

STATISTICAL STUDY OF CANINE IMPACTION

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Keywords: canine impaction, age, female, male, skeletal maturation, anodontia, microdontia

Abstract: This study is performed on 96 patients aged between 12 and 37 years old, and its aim is to present, based on clinical elements and imaging (radiologic) examinations, the main characteristics of maxillary canine impaction. The study highlights, statistically, the localization, distribution according to gender and age, quadrants, skeletal maturation, the correlation with other dental anomalies. According to this study, canine impaction predominates in females, the highest number being noticed at the age of 13-14. Canine impaction also predominates at palatine level and in the 2nd quadrant. Other anomalies are associated, especially anodontia and microdontia of the lateral incisor, only in the case of palatine canine impaction; this fact underlines its genetic determinism. The same is also true in the case of bilateral impaction.

Cuvinte cheie: incluzie de canin, vârstă, sex, maturizare scheletală, anodonție, microdonție

Rezumat: Studiul este efectuat pe un lot de 96 de pacienți cu vârste cuprinse între 12 și 37 ani, cu scopul de a prezenta, pe baza elementelor clinice și a examenelor complementare imagistice (radiologice), caracteristicile incluziei de canin maxilar. Sunt evidențiate, sub forma unui studiu statistic, localizarea, distribuția pe sexe, vârstă, cadrane, maturizare scheletală, corelarea cu alte anomalii dentare. Conform studiului, incluzia de canin maxilar predomină la sexul feminin, ponderea maximă a anomaliei fiind descoperită la 13-14 ani. Incluzia de canin predomină la nivel palatin și în cadranul 2. Asocierea altor anomalii dentare este prezentă, în special anodonții și microdonții ale IL, doar în cazul incluziei palatine a caninului, fapt ce subliniază determinismul genetic al acesteia. Același lucru este valabil în cazul incluziei bilaterale.

INTRODUCTION

Dental eruption is an extremely complex process, integrated into the general development, and subject to the influence of many factors because it is "part of the general development of the maxilla" (Schwartz).

Dental impaction is a monocausal anomaly according to the German classification; the American classification usually places it into class I Angle. The French school introduces it into the group of the disharmonies of the dental system, whereas the Romanian classification (clinical and anthropological) places it into the group of isolated dental anomalies, as far as eruption anomalies are concerned.

Dental impaction represents the dental eruption anomaly characterized by the fact that a fully formed tooth remains inside the bone a long time after its normal eruption age. Canine impaction comes second in point of frequency, after the impaction of the wisdom tooth, and has a frequency of approximately 1-3% in the Caucasian race.

PURPOSE

The study highlights, statistically, the localization, distribution according to gender and age, quadrants, skeletal maturation, the correlation with other dental anomalies of maxillary canine impaction.

METHODS

The hereby paper is the result of a study performed by sampling, transversally and retrospectively, of the X-rays, models, and photos of patients who came to the orthodontist for a specialty examination during 2000-2011. The patients included in the study were aged between 12 and 37 years old and had late mixed dentition and permanent dentition. In point of skeletal development, the patients belonged to stages CS4-CS6.

In order to obtain the results aimed at, clinical and paraclinical (X-rays, photos and models) studies (tests) of the patients with canine impaction were performed.

The examination of the X-rays focussed on the following:

1. Skeletal development (cervical stages) and a possible correlation with the biological (chronological) age.
2. Distribution of the canine impaction according to sex and age.
3. Localization of the impaction on the quadrant and the relation to the middle of the alveolar ridge (Buccal, middle of the ridge or Palatin). This localization is purely theoretical, the surgical approach to discover the canine being B or P, followed by the creation of a tunnel from the level uncovered up to the middle of the alveolar ridge (the place where we wish to position the canine) – the newest, most conservative method from the point of view of periodontal health.

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CLINICAL ASPECTS

4. Depth of the impaction.
5. Axis (orientation) of the respective canine - angulation of the canine or angle of the impaction.
6. Existence of coexistent An D-M or of complications (eruption cyst).
7. Preservation or absence of the necessary space for the eruption of the impacted canine, persistence of the temporary canine at the level of the arch.
8. A-P position of the apex of the canine.
9. Height of the location of the crown of the canine as against IL.
10. Degree of overlapping on IL.
11. Ectopic impactions.

Note: The possible M3 impactions will not be taken into consideration.

The X-rays were performed at the imaging centre „F.M. Medident” in Bucharest.

