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Dr. Archana H Dhusia

Associate Professor and Head of Department, Department of Oral and Maxillofacial Surgery and Dentistry, HBT Medical College and Dr RN Cooper Hospital, Mumbai, Maharashtra, India

Dr. Yatri Shah

Junior Resident, Department of Oral and Maxillofacial Surgery and Dentistry, HBT Medical College and Dr. R.N. Cooper General Hospital, Mumbai, Maharashtra, India

Dr. Nitin Rekulwad

Registrar, Department of Oral and Maxillofacial Surgery and Dentistry, HBT Medical College and Dr. R.N. Cooper General Hospital, Mumbai, Maharashtra, India

Corresponding Author:

Dr. Archana H Dhusia

Associate Professor and Head of Department, Department of Oral and Maxillofacial Surgery and Dentistry, HBT Medical College and Dr RN Cooper Hospital, Mumbai, Maharashtra, India

Transmigrated impacted mandibular canine: Cause of Ludwig's angina

Dr. Archana H Dhusia, Dr. Yatri Shah and Dr. Nitin Rekulwad

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Abstract

Intraosseous migration of unerupted teeth across the midline is a rare phenomenon known as dental transmigration. The term transmigration was coined by Ando *et al* in 1964. Transmigration was defined as a phenomenon of the movement of unerupted canine through the midline by Tarsitano *et al*. Intraosseous migration involving the canine is commonly called transmigration because the affected canine moves mesially across the mandibular symphysis to the opposite side of the mandible. Impaction of maxillary canines is more prevalent, whereas transmigration is seen more commonly in the mandible.

Transmigrated canines usually remain asymptomatic, or at times may be chronically infected, also causing pressure resorption of the roots of adjacent teeth. Transmigrated mandibular canine mostly occur unilaterally but some cases of bilateral occurrence also had been reported. It is more frequently found in females as compared to males in the ratio of 1.6:1. Due to its unfavourable position, repositioning by orthodontic means is rarely indicated and since transmigrated mandibular canine may also develop pathology associated with it, transalveolar extraction is mostly indicated. If the impacted tooth is chronically infected, the foci of odontogenic infection may also lead to diffuse cellulitis, in the form Ludwig's angina. The condition bilaterally affects the submandibular, sublingual, and the submental spaces, causing elevation of the floor of the mouth, obstruction of the airway and stridor. It presents as a medical emergency, requiring immediate surgical intervention, under antibiotic coverage. The present study discusses a case of 63 years old patient presenting with Ludwig's angina with an odontogenic cause of infection- being the transmigrated, impacted mandibular canine.

Keywords: transmigrated canine, Trans alveolar extraction, mandibular impacted canine, intra osseous migration, unilateral, Ludwig's Angina, cellulitis

Introduction

Transmigration is typically found in mandibular canines but may occur rarely in maxillary canine. Transmigrated canines usually remain asymptomatic although follicular cyst formation and chronic infection with fistula formation may occur. They may remain impacted or erupt ectopically. In some cases, transmigrating teeth may cause pressure resorption of roots or tilting of teeth. Transmigrated mandibular canine mostly occurs unilaterally but some cases of bilateral occurrence also had been reported. Ludwig's angina is life-threatening cellulitis of the soft tissue involving the floor of the mouth and neck. It involves three compartments of the floor of the mouth, the sublingual, submental, and submandibular. The infection is rapidly progressive, leading to potential airway obstruction. The most common etiology is a dental infection in the lower molars, mainly second and third, accounting for over 90% of cases. However, even mandibular impacted teeth, with periapical pathology can account for cellulitis, like Ludwig's Angina.

Case Report

A 63 years old male reported to the Department of Dentistry at our hospital with a chief complaint of bilateral swelling in the neck, below the chin and mild difficulty in breathing since one day. On physical examination, the patient had respiratory distress and was mildly toxic in appearance. The body temperature was elevated. The extraoral swelling was indurated and non-fluctuant and was involving the submandibular, sublingual, and sub-mental spaces, bilaterally. Mouth opening was reduced to 2 fingers.

An immediate diagnosis of Ludwig's Angina was made and the patient was posted for surgical decompression.

