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**Avaliação radiográfica dos primeiros molares permanentes inferiores de  
crianças do Sudeste brasileiro**

Governador Valadares

2023

**Luciana Arruda Mendes de Paula**

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Dissertação apresentada ao Programa de Pós-Graduação em Ciências Aplicadas à Saúde, da Universidade Federal de Juiz de Fora, Campus Governador Valadares, como requisito parcial à obtenção do título de Mestre em Ciências Aplicadas à Saúde

Orientador: Prof. Dr. Rafael Binato Junqueira

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## RESUMO

A cárie dentária exerce um impacto negativo na qualidade de vida dos indivíduos, sendo considerada um problema de saúde pública. O primeiro molar, geralmente, é o primeiro dente permanente a erupcionar e conseqüentemente fica exposto por mais tempo aos fatores de risco relacionados à cárie durante a dentição mista, sobretudo quando se trata de uma criança com hábitos de higiene precários e alimentação cariogênica. O objetivo no presente estudo foi avaliar radiograficamente os primeiros molares permanentes inferiores de crianças brasileiras de 6 a 12 anos de idade da região Sudeste. Mil e trezentas radiografias panorâmicas digitais, provenientes de um acervo de imagens e obtidas independentemente dessa pesquisa, foram analisadas por um examinador previamente calibrado, que colheu dados referentes a idade e sexo dos pacientes. Em seguida, os primeiros molares permanentes inferiores foram analisados quanto à presença de lesão cariada em dentina, comprometimento pulpar, presença de material restaurador e/ou obturador e presença de lesão periapical associada. As análises foram realizadas com uso do software R ( $p < 0,05$ ). Verificou-se que 6,4% da amostra apresentou lesão de cárie, 7,3% material restaurador e baixo índice de perda dentária (0,3%). O modelo de regressão linear misto indicou que o avanço da idade foi proporcional ao aumento do número de dentes perdidos ( $p = 0,012$ ) cariados, restaurados e com presença de lesão periapical ( $p < 0,001$ ). Em relação ao sexo, observou-se maior prevalência de dentes restaurados no sexo feminino, sendo 8,5% da amostra, contra 6,1% do sexo masculino ( $p = 0,019$ ). Concluiu-se que houve uma baixa prevalência de lesão de cárie e baixo índice de perda do molar inferior permanente em crianças do Sudeste brasileiro. Quanto mais velho o paciente, maior a frequência das alterações, que não demonstraram associação com o sexo do indivíduo, exceto pela maior presença de restaurações em meninas.

Palavras-chave: Cárie dentária. Molar. Prevalência. Radiografia. Perda dentária

## ABSTRACT

The first molar is usually the first permanent tooth to erupt and consequently is exposed for a longer time to risk factors related to caries during mixed dentition, especially in children with poor hygiene and cariogenic diet. This study aimed to radiographically evaluate the first lower permanent molars of Brazilian children aged 6 to 12 years from the Southeast region. 1300 digital panoramic radiographs from a database and obtained independently of this research, were analyzed by a previously calibrated examiner, who initially collected data regarding the age and sex. Then, 2600 first lower permanent molars were analyzed for the presence of carious lesion in dentin, pulp involvement, presence of restorative and/or filling material and periapical lesion. Data were analyzed using the R software ( $p < 0.05$ ) and showed that 6.4% of the teeth presented caries lesion, 7.3% restorative material and 0.3% were absent. The mixed linear regression model showed that the advance of age was proportional to the increase in the number of missing teeth ( $p = 0.012$ ), decayed, restored and with periapical lesion ( $p < 0.001$ ). Regarding sex, there was a higher prevalence of restored teeth in females, (8.5%), against 6.1% of males ( $p = 0.019$ ). It was concluded that there was a low prevalence of caries lesion and low rate of loss of the permanent lower molar in children from Southeastern Brazil. The older the individual, the higher the frequency of alterations, which did not demonstrate association with the sex, except for the higher frequency of restorations in girls.

Keywords: Dental caries. Molar. Prevalence. Radiography. Tooth loss



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## 1 INTRODUÇÃO

O primeiro molar permanente é derivado da lâmina dentária primária e sua formação geralmente se inicia por volta da 17ª semana de gestação. O tecido duro desses dentes começa a se formar ao nascimento do bebê e seu desenvolvimento coronal se completa no terceiro ano de vida (COBOURNE et al., 2014). A erupção dos primeiros molares permanentes ocorre por volta dos 6 a 7 anos, porém este dente só estará completamente formado entre os 9 e 10 anos de idade. Geralmente, é o primeiro dente permanente a erupcionar, ficando exposto por mais tempo aos fatores de risco para cárie que existem durante a dentição mista, sobretudo quando se trata de uma criança com hábitos de higiene precários e alimentação cariogênica. (NORDEEN et al., 2022). Além de sua função mastigatória, esse dente é essencial para o estabelecimento da chave de oclusão e levante da dimensão vertical, para o desenvolvimento da arcada dentária e da ATM. Atua também como guia para erupção e posicionamento dos outros molares (BOTELHO et al., 2011).

A cárie dentária exerce um impacto negativo na qualidade de vida dos indivíduos, sendo considerada um problema de saúde pública no Brasil e constituindo um dos grandes desafios do Sistema Único de Saúde (CORRÊA-FARIA et al., 2016). Aproximadamente 50% dos pré-escolares em diferentes países apresentaram experiência de cárie (BAELUM et al., 2007). Essa estimativa é confirmada em estudos realizados no Brasil, onde as taxas de prevalência variam de 20,3% a 53,6% (ABANTO et al., 2014; CORRÊA-FARIA et al., 2013).

