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Abstract

Aims: Investigating the incidence of impacted mandibular canines, the associated pathology of these teeth, and to classify them.

Methods and Materials: This is a retrospective cohort study of 5022 panoramic radiographs taken of patients who presented to the Oral and Maxillofacial Surgery Service of the Faculty of Dentistry at Ataturk University in Erzurum, Turkey between January, 1998 and March, 2006. The panoramic radiographs and clinical data were reviewed. Observations were made on the status of missing permanent mandibular canines; retained deciduous canines; side and number of mandibular canines; sex and age of patients; and any other associated pathology or symptoms as well as treatment methods employed.

Results: The incidence of mandibular canine impaction is 1.29% in the 5022 individuals of this Turkish subpopulation. A total of 65 patients had impacted mandibular canines with 33 being females and 32 males. In this study 41 impacted mandibular canines were extracted. 23 canines were attached to bonded buttons for orthodontic eruption purposes. After surgical exposure, 1 impacted canine was transplanted and the others were left in place for observation.

Conclusions: Maxillary canine impaction is more frequent than mandibular canine impaction. Mandibular canine impaction incidence in this study was found higher than in the published literature to date. This result may be evidence of an actual increase of the number of impacted mandibular canine teeth among patients.

Introduction

Impacted teeth are those with a delayed eruption time or that are not expected to erupt completely based on clinical and radiographic assessment.

1. mechanical obstruction: supernumerary tooth, cyst, or tumor
2. insufficient space : skeletal incongruities (micrognathia)
premature loss of deciduous teeth
tooth arch size discrepancy
3. Systemic factors : genetic disorders, endocrine deficiencies, and previous irradiation of the jaws are also associated with a failure of tooth eruption.

- All teeth can be impacted, however, most frequently involved :
third molars, maxillary canines, maxillary and mandibular premolars, and maxillary central incisors.
- mandibular canines impaction are less frequently than maxillary canines.

Bishara et al. suggested the following sequelae of canine impaction:

- Labial or lingual malpositioning of the impacted tooth
- Migration of the neighboring teeth and loss of arch length
- External root resorption of the impacted tooth as well as the neighboring teeth
- Infection particularly with partial eruption resulting in pain and trismus
- Referred pain

Methods and Materials

This is a retrospective cohort study of 5022 panoramic radiographs taken of patients who presented to the Oral and Maxillofacial Surgery Service of the Faculty of Dentistry at Ataturk University in Erzurum, Turkey between January, 1998 and March, 2006. The status of missing permanent mandibular canines, retained deciduous canines, side and number of mandibular canines, sex and age of patients, any other associated pathology or symptoms, as well as treatment methods were evaluated with radiographic and clinical data. Radiographic and clinical data from this study are presented.

- Impacted canine classification:

Angulation: mesioangular, distoangular, vertical, or horizontal.

Depth of the impactions : Level A, Level B, and Level C as follows:

- Level A: The crown of the impacted canine tooth is at the cervical line of the adjacent teeth.
- Level B: The crown of the impacted canine tooth is between the cervical line and root apices of the adjacent teeth.
- Level C: The crown of the impacted canines is beneath the root apices of the adjacent teeth.



Results

- A total of 71 impacted mandibular canine teeth were found in 65 of the 5022 patients (1.29%) with 33 being in females (ages 12-73) and 32 in males (ages 13-60).
- Impacted canine teeth were bilateral in 6 patients and the others were unilateral.
- 33 : left side
38 : right side
- 12 patients → retained deciduous canines, and the remainder had exfoliated deciduous canines (Figure 1).
- 1 patient → history of trauma
- 2 patient → giant cell granulomas.
- 6 impacted canines were located in the mandible and enveloped within cystic lesions (Figure 2).

Figure 1. A vertically impacted mandibular canine tooth and primary canine retained.



Figure 2. Impacted mandibular left canine associated with a dentigerous cyst.



- All cysts → infected (2 of them with fistula)
 - 7 patients → pain without any cyst or tumor → 4 of them infected symptom
 - 71 teeth in the present study:
 - Depths: Level A (15.5%) : 11
 - Level B (46.5%) : 33
 - Level C (38%) : 27
 - 41 impacted canines were extracted surgically:
 - 6 → lingual approach,
 - 35 → labial approach (2 → extraorally)
- 23 → orthodontic treatment
1 → transplanted into normal position
6 → observed

Discussion

- Mandibular canine impaction is regarded as a much rarer phenomenon

Grover and Lorton

found only 11/5000 impacted mandibular canines (0.22%)

Chu et al

5/7486 mandibular impacted canine (0.07%)

Rohrer

62/3000 impacted maxillary canines (2.06%) and only 3 impacted mandibular canines (0.1%), a 20:1 ratio.

