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Interdisciplinary Approach for Surgical Exposure and Traction of Impacted Maxillary Canine: A Case Series

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Abstract:
After third molar, maxillary canine is the most impacted tooth in the oral cavity. Impacted maxillary canine compromises the arch form as well as the aesthetic feature of patients' smile. Various methods have been described in the literature for the exposure of impacted maxillary canine. Selection of one technique among these methods depends on the position of the impacted canine and also the hard and soft tissue surrounding the tooth. In this case series various techniques such as gingivectomy and closed technique along with ostectomy are advocated for the exposure of maxillary buccally placed impacted canine.

Keywords: Impacted canine, interdisciplinary, surgical exposure, orthodontic.

Introduction:

The literature states that the maxillary canine is the second most frequently impacted tooth (2%) **(Bass, 1967)** and is most often (2:1) impacted palatally **(Johnston, 1969; Gensior and Strauss, 1974)**. Maxillary cuspids generally erupts in the oral cavity by 9-12 years of age but sometimes their eruption is hampered by various reasons such as the loss of space, overretained deciduous teeth or deflection facially or palatally off the lateral incisor. **(Smukler and colleagues, 1987)**. Canine has a significant impact on occlusion, arch development, dental aesthetics, and facial attractiveness. Compared to the mandible, impaction occurs more than twice as frequently in the maxilla. The incidence of impacted canines is more in females compared to males.

Managing such cases requires an interdisciplinary approach of periodontist and orthodontist, as along with traction of canine maintaining the soft tissue integrity is also of utmost importance. Various surgical techniques are advocated for the exposure of the impacted canine such as closed technique, open technique (apically repositioning), gingivectomy, full thickness mucoperiosteal flap and ostectomy. After the exposure, orthodontic bracket is placed on the tooth surface and forces are applied for the traction of the canine into the occlusal plane. In this case series, 2 techniques are performed to expose the buccally placed impacted maxillary canine.

CASE REPORTS

Case Report 1: Surgical exposure wrt 13 using gingivectomy technique and placement of direct bonding bracket.

The patient 19 years old was referred with a complaint of impacted maxillary canine in first quadrant (shown in Fig 1). Patient wanted to undergo orthodontic treatment. The canine was buccally placed and clinically visible in the oral cavity. During clinical examination it was established that no bone is present and only gingiva is present on the surface of the tooth. Thus, gingivectomy was the technique utilized to expose the canine. External bevel incision was placed and excision of the tissue was done using Gracey curettes. Direct bonding bracket was bonded with the tooth. (shown in Fig 2)

Fig 1: Preoperative images showing buccally impacted maxillary canine in first quadrant.

(a) (b)

(c)

Fig 2: Gingivectomy done and direct bonding bracket placed on the tooth. Three months follow up.

Case report 2: Surgical exposure of 23 using closed technique and ostectomy of the bone covering the tooth.

Patient complained of malalignment and wanted to undergo orthodontic treatment. Patient age 20 years old had overretained deciduous canine in second quadrant and impacted canine. (Shown in Fig 3) Upon radiographic analysis (Fig 4) it was establish that the canine is placed buccally and embedded inside the alveolar bone. In this case crevicular incision was placed from mesial of 22 to distal of 24 and full thickness mucoperiosteal flap was raised. The buccal surface of tooth was covered by alveolar bone. Reduction of the alveolar bone was done using carbide round bur and micromotor on low speed. With the help of hemocoel, hemostasias was achieved and direct bonding bracket was placed on the buccal tooth surface. Flap was placed back to its original place and sutured with simple interrupted suture technique (Fig 5)

Fig 3: Pre operative images showing over retained deciduous tooth in 2nd quadrant.

