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HELOISA GUIMARÃES RESENDE

AVALIAÇÃO DO GRAU DE CURVATURA RADICULAR DOS INCISIVOS LATERAIS SUPERIORES DE ACORDO COM O SEXO E A LATERALIDADE

UBERABA - MG
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Dissertação apresentada ao Programa de Pós-Graduação em Odontologia da Universidade de Uberaba como parte dos requisitos para obtenção do título de mestre em Odontologia, área de concentração: Clínica Odontológica Integrada.

Orientador: Prof. Dr. Cesar Penazzo Lepri.

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Área de concentração: Clínica Odontológica Integrada

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RESUMO

O desenvolvimento de curvaturas radiculares durante a formação da raiz dentária são variações anatômicas que afetam o manejo clínico odontológico. Diferentes graus de inclinação podem influenciar a complexidade dos tratamentos endodônticos e ortodônticos. Existem evidências na literatura que anomalias do desenvolvimento dentário tem predileção por um determinado gênero e lado. Desta forma, o objetivo desse estudo foi avaliar a associação entre a presença e o grau da curvatura apical dos incisivos laterais superiores (mensurado em º), com o sexo e à lateralidade dos dentes. Este estudo transversal incluiu 182 radiografias panorâmicas de pacientes não sindrômicos com idade entre 8 a 14 anos no período de 2006 a 2021. Foram excluídos da amostra dentes com fusão radicular, submetidos a tratamentos restauradores, ortodônticos ou endodônticos, com reabsorção interna ou externa, com lesão periapical, girovertidos e com rizogênese incompleta. Foram analisados 95 incisivos laterais superior esquerdo- ILSE (41 mulheres e 54 homens) e 89 incisivos laterais superior direito - ILSD (36 mulheres e 56 homens). A mensuração do grau de curvatura radicular foi realizada utilizando o método proposto por Schneider (1971) por meio do software ImageJ . As curvaturas das raízes foram classificadas como leve, moderada ou severa segundo Kuchler (2024).Os dados obtidos foram submetidos à análise estatística e todos os testes adotaram nível de significância menor que 0,05. A média do grau de curvatura do ILSE do sexo feminino foi estatisticamente diferente dos demais grupos (média = 8,49+_ 14,29). Não houve diferença estatisticamente significante entre mulheres (19,44%) e homens (26,42%) para ILS independente do lado.

Palavras-chave: Curvatura apical radicular. Dilaceração radicular. Incisivo lateral. Sexo

ABSTRACT

The development of root curvatures during tooth root formation is associated with anatomical variations that impact clinical dental management, where differing degrees of inclination can influence the complexity of endodontic and orthodontic treatments. Literature provides evidence that dental development anomalies exhibit a preference for specific genders and sides. Thus, the aim of this study was to evaluate the association between the presence and degree of apical curvature in maxillary lateral incisors (measured in degrees), gender, and the lateralization of the teeth. This cross-sectional study included 182 panoramic radiographs of non-syndromic patients over the age of 11. Teeth with root fusion, those subjected to restorative, orthodontic, or endodontic treatments, those with internal or external resorption, periapical lesions, inverted teeth, and those with incomplete rhizogenesis were excluded from the sample. A total of 95 left maxillary lateral incisors (LMIL) were analyzed (41 females and 54 males), along with 89 right maxillary lateral incisors (RMIL) (36 females and 56 males). The measurement of root curvature was conducted using the method proposed by Schneider (1971), classifying roots as straight (≤5°) or curved (>5°) through ImageJ software. The obtained data underwent statistical analysis, with all tests adopting a significance level of < 5%. The average curvature degree of LMIL in females was statistically different from the other groups (mean = 8.49; SD = 14.29), indicating that all teeth displayed a curvature > 5°. For LMIL, no statistically significant difference was found between females (19.44%) and males (26.42%).

Keywords: Dilaceration root. Lateral incisor. Root apical curvature. Sex.

SUMÁRIO

1 INTRODUÇÃO

A dentição humana manifesta características complexas devido a adaptação evolutiva dos mamíferos. Os seres humanos possuem duas dentições, sendo elas: decíduos e permanentes, as quais desempenham um papel essencial para o desenvolvimento e no funcionamento ideal do sistema mastigatório (JERNVALL *et al*., 2000; HOVORAKOVA *et al*., 2018). A dentição adulta inclui 32 dentes, divididos em incisivos, caninos, pré-molares e molares, sendo cada classe responsável por funções específicas, como apreensão e trituração de alimentos. O esmalte e a dentina, compõe a estrutura dentária, os quais são tecidos que fornecem a dureza necessária para suportar as forças mastigatórias ao longo da vida (POPOVICI *et al*., 2023). A análise de variações anatômicas, incluindo dilacerações e curvaturas radiculares, revela sua influência na saúde bucal e na complexidade dos tratamentos e diagnósticos odontológicos (PABLO et al., 2010). Essas alterações anatômicas, como curvaturas radiculares, demandam um planejamento cuidadoso tanto em procedimentos restauradores quanto endodônticos, devido ao seu potencial impacto na adaptação das restaurações e na instrumentação do canal.

