Periodontal Surgery For Impacted Canine Exposure

Authored by:

Dr. Romanita Ghilzon

Introduction

An impacted tooth is one that fails to erupt or erupts only partially. After third molars, canines are the most commonly impacted teeth. The impaction is either on the palatal or labial aspect of the jaw, with palatal impactions being twice as common as labial impactions. Impactions are twice as common in females as in males. The incidence of maxillary canine impaction has been estimated at 0.9% - 2.2%.

The causes for retarded eruption of teeth may be generalized or localized. Generalized causes include a history of irradiation, febrile diseases, and endocrine deficiencies. Localized causes include insufficient space in the dental arch, prolonged retention or early loss of the primary canine, abnormal position of the tooth bud, the presence of alveolar clefts, ankylosis, the presence of cysts or neoplasms, root dilacerations, the absence of maxillary lateral incisors or variations in shape and timing of maxillary lateral incisor root formation. In many instances, there seems to be a genetic predisposition or the causes are idiopathic in nature. Canine impactions are mostly due to localized causes.

If left untreated, canine impactions can lead to labial or lingual eruption of the nearby teeth, as well as loss of arch length, internal or external root resorption, dentigerous cyst formation and possible infection, or referred pain. In many instances, impacted teeth are totally asymptomatic apart from their potentially negative effects on orthodontic positioning and/or treatment.

Treatment Options:

Treatment of patients with impacted canines can involve:

- no intervention with periodic follow-up to detect any pathologic changes
- surgical exposure followed by orthodontics to bring the previously impacted tooth into the plane of occlusion
- auto-transplantation
- extraction of the tooth
    - followed by orthodontics
    - followed by prosthetic replacement
    - with no subsequent treatment

Extraction is usually contraindicated except when the impacted tooth is ankylosed, dilacerated, shows signs of resorption, the impaction is severe, the presence of a cyst is diagnosed, or the patient is not interested in undergoing orthodontic treatment. In cases where the impacted canines are lost without subsequent orthodontic or prosthetic treatment, there is a significant chance for the development of dentoalveolar or aesthetic complications such as drifting of adjacent teeth and midline deviation, which can create aesthetic problems and occlusal discrepancies.

Pre-surgical examination:

Diagnostic steps before deciding on the exact surgical procedure:

- Clinical and radiographic assessment of the horizontal, vertical, mesio-distal position of the impacted tooth. In cases with complicated impactions, cone beam tomography can provide valuable information regarding the location of the impacted tooth and its proximity to the adjacent teeth.
- Assessment of the width of keratinized gingivas

Surgical Procedure for the exposure of palatally-impacted canines

There are two methods for managing palatally impacted canines. The first is surgical exposure followed by natural, unassisted eruption of the impacted tooth. The second is surgical exposure followed by guided eruption using light orthodontic forces.

Surgical exposure to allow for natural eruption should be used when the impacted tooth has good axial inclination and does not need to be uprighted. Eruption can then be allowed to occur naturally until the canine is at the level of the adjacent teeth, after which orthodontics can be used to move the tooth into proper alignment.

First the facial and palatal tissues are anesthetized by local infiltration. The bone is accessed via a flap or by excising a section of palatal tissue (using a 15 or 15C scalpel blade or a tissue punch). Rotary and/or hand instruments such as chisels are used for bone removal. Only the bone covering the crown of the impacted tooth is removed. The bone surrounding the root is left intact so as to minimize future attachment loss. When allowing unassisted

eruption of the tooth, if the palatal mucosa covering the impacted canine has been completely removed, then a periodontal dressing should be used to cover the surgical area for 3-8 weeks in order to prevent the re-growth of soft tissue around the recently exposed tooth. This dressing may require replacement as it tends to become dislodged and is often lost during mastication.

