



ORIGINAL RESEARCH PAPER

Orthodontics

FREQUENCY OF INCLUDED CANINES, THEIR LOCATION AND DIRECTION THROUGH COMPUTERIZED TOMOGRAPHY, IN SANTIAGO, CHILE.

KEY WORDS: Tooth; Impacted Canine; Cone-Beam Computed Tomography

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ABSTRACT

Introduction: Dentomaxillofacial anomalies are frequent, among which we find the inclusion of definitive canines. The diagnosis of included canine becomes important when planning an orthodontic treatment. The objective of this study is to determine the frequency of included canines, their location and position in the arch through the analysis of computed tomography, in patients undergoing orthodontic evaluation in Santiago, Chile. **Method:** The database of the diagnoses of all the patients evaluated during the years 2020 and 2021 between 15 and 22 years of age was reviewed. All the pieces with the diagnosis of canines included in the study were included. Those pieces with incorrect diagnosis and those that did not have an image associated with the diagnosis or its report were excluded. The computed tomography scans of each piece were analyzed, evaluating the variables piece included, position in the vertical axis, direction and position in the mesiodistal direction. **Results:** 67 included canines from 63 patients were analyzed. Of these 63 patients, 68.7% were women. A frequency of 0.36% of included canines was determined. 6.34% were bilateral. The piece with the highest frequency was the upper left canine. **Conclusion:** This is the Chilean study with the largest sample size on the subject to date. The frequency found was lower than the average of similar studies, possibly due to the age range analyzed.

INTRODUCTION

Alterations in dento-maxillary growth are very frequent pathologies, affecting 38.29% of the Chilean population at 6 years old ¹. Among these conditions, we find the inclusion of dental pieces, with the canines being one of the pieces with higher prevalence of inclusion ².

Included canines originate when the eruption does not occur within the normal period. Its prevalence varies between 0.8 - 3.6 according to the different series, being only surpassed by third molars ³⁻⁵.

Clinically, an included canine is suspected when they are not palpable in the oral vestibule in patients older than 10 years, or in the absence of movement of the primary canine when the contralateral canine is already erupted ⁵.

Its diagnosis becomes important when planning an orthodontic treatment, since it has aesthetic, mechanical, periodontal, surgical, and prosthetic implications ⁶. The diagnosis is made through images. Within these, panoramic radiography is a quick and affordable tool for diagnosis. However, it is often not enough to generate a therapeutic plan. In this context, cone beam computed tomography (CBCT) allows a more detailed location of impacted canines and their relationship with adjacent structures in different spatial planes, achieving better therapeutic planning ⁴.

In Chile there is only one study of the frequency of canines included in which they reported a frequency of 2.74% ⁶. Therefore, considering that is relevant for orthodontic therapy, and the little information available on the frequency of this condition in Chile, it is important to carry out new studies of frequency of included canines.

The objective of this study is to determine the frequency of included canines, and their location and position in the arch through the descriptive analysis of computed tomographies,

in patients attending a private clinic in Santiago de Chile, between 2020 and 2021.

METHODS

A descriptive study was carried out to determine the frequency of impacted definitive canines in patients aged from 15 to 22 years, in Santiago, Chile, based on the clinical records of all patients evaluated during the years 2020 and 2021 in the Clinical Center "Instituto Nacional de Ortodoncia". The study was conducted following the principles of the Declaration of Helsinki and was approved by the Scientific Ethics Committee of the Oriental Metropolitan Health Service of Chile.

To find all the patients with the diagnosis of included canines, a search was carried out in the database of the years 2020 and 2021 with the term "included". All patients with diagnosis of included canine through CBCT were included. Patients with semi-included canines, without CBCT or its report, and those with previous orthodontic treatment were excluded.

After finding all the patients with a diagnosis of an included canine, the age and sex of the patient were recorded, and the variables included piece, position in the vertical axis, and direction and position in the mesiodistal direction were analyzed. These were evaluated by three examiners through the CBCT, with the Ondemand 3D Dental program. Additionally, the information obtained with the radiological reports was corroborated.

RESULTS

17,663 clinical records of patients admitted between 2020 and 2021, aged between 15 and 22 years, were reviewed. A total of 113 dental pieces with the code "included canine" were obtained. Of these, 33 pieces that were semi-included dental pieces and 13 that did not have the required imaging examination or its report were excluded, leaving finally a total of 67 included canines from 63 patients. A frequency of 0.36%

of included canines was determined and of this value, 6.34% were bilateral. Of these 63 patients, 68.7% were women.

A higher frequency was obtained in the maxilla compared to the mandible, with 92.5%. The piece most diagnosed as included was the upper left canine (53.7%) (Figure 1).

Vertically, a higher frequency of included canine crowns located in the middle third of the root was observed (38.8%), followed by the apical third (32.8%) and finally the cervical third (28.3%) (Figure 2).