Aydin et al.

involving 4500 Turkish patients, the incidence of mandibular canine impaction was 0.44%.

- The ratio in the present study (1.29%) has been found higher than the published literature to date.
- Frequency: maxillary canine impaction > mandibular canine impaction.
- Aydin et al. reported a ratio of 1 male to 1.22 female in impacted mandibular canines.
- Most of the impacted mandibular canines are unilateral, however, 6 patients had bilaterally impacted mandibular canines.
- Reasons why canines fail to erupt:
 - suspected pathological condition, infection, interference with prosthetic devices, disturbance of the existing dentition, pain, and ectopic eruption. inadequate space, supernumerary teeth, premature loss of the deciduous dentition, retention of the deciduous canine, excessive crown length, hereditary factors, functional disturbances of the endocrine glands, tumors, cysts, and trauma.

- Labial aspect: Impacted mandibular canines > maxillary canines
- the removal of impacted teeth routinely involves an intraoral surgical approach. → Plumpton: some needing extraoral surgical approach.

Angulations	No. of teeth	(%)	Depth of impaction	No. of teeth	(%)
Mesio-angular	23	32.4%	Level A	11	15.5%
Disto-angular	6	8.5%	Level B	33	46.5%
Vertical	29	40.8%	Level C	27	38%
Horizontal	13	18.3%			

- Affected by pathology :
mandibular canines < the third molars and premolars,
(dentigerous cyst → 6, squamous odontogenic tumors, and ameloblastoma)
- Dentigerous cysts → 6 mandibular canine teeth → 2 of them reparative giant cell granulomas and fistula → infected and painful
- Removal of the entire cyst along with the impacted tooth is the principle treatment to prevent recurrence of the cyst.
- Impacted teeth → most asymptomatic → chronic infection with fistula formation
- In the present study
7 patients → pain → no tumor or cyst formation → 4 of them infected.
- Treatment options: for impacted mandibular canines:
surgical removal, exposure, orthodontic alignment, transplantation, observation.

orthodontic treatment:

adequate space for alignment of an impacted mandibular canine into proper position → surgical exposure → erupt passively conjunction with orthodontic alignment (If favorable angulation) → align the adjacent teeth(esthetics)

transplantation:

1. mandibular incisors are in a normal position, sufficient space
2. symptom free
3. relatively quick(to implant), but uncertain long-term prognosis

Observation:

- Systemic contraindication to surgery

- Deeply impacted asymptomatic mandibular canine with no associated pathology, particularly in an older patient.
- Satisfactory dental appearance and does not want surgical intervention.
- Good deciduous canine root length and it is esthetically acceptable
(a series of successive radiographs should be taken periodically)

Surgical extraction:

- Infection, cyst, tumor related to the impacted canine.
- Periodontal disturbances of the adjacent teeth.
- Neuralgic symptoms.
- Therapeutic extractions (Crowding of the mandibular arch requiring)
- Ankylosed and cannot be transplanted.
- Root resorption affecting the adjacent teeth.
- Severely dilacerated root
- Severe impaction
- Rejection of orthodontic treatment or transplantation.

In this study:

- 41 → extracted
- 23 → attached to buttons for orthodontic Tx
- 1 → transplanted
- 6 → observation.

Conclusion

- canine impaction frequency: maxillary > mandibular canine
- Our result may also be evidence of the increase of the number of impacted mandibular canine teeth.

題號	題目
1	<p>What is the most common impacted tooth?</p> <p>(A) maxillary canine (B) mandibular third molar (C) mandibular canine (D) maxillary central incisor</p>
答案(B)	<p>出處：Mandibular third molar are the most frequently impacted teeth. — Dentistry for the Child and Adolescent, P663</p>
題號	題目
2	<p>When the horizontal angle of X-ray tube shifting posteriorly, then the unerupted canine moves to posteriorly. Where is the location of the tooth?</p> <p>(A) Buccal side (B) Lingual side (C) Distal side (D) Mesial side</p>
答案(B)	<p>出處：SLOB rule — Dentistry for the Child and Adolescent, P73</p>