As dilacerações e curvaturas radiculares são definidas como inclinações axiais leves ou acentuadas entre a coroa e a raiz de um dente (SHAFER *et al*., 1985) ou um distúrbio evolutivo entre as partes mineralizadas e não mineralizada da estrutura dental (TOMES *et al*., 1848). Essas alterações morfológicas podem ser por fatores hereditários ou traumas, que alteram a posição da estrutura em relação ao desenvolvimento do dente, contribuindo na formação de ângulos da raiz (KÜCHLER *et al*., 2024). A localização dessas curvaturas pode variar, podendo ocorrer na porção cervical, média ou apical da raiz, sendo mais frequente a presença de dilacerações na região apical dos incisivos laterais superiores (SILVA *et al*., 2012). O incisivo lateral superior é o dente mais suscetível a apresentar anomalias no desenvolvimento dentário, que resultando emalterações tanto da coroa quanto da raiz, podendo afetar a forma e o tamanho do dente, levando a complicações em algumas áreas odontológicas, como: na estética, nas restaurações; ortodontia, no tratamento ortodôntico ou cirurgia oral menor; nas extrações (SILVA *et al*., 2012; KUCHLER *et al*., 2022).

Estudos indicam que essas anomalias radiculares afetam principalmente a região anterior da arcada dentária, com prevalência em incisivos laterais superiores devido à sua posição anatômica e às forças biomecânicas exercidas durante o desenvolvimento (MALCIC *et al*., 2006). Além disso, podem ocasionar implicações clínicas significativas,

por exemplo: maior dificuldade no preparo do canal radicular,risco de perfurações e fraturas de limas durante procedimentos endodônticos, o que pode levar a um prognóstico desfavorável (ASHOUR *et al*., 2020; HASSAN *et al*., 2023).

Dessa forma, tendo uma possibilidade de identificar essas variações anatômicas é imprescindível para um planejamento terapêutico ideal, com métodos de imagem como a tomografia computadorizada de feixe cônico (TCFC), que permite uma visualização tridimensional detalhada das curvaturas radiculares e auxilia no diagnóstico diferencial e na condução de tratamentos mais complexos ou panorâmicas (ASHOUR *et al*., 2020).

Ao longo dos anos, a curvatura apical do incisivo lateral superior tem sido objeto de estudo por pesquisadores, tendo resultados com uma série de classificações e métodos de avaliação que foram sendo evoluídos (SCHNEIDER *et al*., 1971, PrUETT et al ; HARTMANN *et al*., 2018). Um dos mais conhecidos é o proposto por Schneider (1971), que é o mais utilizado devido à sua simplicidade e à confiabilidade dos resultados. Esse método consiste em avaliar o grau de curvatura dos canais radiculares dos incisivos laterais superiores, classificando a raiz como reta (≤5º) ou curva (≥5º) com base em exames radiográficos bidimensionais (SCHNEIDER *et al*., 1971).

Estudos anteriores examinaram a curvatura radicular por meio de imagens panorâmicas radiográficas, que são consideradas o método considerável para essa finalidade (HAMASHA *et al*., 2002). As radiografias convencionais, como periapicais e panorâmicas, são comumente empregadas para investigar a prevalência de dilacerações. No entanto, esses métodos fornecem apenas imagens bidimensionais dos dentes (ASHEGHI *et al*., 2022).

A radiografia panorâmica é uma técnica de imagem que proporciona uma visualização ampla das estruturas dentomaxilofaciais, criando uma imagem curva enquanto o tubo de raios X e o receptor de imagem giram simultaneamente em torno da cabeça do paciente (MARTINS *et al*., 2022). No entanto, algumas limitações são inerentes a essa modalidade, como a ampliação e a distorção das estruturas na região anterior e a sensibilidade a erros de posicionamento do paciente, o que pode comprometer a qualidade da imagem e a precisão diagnóstica (ABDINIAN *et al*., 2016).

