sim (adenóides) ☐ não

8. Seu filho já operou o nariz? ☐ sim (septo nasal)
☐ sim (cornetos ou conchas nasais)
☐ não

9. Você já levou seu filho alguma vez ao profissional que cuida dos ouvidos, garganta e nariz? ☐ nunca ☐ 1 vez ☐ 2 vezes ☐ 3 vezes ☐ mais de 3 vezes

10. Seu filho já fez (ou faz) algum dos hábitos abaixo?

Mamou no peito ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Mamadeira ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Chupeta ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Chupar dedo ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Roer unha ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Morder objetos ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Falar errado ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Ficar com a língua entre os dentes ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Bruxismo/Ranger os dentes ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Morder/Sucção lábios ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).
Outros_____ ☐ sim ☐ não. De ____(anos) ____(meses) até ____(anos) ____(meses).

11. Seu filho possui alguma alergia ? ☐ sim ☐ não
Se sim: ☐ remédio. Qual ? _____ ☐ poeira ☐ mofo ☐ perfume

12. Seu filho tem falta de ar ou sensação de sufocação à noite (apnéia do sono) ?
☐ sim ☐ não

13. Seu filho fica irritado durante o dia ? ☐ sim ☐ sim, às vezes ☐ não

14. Seu filho fica com sono durante o dia ? ☐ sim ☐ sim, às vezes ☐ não

15. Seu filho tem coceira no nariz, boca, olhos ou pele ? ☐ sim ☐ não

16. Seu filho tem catarro branco, parecido com água pelo nariz ?

☐ sim, sempre ☐ sim, às vezes ☐ não

17. Seu filho fica com o nariz entupido ? ☐ sim, sempre ☐ sim, às vezes ☐ não

18. Seu filho espirra muito, vários espirros um seguido do outro ? ☐ sim ☐ não

19. Seu filho fica sempre de boca aberta ? ☐ sim ☐ não

20. Seu filho tem rinite alérgica (alergia no nariz) ? ☐ sim ☐ não

21. Seu filho ouve bem ? ☐ sim ☐ não

22. Quando seu filho é chamado com uma voz mais baixa e de costas, ele atende?

☐ sim ☐ não

23. Seu filho costuma aumentar o volume da televisão ? ☐ sim ☐ não

24. Seu filho tem bronquite ? ☐ sim ☐ não

25. Seu filho tem asma ? ☐ sim ☐ não

26. Seu filho já teve sinusite (inflamação dos seios nasais) ? ☐ sim ☐ não

27. Seu filho já teve otite (inflamação do ouvido) ? ☐ sim ☐ não

28. Alguém na família tem rinite alérgica (alergia no nariz), coceira no nariz, nariz entupido, asma, bronquite ou sinusite?

☐ sim. Quem e o quê ? _____ ☐ não

APÊNDICE 4

FICHA CLÍNICA

Nome da criança: _____Sexo: ___ Idade: ____ Data: _____
Instituição: _____ Série: _____ Prof.: _____