A cárie é considerada uma doença oportunista, de caráter multifatorial, fortemente influenciada pela presença contínua de sacarose na dieta e pela ação dos componentes salivares (KHOUJA et. al., 2017). Seu desenvolvimento é consequência do acúmulo de bactérias sobre os dentes e da ingestão de açúcar, onde as principais medidas para controle são a desorganização periódica do biofilme dentário, a disciplina no consumo de sacarose e a utilização de produtos fluoretados (QUE et al., 2021).

Alguns fatores propiciam o desenvolvimento das lesões cariosas no primeiro molar permanente, como anatomia oclusal com diversos sulcos que facilitam a retenção de alimentos, higienização precária, erupção assintomática e, em alguns

casos, defeitos no desenvolvimento do esmalte (NOGUEIRA et al., 1995; PETRIK et al., 2020).

A perda precoce desse dente está intimamente relacionada à doença cárie e devido à sua importância para o desenvolvimento facial e chave de oclusão, sua ausência pode causar inúmeros prejuízos à saúde bucal (REZAIE, 2018). Estudos prévios realizados no Irã e na Arábia Saudita analisaram radiografias panorâmicas para verificar o índice de perda do primeiro molar permanente em crianças de 7 a 15 anos, verificando que 36,9% e 40% apresentavam ausência desse elemento dentário, respectivamente (REZAIE, 2018; ALMUGLA, 2020).

A radiografia panorâmica é comumente utilizada como uma técnica radiográfica de diagnóstico primário, ou seja, é considerada como um método de triagem para toda a dentição maxilar e mandibular (JEON et al., 2020). Este exame emite baixa dose de radiação e sua técnica de execução é simples, rápida e confortável para o paciente. Tais características fazem com que seja bastante utilizada para abordagem de pacientes infantis (AKKAYA et al., 2006), seja na avaliação dos estágios de desenvolvimento dentário (Estágios de Nolla), lesões periapicais e periodontais, características do osso circundante, traumas e outras alterações patológicas (KWEON et al., 2018).

A avaliação radiográfica dos primeiros molares permanentes e as respectivas taxas de prevalência de lesões cáries e outras alterações e características associadas a estes dentes é de fundamental importância para se avaliar a magnitude deste problema de saúde, além de incentivar o planejamento de medidas preventivas visando à manutenção da saúde bucal das crianças e de seu desenvolvimento. Considerando a escassez de estudos que avaliaram radiograficamente os molares de crianças brasileiras, o objetivo do presente estudo foi avaliar radiograficamente a condição dos primeiros molares permanentes de crianças brasileiras de 6 a 12 anos de idade.

## 2 ARTIGO CIENTÍFICO

Artigo científico enviado para publicação no periódico Brazilian Oral Research, qualis CAPES A2. A estruturação do artigo baseou-se nas instruções aos autores preconizados pelo periódico (ANEXO A).

### Title Page

Pediatric Dentistry – Universidade Federal de Juiz de Fora Campus Governador Valadares

Radiographic evaluation of the lower first permanent molars of children from Southeastern Brazil

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## ABSTRACT

The first molar is usually the first permanent tooth to erupt and consequently is exposed for a longer time to risk factors related to caries during mixed dentition, especially in children with poor hygiene and cariogenic diet. This study aimed to radiographically evaluate the first lower permanent molars of Brazilian children aged 6 to 12 years from the Southeast region. 1300 digital panoramic radiographs from a database and obtained independently of this research, were analyzed by a previously calibrated examiner, who initially collected data regarding the age and sex. Then, 2600 first lower permanent molars were analyzed for the presence of carious lesion in dentin, pulp involvement, presence of restorative and/or filling material and periapical lesion. Data were analyzed using the R software ( $p < 0.05$ ) and showed that 6.4% of the teeth presented caries lesion, 7.3% restorative material and 0.3% were absent. The mixed linear regression model showed that the advance of age was proportional to the increase in the number of missing teeth ( $p = 0.012$ ), decayed, restored and with periapical lesion ( $p < 0.001$ ). Regarding sex, there was a higher prevalence of restored teeth in females, (8.5%), against 6.1% of males ( $p = 0.019$ ). It was concluded that there was a low prevalence of caries lesion and low rate of loss of the permanent lower molar in children from Southeastern Brazil. The older the individual, the higher the frequency of alterations, which did not demonstrate association with the sex, except for the higher frequency of restorations in girls.

Keywords: Dental caries. First permanent molar. Prevalence. Panoramic radiography. Tooth loss

## INTRODUCTION

The first permanent molar is derived from the primary dental lamina and its formation usually begins around the 17th week of gestation. Its hard tissue begins to form at the birth and its coronal development is completed in the third year of life (COBOURNE et al., 2014). The eruption of the first permanent molars occurs around the age of 6 to 7, but this tooth will only be fully formed between 9 and 10 years of age. It is usually the first permanent tooth to erupt, being exposed for a longer time to the

risk factors for caries in mixed dentition, especially in children with poor hygiene habits and cariogenic diet (NORDEEN et al., 2022). In addition to its masticatory function, this tooth is essential for the establishment of the occlusion key and lifting of the vertical dimension, for the development of the dental arch and the temporomandibular joint. It also acts as a guide for eruption and positioning of the other molars (BOTELHO et al., 2011).

Dental caries has a negative impact on the quality of life, is considered a public health problem in Brazil and one of the major challenges of the Unified Health System (CORRÊA-FARIA et al., 2016). Approximately 50% of preschoolers in different countries had caries experience (BAELUM et al., 2007). This estimate is confirmed in studies conducted in Brazil, where prevalence rates range from 20.3% to 53.6% (ABANTO et al., 2014; CORRÊA-FARIA et al., 2013).

