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Study of the prevalence of conoid teeth in the unichristus dentistry course population, associated with possible family involvement

Estudo da prevalência de dentes conóides na população de alunos do curso de odontologia da unichristus, associando com possível envolvimento familiar

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ABSTRACT
Conoid teeth are small teeth compared to normal teeth and have a cone shape. During the formation of the enamel organ, the epithelial structure that shapes the tooth, there may be an alteration in the histological pattern, determining a tooth smaller than normal in size. Conoid teeth are usually genetically inherited and this is one of the problems that negatively interfere with smile harmony and also prevents satisfactory occlusion. The objective of this research is to identify the prevalence of conoid teeth present in the population of students of the Dentistry course at the Christus University Center - Unichristus. The methodology involved the participation of students between the ages of 16 and 30, where a nominal list of all students duly enrolled in the Unichristus Dentistry course was used. The type of study is descriptive and transversal. Based on sample calculation, it is estimated necessary to examine a total of 41 patients in order to obtain a sample that represents with 95% confidence the prevalence of this condition in the outlined population. The students were examined clinically at the Dental Clinic of the Centro Universitário Christus Parque Ecológico, and in case of doubt, radiographs were taken to diagnose the existence or not of a restoration on the conoid tooth. Four patients were found to have conoid teeth, 3 female and 1 male, representing a prevalence of 1.3%, and of the 4 patients only 1 had no family involvement for such dental alteration in question. It can be concluded that the prevalence of conoid teeth in the population of students of the Unichristus Dentistry course was 1.3% and that the relatives of most of those affected also had such an alteration, which represents obervationally, a supposed family involvement.

Keywords: Conoid teeth, Family Involvement, Reanatomization.

RESUMO
Dentes conóides são dentes pequenos comparados aos dentes normais e têm formato de cone. Durante a formação do órgão do esmalte, a estrutura epitelial que forma o dente, pode haver uma alteração no padrão histológico, determinando um dente menor que o normal em tamanho. Dentes conóides são geralmente herdados geneticamente e este é um dos problemas que interferem negativamente na harmonia do sorriso e também impedem a oclusão satisfatória. O objetivo desta pesquisa é identificar a prevalência de dentes conóides presentes na população de estudantes do curso de Odontologia do Centro Universitário Christus - Unichristus. A

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metodologia envolveu a participação de estudantes entre 16 e 30 anos, onde foi utilizada uma lista nominal de todos os alunos devidamente matriculados no curso de Odontologia Unichristus. O tipo de estudo é descritivo e transversal. Com base no cálculo amostral, estima-se necessário examinar um total de 41 pacientes para obter uma amostra que represente com 95% de confiança a prevalência dessa condição na população delineada. Os estudantes foram examinados clinicamente na Clínica Odontológica do Centro Universitário Christus Parque Ecológico e, em caso de dúvida, foram realizadas radiografias para diagnosticar a existência ou não de restauração do dente conóide. Verificou-se que quatro pacientes possuíam dentes conóides, 3 do sexo feminino e 1 do sexo masculino, representando uma prevalência de 1,3%, e dos 4 pacientes apenas 1 não possuía envolvimento familiar para essa alteração dentária em questão. Conclui-se que a prevalência de dentes conóides na população de estudantes do curso de Odontologia de Unichristus foi de 1,3% e que os familiares da maioria dos afetados também tiveram essa alteração, o que representa em nível internacional, um suposto envolvimento familiar.

Palavras chave: Dentes conóides, Envolvimento da família, Reanatomização.

1 INTRODUCTION

Dental anomalies can manifest with different degrees of severity, from the mildest to the most severe manifestation, which can be the delay in dentistry to the total absence of the dental germ or agenesis, respectively.[1]

Several studies have suggested a genetic and hereditary tendency in the etiology of dental anomalies of number, size, position, as well as in eruption disorders.[2] BACCETTI, *et al.* (1998)[3], observed that some dental anomalies may manifest in the same person, more than expected. This is because the same defective gene can manifest different types of anomalies including macrodontia, agenesis, taurodontia, microdontia, tooth fusion, twinning and developmental delay.

