

## TRANSVERSAL (CROSS-SECTION) STUDY FOR REPRESENTATION OF IMPACTED MAXILLARY CANINES IN MACEDONIA

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### Abstract

**Background:** The impacted maxillary canine can be defined as un-erupted teeth after its root development is complete. It can be detected in early stadium of development as early as 8 years. If there are signs of clinical presence of impaction, radiographic examination should be performed to confirm the diagnosis.

**Aim:** The aim of this study is to determine occurrence of IMC in both genders and their aged features of appearance; to make classification depending on their localization and depending on their position according to the other anatomic structures in the alveolar bone; to find correlation between localization and both age groups, (10-15 and 15-69 years).

**Materials and methods:** It is a cross-sectional survey carried out on 104 dental patients who attended representative polyclinics and dental ordinations located in Skopje, Kumanovo and Kriva Palanka between 1.12.2017 and 28.02.2018. Their dental records were examined followed by panoramic radiographs. Thechi-squared test was used to examine potential differences in the distribution of impacted maxillary canines stratified by gender, age, location (left or right), and position.  $P < 0.05$  was accepted as statistically significant.

**Results:** The age group ranging from 10 to 19 years was the most prevalent and comprised 60.58% of all examinees with IMC. Out of all examinees, 81 (77.88%), had unilaterally impacted maxillary canines, while 23 (22.12%) had bilateral impactions. Dominant position of the IMC in younger group (up to 15 years), was mesioangular and vertical - 23 (47.92%), 20 (41.67%), consequently, and in the older group (from 15 to 69 years) was mesioangular and horizontal position - 25 (44.64%), and 22 (39.29%), consequently (p-value 0.00025 sig).

**Conclusion:** The early detection is crucial for successful treatment. Further demographic study is needed.

**Key words:** impaction, impacted maxillary canine, panoramic, localization.

### Introduction

Impacted maxillary canines (IMC) are developing dental anomaly which occurs during the exchange of the baby tooth with permanent dentation. It is an asymptomatic phenomenon and does not cause any subjective difficulties. The consequences are of esthetic and functional nature due to the irreplaceable role of the maxillary canines in facial esthetics, in development of dental arcs, as well as in functional movements of mandible [1]. Early diagnosis is made, before all, clinically, with inspection and palpation, but final proof is made radiologically, most frequently with orthopantomograms. The earliest diagnosis can be set as early as the age of 8 [2, 3]. The period of eruption of maxillary canines ranges from 9.3 to 13.1 years, for that time the inception of the canine could show some non-typical movements

which could mean that it penetrates slowly in impacted position. If the child's growing is in pre-puberty stadium and the canine apex is still not closed, there are great chances, by early extraction of the baby canines, to return the permanent canine from impacted position and to take its place in maxillary dental arc. It means that there is no need to use orthodontic apparatus [4, 5] and other complex therapeutic procedures [6], by what the consequent dispend of time and money could be avoided [7, 8, 9].

The **aim** of this study is to present the socio-demographic characteristics of patients with impacted maxillary canines (gender, age); to make classification of the impacted maxillary canine depending on the type of representation (unilateral and bilateral); to determine the relationship of the gender with the type of impaction of maxillary canine; to determine the relationship of the age groups and presence of maxillary impacted canines, and to determine the relationship between the anatomic position (the angle which takes the canine longitudinal axis with occlusive plane) and the patients' age.

### **Methodology of the study**

This investigation represents a cross-sectional study for representation of the impacted maxillary canines. It is realized during the period from 1 December 2017 to 28 February 2018. The population which was the subject of this investigation comprised individuals aged from 10 to 69 years, who underwent dental examination and radiographic orthopantomograms in representative dental polyclinics and ordinations on the territory of Skopje, Kumanovo and Kriva Palanka.

The inclusion criteria - patients aged from 10 to 69 years with non-erupted maxillary canines who agreed, voluntarily, to participate in the study and who underwent orthopantomographic recording.

The exclusion criteria - patients younger than 10 and older than 69 years; patients whose panoramic pictures had bad quality; patients with incomplete medical records from their home ordinations, and patients with syndromes and craniofacial anomalies.

Two instruments of investigation were used in this study: radiographic orthopantomograms, performed in selected dental ordinations and polyclinics, as well as data obtained from dental dairies, where the examinees have been registered.

Statistical analysis of the data obtained during the investigation has been realized on the basis of statistical program Statistica for Window 8.0. Computer analysis comprised adequate statistical methodologies: frequency distribution (absolute and relative representation), for demonstration of qualitative signs, i.e. parameters, as well as descriptive methods (measures for central tendencies – cut off, mean and modus), for demonstration of median and typical data values.

Determination of the association, i.e. relationship of some variables and the occurrence of impacted maxillary canines and quantification of that relationship, has been made by usage of non-parametric methods (Chi-square test of homogeneity with C – coefficient of contingency) and the parametric methods (Linear correlation – Pearson's coefficient).