Caries is considered an opportunistic disease, of multifactorial character, strongly influenced by the continuous presence of sucrose in the diet and by the action of salivary components (KHOUJA et al., 2017). Its development is a consequence of the accumulation of bacteria on the teeth and the intake of sugar, where the main measures for control are the periodic disorganization of the dental biofilm, the discipline in the consumption of sucrose and the use of fluoridated products (QUE et al., 2021). Some factors favor the development of carious lesions in the first permanent molar, such as occlusal anatomy with several grooves that facilitate food retention, poor hygiene, asymptomatic eruption and, in some cases, defects in enamel development (NOGUEIRA et al., 1995; PETRIK et al., 2020).

The early loss of this tooth is closely related to caries disease and due to its importance for facial development and occlusion key, its absence can cause numerous damages to oral health (REZAIE, 2018). Previous studies conducted in Iran and Saudi Arabia analyzed panoramic radiographs to verify the rate of loss of the first permanent molar in children aged 7 to 15 years, verifying that 36.9% and 40% had absence of this dental element, respectively (REZAIE, 2018; ALMUGLA, 2020).

Panoramic radiography is commonly used as a primary diagnostic radiographic technique, that is, it is considered as a screening method for the entire maxillary and mandibular dentition (JEON et al., 2020). This exam emits low dose of radiation, and its execution technique is simple, fast, and comfortable for the patient. Such characteristics make it widely used to approach child patients (AKKAYA et al., 2006), whether in the evaluation of the stages of dental development (Nolla's stages),

periapical and periodontal lesions, surrounding bone features, traumas, and other pathological changes (KWEON et al., 2018).

The radiographic evaluation of the first permanent molars and the respective incidence rates of carious lesions and other alterations associated with these teeth is essential to assess the magnitude of this health problem. In addition, may encourage the planning of preventive measures aimed at maintaining the oral health of children and their development. Considering the scarcity of studies that radiographically evaluated the molars of Brazilian children, the aim in the present study was to radiographically evaluate the first permanent molars of Brazilian children aged 6 to 12 years.

## **MATERIALS AND METHODS**

This descriptive cross-sectional observational study was submitted to and approved by the Human Research Ethics Committee of a public University. The radiographic examinations used in this project were performed for diagnostic purposes, independent of this research, so the patients were not exposed to radiation without proper indication. The identification of the individuals was kept confidential, and data were not disclosed along with the results.

### *Sample selection*

The sample was obtained by convenience sampling, including all panoramic radiographs of children aged 6 to 12 years available in a database. The images were acquired between the years 2020 and 2023, in different cities of the Brazilian states of Minas Gerais, Rio de Janeiro, São Paulo and Espírito Santo, using the device OP 300 Kavo (Instrumentarium, Helsinki, Finland). A total of 1300 digital panoramic radiographs of individuals of both sexes were selected.

To be included in the study, the images should present medium contrast, average density, maximum sharpness and detail, minimum distortion, no technical error of execution and be of patients aged between 6 and 12 years. Radiographs in which it was not possible to complete visualization of the region of the first lower molars were excluded.

### *Image evaluation*

A dental surgeon specialized in Pediatric Dentistry (L.A.M.P.) and with more than five years of experience, previously calibrated in a pilot study, evaluated the radiographs in a room with standardized lighting conditions, using a 21.5-inch LCD monitor and high resolution (1920 x 1080) (Dell S2240L - Dell Computadores do Brazil Ltda., Eldorado do Sul, Rio Grande do Sul, Brazil). A maximum of 20 images per day were evaluated to avoid visual fatigue and consequent impairment of the assessments. The zoom, brightness and contrast tools could have been used at the discretion of the evaluator. After a period of 30 days, sufficient for dememorization of the images, 20% of the sample was reassessed to calculate intra-rater agreement. A form was used to record the information, considering age, sex, and the first molar features investigated, as shown in Figure 1. Figures 2 to 5 are panoramic radiographs of the sample and show some examples of the alterations evaluated.

### *Statistical analysis*

Data were evaluated through descriptive statistics, using the R software, version 4.1.2, with a 5% significance level. Continuous variables were described by their means and standard deviations and categorical variables were described by their absolute and relative frequencies.

The comparison between the sides was made using the McNemar hypothesis test for dependent samples, due to the dependence on the side of the tooth for the same individual. The evaluation of the effect of sex and age considered the tooth (and no longer the individual, as in the comparison between the sides) as the sample unit, and in these models, we considered the side of the tooth as a random effect. The effect of sex and age on dental manifestations were evaluated using a generalized linear model of the binomial family with random effect of the Side.

## **RESULTS**

The Kappa value, calculated for intra-examiner agreement, was 0.914, indicating an almost perfect degree of agreement. Data from 1,300 children with a



mean age of 9.2 years (standard deviation of 1.9 years) were analyzed. The distribution of all ages and sex of the sample is shown in Table 1.

Comparing the left and right sides, no statistical evidence of differences was identified for the conditions studied (Table 2).

Table 3 shows the distribution of dental conditions according to gender. Note that female individuals had a higher frequency of molars restored in relation to males ( $p=0.019$ ). For the other conditions, there was no difference between sexes ( $p>0.05$ )

The box plot graphs of the ages of according to the presence or absence of tooth condition are represented in Figure 6. The median age is higher when the following conditions occurred: caries in the dentin + pulp, restoration, filling, and periapical lesion.

The means and standard deviations of age according to the presence or absence of a dental condition are shown in Table 4. It was noted that the mean age among participants with missing lower first molar was 11.6 years. To test the effect of age on the presence of the tooth, a mixed linear regression model was adjusted that controlled for the effect of the tooth side and thus obtained a  $p$ -value of 0.012, indicating that there was an effect of age on tooth loss. It was also observed that caries in dentin and pulp, restoration, filling, and periapical lesion occurred in the older participants (Table 4).