In relation to the sagittal axis, a higher frequency of pieces directed towards the palate was obtained, with 55.2%, followed by the vestibular ones with 22.4%, 13.4% in vertical direction, 7.5% horizontal, and finally 1.5% towards lingual direction (Figure 3). No canines with lingual or horizontal direction were found in male patients

Regarding the mesiodistal position, 65.7% presented position IV, followed by III, with 14.9%, being these the least favorable positions and close to the midline (Figure 4).

DISCUSSION

The results of the study showed a frequency of included canines of 0.36%. The percentage evidenced is lower than that observed in other countries, for example, 2.95% in Belgium ⁷, 3% in Ecuador ⁸, and 3.4% in Mexico ⁹. Regarding studies carried out in Chile, 2.74% of canines were included⁶.

In relation to the distribution by sex, a higher frequency was obtained in women, as mentioned in various studies ⁶⁻¹¹. The maxilla was the most affected with 92.5% of included canines, which correlates with the literature, where it is mentioned that it is 20 times more common in the maxilla ^{11,12}. This percentage is higher compared to similar studies within the country, where 74% of maxillary involvement was observed ⁶.

Patients with unilateral inclusion correspond to 93.66% of the sample. This is a higher frequency than that reported in other studies, where 78.26% of unilateral canines were observed ⁶.

Regarding the vertical classification, we observed a higher frequency of included canine crowns located in the middle third of the root, followed by the apical third, which differs from the data obtained in another study in Santiago, where the cervical position is more frequent with 39%, followed by the apical with 34% ⁸. The most common direction was palatal, which correlates with the literature ^{4,10}.

Regarding the mesiodistal position, type IV was the most common with 65.7%, followed by type III. In two other studies, the most frequent mesiodistal position was type II, with frequencies of 34.2% and 36.6% ^{13,14}. In both studies it was observed that the second most frequent position was position III ^{13,14}.

The frequency of included canines found was lower than expected. This may be due to the age range of the patients studied, which is wider than other studies, including older patients, so we can expect that the frequency decreases with increasing age.

In the distribution by sex there is an undoubted difference. The highest percentage of incidence was evidenced in the female sex, which can be explained due to the little development of the size of their maxilla and jaw compared to the male sex. The results obtained are compatible with those found by Celikoglu et al ¹¹.

Within the limitations may be the error in the diagnosis recorded in the database, and the lack of an image or its report in some patients, which could affect the calculated frequency in some way.

CONCLUSION

The inclusion of canines is a relevant pathology when carrying out an orthodontic therapeutic plan. The present study is the publication with the largest sample size in Chile about included canines to date. Our results reported a lower frequency of included canines compared to international and national studies on the subject, following a similar pattern in terms of their location and direction.

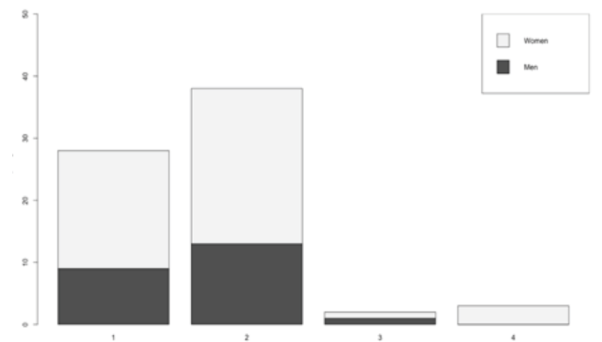


Figure 1. Dental Piece Included By Sex.

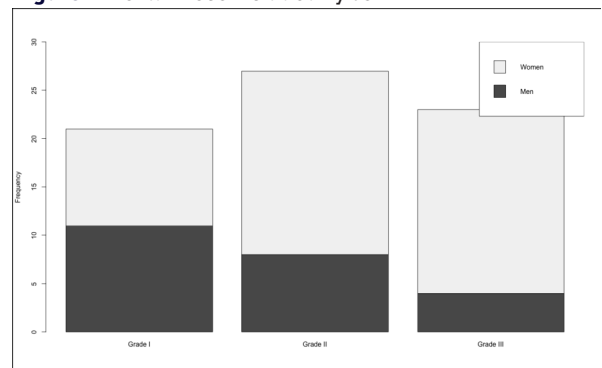


Figure 2. Vertical Axis Position By Sex.

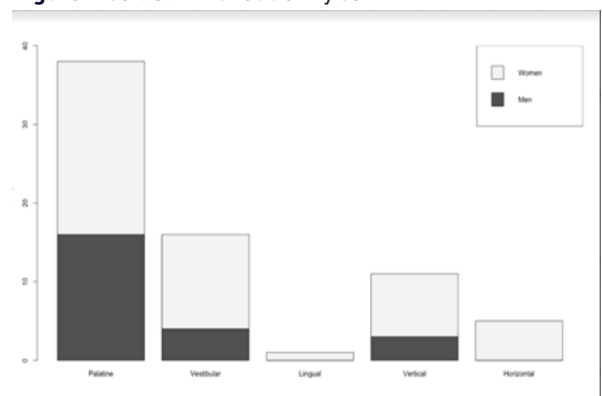


Figure 3. Direction Of The Included Canine By Sex.



Figure 4. Mesiodistal Position Of The Included Canine.

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