1. Perfil
- ☐ reto
- ☐ convexo _____
- ☐ côncavo _____

2. Respiração
- ☐ predominantemente nasal
- ☐ predominantemente bucal

3. Linha média
- ☐ normal
- ☐ desviada

para qual lado? _____

4. Selamento labial
- ☐ normal
- ☐ anormal

5. Lábios
- ☐ normais
- ☐ ressecados

6. Caninos decíduos
- ☐ neutroclusão
- ☐ mesioclusão
- ☐ distoclusão

7. Tipo Facial
- ☐ Braquicéfalo
- ☐ Mesocéfalo
- ☐ Dolicocéfalo

8. Arcada dentária
- ☐ parabólica
- ☐ em forma de "U"
- ☐ atrésica (ogival)

9. Primeiros molares permanentes
- ☐ Classe I
- ☐ Classe II
- ☐ Classe III
- ☐ Topo

10. Plano terminal dos segundos molares decíduos
- ☐ reto
- ☐ mesial
- ☐ distal

11. Perdas precoces/Cárie/Bruxismo
- ☐ decíduos ___ ☐ permanentes___

12. Mordida cruzada posterior
- ☐ presente _____
- ☐ ausente

13. Mordida Aberta
- ☐ ausente
- ☐ anterior ☐ posterior

14. Trespasse horizontal
- ☐ normal _____mm
- ☐ aumentado _____mm
- ☐ negativo _____mm
- ☐ topo

15. Trespasse Vertical
- ☐ normal _____mm
- ☐ aumentado _____mm
- ☐ negativo _____mm
- ☐ topo

16. Simetria facial
- ☐ presente ☐ ausente

17. Postura corporal
- ☐ normal ☐ anormal

18. Freio lingual e labial superior
- ☐ normal ☐ normal
- ☐ curto ☐ anormal

19. Amígdalas hipertrofiadas
- ☐ sim
- ☐ não

20. Apinhamento
- ☐ inferior___mm ☐ superior___mm
- ☐ ambos ☐ ausente

21. Deglutição
- ☐ normal
- ☐ atípica

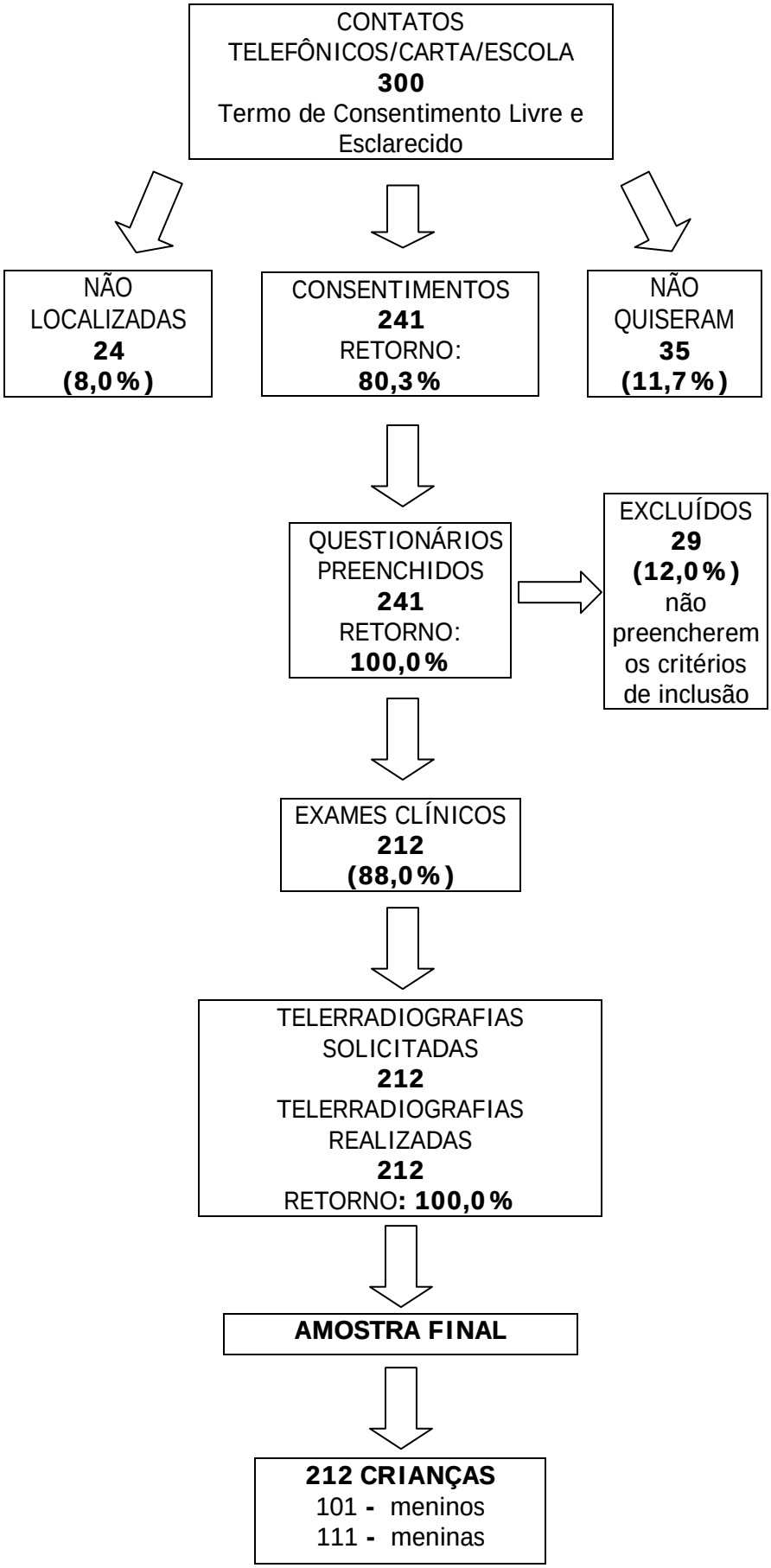
22. Fonação
- ☐ normal ☐ atípica

23. Classificação de Angle
- ☐ normal ☐ Cl I ☐ Cl II, 1ª div
- ☐ Cl II, 2ª div ☐ Cl III

24. Trajeto/Erupção dentária
- ☐ normal ☐ alterado _____

APÊNDICE 5

FLUXOGRAMA DO ESTUDO PRINCIPAL



ANEXOS

ANEXO 1

PROGRAMA DE PÓS-GRADUAÇÃO EM SAÚDE PÚBLICA - PPGSP
UNIVERSIDADE FEDERAL DE SANTA CATARINA – UFSC

Florianópolis, 24 de Julho de 2008

Ilmo Sr.
Prof. Dr. José Eustáquio da Costa
Coordenador do Colegiado do Programa de Pós-Graduação em Odontologia
Faculdade de Odontologia da UFMG