Table 5 shows the two by two associations between the dental conditions studied. In the first block of variables, there is an association between the conditions and carious lesion in the dentin. It was not possible to observe significant associations between carious lesion only in dentin and carious lesion in dentin + pulp, restoration, filling, or periapical lesion. In the group of teeth with carious lesion in the dentin and pulp ( $n=33$ ), it was observed that 18.2% presented restoration, 6.1% filling and 66.7% periapical lesion. All differences were significant. There was also an association between the presence of restoration and filling and periapical lesion, as well as the association between the presence of filling and periapical lesion.

## **DISCUSSION**

This study evaluated the radiographic condition of the first lower permanent molars of children aged 6 to 12 years from the Southeast region of Brazil.

Epidemiological surveys are essential to characterize the profile of the population and identify the main diseases and injuries affecting it. Through these data, it becomes possible to elaborate public policies, actions and strategies for health promotion and prevention (Gimenez et al, 2016).

The last survey of the oral health conditions of the Brazilian population showed that there was an improvement in the experience of caries in permanent teeth of the age group of 12 years, with a decrease of 26% between 2003 and 2010. The DMFT index (number of decayed, missing and filled permanent teeth) for this same age group also showed a regression over the years, being 6.7 (very high prevalence) in 1986; 2.8 (moderate prevalence) in 2003 and 2.1 (low prevalence) in 2010 (BRASIL, 2022).

Teixeira et al. (2011) reported that this regression observed in the DMFT index has been occurring in response to the implementation of Brazilian government projects aimed at prevention, specialized treatments, and rehabilitation. Crescente et al. (2022) corroborate citing that the National Oral Health Policy (PNSB) came into force in 2004 and made oral health care more accessible through the insertion of Oral Health Teams (ESB) in the Family Health Strategies (ESF) and also expanded water fluoridation in Brazilian cities. These facts may explain the low prevalence of alterations in the first permanent molar found in the present study, since 6.4% of the teeth evaluated were decayed and 7.3% restored.

This research included participants from the Southeast region of Brazil. According to Kazeminia et al. (2020), geographical, cultural, nutritional, social, and structural factors should be considered when discussing the prevalence of oral conditions, especially caries. Costa et al. (2013), showed that the Southeast and South regions had lower DMFT indices when compared to other regions of Brazil.

According to Pontigo-Loyola et al. (2020), the first permanent molars are the teeth most affected by caries lesions due to some features such as their anatomy, posterior location that makes hygiene difficult and often be confused with deciduous teeth, receiving less attention from those responsible. In the study by Teixeira et al., (2011) a higher frequency of involvement was observed in tooth 46 (first right lower permanent molar), while in the present study there was no statistical difference between the right and left sides in the occurrence of the studied conditions.

According to Sfreddo et al. (2019), there is evidence indicating that some risk factors provide a sex bias, putting women at higher risk of developing caries lesions than men. Martinez-Mier et al. (2013) cited some factors, such as: different

compositions and salivary flow rates, hormonal fluctuations, eating habits, genetic variations, and specific social roles between families. Zhu (2021) showed that girls between 6 and 8 years of age had a higher rate of caries than boys. However, the present study did not show differences between the occurrence of caries disease between the sexes, although it evidenced that females had a higher frequency of restorations in the first permanent molars.

The results of this study showed that there was an association between the increase in age and the incidence of alterations. The older the individual, the higher the index of absence of the first molar and the presence of deep caries lesion, restoration, and filling material, corroborating the findings of Urvasizoglu et al. (2022), who found an incidence rate of caries of 7.2% in 7-year-olds and 23.3% in 10-year-olds.

The apparent decline in the incidence of caries at an early age does not mean that it is no longer a public health problem. Pizzo et al. (2023) and Zhu (2021) stated that the experience of caries in childhood presents an increased risk for adulthood. According to the Ministry of Health (BRASIL, 2020) the DMFT index of the age group of 35 to 44 years fell 19%, from 20.1 to 16.3 in seven years, but it is still considered a very high degree of severity. Therefore, understanding what may be occurring differently in the younger population is necessary to guide future policies of prevention and rehabilitation in oral health.

The methodology of this study used panoramic radiographs to detect the conditions of the molars. Jeon et al. (2020) showed that this radiographic technique may present low resolution and image distortions. However, it is a widely used method to perform the monitoring of dental development in children, in the evaluation of facial growth structures and are usually used as a primary diagnostic exam. The ease in performing the evaluations from an expressive database and the care not to submit individuals to radiation unnecessarily, justify the choice of this test to carry out the present study.

The DMFT index is widely used in epidemiological studies on oral health. The literature presents few studies that performed epidemiological surveys through radiographic examinations in children and with this, the information on depth of caries lesion and periapical involvement of the first permanent molars is limited, constituting a differential of this work. Significant associations were found between the presence of deep carious lesion and periapical lesion ( $p < 0.001$ ), in addition to deep carious lesion

and presence of filling material ( $p=0.003$ ). Therefore, the absence of effective and early treatment of carious lesions, as well as the treatment performed incompletely or unsatisfactorily, can evolve and worsen the disease, which in the future may lead to the tooth loss (KARAMIFAR et al., 2020).

The study of the conditions of the first permanent molar is essential to assist in the future planning of preventive and educational programs and early dental interventions, aiming to avoid complex treatments and consequently, improving the quality of life of the population. The limitations of this study are inherent to cross-sectional investigations, which do not allow establishing a cause-and-effect relationship. However, it should be emphasized that the sample is within acceptable limits in relation to the generalization of the findings. In addition, future studies that evaluate and compare populations from other regions of the country and with associated clinical data may provide more comprehensive results.

