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Is There a Relationship Between Buccally Displaced Maxillary Canine and Nasal Septum Deviation?

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ABSTRACT

This study aimed to evaluate the relation between buccally displaced canine and nasal septum deviation.
822 individuals (mean age 12,91±2,21; 469 female, 353 male) were divided into has buccally displaced canine (n=411) and has no buccally displaced group (n=411). Intra-oral photographs were used to evaluate the position of displaced canine. Posteroanterior radiographs were used to determine the deviated nasal septum. A Chi-square test was used for analyzing the variables.
While the incidence of septum deviation is 70.1% in individuals with buccal ectopic canine, the rate of septum deviation in individuals with canine teeth in normal position is 40.6%. A statistically significant relationship was found between the presence of canine in the ectopic position in the buccal and the deviation of the septum(p=0,000).
In the intraoral examination, it can be estimated that there may also be a nasal septum deviation when the buccal ectopic canine is found. It should be kept in mind that patients may be directed to the medical doctor to prevent problems that may occur in the long term as a result of the nasal septum deviation.

Key Words: Buccal ectopic canine, nasal septum deviation, posteroanterior radiography

Introduction

The nasal septum, which can be defined as a wall separating the nasal cavity, is an important functional and aesthetic structure of the nose. While regulating the flow of air through the nose, it supports the nose by shaping the back and the caudal part of the nose. A flat septum in the nasal cavity enables the laminar airflow, which allows the air intake to be heated, cleaned and moistened, thus optimizing for gas exchange in the alveoli in the lungs. (1)

Although there is no standard definition of nasal septum deviation, the curvature of the nasal septum caused by cartilage, bone, or both are defined as the deviation, which is the anatomical variation, and its incidence varies between 8.8% and 75%. (1)

Septum deviation can be seen in the intrauterine period, at birth or after birth. (2) Minor nasal traumas and microfractures occurring during the intrauterine period, delivery, and growth-development period may cause chondrocyte growth to stop on the one hand but continue chondrocyte growth on the opposite side, causing the septum to deviate. Severe traumas in adult ages lead to septal cartilage and bone fractures, deformity in the nasal roof, and associated deviations. Deviation of the septal cartilage growing in a narrow nasal roof and the development of deformity can also be an example of the deviation of the septum developing without exposure to trauma. (3)

The nasal septum deviation may cause mouth breathing, causing facial deformity in children.(4) D'ascanio et al. (4) showed that in the analysis of children with nasal septal deviation on the lateral cephalometric radiographs, the height of the face was increased compared to the control group, the maxilla, and mandibular retrognathism developed, the palatal height increased and the maxillary intermolar width was narrower. The narrowness of the maxillary arch may cause crowding in the transition to permanent dentition, and the permanent maxillary canine teeth, whose eruption is around 11-13 years old, may not continue in the proper position in the arch. (5, 6)

Ectopic canine in the buccal is a problem that is often thought to be caused by insufficient arch size. They usually drive through the alveolar bone, through the alveolar mucosa. Crowding is the main cause of buccal ectopic canines. Crowding causes the tooth to not be able to continue where it needs to develop on the arch. (5, 6)

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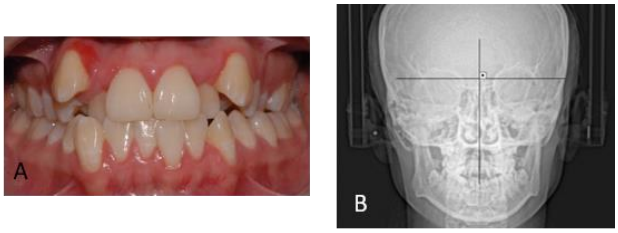

Fig. 1. A. Ectopic canine in the buccal in the frontal intraoral photo. B. Nasal septum deviation in postero-anterior radiography

The purpose of our study, which we determined the null hypothesis as "there is no relation between the ectopic canine tooth and nasal septum deviation", is to evaluate the relationship between the canine tooth in the buccal ectopic position and the deviation of the nasal septum.

Materials and Methods

Ethics committee approval for this retrospective study was obtained from the Kırıkkale University Non-Interventional Research Ethics Committee (Decision no: 2018.08.03, Date: 01.08.2018).

The study included 822 (469 women, 353 men) patients between 7 and 17 years of age who were treated at Kırıkkale University between 2014-2017, who had ectopic canine teeth with an average age of 12.91 ± 2.21, without severe asymmetry, craniofacial anomaly or syndrome, who had no congenital or subsequent malformations in the dental-maxillofacial system, had no trauma, no orthodontic or orthopedic treatment history, and radiographic images with no artifact and distortion, and photos taken clearly from the full frontage.

Individuals were divided into two groups as the buccal ectopic positioned upper canine (234 female, 177 male, n = 411) and normally positioned (235 female, 176 male, n = 411).

Intraoral photographs were used to determine the position of the canine tooth, and posteroanterior radiographs were used to evaluate the septum deviation. Oral photographs were taken with a digital camera (Nikon D7100; Nikon Corporation, Tokyo, Japan). On posteroanterior radiographs, a line (vertical reference plane) from crista galli to the horizontal reference plane (the intersection plane of the fronto-zygomatic points) was used (Figure 1). Deviations on this line indicated the presence of septum deviation. The measurements were performed by Dolphin Imaging, Chatsworth, CA, USA). Posteroanterior radiographs were taken by the same technician with the Kodak digital 9000 device (Carestream Health, Rochester, NY, USA). Radiographs and oral photographs were examined by a single observer (TSE), and after 4 weeks, 50 randomly selected materials were re-evaluated.