Em contrapartida, mesmo na presença de discrepâncias anatômicas, e apesar das limitações, as panorâmicas tem capacidade de mostrar as arcadas superiores e inferiores em uma mesma imagem e suas estruturas adjacentes, portanto, continua a ser uma ferramenta valiosa para a avaliação inicial de patologias e anomalias dentárias, sendo frequentemente preferida pela praticidade e menor exposição à radiação, sendo isso uma

de suas maiores vantagens quando comparada com métodos tridimensionais, como a tomografia computadorizada de feixe cônico (LOUGHLIN *et al*., 2017).

A presença de curvaturas radiculares em pacientes ortodônticos exige uma abordagem terapêutica personalizada, uma vez que aumenta a suscetibilidade à reabsorção radicular externa durante a movimentação dentária, conforme demonstrado por CUOGHI et al. (2016) e WISHNEY (2017). Uma avaliação detalhada é, portanto, indispensável.

A lateralidade tem um papel importante na avaliação (SAWAGA *et al*., 2021). Essas variações morfológicas podem causar diferentes padrões de fraturas radiculares e dificuldades durante o preparo de canais em dentes com curvaturas acentuadas. Portanto, o conhecimento dessas diferenças é essencial para otimizar o planejamento clínico e minimizar complicações (SMITH *et al*., 2018; HU *et al*., 2022). Estudos como o de Küchler *et al*. (2024) sugerem que genes associados a fissuras orais, como BMP2 e BMP4, podem estar envolvidos na formação de curvaturas radiculares dos incisivos laterais superiores, o que corrobora para a investigação dessas variações anatômicas e sua relação com predisposições genéticas. Tais genes podem influenciar na complexidade morfológica.

Compreender as variações anatômicas dos incisivos laterais superiores e suas implicações clínicas é crucial para a odontologia moderna. Este estudo se propõe a investigar se existem padrões de dimorfismo sexual e predileção lateral nessas variações, buscando evidências que refutem a hipótese nula de que não há diferenças significativas entre sexos e lados. Ao identificar esses padrões, almejamos fornecer aos profissionais melhores ferramentas de diagnóstico e condutas clínicas mais precisas e eficazes.

2 OBJETIVOS

2.1 Objetivo geral

Avaliar o grau de curvatura radicular dos incisivos laterais superiores em relação ao sexo e à lateralidade, utilizando método radiográfico em paciente com faixa etária entre 8 a 14 anos, em um período de tantos anos de avaliação.

2.1. Objetivos específicos

(2.2.1) comparar a prevalência e o grau de curvatura radicular entre pacientes do sexo masculino e feminino;

(2.2.2) investigar a existência de diferenças significativas entre os lados direito e esquerdo.

3 CAPÍTULO 1

Research Article: Operative Dentistry and Endodontics

Evaluation of the Degree of Root Curvature in Maxillary Lateral Incisors According to Sex and Laterality

Concise title: Evaluation of the Degree of Root Curvature in Maxillary Lateral Incisors

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4 ABSTRACT

Background: The development of root curvatures during tooth root formation is associated with anatomical variations that impact clinical dental management, where differing degrees of inclination can influence the complexity of endodontic and orthodontic treatments. Literature provides evidence that dental development anomalies exhibit a preference for specific genders and sides. The aim of this study was to evaluate the association between the presence and degree of apical curvature in maxillary lateral incisors (measured in degrees), gender, and the lateralization of the teeth.

Material and Methods: This cross-sectional study included 182 panoramic radiographs of non-syndromic patients of the age 8 to 11. Teeth with root fusion, those subjected to restorative, orthodontic, or endodontic treatments, those with internal or external resorption, periapical lesions, inverted teeth, and those with incomplete rhizogenesis were excluded from the sample. A total of 95 maxillary left lateral incisors (ILSE) (41 females and 54 males) and 89 maxillary right lateral incisors (ILSD) (36 females and 56 males) were analyzed. The degree of root curvature was measured using the ImageJ software proposed by Schneider (1971). Root curvatures were classified as mild, moderate, or severe, according to Kuchler (2024).

Results: The data obtained were subjected to statistical analysis, and all tests adopted a significant level of <5%. The mean degree of curvature of the ILSE of females was statistically different from the other groups (mean = 8.49 ± 14.29). There was no statistically significant difference between women (19.44%) and men (26.42%) for ILS, regardless of the side.

Conclusions: Given the limitations of this study there was no statistical difference between genders and sides.

Key words: Apex tooth. Endodontics. Incisor. Tooth root. Sex.

5 INTRODUCTION

Dental root developmental alterations, such as dilacerations and root curvatures, can impact dental treatments [1]. For dental procedures, particularly endodontic treatments, these variations require special attention due to their clinical impact.