## CONCLUSION

There was a low incidence of caries lesion and low rate of permanent lower molar loss in children from Southeastern Brazil. The older the patient, the higher the frequency of alterations, which did not demonstrate association with the sex of the individual, except for the greater presence of restorations in girls.

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## **FIGURE LEGENDS**

**Figure 1 - Data collection form**

**Figure 2 - Male patient, 6 years old. The presence of a carious lesion in dentin is observed in tooth 36.**

**Figure 3 - Male patient, 11 years old. There is a carious lesion in dentin with pulp and periodontal involvement in teeth 36 and 46.**

**Figure 4: Female patient, 12 years old. The presence of restorative material is observed in teeth 36 and 46.**

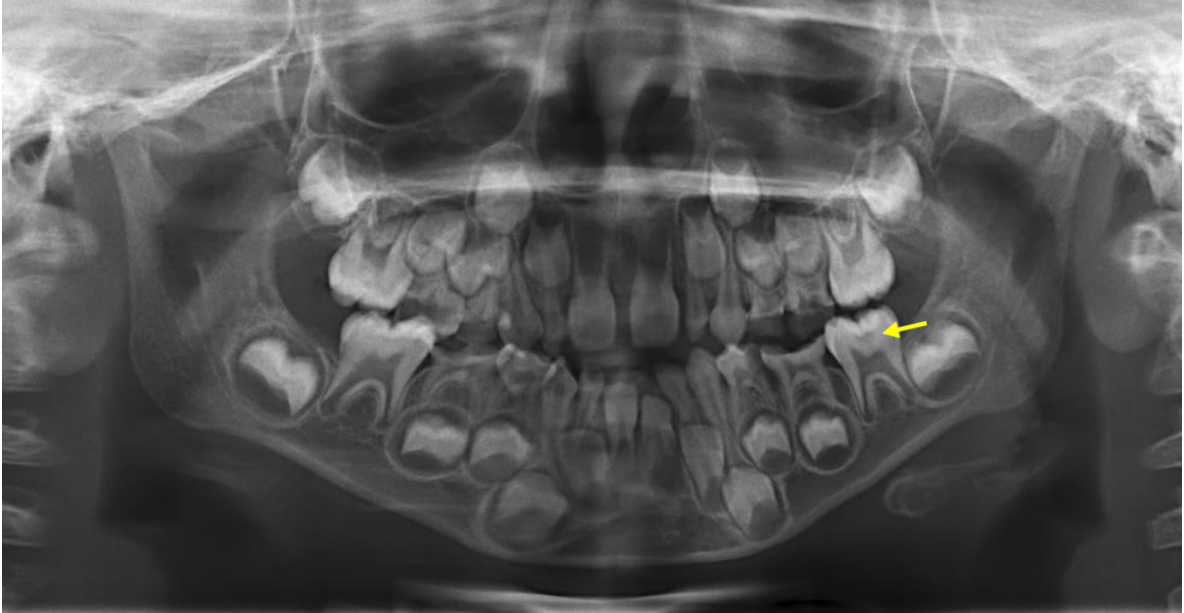
**Figure 5: Female patient, 12 years old, with absence of tooth 46.**