Parecer final sobre projeto de pesquisa "*Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista em escolares na cidade de Juiz de Fora*".

Doutorando: Elton Geraldo de Oliveira Góis

Programa de Pós-Graduação em Odontologia, Faculdade de Odontologia da UFMG, área de concentração Odontopediatria

Avaliador: Marco Aurélio Peres

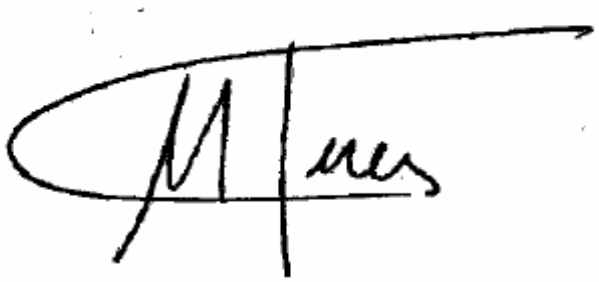
PROGRAMA DE PÓS-GRADUAÇÃO EM SAÚDE PÚBLICA - PPGSP
UNIVERSIDADE FEDERAL DE SANTA CATARINA – UFSC

Parecer final

A versão revisada do projeto contempla todas as dúvidas e considerações por mim emitidas quando da análise da primeira versão.

Reitero a extrema relevância e originalidade do tema e destaco a qualidade da redação, da metodologia proposta e das referências utilizadas.

Parabenizo o doutorando e suas orientadoras pela qualidade do projeto e agradeço a oportunidade de ter podido avaliá-lo.



Marco Aurélio Peres

ANEXO 2

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

Parecer nº. ETIC 416/08

Interessado(a): Profa. Isabela Almeida Pordeus
Departamento de Odontopediatria e Ortodontia
Faculdade de Odontologia - UFMG

DECISÃO

O Comitê de Ética em Pesquisa da UFMG – COEP aprovou, no dia 04 de novembro de 2008, após atendidas as solicitações de diligência, o projeto de pesquisa intitulado **"Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica: estudo tipo *coorte* em crianças de Juiz de Fora-MG"** bem como o Termo de Consentimento Livre e Esclarecido.

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

Profa. Maria Teresa Marques Amaral
Coordenadora do COEP-UFMG

Av. Pres. Antonio Carlos, 6627 – Unidade Administrativa II - 2º andar – Sala 2005 – Cep:31270-901 – BH-MG
Telefax: (031) 3409-4592 - e-mail: coep@prpq.ufmg.br

ANEXO 3

TERMO DE CONCORDÂNCIA

Título da Pesquisa: "Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica: estudo tipo coorte em crianças de Juiz de Fora-MG".