These morphological alterations occur caused by genetic factors or trauma, which change the position of the structure in relation to tooth development, contributing to the formation of root angles [2]. The location of these curvatures can vary, occurring in the cervical, middle, or apical portion of the root, with dilacerations being more frequently observed in the apical region of maxillary lateral incisors [3].

The maxillary lateral incisor is the tooth most susceptible to developmental anomalies influenced by its anatomical position and the biomechanical forces exerted during its formation [4]. These anomalies can affect both the crown and the root, altering the tooth's shape and size and potentially leading to complications in various dental fields, such as esthetics, orthodontic, endodontic, and periodontal treatments, as well as in dental extractions [3,5].

Such variations can result in significant clinical implications, such as increased difficulty in root canal preparation, risk of perforations, and file fractures during endodontic procedures, which may lead to an unfavorable prognosis [6,7].

In an orthodontic context, the presence of root curvatures is associated with an increased risk of external root resorption, particularly during prolonged orthodontic force application. This highlights the importance of a detailed and personalized evaluation before initiating treatment [8,9].

Over the years, the apical curvature of the maxillary lateral incisor has been studied extensively, with researchers proposing various classifications and evaluation methods [10,11]. One of the most widely recognized methods is that proposed by Schneider (1971), which remains the most commonly used resulting from its simplicity and reliability. This method evaluates the curvature degree of maxillary lateral incisor root canals, classifying them as straight ($\leq 5^{o}$) or curved ($\geq 5^{o}$) based on two-dimensional radiographic assessments [10].

As an evaluation tool, panoramic radiography provides a broad view of dentomaxillofacial structures, creating a curved image while the X-ray tube and image receptor rotate simultaneously around the patient’s head [12].

However, this imaging technique has inherent limitations, such as enlargement and distortion of anterior structures and sensitivity to patient positioning errors, which can affect image quality and diagnostic accuracy [13]. Nevertheless, despite anatomical discrepancies and limitations, panoramic radiographs can capture both maxillary and lower dental arches in a single image, along with adjacent structures. This makes them a valuable tool for the initial assessment of dental pathologies and anomalies. Additionally, they remain a preferred option due to their practicality and lower radiation exposure compared to three-dimensional methods such as cone-beam computed tomography [1].

Previous studies have examined root curvature using panoramic radiographic images, which are considered a reliable method for this purpose [15]. Conventional radiographs, such as periapical and panoramic images, are commonly used to investigate the prevalence of dilacerations. However, these methods only provide two-dimensional images of the teeth [16].

Studies suggest that root morphology may differ between males and females in terms of both size and curvature associated with hormonal or genetic factors. Sexual dimorphism and lateral differences in root morphology are relevant factors in understanding anatomical variations, particularly in maxillary lateral incisors [17,18]. Additionally, laterality plays an important role in evaluations [19]. These morphological variations can lead to different root fracture patterns and challenges during canal preparation in teeth with pronounced curvatures. Therefore, knowledge of these differences is essential to optimize clinical planning and minimize complications [17, 18].

Given the above, expanding knowledge on anatomical variations of maxillary lateral incisors and their clinical implications is essential. The null hypothesis of this study was that there would be no statistically significant difference in the curvatures of maxillary lateral incisors between males and females, nor any predilection for the left or right side. Therefore, this study aimed to identify possible patterns of sexual dimorphism and lateral predilection to improve diagnosis and clinical decision-making in dental practice.

6 MATERIAL AND METHODS

This cross-sectional study included panoramic radiographs of non-syndromic patients, as previously described by Küchler *et al.* (2024) [2]. The study was approved by the Research Ethics Committee of the University of Uberaba (CAAE: 69181023.7.0000.5145) in accordance with the latest guidelines of the Declaration of Helsinki. All individuals were included in the study only after providing written informed consent. For individuals under 18 years of age, informed consent was obtained from both the patient and their legal guardian.

6.1 Image Selection

Dental records, including medical history and panoramic radiographs, were screened from patients treated at the Getúlio Vargas Polyclinic – UNIUBE – University of Uberaba (Uberaba, Minas Gerais, Brazil). Only high-quality panoramic radiographs were considered for evaluation. Patients with teeth presenting altered morphology due to root fusion, as well as those who had undergone orthodontic, endodontic, or restorative treatments, or exhibited internal or external root resorption, were excluded. In total, 182 panoramic radiographs of patients aged 8 to 14 years, taken between 2006 and 2021, were included (Fig 1).

6.2 Measurement of Maxillary Lateral Incisor Root Curvature

Root curvature degree was estimated using Schneider's method (1971), which involves tracing two straight lines: one representing the apical region's continuity and another following the middle and coronal thirds of the root (2). The angle between these lines was measured geometrically using the ImageJ software, and the resulting curvature was expressed in degrees (Fig 2).