**Figure 6. Box Plot Graphs of age according to oral conditions evaluated.**

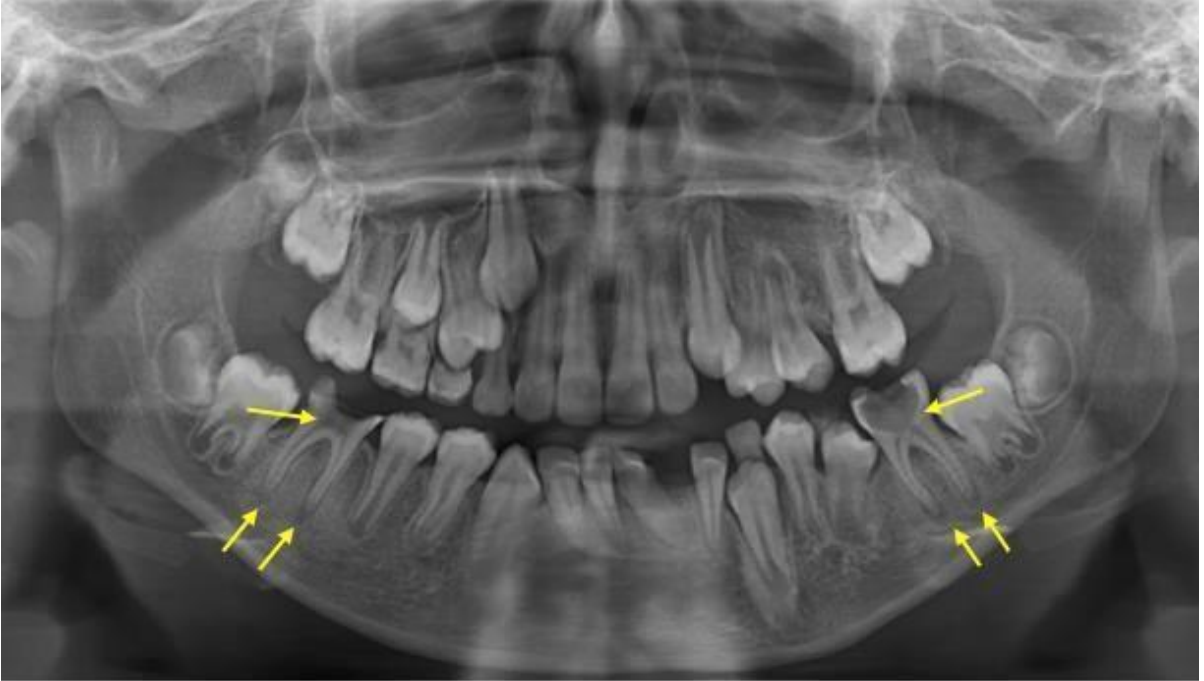




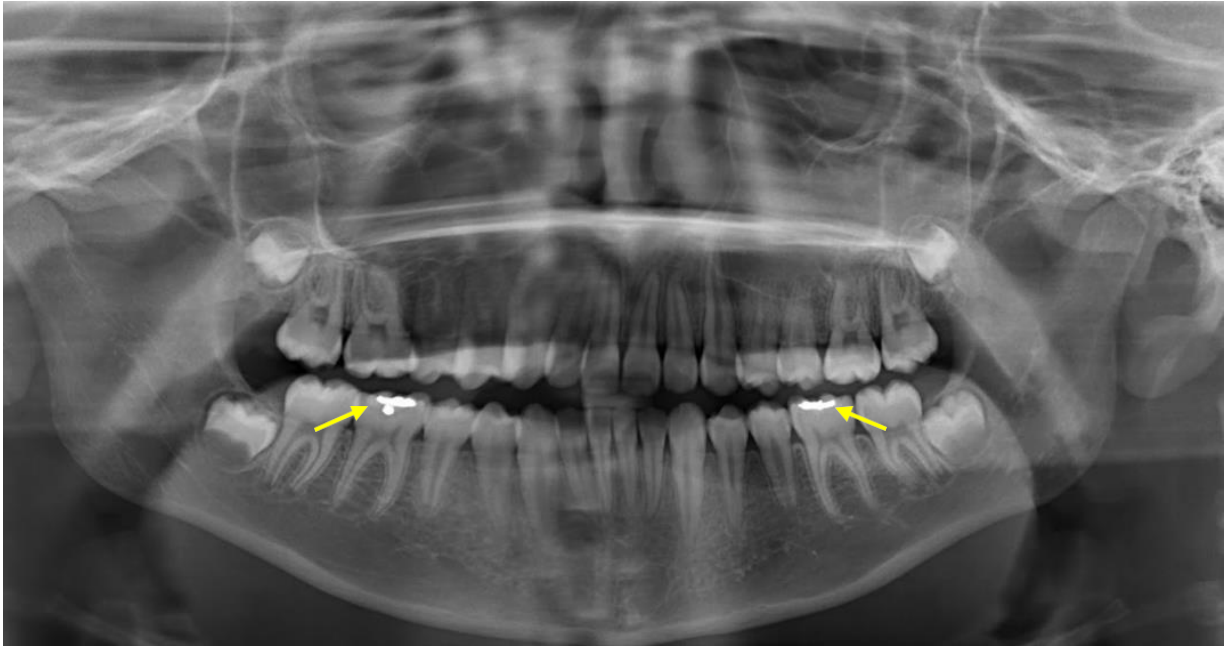
**FIGURE 2**



**FIGURE 3**



**FIGURE 4**



**FIGURE 5**

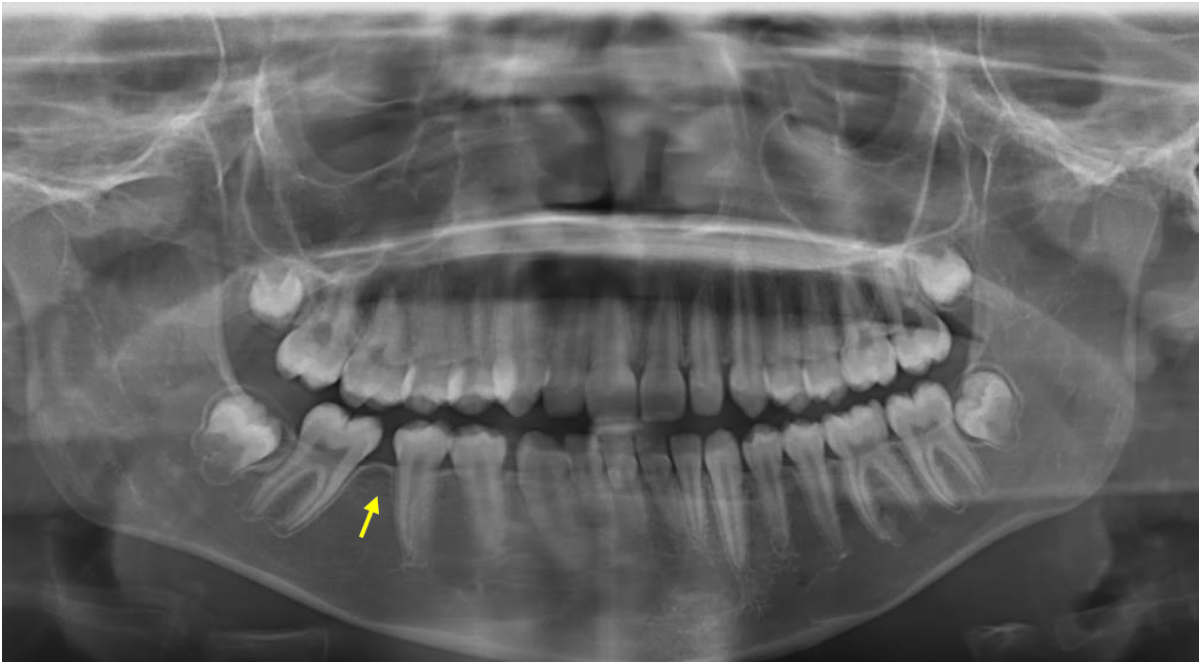
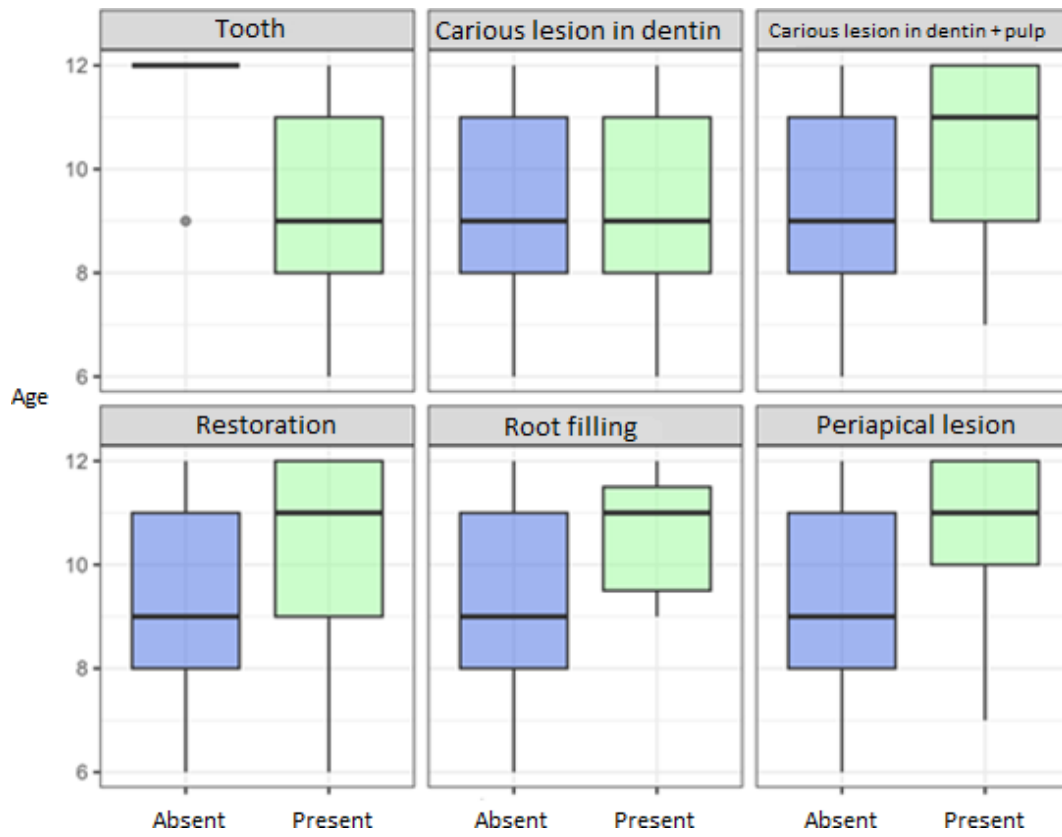


FIGURE 6



**Table 1.** Age and sex distribution of children participating in the study.

<b>Variables</b>	<b>Total</b>
Age (years), n/N (%)	
6	143/1300 (11.0%)
7	158/1300 (12.2%)
8	211/1300 (16.2%)
9	201/1300 (15.5%)
10	205/1300 (15.8%)
11	189/1300 (14.5%)
12	193/1300 (14.8%)
Sex, n/N (%)	
Female	636/1300 (48.9%)
Male	664/1300 (51.1%)

**Table 2.** Distribution of oral conditions according to the right and left sides.

Manifestations	Side		Total	P value
	36	46		
Missing Tooth, n/N (%)	3/1300 (0.2%)	4/1300 (0.3%)	7/2600 (0.3%)	>0.999
Carious Lesion in Dentin , n/N (%)	66/1297 (5.1%)	67/1296 (5.2%)	133/2593 (5.1%)	>0.999
Carious Lesion in Dentin + Pulp, n/N (%)	16/1297 (1.2%)	17/1296 (1.3%)	33/2593 (1.3%)	0.831
Restoration, n/N (%)	90/1297 (6.9%)	99/1296 (7.6%)	189/2593 (7.3%)	0.332
Root filling, n/N (%)	2/1297 (0.2%)	5/1296 (0.4%)	7/2593 (0.3%)	0.221