Among the changes in shape, there is microdontia, which refers to the reduction of normal tooth size or part of it and can be classified as: localized or generalized.[4] According to NEVILLE *et al.* (2009),[5] this term should only be used for teeth physically smaller than the common one. Examples of microdontia are conoid lateral incisors and also supernumerary teeth, which are often affected by this pathology.[6] The genetic causes of conoid lateral incisors, as well as tooth agenesis, are due to different expressions of an autosomal dominant gene, which has as one of its characteristics to be present in one of the parents of the affected person.[7] The frequency of conoid lateral incisors is generally lower than the frequency of upper lateral incisor agenesis, but there is a large variation according to the population studied. In the meta-analysis performed by HUA *et al.* 2013[8], a prevalence of 1.8% was observed, with higher incidence in women, without difference between bilateral or unilateral involvement. The authors also

observed a higher prevalence in the Mongolian race, followed by the black and white races respectively.

Several factors can interfere with smile aesthetics, which can include dental anomalies, which can be classified into anomalies of number, size, structure and shape.[9]

The presence of conoid teeth in the anterior segment of the mouth presents itself as one of the problems that negatively interfere with smile harmony.[10] In a given population, both agenesis and the upper lateral incisor conoid form may have a similar prevalence of around 0.5% to 3%.[11]

The literature guides that dental reanatomization allows the restoration of the harmony of form and function to teeth with aesthetic impairment, such as conoids.[12]

A solution for the disharmonies of shape and dental size of conoid teeth, is the direct restorative treatment, using composite resins suitable for enamel and dentin.[13] This type of procedure has the advantages of preserving tooth structure, shorter treatment time, reversibility of treatment and possible addition or reduction of material.[14]

Knowing the importance of conoid teeth diagnosis for the return of the patient's self-esteem and restoration of the correct function in the mouth, this research is justified due to the lack of references in the literature that study the prevalence of conoid teeth in the population. Therefore, this study aimed to identify the prevalence of conoid teeth in the population of students of the Dentistry course at the Christus Unichristus University Center, Fortaleza - Ceará, verifying whether there is family involvement for affected individuals.

2 METHODOLOGY

2.1 POPULATION, TYPE AND PLACE OF STUDY

The study population was composed of students between 16 and 30 years of age, using a nominal list of all students duly enrolled in the Unichristus Dentistry course. The type of study was descriptive and cross-sectional where it was carried out at the Christus University Center, at the Dentistry School Clinic run from October 2018 to March 2019.

2.2 SAMPLE CALCULATION AND SAMPLE SELECTION

The sample calculation was based on the population of dental students enrolled at the Christus University Center (N=420) and the average prevalence of conoid teeth of approximately 3% in the population of Brazil, where it was thus estimated necessary to evaluate

a total of 41 patients in order to obtain a sample representing 95% confidence in the prevalence of this condition in the outlined population.

Sample size n = [Np (1-p)]/ [(d2/Z21-α/2*(N-1) +p*(1-p)] N=420; p=0.03; α=0.05

2.3 INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria were patients with permanent dentition, who were between 16 and 30 years old, had conoid teeth or not, and who were students of Unichristus. The exclusion criteria were patients who refused to sign the Informed Consent Form.

2.4 CLINICAL EXAMINATION OF STUDENTS AND NECESSARY REFERRALS

The students were clinically examined at the Dental Clinic of the Christus Parque Ecológico University Center, with the aid of a wooden tongue depressor for the observation of the presence or absence of conoid teeth. In case of doubt, panoramic and/or periapical radiographs were taken to diagnose whether or not there was a restoration on the conoid tooth, where four calibrated assessors simultaneously analyzed the radiographs. Patients with conoid teeth were advised of the importance and aesthetic and functional need of dental rehabilitation or even the replacement of the restoration, if necessary, by advising them on the availability of restorative treatment of conoid teeth at the Unichristus School Clinic.