6.3 Classification according to Schneider's

Each incisor was classified according to Schneider's (1971) criteria as straight (≤5º), moderately curved (>5º), or severely curved (>20º). All measurements were performed by the same trained and qualified examiner.

6.4 Statistical Analysis

All analyses were conducted using GraphPad Prism 9 software (GraphPad, San Diego, CA, USA). Root curvature measurements (in degrees) were evaluated as

continuous data. An independent t-test was used to compare curvature degrees between genders, while a paired t-test was applied to assess differences between the left and right sides. Data were expressed as mean ± standard deviation (SD).

To evaluate the association between gender and laterality among the straight and curved root groups, a Chi-square test was performed, with data expressed as frequency (%).

A significance level of <5% was established for all analyses.

7 RESULTS

A total of 182 panoramic radiographs were analyzed. Among them, 81 were from female patients and 101 from male patients. The mean age of the patients was 12.35 (SD= 1.07) years.

Thirty-six right maxillary lateral incisors were excluded due to evaluation difficulties: 7 because of rotation and 44 owing to incomplete root formation. Among the left maxillary lateral incisors, 37 teeth were excluded: 9 because of rotation, 46 owing to incomplete root formation, and 1 due to a carious lesion.

The phenotype frequency is described in Table 1. Regarding the right maxillary lateral incisors, a mild curvature was more frequently observed in males (72.22%), while a severe curvature was more frequent in females (36.59%). In contrast, the mild curvature of the left maxillary lateral incisors was more common in females (77.22%). When examining the data for severe curvature, females presented a lower frequency (19.44%) compared to males (26.42%). However, no statistically significant difference was found ($p<0.05$).

The continuous data obtained for the curvature of the maxillary lateral incisors are described in Table 2. The results suggest significant differences in the root curvature of the maxillary lateral incisors between sexes, especially for tooth 12. The mean curvature of 17.14 (SD = 20.50) observed in tooth 12 for females was considerably higher compared to the mean for males (10.54, SD = 19.12), but with no statistical significance. Similarly, for the left maxillary lateral incisor (tooth 22), the female group exhibited a slightly higher mean curvature of 8.45 (SD = 14.29) compared to males (13.50, SD = 18.68), also with no statistical difference. These similarities between the right and left sides emphasize the importance of considering laterality when evaluating root morphology.

8 DISCUSSION

The root morphology of human teeth may vary between males and females in terms of both size and curvature due to hormonal or genetic factors. Sexual dimorphism and laterality in root morphology are relevant factors for understanding anatomical variations, particularly in the maxillary lateral incisors [17,18]. However, the null hypothesis of the present study was not rejected. The results obtained are consistent with the findings of Willershausen et al. (2008) [20], as all maxillary lateral incisors exhibited some degree of curvature, with no statistically significant differences between sex or side.

The similarities between the right and left sides highlight the importance of considering laterality when assessing root morphology. The symmetry between the sides of the dental arch can significantly influence the diagnosis and planning of dental treatments, especially in cases of anatomical variations such as root dilacerations [21].

Thus, by carefully observing these alterations, it is possible to tailor therapeutic approaches according to the particularities of each side of the dental arch, ensuring greater precision and efficiency in treatment. However, if any discrepancy is observed in the degrees of root curvature of the maxillary lateral incisors, it may be associated with sex-related differences in dental development, which could impact the choice of therapeutic approaches in restorative, orthodontic, endodontic, and surgical treatments. More specifically in Endodontics, such complications increase treatment difficulty and may compromise clinical prognosis [7,22,23].

Studies reveal a high prevalence of developmental anomalies in the region of the maxillary lateral incisors, attributing them to the interaction of genetic and environmental factors in maxillary bone formation. According to Hovorakova et al. (2018) [24], certain variations in the development of maxillary lateral incisors are related to modifications occurring in the fusion area of the nasal and maxillary processes during craniofacial formation.