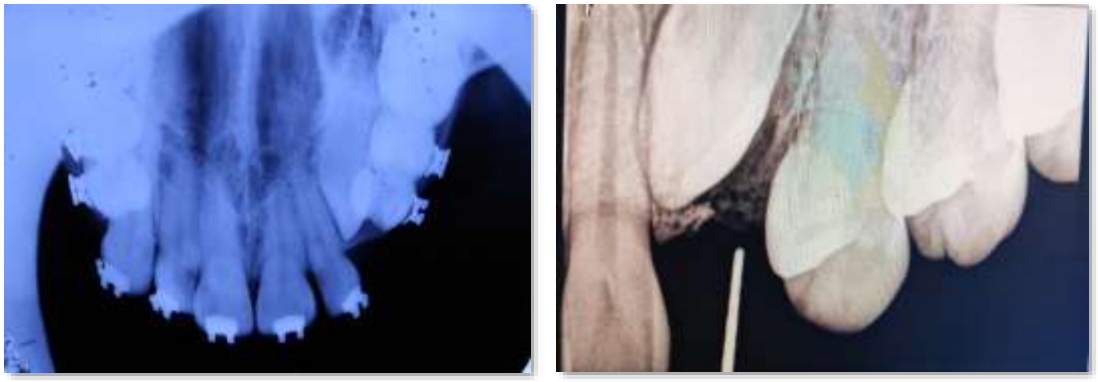

Fig 4: Occlusal radiograph and RVG to evaluate the position of impacted canine

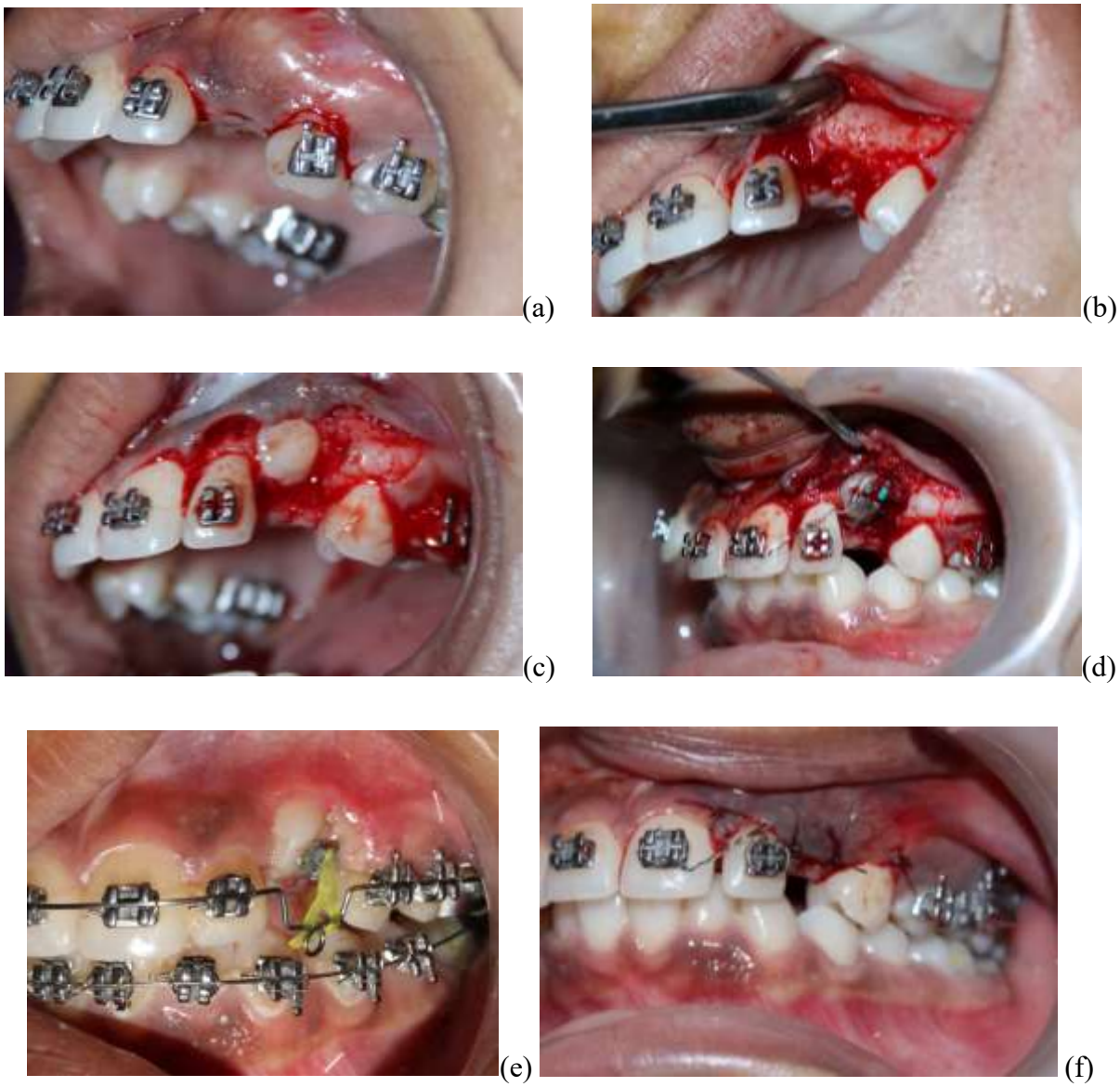

Fig 5 (a-e) Impacted canine exposure using closed surgical technique. Three months follow up (f)

DISCUSSION

Maxillary canine impaction is the second most common form of tooth impaction after third molars, with a higher prevalence for buccal impactions in certain populations.[1] Given the maxillary canine's pivotal role in dental aesthetics, occlusion, and arch coordination, its impaction necessitates prompt and effective management. This case series highlights the use of two primary techniques—gingivectomy and the closed eruption approach with ostectomy—for the exposure of buccally impacted canines, chosen based on the individual presentation of each case.

Three significant labially impacted maxillary canine exposure techniques were described by **Kokich et al. 2004** [6] based on the position of the impacted canine in relation to the mucogingival junction.
1.Gingivectomy: When the mucogingival junction is coronal to the canine cusp,
2.Apically positioned flap: The canine cusp is apical to the mucogingival junction.
3.Closed eruption technique: The canine cusp is extremely high within the buccal sulcus and considerably apical to the mucogingival junction/tooth.

Gingivectomy is indicated when the impacted canine is superficially positioned with minimal bone coverage and sufficient keratinized gingiva. The simplicity and direct access afforded by this approach are advantageous. However, concerns persist regarding post-operative gingival recession and compromised aesthetics, particularly in the anterior zone.[2] Therefore, careful case selection is essential.

In contrast, the **closed eruption technique with ostectomy** is often preferred for more deeply impacted canines. This method involves repositioning a full-thickness flap after bonding an attachment, thereby preserving the natural soft tissue architecture. Studies by **Becker and Chaushu 2015** support this technique, citing improved periodontal outcomes and more predictable aesthetic results, especially when the canine is located high in the alveolar process.[3] Similarly, **Burden et al. 1998** observed that closed techniques maintained the mucogingival junction and reduced the risk of visible scarring or uneven gingival contours.[4]