2.5 INFORMATION GATHERING AND OBSERVATION OF FAMILY INVOLVEMENT

Information about the patients was collected through a mixed-type questionnaire. The knowledge that the students had on the subject was evaluated and, if the student presented the alteration, heredograms were constructed in order to describe the family history, assessing whether other family members were affected by the same alteration in a dental form.

2.6 ETHICAL CRITERIA

This study was submitted to the Brazil Platform No. 2,632,978 and executed after approval by the Ethics Committee, according to the protocol attached. After clarifications, the patients signed informed consent forms and authorizations to participate in the study.

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2.7 STATISTICAL ANALYSIS

The data were analyzed in Microsoft Excel and exported to the Statistical Packcage for the Social Sciences (SPSS) software version 17.0 for Windows in which the descriptive and inferential statistics were performed. The data were expressed as absolute frequency and percentage, and analyzed using the Fisher test or chi-square.

3 RESULTS

In total, 296 students were examined in the Unichristus Dentistry course, where 230 (77.7%) were female and 66 (22.3%) male. The survey showed that of all the women examined, only 3 (75% of the total affected) had conoid teeth while only 1 man (25% of the total affected) had conoid teeth, which represented a prevalence of conoid teeth of 1.3% in the population of students of the Dentistry course at Unichristus (Table 1).

The 4 patients affected by the dental alteration (3 women and 1 man) were named patients A, B, C and D, respectively. Patient A presented teeth 12 and 22 conoids, patients B and C presented tooth 12 conoid and patient D presented tooth 22 conoid. Thus, a higher prevalence for tooth 12 being conoid was observed in this study.

Regarding the age group of students who presented conoid teeth, 3 students were between 16 and 25 years old (representing 75% of those affected) and 1 student was over 25 years old (representing 25% of those affected) (Table 1).

The 4 students (1.3%) who have conoid teeth, all predisposed themselves to perform the panoramic radiography for a better evaluation (Images 1, 2, 3 and 4). In this study, the 4 students diagnosed with conoid teeth had already performed the reanatomization of their teeth, observed both clinically and radiographically confirmed. In addition, in the questionnaire, the 4 students reported that they were aware of the existence of such an alteration and the importance of the reanatomization, as questioned.

According to the heredogram design of the 4 patients, 3 patients were found to have family involvement, in which at least one family member has this anomaly. Patient A had family involvement in which the father and the paternal grandmother also had conoid teeth. Patient B was the only one who had no family involvement for such dental alteration. Patient C had family involvement in which only his maternal grandmother had conoid teeth. Patient D had family involvement in which both the mother and the maternal grandfather also had conoid teeth (Figures 1, 2, 3 and 4).

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Table 1. Presence of conoid or non conoid teeth in the study population

		Conoid tooth		
	Total	**No**	**Yes**	**p-Value**
Sex				
Female	230	227	3	1,000
	77,7%	77,4%	75,0%	
Male	66	65	1	
	22,3%	22,6%	25,0%	
Age				
<25	259	255	3	1,000
	87,5%	87,3%	75,0%	
25 or more	37	37	1	
	12,5%	12,7%	25,0%	
Radiography				
No	292	292*	0	***<0,001***
	98,6%	100,0%	,0%	
Yes	4	0	4*	
	1,4%	,0%	100,0%	
Family history				
No	293	291*	1	***<0,001***
	99,0%	99,7%	25,0%	
Yes	3	1	3	
	1,0%	,3%	75,0%	

Table 1: Presence of conoid or nonconoid teeth, related to variables such as gender, age, presence or not of radiographs and family history present or absent for the involvement in question. Data expressed as absolute frequency and percentage. Fisher's exact test or Pears' chi-square.

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Image 1: Panoramic radiography of patient A, who presented teeth 12 and 22 conoids.