The literature suggests that root morphology stabilizes as teeth reach functional occlusion, coinciding with the eruption of permanent dentition and arch alignment, making root curvature potentially a result of mechanical stress exerted by surrounding oral structures [5,25]. Thus, the early identification of root curvature alterations is essential for proper therapeutic planning, especially in pediatric patients. Accurate assessment of these variations can optimize treatment prognosis [26]. The present study relied exclusively on panoramic radiographs, which provide a useful general view of dental structures. However, it is important to emphasize that this technique has

limitations, such as distortions and lower resolution, although it results in lower radiation exposure. On the other hand, cone-beam computed tomography (CBCT) provides high-resolution three-dimensional images, allowing for a more detailed visualization of dental and bone structures, making it an ideal method for evaluating root morphology and detecting anatomical variations with greater accuracy [27]. However, performing computed tomography in pediatric patients raises ethical and safety concerns due to exposure to relatively higher radiation doses compared to panoramic radiographs [27]. For this reason, the choice of panoramic radiography in the present study was justified by the need to adhere to current ethical guidelines and minimize health risks to participants, additionally, all panoramic images were taken due clinical purpose. Despite the inherent limitations of the radiographic method used, the decision to employ this technique was based on the need to protect young patients.

The Schneider method (1971) [10], used to measure root curvature, is a simple method that does not require expensive equipment or software. This method has been widely used in dental research since root curvature is of great clinical importance, particularly in endodontics, where it presents a challenge in daily clinical practice [2, 28].

Regarding the selection of the evaluated records, the exclusion criteria applied in this study ensured the quality and accuracy of the results by selecting only teeth in suitable conditions for assessment. The resulting sample allowed for the analysis of anatomical variations according to sex and age while respecting ethical and methodological limitations and avoiding exposure of patients to more invasive examinations.

Nevertheless, this study has several limitations that may have affected the results. One such limitation is that panoramic radiography may have provided limited information on some subtle structures, such as lateral branches and apical divergence, due to its resolution [13, 16]. Another limitation to consider is that the measurements may not have always passed through the true center of the canal, potentially leading to an underestimation of the number of curved roots.

In the present study, the results did not indicate the presence of sexual dimorphism in the root curvature of the maxillary lateral incisors, as the data presented were statistically similar between males and females. Previous studies suggest that root morphology is influenced by genetic and hormonal variables that modulate dental growth and development [2]. The impact of sexual dimorphism is relevant for clinical case planning, as understanding morphological differences between males and females is crucial. Although root curvatures and dilacerations have been extensively studied, further

research is needed in different populations, and future studies should consider using imaging techniques that offer less distortion and higher resolution, such as single beam computed tomography.

9 CONCLUSION

Given the limitations of this study it was possible to conclude that there was no statistically significant differences were found between sex or side.

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11 ACKNOWLEDGMENTS

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12 CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

Tables

Table 1. Frequency of phenotypes of the maxillary lateral incisors according to sex.

	Total	**Female**	**Male**
Right upper lateral incisors			
Slight curvature	63 (66.32%)	24 (58.54%)	39 (72.22%)
Moderate curvature	3 (3.16%)	2 (4.88%)	1 (1.85%)
Severe curvature	29 (30.53%)	15 (36.59%)	14 (25.93%)
Total	95 (100%)	41 (100%)	54 (100%)
Left upper lateral incisors			
Slight curvature	59 (66.29%)	26 (72.22%)	33 (62.26%)
Moderate curvature	9 (10.11%)	3 (8.33%)	6 (11.32%)
Severe curvature	21 (23.60%)	7(19.44%)	14 (26.42%)
Total	89 (100%)	36 (100%)	53 (100%)

Note: * Chi-square was used.

Table 2. Mean values and standard deviation of the curvature (in º) of the right and left maxillary lateral incisors.

Tooth/Side	**Sex**	**n**	**Average and SD**	**Min-Max**	***p-value****
Right upper lateral incisors	Female	40	17.14 (20.50)	0 – 58.67	Male **vs.** Female Right upper lateral incisors = 0.212
	Male	23	10.54 (19.12)	0 – 52.31	Male **vs.** Female Left upper lateral incisors = 0.276
Left upper lateral incisors	Female	41	8.45 (14.29)	0 – 42.43	Right upper lateral incisors **vs.** Left upper lateral incisors Female = 0.083
	Male	39	13.50 (18.68)	0 – 62.10	Right upper lateral incisors vs. Left upper lateral incisors Male = 0.552

Figures

Figure 1. Study flowchart. Inclusion and selection criteria.