Periapical lesion, n/N (%)	16/1297 (1.2%)	15/1296 (1.2%)	31/2593 (1.2%)	>0.999

**Table 3.** Distribution of dental conditions according to sex.

Dental Manifestations	Female	Male	Total	p <sup>1</sup> value
Missing Tooth, n/N (%)	5/1272 (0.4%)	2/1328 (0.2%)	7/2600 (0.3%)	0.251
Cariou Lesion in Dentin , n/N (%)	56/1267 (4.4%)	77/1326 (5.8%)	133/2593 (5.1%)	0.111
Cariou Lesion in Dentin + Pulp, n/N (%)	15/1267 (1.2%)	18/1326 (1.4%)	33/2593 (1.3%)	0.694
Restoration, n/N (%)	108/1267 (8.5%)	81/1326 (6.1%)	189/2593 (7.3%)	<b>0.019</b>
Root Filling, n/N (%)	4/1267 (0.3%)	3/1326 (0.2%)	7/2593 (0.3%)	0.662
Periapical lesion, n/N (%)	13/1267 (1.0%)	18/1326 (1.4%)	31/2592 (1.2%)	0.440



**Table 4.** Means and standard deviations of age according to the presence/absence of dental conditions

Dental Manifestations	Mean (standard deviation) age (years)		p <sup>1</sup> Value
	Absent	Present	
Tooth	11.6 (1.1)	9.2 (1.9)	0.012
Cariou Lesion in Dentin	9.2 (1.9)	9.1 (1.8)	0.571
Cariou Lesion in Dentin + Pulp	9.1 (1.9)	10.4 (1.6)	<0.001
Restoration	9.1 (1.9)	10.2 (1.8)	<0.001
Root filling	9.1 (1.9)	10.6 (1.3)	0.066
Periapical Lesion	9.1 (1.9)	10.5 (1.5)	<0.001

