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Association of age, gender, facial biotype and aesthetic line of Ricketts in patients with retained canines

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Abstract

Objective: This study seeks to determine the relationship between facial biotype, lip profile and the probability of canine retention in orthodontic patients, as well as to evaluate the prevalence of this condition as a function of gender and age.

Materials and Methods: Clinical histories and panoramic and lateral skull x-rays of 95 patients of the orthodontic postgraduate program at the Torreón Unit Faculty of Dentistry were used. The Ricketts VERT index was used to classify facial biotypes (dolichocephalic, brachycephalic, mesocephalic) and the Ricketts aesthetic line to assess the lip profile (recto, protrusive, retrusive). The data obtained were analyzed using the Minitab 17 statistical package, applying the chi-square test to determine significant associations between the variables studied.

Results: A total of 95 patients were analyzed, with a predominant distribution of the female gender 72.6% (69 patients) over the male 27.4% (26 patients). And an average age of 10 to 19 years, with a mean of 13.63 years and a standard deviation of 5.11 years. 33.7% of the patients had a dolichocephalic or brachycephalic facial biotype, while 32.6% showed a normocephalic biotype. Regarding the lip profile, 55.8% had normal lips, 14.7% retrusive lips and 29.5% protrusive lips.

Conclusions: In this study, 95 patients were analyzed, with a predominance of women (72.6%) and an average age of 13.63 years, coinciding with the common age group in orthodontic treatments. An equal distribution was observed between the dolichocephalic and brachycephalic facial biotypes (33.7% each), and 55.8% of the patients had normal lips. However, no significant association was found between facial biotype and lip profile. The results underscore the need for further investigation of other factors influencing canine retention and facial relationships.

Keywords: Canine retention, facial biotype, lip profile, Ricketts aesthetic line, orthodontic patients

1. Introduction

Canines are some of the teeth that are most often retained in the dental arch, after the third molars^[1]. For this reason, it is crucial to identify anatomical features, position, angulation, and relationship to neighboring teeth and adjacent structures during the diagnostic phase.

In the literature, there are several protocols for evaluating two- and three-dimensional images that optimize the treatment plan and prognosis of retained maxillary canines. These teeth usually emerge in the oral cavity during the second replacement period of the definitive eruption^[2, 3].

During the initial evaluation of children in their first replacement period, professionals often use panoramic x-rays to review the list of permanent teeth. At this stage, it is common to observe a lack of space for eruption of the central and lateral incisors, and, eventually, the canines^[4].

The most used method to determine facial biotype is the Ricketts VERT index. Currently, there is a growing interest in facial analysis as part of orthodontic diagnosis and treatment planning^[5].

Physical attractiveness has gained great relevance worldwide, which has made facial aesthetics a factor that raises expectations for results in orthodontic treatments. This, in turn, increases the difficulty of achieving adequate patient satisfaction^[6].

To determine the facial biotype and lip profile of patients with retained canines, analyzing their lateral radiographs in the postgraduate course of orthodontics at the Torreón Unit Faculty of Dentistry.

Materials and Methods

Clinical histories from the Orthodontics Postgraduate Program at the Faculty of Dentistry, Torreón Unit, were used. Panoramic radiographs from the records of 95 patients were reviewed, as well as their lateral skull radiographs.

The Ricketts' VERT Index was used to determine facial biotype (dolichocephalic, brachycephalic, mesocephalic), and Ricketts' esthetic line was used to assess lip profile (straight, protrusive, retrusive).

Methods

Data were collected from patient records at the Orthodontics Postgraduate Program, Faculty of Dentistry, Torreón Unit. Using the VERT Index and Ricketts' esthetic line, each patient's facial biotype and lip profile were obtained. Only patients with retained canines were included, in order to determine whether a correlation exists between these variables, as well as to identify whether canine retention is more prevalent in males or females and at what age this condition is most common.

Statistical Method

Data were analyzed using Minitab 17 statistical software. The chi-square test (χ^2) was applied to evaluate the association between variables.

Results

Descriptive statistical analysis for each categorical variable was performed using frequencies and percentages. The chi-square test (χ^2) in Minitab 17 was used to analyze associations between categorical variables. A total of 95 patients participated in this study, 69 (72.6%) females and 26 (27.4%) males (Table 1).

Table 1: Gender

	Fr	%
Gender		
Female	69	72.60%
Male	26	27.40%
N=95		

In table 2, participants' ages ranged from 10 to 19 years (M = 13.63, SD = 5.11).