The clinical examination, the models and the photos were performed in the clinic and they aimed at showing:

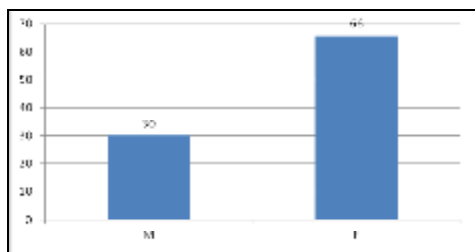
1. The type of impaction.
2. The functional troubles (anterior and lateral guidance).
3. The esthetic troubles determined by the canine impaction (dental anomalies in point of shape and volume associated to maxillary IL; consecutive position anomalies - Quintero's sign - pathognomonic for the canine impaction: MV rotation IL adjacent to the impaction).

The type of study is descriptive (analytical), and the domain of the clinical research is the evaluation of a therapeutic approach, and, secondly, the underlining of prognostic risk factors.

RESULTS AND DISCUSSIONS

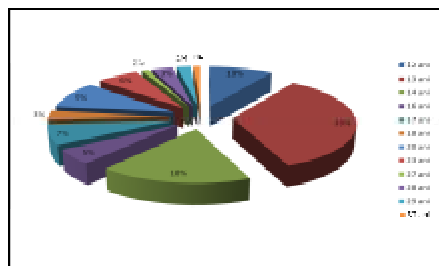
The distribution according to gender of the canine impaction was of 30 cases for the masculine sex and 66 cases for the female gender.

Figure no. 1. Canine impaction distribution according to gender



According to the age, the maximum number of cases found and presented was between the age of 13-14, which shows the increasing concern of the patients or of the parents for the esthetic aspect.

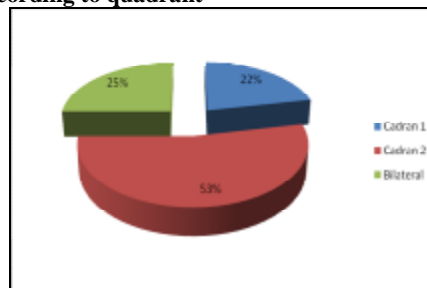
Figure no. 2. Repartition of canine impaction according to age



According to the skeletal maturity:

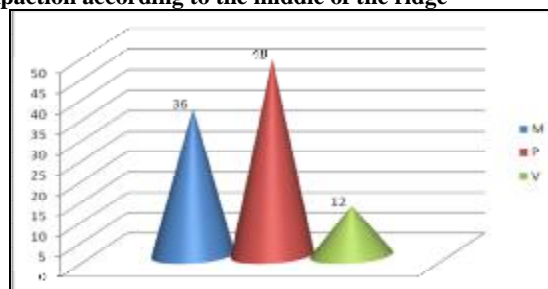
The localization of the canine impaction: 21 cases (22%) in the first quadrant, 25 cases (53%) in the second quadrant and 24 cases (25%) bilaterally.

Figure no. 3. Repartition of the localization of canine impaction according to quadrant



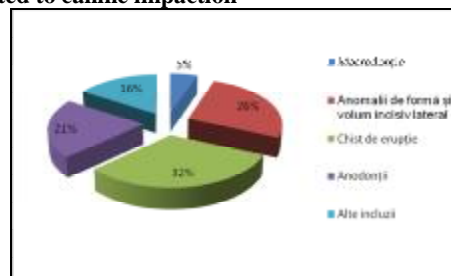
If we consider the impaction at the middle of the ridge, it can be vestibular (13%), central – in the middle of the ridge (36%) - these two localizations benefitting from a vestibular approach and tunnelling - and palatine (50%) - with palatine approach and tunnelling.

Figure no. 4. Repartition of the localization of canine impaction according to the middle of the ridge



Canine impaction may coexist with other dental and maxillary anomalies, or, an eruption cyst may exist at the level of the respective canine, blocking the eruption. In this study we identified: macrodontia (5%), anomalies of the shape and volume of IL maxillary (26%), anodontia (21%), other impactions (16%) or follicular cysts (18%).