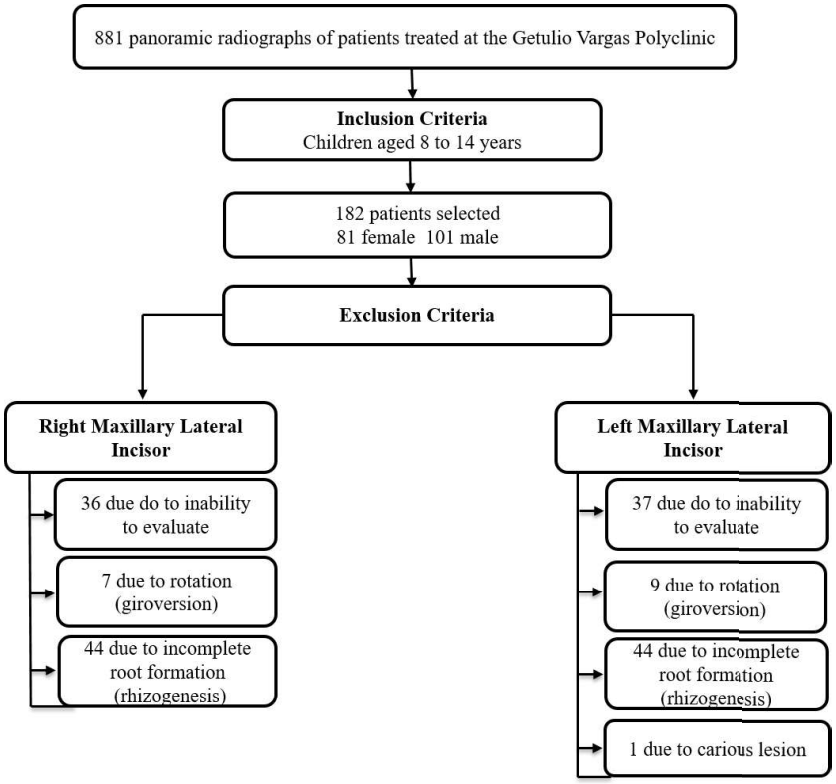
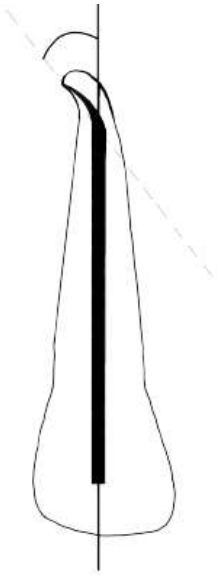


Figure 2. Diagrammatic representation of the calculation of the apical curvature degree of the maxillary lateral incisor root, according to Schneider (1971).



13 CONCLUSÃO

Considerando as limitações desse estudo, foi possível concluir que a prevalência de curvatura nos incisivos laterais superiores é alta na população estudada, mas não foram encontradas diferenças estatisticamente significativas entre os sexos ou lados.

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ANEXOS

Anexo 1. Parecer Consusbstanciado do CEP da Universidade de Uberaba.

- Página inicial

UNIVERSIDADE DE UBERABA - UNIUBE

Plataforma Brasil

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: FENÓTIPOS DE DESENVOLVIMENTO DO COMPLEXO CRANIOFACIAL, DOENÇAS BUCAIS CRÔNICAS E POLIMORFISMOS GENÉTICOS - UM ESTUDO EM UMA POPULAÇÃO BRASILEIRA

Pesquisador: Maria Angélica Hueb de Menezes

Área Temática: Genética Humana:
(Trata-se de pesquisa envolvendo Genética Humana que não necessita de análise ética por parte da CONEP;);

Versão: 1

CAAE: 69161023.7.0000.5145

Instituição Proponente: Sociedade Educacional Uberabense

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 6.037.910

Apresentação do Projeto:
Trata-se da PRIMEIRA apresentação do PROJETO de Pesquisa, intitulado: "FENÓTIPOS DE DESENVOLVIMENTO DO COMPLEXO CRANIOFACIAL, DOENÇAS BUCAIS CRÔNICAS E POLIMORFISMOS GENÉTICOS - UM ESTUDO EM UMA POPULAÇÃO BRASILEIRA" da Pesquisadora Responsável: Maria Angélica Hueb de Menezes.

No PB, podemos evidenciar as seguintes informações:
Desenho: "Trata-se de um estudo transversal retrospectivo e prospectivo que utilizará uma amostra de conveniência obtida a partir da documentação ortopédica/ortodôntica e avaliação clínica de crianças brasileiras com idade de 7 a 13 anos atendidas na Policlínica Getúlio Vargas da Universidade de Uberaba. Subgrupos serão formados posteriormente conforme variações fenótipas encontradas na amostra. Os fenótipos serão também subdivididos conforme os polimorfismos encontrados."