Pesquisadora Responsável e Orientadora: Profª. Drª. Isabela Almeida Pordeus

Pesquisadores: Prof. Elton Geraldo de Oliveira Góis

Profª. Drª. Miriam Pimenta Parreira do Vale

Profª. Drª. Isabela Almeida Pordeus

O Departamento de Saúde Bucal da Secretaria de Saúde, Saneamento e Desenvolvimento Ambiental da Prefeitura de Juiz de Fora organiza a assistência em saúde bucal de acordo com os princípios do SUS e tem conhecimento da existência de problemas de má oclusão existentes na população do município, mas ainda não realizou inquérito específico para detecção desses problemas e, portanto, não conta ainda com serviços assistenciais em quantidade suficiente para responder toda a demanda, daí entender ser importante o estudo proposto. Ressaltamos que a concordância para o desenvolvimento da referida pesquisa, nos usuários atendidos pela rede de serviços municipais, está condicionada a apresentação de um planejamento das atividades integradamente com as equipes distritais de forma a causar o mínimo de possíveis transtornos e perdas na prestação dos serviços assistenciais.

Esclarecemos que o Departamento de Saúde Bucal da Secretaria de Saúde, Saneamento e Desenvolvimento Ambiental da Prefeitura de Juiz de Fora, ao concordar com a realização deste trabalho, entende que isto não elimina a responsabilidade dos pesquisadores da exigência de obter, junto ao responsável pelo usuário examinado, o Termo de Consentimento Livre e Esclarecido para participar dos objetivos e propósitos da investigação. Assim sendo, este Termo de Autorização não se traduz em responsabilização deste Departamento pelo atendimento e resolução dos problemas de má oclusão dentária que possam ser detectados pelo estudo, devido aos nossos atuais limites.

Juiz de Fora, 13 de outubro de 2008.

Chefe do Departamento de Saúde Bucal / SSSDA

- MARIA APARECIDA MARTINS GAÊTA GUIMARÃES -

ANEXO 4

Prefeitura de Juiz de Fora

Em 04 de novembro de 2008

Prezado Senhor,

Acusamos solicitação de V. Sª. na autorização para o desenvolvimento da Tese de Doutoramento pela Universidade Federal de Minas Gerais intitulada: **"Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica: estudo tipo coorte em crianças de Juiz de Fora – MG** junto às escolas municipais de ensino deste município.

Reconhecemos a importância social do projeto e somos favoráveis ao seu desenvolvimento junto às escolas da rede pública municipal.

Desejando êxito na execução dos trabalhos, subscrevemo-nos.

Atenciosamente,

Regina Célia Mancini
Secretária de Educação/JF

Ilmº. Sr.
Elton Geraldo de Oliveira Góes
JUIZ DE FORA - MG

Secretaria de Educação
Av. Getúlio Vargas, 200 - Centro - CEP: 36010-110 - Juiz de Fora - MG (32) 3690-7634 - Fax: (32) 3690-8395 - secgab@pjf.mg.gov.br

ANEXO 5

ESCOLA ESTADUAL ALMIRANTE BARROSO
PRAÇA DUQUE DE CAXIAS, S/N - BENFICA
JUIZ DE FORA - MG - FONE 3222-5421

Juiz de Fora, 20 de outubro de 2008.

Prezado Dr. Elton Geraldo de Oliveira Góis,

Acusamos o recebimento do Projeto da Tese de Doutoramento pela Universidade Federal de Minas Gerais intitulado: **"Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica: estudo tipo coorte em crianças de Juiz de Fora-MG"**, tendo como orientadora a Profª Drª Isabela Almeida Pordeus, juntamente com o Questionário e o Termo de Consentimento Livre e Esclarecido, além da solicitação para o exame clínico da cavidade bucal das crianças matriculadas na Escola Estadual Almirante Barroso. Este exame só trará benefícios e não acarretará em nenhum ônus para os responsáveis pelas crianças.

Reconhecemos a importância social do Projeto e concordamos com a realização do exame odontológico na referida Escola, desde que os responsáveis pelas crianças autorizem a sua execução através do Termo de Consentimento Livre e Esclarecido.

Desejando êxito na execução do estudo, colocamo-nos à sua disposição para quaisquer outros esclarecimentos.

Atenciosamente,

Maria Elisabete Delgado de Oliveira
- Diretora da Escola Estadual Almirante Barroso -

Maria Elisabete Delgado de Oliveira
DIRETORA - MASP 366.372-1
Nomeação MG - 03.07.07

ANEXO 6

ODONT RAD
RADIOLOGIA ODONTOLÓGICA

DECLARAÇÃO

Declaramos que os pacientes que comparecerem à Clínica Odonto Rad Ltda, em virtude do Projeto da Tese de Doutorado do Cirurgião-Dentista Elton Geraldo de Oliveira Góis, intitulado: **"Estudo longitudinal do desenvolvimento da oclusão entre as fases de dentição decídua e mista e a influência dos hábitos bucais deletérios e da adenóide hipertrófica: estudo tipo *coorte* em crianças de Juiz de Fora-MG"**, tendo como orientadora a Profª Drª Isabela Almeida Pordeus, serão submetidos à tomada radiográfica (Telerradiografia Cefalométrica Lateral).