Image 2 - Panoramic radiography patient B

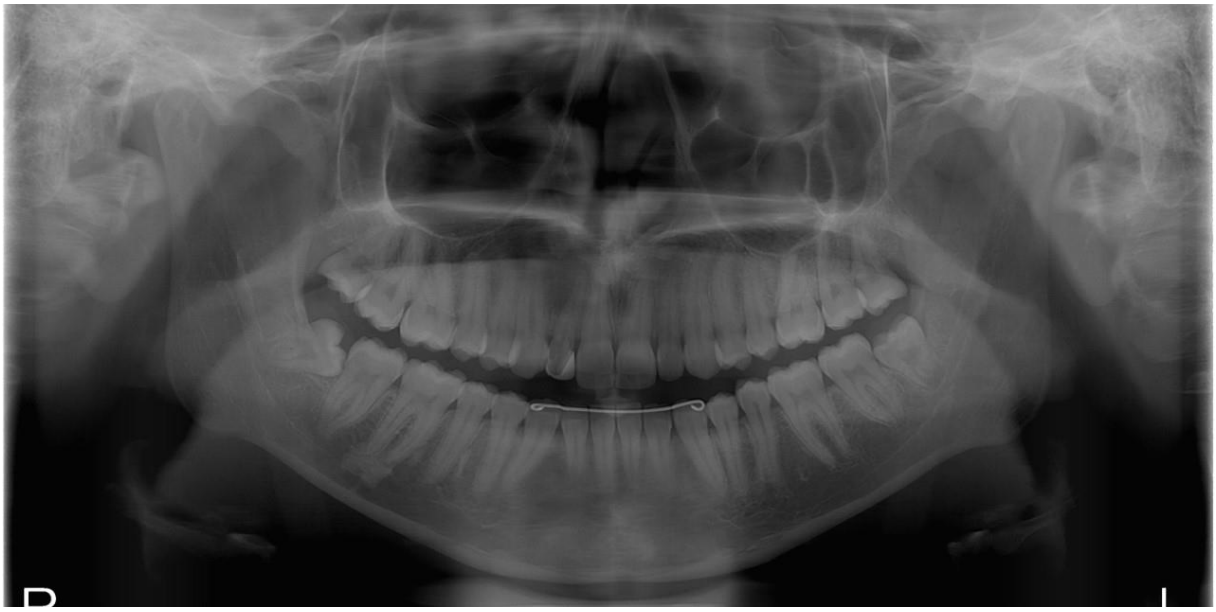

Image 2: Panoramic radiography of patient B, who presented tooth 12 conoid

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Image 3 - Panoramic radiography patient C

Image 3: Panoramic radiography of patient C, who presented tooth 12 conoid.

Image 4 - Panoramic radiography patient D

Image 4: Panoramic X-ray of patient D, who presented tooth 22 conoid.

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Figure 1 - Heredogram patient A