Resumo: "O conhecimento de fenótipos de desenvolvimento do sistema estomatognático e suas associações são de suma importância para elaboração de estratégias preventivas, terapêuticas e de promoção de saúde. Diante o exposto, o objetivo desse projeto é avaliar a associação entre

- Página final

UNIVERSIDADE DE UBERABA - UNIUBE

Plataforma Brasil

Continuação do Parecer: 6.007.910

Considerações Finais a critério do CEP:

Em 03/05/2023 a plenária votou de acordo com o relator, pela aprovação da proposta. Ressalte-se, em tempo, que o pesquisador é o direto responsável pela pesquisa, devendo apresentar dados solicitados pelo CEP, ou pela CONEP, a qualquer momento; manter os dados da pesquisa em arquivo, físico ou digital, sob guarda e responsabilidade, por 5 (cinco) anos após a pesquisa; informar e justificar qualquer alteração na pesquisa, e apresentar o relatório final do projeto desenvolvido ao CEP, conforme Res. 466/2012, Capítulo XI, Artigo XXI.2 alíneas D e F.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_2118345.pdf	27/04/2023 11:52:35		Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE.pdf	27/04/2023 11:51:47	Maria Angélica Hueb de Menezes	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TALE_m.pdf	27/04/2023 11:50:50	Maria Angélica Hueb de Menezes	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TALE.pdf	27/04/2023 11:50:26	Maria Angélica Hueb de Menezes	Aceito
Projeto Detalhado / Brochura Investigador	Projeto.pdf	27/04/2023 11:45:51	Maria Angélica Hueb de Menezes	Aceito
Folha de Rosto	FOLHA_DE_ROSTO.pdf	27/04/2023 10:32:32	Maria Angélica Hueb de Menezes	Aceito
Orçamento	Orcamento.pdf	11/04/2023 19:36:11	Maria Angélica Hueb de Menezes	Aceito
Cronograma	Cronograma.pdf	11/04/2023 19:35:59	Maria Angélica Hueb de Menezes	Aceito
Declaração de Pesquisadores	Declaracao_pesquisador.pdf	11/04/2023 12:14:24	Maria Angélica Hueb de Menezes	Aceito
Declaração de Instituição e Infraestrutura	Autorizacao_policlinica.pdf	11/04/2023 12:12:19	Maria Angélica Hueb de Menezes	Aceito

Situação do Parecer:

Continuação do Parecer: 6.007.910

Aprovado

Necessita Apreciação da CONEP:

Não

UBERABA, 03 de Maio de 2023

Assinado por:

Geraldo Thedei Junior

(Coordenador(a))

Anexo 2. Normas para publicação no periódico Journal of Clinical and Experiemtnal Dentistry.

INSTRUCTIONS FOR AUTHORS - *Journal of Clinical and Experimental Dentistry - eISSN 1989-5488*

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Halpern SD, Ubel PA, Caplan AL. Solid-organ transplantation in HIV-infected patients. N Engl J Med. 2002;347:284-7.

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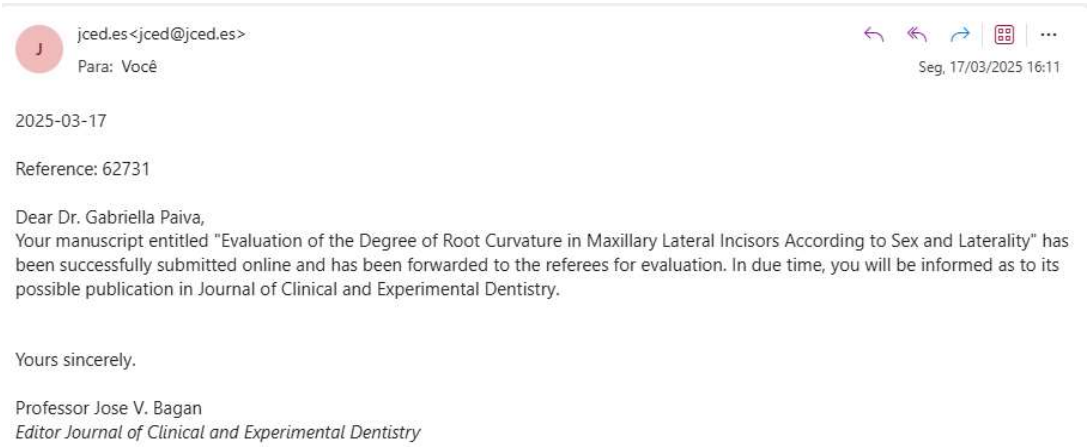
Anexo 3. Comprovante de submissão do artigo.



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Dear Dr. Gabriella Paiva,
Your manuscript entitled "Evaluation of the Degree of Root Curvature in Maxillary Lateral Incisors According to Sex and Laterality" has been successfully submitted online and has been forwarded to the referees for evaluation. In due time, you will be informed as to its possible publication in Journal of Clinical and Experimental Dentistry.

Yours sincerely.

Professor Jose V. Bagan
Editor Journal of Clinical and Experimental Dentistry