Informo-vos, ainda, que este procedimento não trará nenhum ônus para os pacientes referenciados.

Juiz de Fora, 20 de outubro de 2008.

Heligton de Sant'Ana Almeida
ODONTO RAD LTDA.
CGC 03.559.469/0001-24
RUA MARECHAL DEODORO, 406
CENTRO - JUIZ DE FORA - MG
TELEFONE (32) 3215-2224

Rua Marechal Deodoro, 406 - Sobreloja – Centro – Juiz de Fora / MG – Cep: 36013-001
Tel: (32) 3215-2224 - Telefax: (32) 3214-5580

ANEXO 7

The Online
ANGLE ORTHODONTIST
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79th Anniversary 1930-2009
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  Articles must be original and written in clear English. The total article file must be entered as one document and must contain the Title, Abstract, Text References and Figure Legends. The article file must not exceed a maximum of 3500 words. To determine the number of words in your document, go to the toolbar, click on tools and then click on word count.

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  ABSTRACT
  Objective: List the specific goal(s) of the research.
  Materials and Methods: Briefly describe the procedures you used to accomplish this work. Leave the small details for the manuscript itself.
  Results: Identify the results that were found as a result of this study.
  Conclusion: List the specific conclusion(s) that can be drawn based on the results of this study.

- **Manuscript text** - Please remove all references to the author's identity or institutions as manuscripts are peer reviewed anonymously. An original article text will contain the following in order:

  INTRODUCTION - This section states the purpose of the research and includes a brief summary of the literature describing the current state of the field.

  MATERIALS AND METHODS -This section states exactly what was done and should enable a reader to replicate the work. Materials or methods described elsewhere in the literature can be referenced without repeating these details. Identify teeth using the full name of the tooth or the FDI annotation. If human subjects or animals were involved in the work, this section must contain a statement that the rights of the human or animal subjects were protected and approval was obtained from an identified institutional review board, or its equivalent.

  RESULTS - This section should describe the objective findings without any comment on their significance or relative importance. Cite all tables and figures in sequential order in the text.

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  CONCLUSION - This section states what conclusions can be drawn specifically from the research reported. Bullet points are preferred. Do not repeat material from other sections..

  REFERENCES - References cited must refer to published material. Number references consecutively in order of their appearance in the manuscript using superscript and Arabic numerals. References to "personal communication" or unpublished theses are not acceptable. The style and punctuation of references should strictly conform to *American Medical Association Manual of Style: A Guide for Authors and Editors*, 9th ed (Baltimore, Md: Williams & Wilkins; 1998). Consult previous issues of The Angle Orthodontist for guidance (Available at http://www.angle.org).

  FIGURE LEGENDS - All figures must be numbered sequentially in the manuscript and a legend for each figure must appear in this section.

- **TABLE FILES**

Each table must be in WORD or EXCEL format and entered as a separate file. Each table must have its own legend accompanying it, numbered with Arabic numerals and sequentially referred to in the text. All abbreviations used in the table must be defined in a footnote. Use * *P*=.05; ** *P*=.01; *** *P*=.001; ****P*=.0001 as needed. Tables cannot be in pictorial or image formats. Pictorial or image formats are figures and must be entered as figures.

- **FIGURE FILES**

  Each figure must be of sufficient resolution for high quality publication usually in TIFF or EPS format. All images need to be at 300 DPI when the figure is of the size to be used in publication.

  If you enter a large image at 300 DPI and reduce it to a much smaller size for publication, this will increase the DPI and the image will be very heavy and slow to open electronically. If you enter a small image (such as a 35 mm picture) and plan to enlarge it for publication, it needs to be entered at more than 300 DPI since enlargement will only reduce the resolution.

  Figures in WORD or presentation software such as PowerPoint, Corel Draw or Harvard Graphics do not contain sufficient resolution for publication and will not be accepted. Authors will be charged for publication of figures in color.

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