Findings obtained in the study were evaluated using SPSS 20.0 computer statistical software. The relationship between the variables was analyzed with the chi-square test. P <0.05 value was considered statistically significant.

Results

The intraclass correlation coefficient was found to be high for intra-observer compliance (ICC = 0.948-0.993). In the post-hoc power analysis test related to the sample size using the G Power-3.1.9.2 program, the effect size was found to be 0.178, with a 95% confidence level. The power of the study with a sample size of 822 was approximately 0.99.

While the incidence of septum deviation is 70.1% in individuals with buccal ectopic canine, the rate of septum deviation in individuals with canine teeth in normal position is 40.6%. A statistically significant relationship was found between the presence of canine in the ectopic position in the buccal and the deviation of the septum ($\chi 2$ (1) = 72,072, p = 0,000) (Table 1). The null hypothesis of our study was not accepted.

Septal deviation did not differ statistically between males and females with ectopic canine in the buccal ($\chi 2$ (1) = 3.85, p = 0.05). The septal deviation was observed in 73.9% of females with ectopic canine teeth and 65% of males with ectopic canine teeth (Table 2).

Discussion

The nasal septum deviation is observed at very high rates in our country, with a percentage of 34.9% among children aged between four and sixteen, and has therefore been the subject of numerous studies. (4, 7-9)

The nasal septum consists of cartilage, bone, and fibrous tissues. Septal cartilage, consisting of a single cartilage structure, is supported at the base and behind by bone septum structures. It is adjacent to the perpendicular laminate of the ethmoid bone at the top and back, and the premaxilla, maxillary and palatine crest and vomer at the bottom. (10)

Nasal septum deviation may occur due to external traumas, prolonged pressure in the intrauterine period, and genetic factors. (11) Although it does

Table 1. Relationship of Individuals With and Without Ectopic Canine Teeth In The Buccal With Nasal Septum Deviation

	The presence of deviation n (%)	Absence of deviation n (%)	P*
Absence of ectopic canine	244 (59.4%)	167 (40.6%)	0.000
The presence of ectopic canine	123 (29.9%)	288 (70.1%)	

*Chi-square test

Table 2. Relationship of Genders With and Without Ectopic Canine Teeth in the Buccal With Nasal Septum Deviation

		The presence of deviation n (%)	Absence of deviation n (%)	p*
Absence of ectopic canine	Female	92 (39.1%)	143 (60.9%)	0.479
	Male	75 (42.6%)	101 (57.4%)	
The presence of ectopic canine	Female	173 (73.9%)	61 (26.1%)	0.050
	Male	115 (65%)	62 (35%)	

*Chi-square test

not usually cause serious problems, it is one of the most important causes of nasal congestions.(4) As a result of nasal obstructions, dryness-crusting, turbulent air circulation, nosebleeds, and recurrent sinusitis may occur, while one of the most important orthodontic effects is mouth breathing. (4, 9) According to the functional matrix theory, nasal air circulation is a continuous stimulus for the growth of the maxilla down and to the side. This shows the close relationship of nasal breathing and dentofacial morphology. (12)

Mouth breathing causes dentofacial malocclusions in children in the period of growth and development. (4) Due to the narrowing in the upper jaw and the decrease in the size of the arch required for the teeth to erupt, the canine tooth, which develops in the deepest region of the maxillary, known to travel 22 mm while erupting with the three-dimensional studies, can often be impacted or ectopic. (4, 13-15) In our study, it may be possible for individuals to have buccal ectopic canines for this reason.

As a result of dental and skeletal evaluations in individuals with and without nasal septum deviations, Bektaş et al. (8) found a significant difference between the upper second intermolar distance and the distance between the maxillary points. Our study, in which we think that ectopic canine was formed in the buccal area due to the narrowing of the maxillary arch as a result of the nasal septum deviation, supports the work of Bektaş and his friends.

In orthodontic evaluations, evaluations such as differences before, and after treatment, the examination of occlusion, determination of white point lesions, hyperplastic areas, and gingival clefts can be made from photographs taken from each individual. (16) In our study, the frontal intraoral photographs were used to determine buccally ectopic canine teeth.

Posteroanterior cephalometric radiographs are frequently used to detect facial asymmetries and their quantity, and to diagnose transversal and vertical orthodontic anomalies in skeletal or dental structures. (17-19) During the determination of these anomalies, the cost and radiation dose are low for the patient according to the methods that can be considered as equivalent. (18) Bektaş et al. (8) used posteroanterior radiographs in their studies in which they determined the nasal septum deviation. We also used posteroanterior radiographs in our study.

In further studies on this subject, the use of three-dimensional radiographs and the mode of respiration can be suggested.

There was a relationship between nasal septum deviation and buccal ectopic canine. In early diagnosis of nasal septum deviation, it may be thought that it is important to refer to medical doctors in order to prevent long-term anomalies. The use of posteroanterior radiographs can assist clinicians in evaluating the septum deviation.

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