Table 2: Age

	Fr	%	M (SD)
Age			13.63 (5.11)
10	11	11.6	
11	16	16.8	
12	25	26.3	
13	12	12.6	
14	8	8.4	
15	2	2.1	
16	5	5.3	
17	3	3.2	
18	2	2.1	
19	1	1.1	
Out of range	10	10.5	

N=95

Table 3 shows that 33.7% (n = 32) of the sample presents a dolichocephalic or brachycephalic facial type, while 32.6% (n = 31) are identified as having a normocephalic facial type. In the same Table 3, regarding lip characteristics, 55.8% (n = 53) are classified as having normal lips, 29.5% (n = 28) exhibit a protrusive type, and 14.7% (n = 14) a retrusive type.

Table 3: Biotipo facial y Línea estética de Ricketts

	Fr	%
Tipo facial		
Dolichocephalic	32	33.7
Normocephalic	31	32.6
Brachycephalic	32	33.7
Lips		
Normocephalic	53	55.8
Retrusive	14	14.7
Protrusive	28	29.5
N=95		

In Table 4, since p-values were greater than 0.05, no significant association was found between "facial biotype" and "lip profile" in this study.

Table 4: Association between Facial Biotype and Lip Profile

Lips / Facial Type	Normal (1)	Retrusive (2)	Protusive (3)	Total
Dolichocephalic (1)	19 (17.853)	17 (17.295)	17 (17.853)	53
Normocephalic (2)	2 (4.716)	5 (4.568)	7 (4.716)	14
Brachycephalic (3)	11 (9.432)	9 (9.137)	8 (9.432)	28
Total	32	31	32	95

Discussion

In relation to the prevalence of canine retention according to gender, the results obtained in this study agree with what has been reported in the existing literature, which describes a predominance of cases in women compared to men. Previous studies carried out by Estrada, *et al*^[7], have consistently pointed to this trend, suggesting that females are more likely to experience canine retention. In our studied population, this difference is evident, with a significantly higher prevalence in women, reaching 72.60%, in contrast to the 27.40% observed in men.

Regarding the age distribution of patients, it is necessary to analyze how this factor could interact with gender to influence canine retention, which could open new lines of research in future evaluations of the affected population.

In the orthodontic literature, it has been established that the facial biotype is determined by genetic and environmental factors, being key in the planning of orthodontic treatment^[8]. In this study, we have used radiographic methods to classify patients according to their facial biotype and lip characteristics.

In this study, we have identified that 33.7% of the patients evaluated have a dolichocephalic or brachycephalic facial type, while 32.6% correspond to a normocephalic type. This suggests a possible relationship between facial biotype and canine retention, as each facial type has specific morphological characteristics that could influence tooth eruption.

Dolichofacial patients, who have vertical growth and a tendency to develop open bite, could be more predisposed to canine retention due to the lack of space in the narrow dental arches, which coincides with the literature that mentions the relationship between the dolichofacial biotype and unfavorable growth patterns. On the other hand, brachyfacials, with horizontal growth and greater muscle

development, might experience an earlier rash or retention due to reduced space in the arch, despite having wider arches. However, in both cases, canine retention does not seem to be exclusively related to lack of space, which supports the hypothesis that this pathology has a multifactorial etiology.^[8, 9]

In Table 3, more than 50% of patients have a normal type of labia, while 29.5% show protrusive lips and 14.7% have restrictive lips. This suggests that variability in lip profile could also be correlated with canine retention, although it is not conclusive. The lip profile plays a crucial role in facial aesthetics and soft tissue balance, so its analysis is essential when evaluating patients with retained canines. A protrusive lip profile, for example, could be linked to an increased risk of retention due to protruding anterior teeth and lack of room for eruption of the canines.

The Ricketts VERT index and the lower facial height of patients provide an accurate assessment of mandibular and maxillary growth, which has allowed us to identify possible growth patterns that could predispose to canine retention.^[10, 11] In this sense, preliminary results indicate that patients with a brachyfacial or dolichofacial biotype have a higher probability of presenting canine retention, although more studies are required to confirm this significant correlation.

Conclusion

In the present study, a total of 95 patients were analyzed, with a predominant distribution of the female gender (72.6%) over the male (27.4%), and an average age of 13.63 years (SD=5.11), which coincides with the age group with the highest prevalence in orthodontic treatments, which indicates that most of the patients are in the adolescent stage. critical age for the diagnosis and treatment of orthodontic disorders such as canine retention.

Regarding the facial biotype, an equal distribution was observed between dolichocephalic and brachycephalic types (33.7% each), while 32.6% of the patients corresponded to a normocephalic type. Regarding the lip profile, more than half of the patients (55.8%) had normal lips, 29.5% protrusive lips, and 14.7% retrusive lips.

Despite the observed distribution, the chi-square (χ^2) statistical analysis did not show a significant association between facial biotype and lip profile, since the p values obtained were greater than 0.05. This suggests that, in this sample, a direct relationship between these two variables could not be established.

This finding highlights the importance of further investigating other factors that may influence canine retention and their relationship to facial and lip features in the context of orthodontics.

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