For testing the significance of difference among some analyzed parameters were used, depending on the type and distribution of the data, parametric (t-test for independent samples), and non-parametric tests for independent samples (Mann-Whitney U test, Kolmogorov-Smirnov test for two samples, Fisher-exact test).

The value of  $p < 0.05$  was taken as a level of significance, while for the high significant value was taken  $p < 0.01$ .

### **Results**

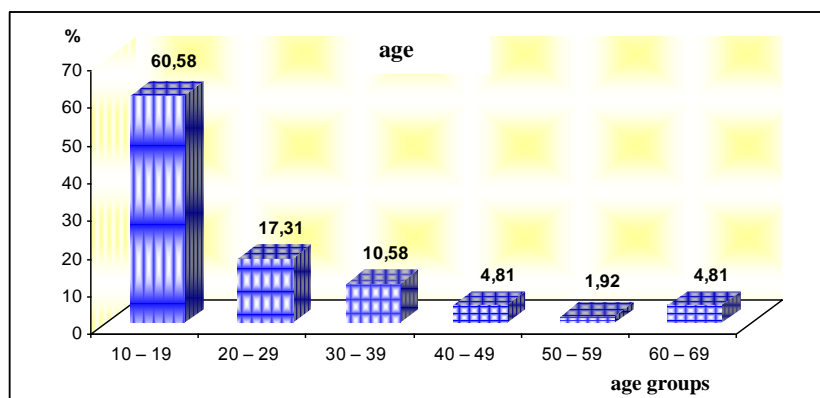
In this part of the investigation are presented the results obtained by the analysis of 104 examinees, patients with impacted maxillary canines, 48 (46.15%) of which were males and 56 (53.85%) females.

The examinees' age ranged from 10 to 69 years, divided into 6 age groups. The youngest age group, from 10 to 19 years was dominant, represented by 63 (60.58%) examinees, followed by 18 (17.31%) individuals old from 20 to 29 years. Eleven (10.58%) examinees were old from 30 to 39 years,

while 5 (4.81%) of them belonged to the age group from 40 to 49 years, and from 60 to 69 years. The least examinees belonged to the age group from 50 to 59 years.

**Table 1.** Gender survey of the examinees with impacted maxillary canine

Gender	n (%)
Male	48 (46,15)
Female	56 (53,85)



**Figure 1.** Graphic survey of the examinees' adult distribution

Division of the examinees into two age groups, up to and above 15 years, showed distribution of 48 (46.15%), at the age up to 15 years, 56 (53.85%) older than 15 years.

**Table 2.** Survey of the examinees up to and above 15 years of age

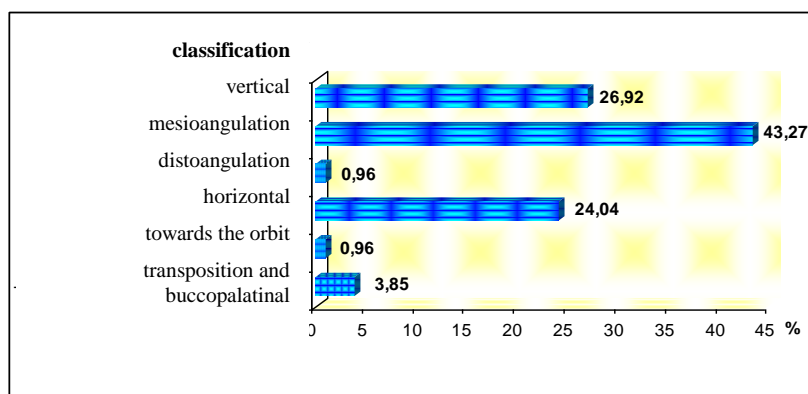
Age up to and above 15 years of age	n (%)
Up to 15 years	48 (46,15)
Above 15 years	56 (53,85)

The results showed more frequent representation of unilateral impaction – 81 (77.88%), meaning right impaction in 41 (39.42%), and left in 40 (38.46%) examinees. Bilateral impaction has been diagnosed in 23 (22.12%) examinees.

**Table 3.** Survey of the examinees in relation to the impaction type

Impaction type	n (%)
Unilaterally right	41 (39,42)
Unilaterally left	40 (38,46)
Bilaterally	23 (22,12)

The most frequent position of impaction was the mesioangular, registered in 45 (43.27%) examinees, followed by vertical impaction, found in 28 (26.92%) examinees, and the horizontal one, present in 25 (24.04%) examinees. Four (3.85%) examinees had buccal-palate impaction, one had impaction with distal-angulation, and in one patient the position of impaction has been towards the eye orbit (Fig. 2).



**Figure 2.** Graphical survey of the examinees in relation to the impaction localization

No statistically significant difference was found comparing the male and the female patients in relation to unilateral right, unilateral left and bilateral impaction ( $p=0,8$ ).