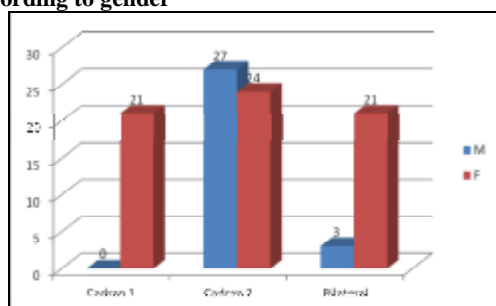
Figure no. 5. Repartition of dental and maxillary anomalies associated to canine impaction



The distal inclination of the inferior PM2 bud, described in the specialty literature, exists in % of the cases of delayed mixed dentition. The distribution of the canine impaction by quadrants according to gender is as follows :

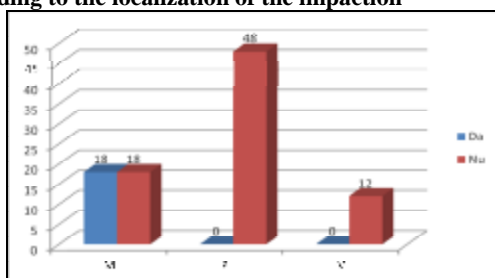
- First quadrant: females (F): 21 cases, males (M): 0 cases.
- Second quadrant: females (F): 24 cases, males (M): 27 cases.
- Bilaterally: females (F): 21 cases, males (M): 3 cases.

Figure no. 6. The distribution of the canine impaction according to gender



Quintero's sign, considered pathognomonic for canine impaction, appears only in central impactions (those corresponding to the middle of the ridge – radiologically identified and demonstrated intraoperatively).

Figure no. 7. The presence of the pathognomonic sign according to the localization of the impaction



The temporary canine persists especially in the case of the palatine localization of the canine impaction (62%, i.e. 30 cases out of the total of 96), but its persistence in the other localizations is not excluded.

Figure no. 8. Persistence of the temporary canine according to localization

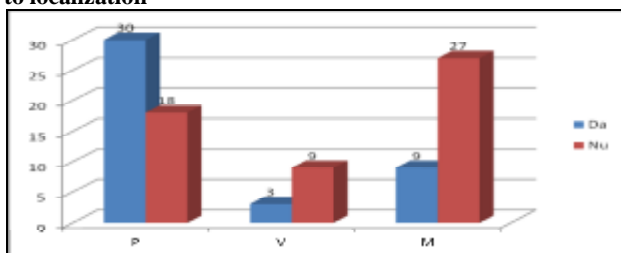


Figure no. 9. Persistence of the temporary canine in the palatine inclusion

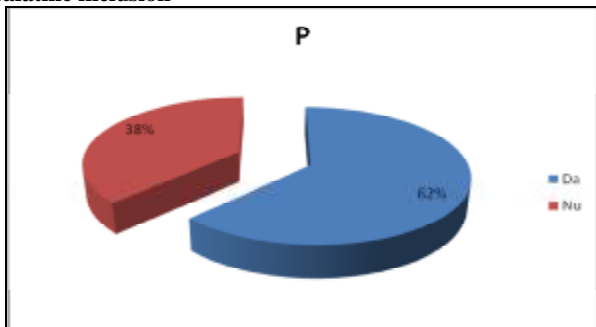


Figure no. 10. Persistence of the temporary canine in the palatine inclusion

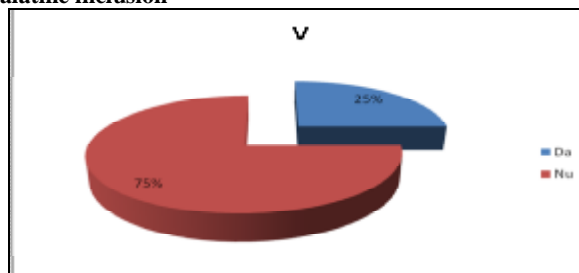


Figure no. 11. Persistence of the temporary canine in the middle of the ridge

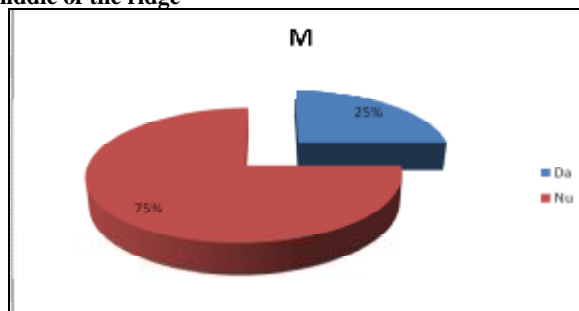
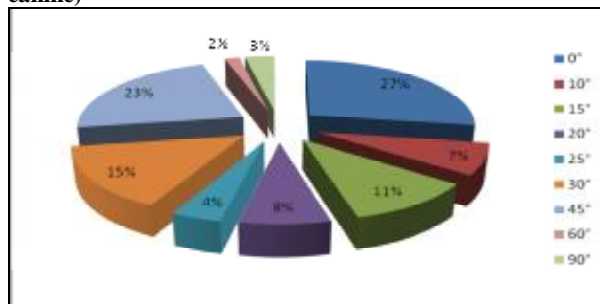