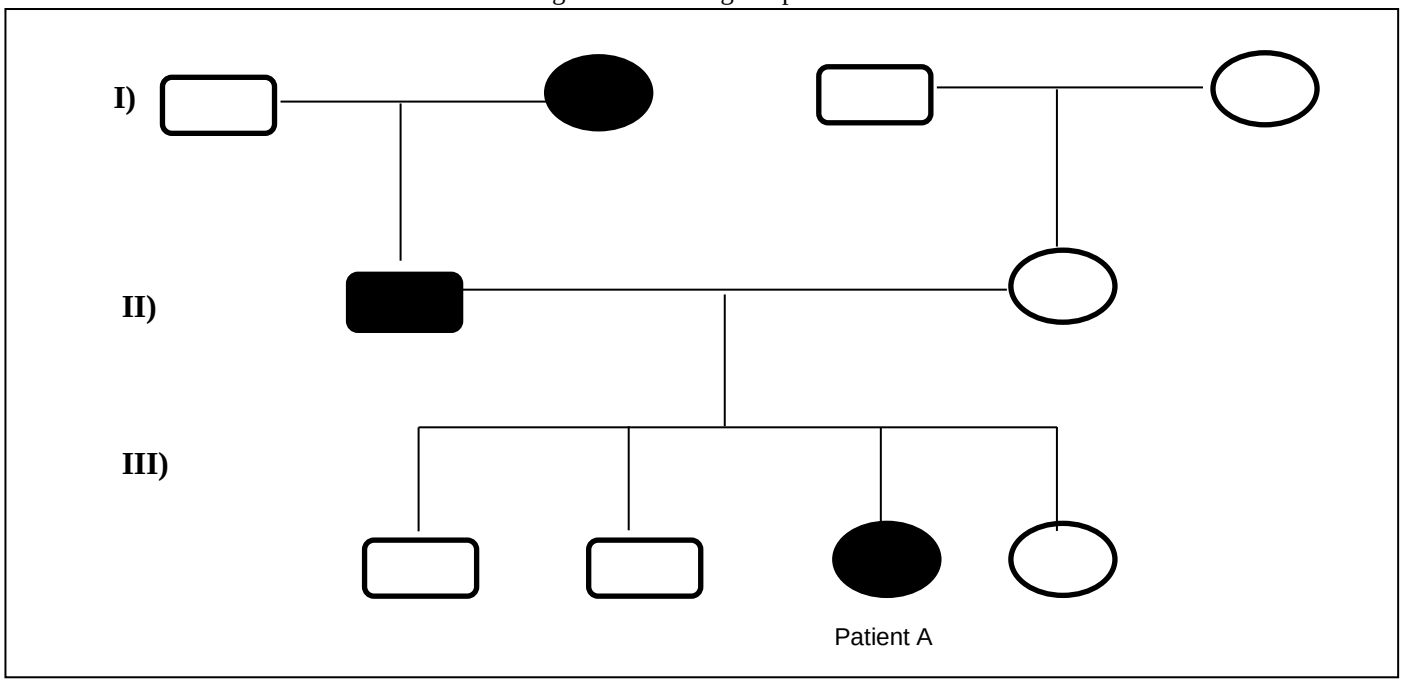

Figure 1: Heredogram representing the family generations of Patient A, showing the father and grandmother affected by conoid teeth.

