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Dr. Sonal Chowdhary
Professor, Department of
Orthodontics and Dentofacial
Orthopedics, PGIDS, Rohtak,
Haryana, India

Dr. Raveena Yadav
PG Student, Department of
Orthodontics and Dentofacial
Orthopedics, PGIDS, Rohtak,
Haryana, India

Diagnosis and management of impacted mandibular canine: A review

Dr. Sonal Chowdhary and Dr. Raveena Yadav

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Abstract

Canine impactions can lead to varying signs and symptoms with some of them being poor craniofacial development, improper occlusion and unpleasant esthetics. Patients normally do not notice canine impactions unless they have some of these symptoms. Different surgical methods are being used to expose the impacted canines and help in their eruption. Alignment of impacted teeth into the arch after exposure needs proper treatment planning and orthodontic skill.

This paper focuses on diagnosis and management of impacted mandibular canines in order to make this intervention less painful and improve patient esthetic outcomes.

Keywords: Impaction, angulation, eruption

Introduction

Canine impaction is considered highly important in orthodontics as they are the cornerstones of the dental arch. There is a prevalence of 0.8% to 3.6% for maxillary canine impaction^[1, 2]. However, there is 20 time less chance for mandibular canines to get impacted compared to the maxillary canines. It is not rare for a tooth to migrate across the midline.

Prevention of eruption of a tooth by some physical barrier in its eruption path is defined as dental impaction^[4]. Impacted teeth do not show any signs of eruption either clinically or radiologically even after their expected time of eruption^[5]. A tooth is considered impacted when its root is fully formed, the contralateral tooth eruption has occurred at least six months before, and it is one year beyond the chronological age at which it was expected to erupt.

Impacted teeth may remain asymptomatic however enlargement of the follicle, root resorption and infection of the neighbouring teeth are the main risk factors of impactions^[6]. Impacted anterior teeth especially canines can also lead to a reduction in arch length, transmigration of the impacted canine, retention of deciduous teeth or tilting of the adjacent teeth into impacted teeth space.

Aetiology of impaction

There are various causes of the impaction of tooth. These are broadly classified into systemic and local causes.

Systemic causes includes: Endocrine and nutrition causes; irradiation such as in children with leukemia; syndromes like familial gingival fibromatosis; non syndromic impactions seen as multiple supernumerary teeth, primary failure of eruption (PFE). Local causes are: trauma to the deciduous teeth; physical barrier like retained primary tooth, supernumerary teeth, fibrous tissue; arch length discrepancy, early loss of deciduous tooth due to caries; CLP cases like alveolar clefts without SABG^[7].

In clinical practice, these are the following systemic conditions that are associated with impactions like hypothyroidism, hypopituitarism and cleidocranial dysostosis.

There can be labial or lingual displacement of mandibular impacted canine. Transmigration is also known to occur sometimes. Mupparapu^[8] classified transmigrated mandibular canines using the following 5 criteria:

Corresponding Author:
Dr. Sonal Chowdhary
Professor, Department of
Orthodontics and Dentofacial
Orthopedics, PGIDS, Rohtak,
Haryana, India

Type 1: Mesioangular impaction of the canine crossing the midline where the canine is either labial or lingual to the anterior teeth.

Type 2: Horizontal impaction of the canine lying below the apices of the incisors and near the lower border of the mandible.

Type 3: Eruption of the canine medially or distally to the canine on the opposite side.

Type 4: Horizontal impaction of the canine below the apices of either the premolars or molars on the opposite side near the lower border of the mandible.

Type 5: Vertical position of the canine in the midline with its long axis crossing the midline.

Diagnosis of impaction

Clinical examination

The clinician should carefully observe the teeth erupted and dental status in the child. A tooth is considered as impacted in correlation with the dental age. The skeletal or chronological age are not taken into account. A reliable method to assess the dental age is root formation which is seen on radiographs. Also, the sequence in which teeth erupt is rather more important than the time at which they erupt.

The area where a tooth is missing should be inspected to see whether there is any bulge of soft tissue. Additionally, it should be checked whether the nearby or adjacent teeth are abnormally tilted as this may be because of pressure applied by the impacted tooth's root. Using the index finger to palpate the buccal or lingual mucosa by is a very good method to locate the proturbance and hence the place in the arch where the impacted tooth is present.

Radiographic examination

1. SLOB rule with periapical or occlusal films plus panoramic films.
Two x rays taken at different angles are used traditionally to diagnose the buccolingual position of impacted canine by using the cone shift technique.
A true occlusal view is usually required for mandibular arch.
2. At age 8-9, the canine should be parallel to the incisor in lateral cephalogram and angled medially in posteroanterior radiograph. Canine impaction should be considered if its crown is present medial to the nasal cavity's lateral border.
3. CBCT is considered the gold standard. The position of impacted canine can be localized with more accuracy with a CBCT than cone shift technique. However, CBCT requires a relatively higher radiation dose^[9]. CBCT can also be used to localize root resorption of adjacent teeth and ankylosis of impacted canine if present.

Treatment using interceptive orthodontics

1. Ericson and Kurol said that extracting the deciduous canine at 11 years of age will lead to
 - 91% spontaneous eruption of canine if the canine's crown is present distal to the lateral incisor's midline.
 - 64% spontaneous eruption of canine if the canine's crown is present mesial to the lateral incisor's midline.
2. Increase in the horizontal angulation of an impacted canine leads to decrease in the chance of it erupting

successfully after the primary canine's extraction.

3. Prognosis is more influenced by the amount by which the canine overlaps the lateral incisor than the angle which it makes.
4. In order to prevent the impaction of permanent canines, clinicians should intervene and timely extraction of primary canine should be carried out.

Management of canine impaction

1. Various approaches have been proposed. The resulting periodontal conditions should be considered.
2. First premolars should not be extracted before the impacted tooth has been successfully moved. If an impacted canine does not have a favourable location anatomically, extracting it may be the only option.

Discussion

Positioning of the impacted canine in the jaw in relation to the adjacent teeth, how far it is from the occlusal plane, the teeth which the canine overlaps, and the angle which it makes with the occlusal plane^[10] are some of the factors affecting the method of managing them. Depending on these factors, it is predicted how much will be the time taken for canine alignment^[11].

Treatment of patients with impacted canines is very commonly fraught with complications^[12]. Age of the patient, the amount of distance the impacted tooth needs to move occlusally, the angle which the impacted tooth makes with the occlusal surface, position of the impacted tooth mesiodistally, distance of the canine's crown and arch midline, and transposition of lateral incisor or first premolar are some of the factors which determine how difficult the treatment is and chances that there will be complications, which will lead to longer duration of the treatment^[13].

Mandibular impacted teeth are usually present at a labial or intra-alveolar position. So, a closed flap approach to pull the tooth to an ideal position in the arch is recommended. Severe cases of mandibular impaction or transmigration are very difficult to treat. Extraction of the canine is a more prudent approach in these situations instead of performing any surgical procedure. This helps in preserving the available bone and avoid damage to the adjacent tooth roots.

Conclusion

Esthetics and function for patients are profoundly impacted by tooth impaction. However, it is increasingly recognised by dental professionals that treatment of impacted teeth is very challenging. However, when there is proper coordination and collaboration between the patient, the general dentist, and the dental specialist, early diagnosis and interception of impacted canines results in a predictable and successful esthetic and functional outcomes.

Conflict of Interest

Not available

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