**Table 5.** Association between carious lesion in dentin and pulp with restoration, filling, and periapical lesion.

Dental Manifestations	Cariou Lesior in Dentin			Cariou Lesion in Dentin + Pulp			Restoration			Root Filling		P-Value
	Absent	Present	p Value	Absent	Present	p Value	Absent	Present	p Value	Absent	Present	
Caries Lesion in Dentin + Pulp , n/N (%)	33/2460 (1.3%)	0/133 (0.0%)	0.412	-	-	-	-	-	-	-	-	-
Restoration , n/N (%)	181/2460 (7.4%)	8/133 (6.0%)	0.731	183/2560 (7.1%)	6/33 (18.2%)	0.029	-	-	-	-	-	-
Root filling, n/N (%)	7/2460 (0.3%)	0/133 (0.0%)	<0.999	5/2560 (0.2%)	2/33 (6.1%)	0.003	2/2404 (0.1%)	5/189 (2.6%)	<0.001	-	-	-
Periapical lesion , n/N (%)	30/2460 (1.2%)	1/133 (0.8%)	<0.999	9/2560 (0.4%)	22/33 (66.7%)	<0.001	18/2404 (0.7%)	13/189 (6.9%)	<0.001	27/2585 (1.0%)	4/7 (57.1%)	<0.001

### **3 CONCLUSÃO**

Foi observada uma baixa incidência de lesão de cárie e baixo índice de perda do primeiro molar permanente em crianças do Sudeste brasileiro. Quanto mais velho o paciente, maior a frequência das alterações, que não demonstraram associação com o sexo do indivíduo, exceto pela maior presença de restaurações em meninas.

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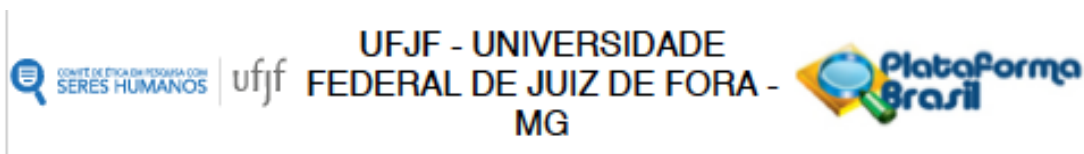
## ANEXO A

Instruções para submissão no periódico “Brazilian Oral Research”, disponível em:

<https://www.scielo.br/journal/bor/about/#about>



## ANEXO B - PARECER CONSUBSTANCIADO DO CEP



### PARECER CONSUBSTANCIADO DO CEP

#### DADOS DO PROJETO DE PESQUISA

**Título da Pesquisa:** Avaliação radiográfica da condição dos primeiros molares permanentes de crianças de 6 a 12 anos de idade

**Pesquisador:** Rafael Binato Junqueira

**Área Temática:**

**Versão:** 1

**CAAE:** 60674222.3.0000.5147

**Instituição Proponente:** UNIVERSIDADE FEDERAL DE JUIZ DE FORA UFJF

**Patrocinador Principal:** Financiamento Próprio

#### DADOS DO PARECER

**Número do Parecer:** 5.560.433

#### Apresentação do Projeto:

As informações elencadas neste campo foram retiradas do arquivo "Informações Básicas do Projeto"

"Resumo: O objetivo no presente estudo será avaliar radiograficamente os primeiros molares permanentes de crianças brasileiras de 6 a 12 anos de idade. Três mil radiografias panorâmicas digitais, provenientes de um acervo de imagens e obtidas independentemente da presente pesquisa, serão analisadas por um examinador previamente calibrado, que levantará dados referentes a idade e sexo dos pacientes. Em seguida, os primeiros molares permanentes serão analisados quanto a presença de lesão cariiosa, comprometimento pulpar, lesão periodontal, presença de material restaurador e/ou obturador, presença de lesão periapical associada. Além disso, será verificado o estágio de desenvolvimento dentário. A reprodutibilidade intra-avaliador ocorrerá através de reavaliação de 20% da amostra e realização do cálculo de concordância. As análises estatísticas serão realizadas pelo software Jamovi versão 2.2.5 com nível de significância de 5%. Espera-se que os resultados deste estudo auxiliem os profissionais na compreensão da importância da presença do primeiro molar permanente para o desenvolvimento infantil, estimulando a elaboração de medidas de prevenção e de tratamento conservador.."

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Continuação do Parecer: 5.560.433

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_P ROJETO_1977699.pdf	13/07/2022 20:47:50		Aceito
Outros	DECLARACAO_BANCO_IMAGENS_as assinado.pdf	13/07/2022 20:46:37	Rafael Binato Junqueira	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Dispensa_TCLE_assinado.pdf	13/07/2022 20:44:05	Rafael Binato Junqueira	Aceito
Outros	Termo_sigilo_assinado.pdf	13/07/2022 20:41:20	Rafael Binato Junqueira	Aceito
Declaração de Instituição e Infraestrutura	declaracao_infra_assinado.pdf	13/07/2022 20:36:37	Rafael Binato Junqueira	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_detalhado.pdf	13/07/2022 20:36:03	Rafael Binato Junqueira	Aceito
Folha de Rosto	folhaDeRosto_assinado.pdf	13/07/2022 20:16:43	Rafael Binato Junqueira	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

JUIZ DE FORA, 03 de Agosto de 2022

Assinado por:  
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