Figure 2 - Patient B Heredogram

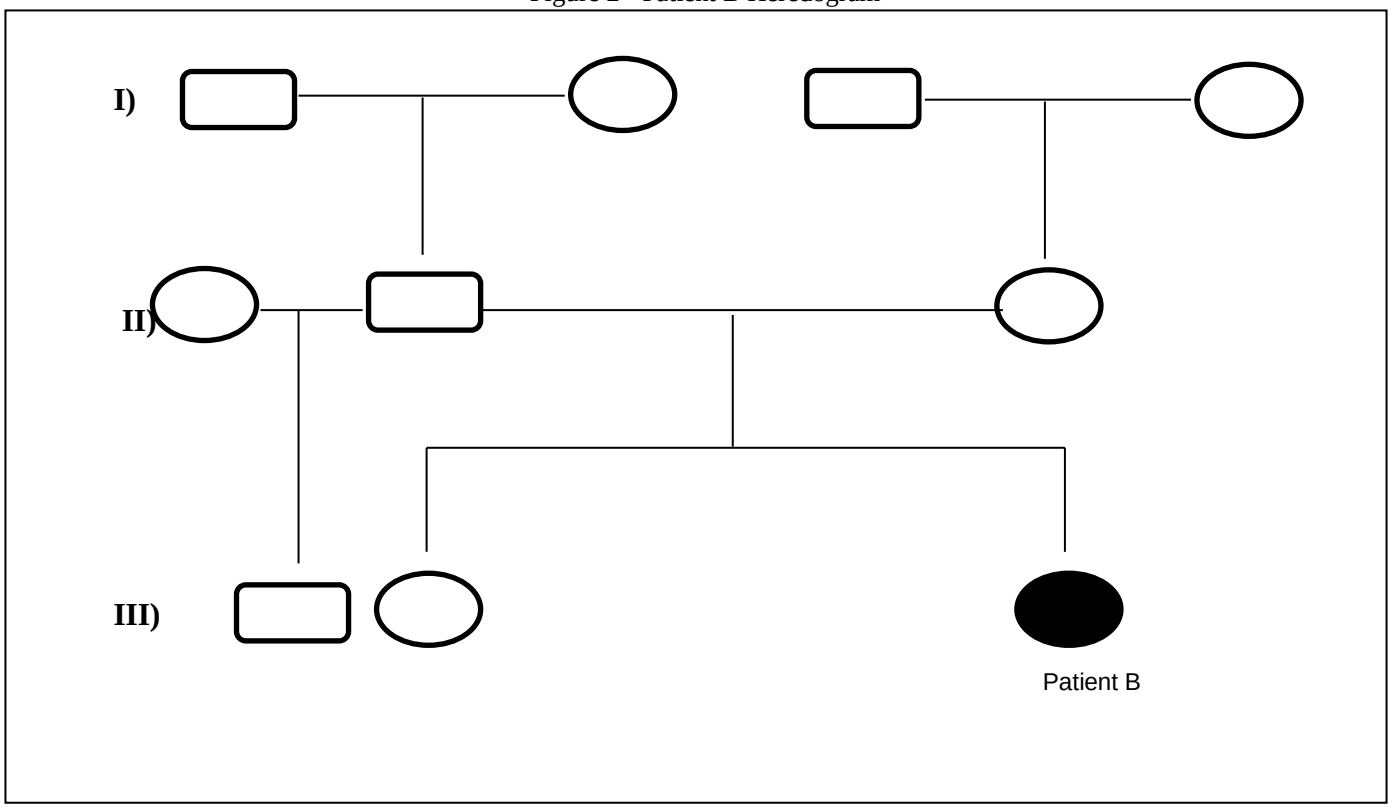

Figure 2**:** Heredogram representing the family generations of Patient B showing no family involvement.

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Figure 3 - Heredogram patient C