Radiographic assessment, particularly with cone-beam computed tomography (CBCT), enhances treatment planning by accurately localizing the tooth and assessing proximity to adjacent structures.[5] This facilitates precise ostectomy and minimizes surgical morbidity.

Although the outcomes in this case series were favourable, the findings should be interpreted cautiously. Limitations include the small sample size, absence of a control group, and lack of standardized periodontal outcome measures. Longitudinal studies with larger cohorts are needed to evaluate not only surgical success but also long-term periodontal health, aesthetic integration, and patient satisfaction.

Ultimately, the choice of exposure technique must be individualized, taking into account the canine's position, available soft tissue, bone coverage, and aesthetic demands. Multidisciplinary collaboration between orthodontists and surgeons remains essential for optimizing both functional and aesthetic outcomes.

CONCLUSION

The management of buccally impacted maxillary canines requires careful selection of the surgical exposure technique to ensure optimal functional and aesthetic outcomes. This case series demonstrates that both gingivectomy and the closed eruption technique with ostectomy can be effective when applied judiciously based on the clinical scenario. Gingivectomy offers a straightforward approach for superficially impacted canines with adequate keratinized tissue, while the closed technique, particularly when combined with ostectomy, provides superior periodontal and aesthetic outcomes for deeper

impactions. Successful treatment outcomes depend on individualized treatment planning, accurate radiographic assessment, and close interdisciplinary coordination. Further prospective studies with standardized periodontal and aesthetic evaluations are needed to validate these findings and guide evidence-based clinical protocols.

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