Intraoral examination revealed no active signs of odontogenic infection, except for a slight nodular elevation on the anterior aspect of the partially edentulous mandibular ridge. He was asked to follow up with a digital orthopantomogram, to rule out any odontogenic cause of the infection and Ludwig's Angina

Patient presented with a past medical history of Myocardial infarction, 7 years back, and was presently on anti-platelet drugs. He is also under medication for Hypertension and Diabetes Mellitus. Prompt surgical decompression, under suitable antibiotic cover, is a life-saving intervention in such a case.

Investigations

An orthopantomogram was advised for the patient to begin with, which revealed transmigrated, vertically impacted mandibular canine, on the left side, approaching the midline. The apex of the impacted canine appears to be very close to the inferior border of the mandible. Diffused periapical radiolucency was also present with respect to the impacted canine.

Generalised horizontal bone loss was present, with multiple missing/un-replaced teeth. Since the ortho-pantomogram revealed periapical radiolucency with the intraosseous mandibular canine, it was considered to be the foci of odontogenic infection, causing the massive cellulitis of the lower jaw and the neck. (Figure 1)

After obtaining the complete blood counts, coagulation profile, and blood sugar levels of the patient within normal limits and fitness from the cardiologist, the patient was planned for incision and drainage of Ludwig's angina to decompress the swelling in the first stage followed by Trans alveolar surgical extraction of the transmigrated, impacted mandibular canine under local anaesthesia once the acute phase subsided.

Surgical Management

The Ludwig's angina was surgically decompressed by incision and drainage through a submental incision. Once the acute phase subsided, patient was taken up for removal of the odontogenic cause under local anaesthesia.

For the Trans alveolar extraction of the impacted mandibular canine, the patient was painted, scrubbed and draped in routine surgical fashion. 2% lignocaine with 1:200000 adrenaline was used as the local anaesthetic agent and infiltration anaesthesia was given in the mandibular anterior region (buccally and palatally). When no objective symptoms were elicited after administration of the anaesthesia, incision was taken from mandibular right canine to mandibular left canine region, and full thickness mucoperiosteal flap was reflected and the coronal portion of the impacted canine was exposed. The impacted canine was released from the surrounding bone by drilling bone around it and creating a bone gutter. An Apexo elevator was used to elevate and sublaxate the tooth from the cavity. After adequate elevation, the tooth was extracted with the forceps. The cavity of the alveolar bone was inspected for any residual fragments of periapical pathology of the impacted canine, and the subsequent was curetted out. The cavity of the alveolar bone was copiously irrigated with betadine and saline solution, and the incision was closed with 3-0 vicryl sutures in place. Intraoral pressure pack was given and the patient was given post extraction instructions. Patient was recalled after 24

hours for follow up.

Discussion

Transmigration of canine is an uncommon phenomenon affecting mostly left side of mandible with its incidence higher in females. Tarsitano *et al.* defined transmigration as a phenomenon in which an unerupted mandibular canine migrates, crossing the midline. Javid expanded the definition to include the cases in which more than half of the tooth had passed through the midline. Joshi & Auluck *et al.* ^[5, 6] suggested that the tendency of canine to cross the midline suture is an important consideration than the actual distance of migration after crossing the midline. Little is known about the etiology of transmigration however various etiologies are suggested such as premature loss or retention of deciduous canines, long path of eruption of canine, trauma, tumours, odontomas, no anatomical restriction in midline of mandible and genetic predisposition. Marks and Schroeder suggested that a regional disturbance in the dental follicle might lead to local defective osteoclastic function with an abnormal eruption pathway being formed ^[9]. Virchi & Franchi ^[7] suggested that, proclination of lower incisors, increased axial inclination of the unerupted canine and an enlarged symphyseal cross-sectional area of the chin may be favorable conditions for transmigration ^[7].