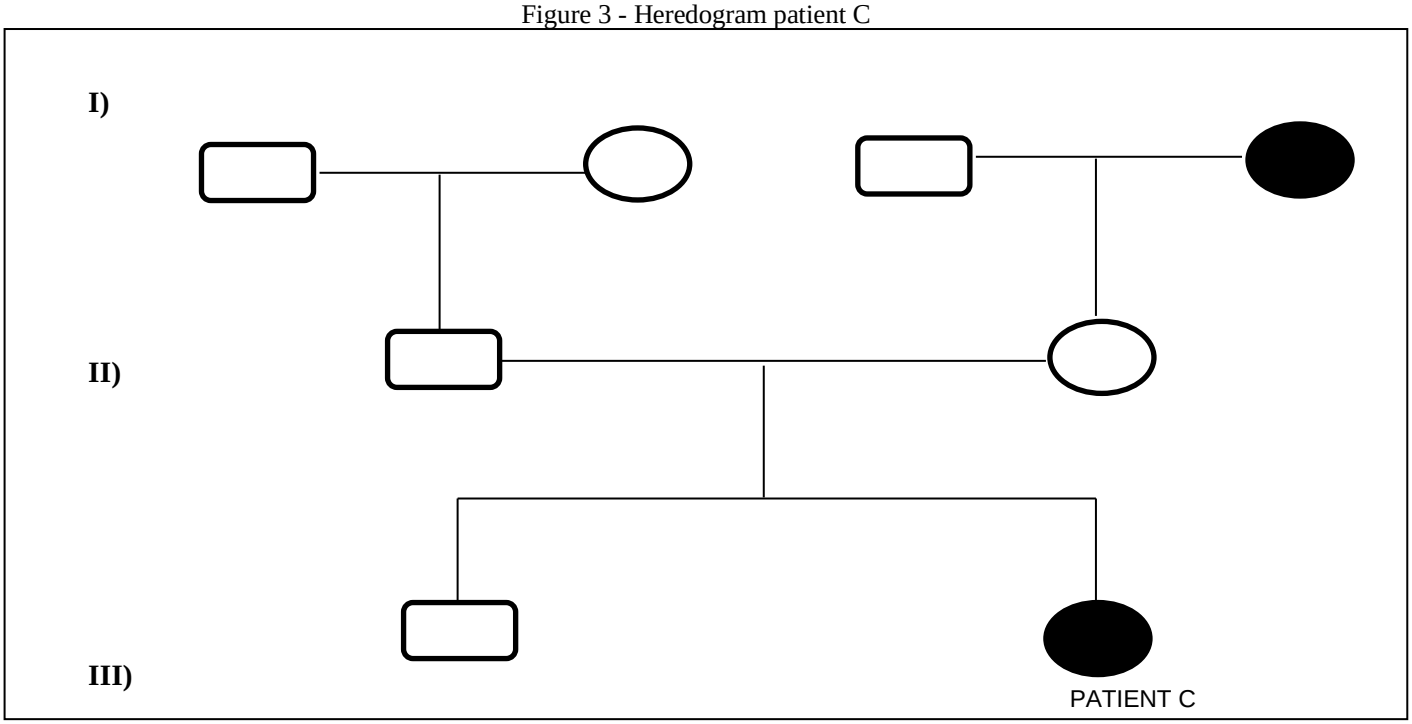

Figure 3: Heredogram representing the family generations of Patient C, showing the maternal grandmother affected by conoid teeth.

Figure 4 - Patient heredogram D

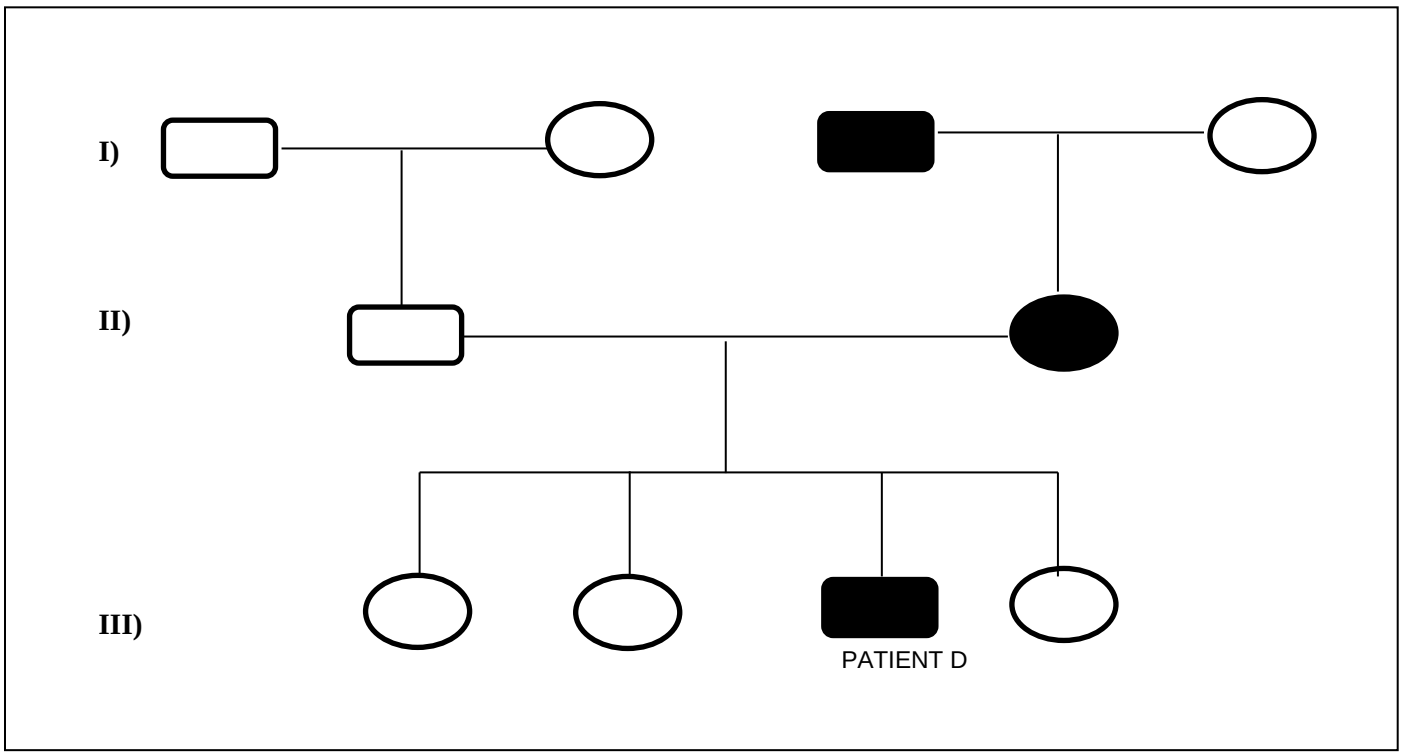

Figure 4: Heredogram representing the family generations of Patient D, showing the mother and grandfather affected by conoid teeth.