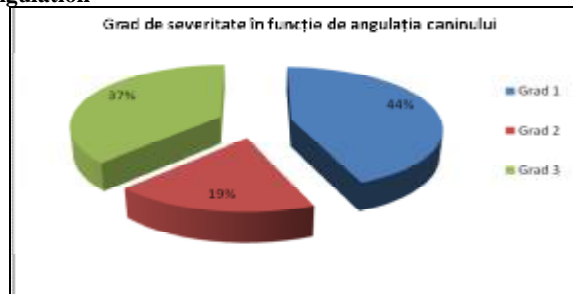
Figure no. 12. The angle of the impaction (angulation of the canine)



The degree of severity of the impaction is established according to:

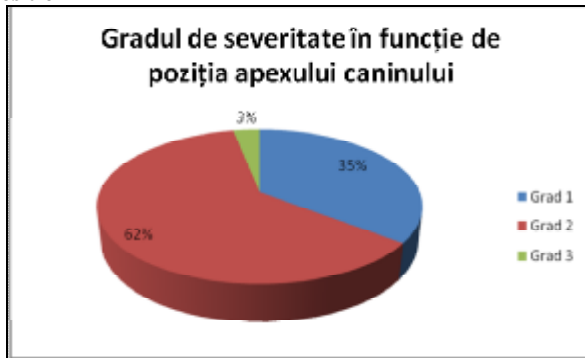
1. Angulation of the canine: 1st degree (44%), 2nd degree (19%), 3rd degree (37%).

Figure no. 13. Severity degree according to canine angulation



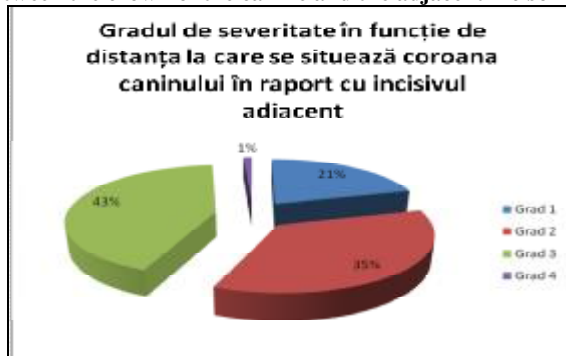
2. Position of the apex of the canine: 1st degree (35%), 2nd degree (62%), 3rd degree (3%).

Figure no. 14. Severity degree according to canine apex position



3. Distance between the crown of the canine and the adjacent incisor: 1st degree (21%), 2nd degree (35%), 3rd degree (43%), 4th degree (1%).

Figure no. 15. Severity degree according to the distance between the crown of the canine and the adjacent incisor



4. Canine overlapping with the root of the lateral incisor: 1st degree (48%), 2nd degree (15%), 3rd degree (2%), 4th degree (35%).

Figure no. 16. Severity degree according to canine overlapping with the root of the lateral incisor



The degree of difficulty of a case is established based on the analysis of the above mentioned parameters, this assignment being made in the highest degree of difficulty found, to every degree of difficulty of every category corresponding to the number of weeks necessary to bring the canine to the arch. The parameter which can modify this rule is the age: the older the age, the longer the necessary treatment.

CONCLUSIONS

According to this study and in agreement with the specialty literature, maxillary canine impaction predominates in

female patients, the maximum number of cases of this anomaly being discovered at the specialty examination between the age of 13 -14.

Canine impaction presents predominantly at the palatine level (if the impaction is palatine, central and vestibular and, if we consider the surgical approach, the number of palatine and vestibular cases is equal) in the second quadrant as well.

The association of other dental anomalies, especially anodontia and microdontia of IL are present, only in the case of palatine canine impaction, this fact underlining the genetic determinism of the latter.

The presence of Quintero's pathognomonic sign can be noticed only in the case of central impaction corresponding to the middle of the ridge.

The temporary canine tooth persists especially in the case of palatine impaction, but this is not always the case.

The degree of severity of the maxillary canine impaction determines the duration of the treatment, which is always longer in the case of palatine impaction.

The necessity to recognize the radiological signs announcing canine impaction is essential for the initiation of an interceptive treatment during the early or retarded mixed dentition stages (more correctly during the CS 1-4 cervical stages).

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