Clinical findings associated with transmigration of the canines include absence of mandibular canines in the dental arch or abnormal retention of the mandibular primary canine. A few cases also involved congenitally missing mandibular lateral incisors and mandibular premolars. Transmigration is mainly diagnosed with help of radiographic evaluation, which is primarily based on the panoramic radiograph. Mostly transmigrated canines are asymptomatic, although follicular cyst formation and chronic infection with fistula formation have been reported. The following criteria were used to describe transmigration patterns: inclination of the long axis of the canine, relationship of the canine and, in particular, the crown with the midline, adjacent teeth and contralateral erupted canine. The transmigrated teeth were classified based on their migratory pattern and the final position within the jaw when diagnosed. Mupparapu ^[8] classified transmigrated mandibular canines into five types:

- a) **Type 1:** Canine positioned mesio-angularly across the midline within the jaw bone, labial or lingual to anterior teeth, and the crown portion of the tooth crossing the midline.
- b) **Type 2:** Canine horizontally impacted near the inferior border of the mandible below the apices of the incisors.
- c) **Type 3:** Canine erupting either mesial or distal to the opposite canine.
- d) **Type 4:** Canine horizontally impacted near the inferior border of the mandible below the apices of either premolars or molars on the opposite side.
- e) **Type 5:** Canine positioned vertically in the midline (the long axis of the tooth crossing the midline) irrespective of eruption status.

In the above presented case, the transmigrated mandibular canine seems to be of Type 5, according to classification proposed by Mupparapu.

Ludwig's angina and deep neck infections are dangerous because of their normal tendency to cause edema, distortion, and obstruction of airway and may arise as a consequence of airway management mishaps. In the early stages of the disease, patients may be managed with observation and

intravenous antibiotics. Advanced infections require the airway to be secured with surgical drainage. This is complicated by pain, trismus, airway edema, and tongue displacement creating a compromised airway. The most feared complication is airway obstruction due to elevation and posterior displacement of the tongue, and it is the leading cause of death.

The point of interest in this particular patient is that the Transmigrated and submerged mandibular canine was detected in early 60s of age, contrary to its usual early presentation of some symptoms in the teenage or early adulthood. It could be an acute exacerbation of a chronic periapical abscess associated with the apex of the mandibular canine, and that being the odontogenic cause of Ludwig's Angina.



Fig 1: Orthopantomogram showing the transmigrated, impacted mandibular canine.



Fig 2: Post incision and drainage of Ludwig's Angina



Fig 3: Scar tissue of incision and drainage



Fig 4: Pre-operative intraoral examination. Notice the slight bulge on the midline of the partially edentulous mandibular ridge.



Fig 5: Incision in place



Fig 6: After reflection of full thickness mucoperiosteal flap, the coronal portion of the impacted canine was exposed

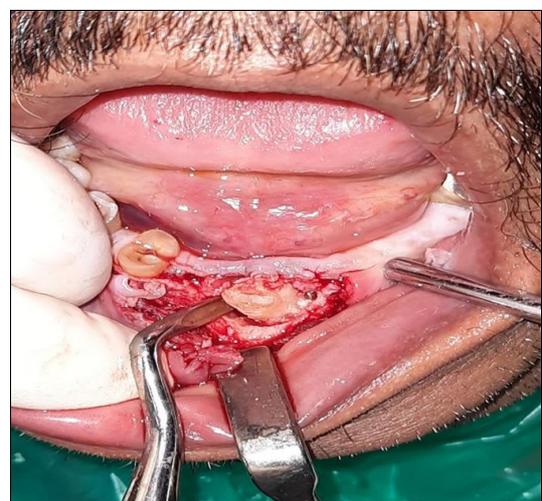


Fig 7: Use of Apexo elevator



Fig 8: Use of mandibular anterior tooth extraction forceps



Fig 9: Post-extraction socket



Fig 10: Incision closed with continuous interrupted sutures



Fig 11: Extracted mandibular canine

arch. They play an essential role in maintaining the facial harmony and functional efficiency. The unerupted or transmigratory canines are generally asymptomatic. Radiographic examination is essential to diagnose impacted canines and panoramic radiographs are generally required to diagnose transmigrated canines^[59]. Timely detection and treatment can help to preserve these canines, surrounding tissues and dentition, resulting in better esthetic and function. The possibility of a transmigrated, impacted mandibular canine, with a periapical pathology can be a cause of a serious, life-threatening condition like Ludwig's Angina should not be overlooked.

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Conclusion

Canines are considered to be the cornerstones of the dental