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4 DISCUSSION

The prevalence of conoid lateral incisors in the population, for PLAZA *et al.* (1998)[15]; TEIXEIRA *et al.* (2003)[16] and HUA *et al.* (2013)[8] ranges from 1 and 2%, which is similar to the results of the present study, which presented a prevalence of 1.3%. However, according to studies by CUNHA *et al.* (2013)[13] the prevalence for such dental form change was much higher, affecting 4% of the population studied, probably due to having conducted a study using a larger sample than the present study.

In the present study, conoid teeth were more prevalent in women, agreeing with previous studies by WU and FENG (2005)[17] and JONES (1970)[18, in which] a higher incidence of this anomaly was observed in the latter study, averaging 6.35% to 7.07% for women and 5.55% for men. Besides these, the meta-analysis of HUA *et al*. (2013)[8] found a higher probability of 1.35 women to have conoid teeth compared to men, also corroborating the findings of the present study.

There is a higher incidence in the permanent dentition[19] and in the left upper hemiarch, according to KOOK, PARK and SAMESHIMA (2003)[20] and HUA *et al.* (2013)[8], however, in the present study the results were different, in which most of the conoid teeth were in the right upper hemiarch. Therefore, further studies, with larger samples, are needed to understand whether there is a higher prevalence on one side or not for the occurrence of conoid teeth.

Several studies suggest a genetic and hereditary trend in the etiology of dental anomalies of number, size, position, as well as in eruption disorders.[2] Thus, for BJERKLIN *et al.* (1981),[21] the heredity comes from investigations in families in monozygotic twins, and the observation of associations in the occurrence of certain anomalies, such as conoid teeth. According to MARKOVIC *et al*. (1982)[22], monozygotic twins have identical genes and thus the genetic characteristics are expressed in both monozygotic twins in a similar manner. The dizygotic twins, on the other hand, because they have 50% of distinct genes, present low similarity index for the same irregularity. The studies of ALVESALO and PORTIN (1969)[7] show that the appearance of conoid teeth results from an autosomal dominant inheritance and both the conoid lateral incisors and tooth agenesis are of different expressions of the same gene. For GARIB *et al.* (2010)[1], when an anomaly manifests repeatedly in the same family of affected patients compared to the expected prevalence for a population, it is believed that the genetic factor is influencing the etiology of the problem. Comparing these data from the literature with the results of the present study, it can be seen that in this aspect of family involvement, the results corroborate with these studies, since of the 4 patients with the anomaly in conoid shape, 3 had

family involvement related to dental malformation, always being related to a first degree relative (father or mother), and/or second degree (grandmother or grandfather), which characterizes proximity to an autosomal dominant inheritance. Therefore, a positive family involvement is suggested for such alteration in this observational study, but observational studies with a larger sample as well as molecular studies become necessary to confirm genetic involvement as well as to identify which (is) gene locus are specifically related to such alteration.

The presence of conoid teeth in the anterior segment of the mouth presents itself as one of the problems that negatively interfere with smile harmony, which directly influences the patient's self-esteem, also compromising its function.[10] The literature guides that dental reanatomization, through the use of direct adhesives, allows the restoration of harmony of form and function to teeth that present aesthetic impairment, such as conoids.[14,12] The 4 students diagnosed with conoid teeth in this study had already performed the reanatomization of their teeth. In addition, in the questionnaire, the 4 students reported science on the importance of reanatomization, as questioned.

5 CONCLUSION

It can be concluded that the prevalence of conoid teeth in the population of students of the Unichristus Dentistry course was 1.3%, and that the relatives of most of those affected also had such an alteration, which represents obervationally, a supposed family involvement related to such alteration in a dental form, awakening the importance for early diagnosis in order to recover aesthetics and function, besides preventing malocclusions.

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