**Table 4.** Impaction type in relation to the examinees' gender

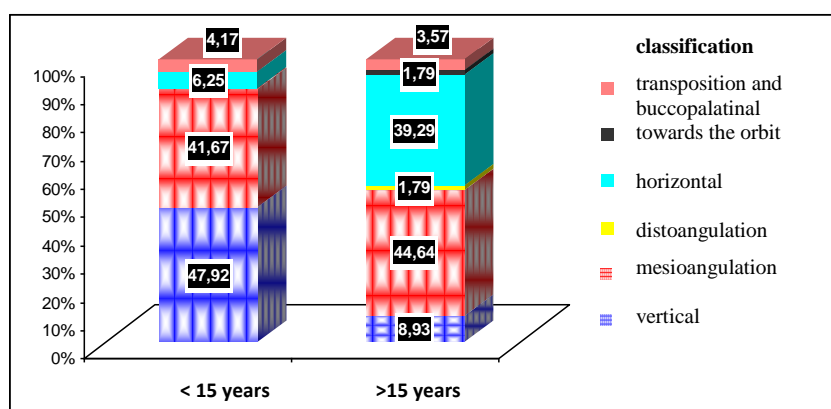
Impaction type	Gender		p-value
	Male	Female	
Unilaterally right	18 (37,5)	23 (41,07)	Unilat vs bil 0,52 ns

Unilaterally left	18 (37,5)	22 (39,29)	Right vs left vs bil 0,8 ns
Bilaterally	12 (25)	11 (19,64)	
<b>Total</b>	<b>48</b>	<b>56</b>	

p (Chi-square test)

The position of the impacted maxillary canine significantly differs between the patients at the age under and above 15 years ( $p < 0.0001$ ).

Vertical and mesioangular positions dominate in the group of patients younger than 15 years - 23 (47,92%), 20 (41,67%), consequently, while mesioangular and horizontal positions dominate in the group of patients older than 15 years - 25 (44,64%), 22 (39,29%), consequently.



p-value, Fisher exact, two tailed,  $p < 0.0001$  sig

**Figure 3.** Graphical survey of the examinees up to 15 and above 15 years of age according to the position of the impacted maxillary canine

## Discussion

Subject of our study is impacted maxillary canines (IMC) only, while mandibular and maxillary canines are comprised in majority studies. But, due to different approaches to their diagnosing, prevention and therapeutic solutions, we viewed only the impaction of maxillary canines. Of course, IMC are more frequent even in the study performed at Arabic population by Watted (2014), where 86.3% of the impacted canines are located in maxilla, and 13.7% [10] in mandible. There is no statistically significant difference in distribution of the impacted, maxillary and mandibular canines between the genders, so, according to the study of Arabuin et al. (2017), in maxilla the IC was found in 42.3% individuals from male gender, i.e. 57.7% of the female gender [11].

The gender distribution of 46.15% for males, and 53.85% for females in our study, showed similarities with the study performed in selected Iranian population, and referred to impacted canines in both jaws and was made by Shiraz et al. (2012) where the male gender was represented with 48.4% of the examinees [12]. Somewhat greater representation in women showed Sharmila's study (2016), where 58.82% of the examinees with impacted canines belonged to them, opposite to 41.18% who belonged to the male gender [13].

In relation to how the incidence was going among the age groups, El-Khatebi et al. in their study conducted to male population in Western Saudi Arabia, proved that the incidence of occurrence impaired

with advance of the age, as well as the fact that the occurrence was the most frequent in patients aged 13 to 30 years [14]. Recently, a study for IMC was conducted in Kosovo. It showed statistically significant more frequent location on the left impaction,  $p < 0.0002$ ). Unilateral impaction was present in 75.58% of the cases, while bilateral in 24.43% of the examinees [15].

Mesioangular position was the most represented in IMC. In some investigations, this position appeared in 51.6% of the cases with impaction [16], but it could reach to 75%, according to other studies [14]. Al-Zoubi et al. used a classification which took into account all possible positions of IMC on longitudinal axes in relation to occlusal h impaction plane [17]. By this study we can compare the results with our study. In both studies, the most represented was type II, i.e. mesioangular with 51.6% vs 43.57%, then followed by horizontal or type IV, with 28.2% vs 24.04%, type VI was the least present with 0.6% vs 0.96%), and type V where no case was registered in both studies.

In the study performed on Iranian population, the left unilateral impaction was more frequently present in the male gender, while the right type of impaction of canines more frequently appeared in female gender. However, the total number of impacted canines either left or right has been equal in both genders [18]. In the study performed on isolated Jewish community, the unilateral type of impaction occurred more frequently in female sex [19].

### **Conclusion**

IMC is a dental anomaly which develops during the age and the tooth gains more inconvenient position which does not endanger only the surrounding structures but also the prognosis from the outcome of the surgical-orthodontic treatment is more negative. If an early interceptive treatment is not conducted on time, of more importance is the treatment to bring the canine in the tooth line to start as soon as possible, i.e. sooner after the age of 15 year.

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