If orthodontic movement and/or forced eruption of the impacted tooth are required, the canine crown is exposed, in the same manner as for unassisted eruption, and an orthodontic attachment such as a bonded bracket, is placed on the tooth at the time of surgery or after a period of healing (2-6 weeks post-op). Placement of the bracket at the time of surgery is often not ideal due to the limited access to the entire facial aspect of the impacted tooth. This can be corrected once the canine crown is fully erupted. A periodontal dressing is not necessary once the bracket has been bonded to the tooth.

Surgical Procedure for the exposure of labially-impacted canines

Labially-impacted canines should only be exposed once enough space has been created through orthodontic movement. In this way the impacted canine can be guided into the dental arch. If enough space cannot be created, the impacted canine or the adjacent first bicuspid may have to be extracted based on the treatment plan.

There are three methods of exposing the labially impacted canine. First is the exposure with apical repositioning of the labial flap, then there is the closed eruption technique, and finally there is exposure by the creation of a window.

For the first method the site is anesthetized by local infiltration and an approximately 12mm wide horizontal incision (using a 15, 15C or 12 scalpel blade) is made into the mid-crestal area of the ridge coronal to the impacted tooth. Two vertical releasing incisions (using the same blade) are made connecting the horizontal incision and extending apically into the vestibular mucosa. A split thickness flap is elevated using the scalpel blade and periosteal elevators. If present, the bone covering the facial aspect of the canine crown is removed. Rotary and/or hand instruments such as chisels are used carefully so as to prevent damaging the enamel of the impacted canine. The flap is repositioned apically and sutured in place so that its keratinized portion covers 2-3mm of the enamel and the CEJ (cementoenamel junction) of the exposed tooth. The flap is sutured in place with horizontal sutures using 5-0, or 6-0 resorbable or non-resorbable sutures (if non-resorbable sutures are used they must be removed 1-2 weeks post-operatively). An orthodontic bracket can be bonded to the exposed enamel and secured passively to the archwire via a ligature wire or a chain. These are then activated one week post-operatively.

The second method is the closed eruption technique and is used in cases where the impacted tooth is farther from the labial cortex and ideal apical positioning of the soft tissue at the time of surgery is not possible. In this technique a mucoperiosteal flap is raised just

enough to expose the bone covering the crown of the impacted canine. Enough bone is removed (as described above) to allow for the placement of a bonded bracket which is secured passively to the archwire via a ligature wire or a chain. The flap is then replaced and sutured in its original position. The bracket is activated after the post-operative appointment. Final soft tissue recontouring is postponed until after the completion of the orthodontic treatment.

The third method for the exposure of labially-impacted canines is the creation of a window through the mucosa and overlying bone. The location of the impacted tooth is identified and a section of labial mucosa approximately the size of the canine crown is excised using a scalpel and a 15 or 15C blade. The underlying bone, if present, is removed as described above and a bracket is bonded to the exposed tooth. This method is used only rarely as it results in the canine lacking keratinized free and attached gingiva and, therefore, being more prone to inflammation and subsequent attachment loss. Nevertheless, in cases where there is no keratinized gingiva at all, one can expose the impacted tooth in this way and one can place a free tissue graft once the canine has been aligned in the dental arch.

Post-surgical Care:

The patient is instructed to avoid chewing on the surgical site for the 2 weeks following the surgery and to rinse with 0.12% Chlorhexidine twice daily for 2 minutes until the surgical site is comfortable and normal hygiene procedures can be resumed.

Research and clinical implications

Post-orthodontics surveys of the status of palatally-impacted canines exposed with and without the elevation of flaps have found that the treated teeth had increased attachment loss and increased probing depths when compared to the contralateral, non-impacted teeth.4

Hansson et al, during a 1-18 year follow-up period, found radiographic evidence of increased bone loss on the distal of previously impacted canines as well as increased attachment loss and increased probing depths at the adjacent laterals and first premolars.5

These findings were confirmed by Becker et al in a follow-up of 23 patients who had impacted canines exposed and fitted with bands. They reported an average of 10% bone loss at the treated canines compared to a 7% bone loss at the non-treated contralateral teeth, 2-3 years following orthodontic treatment.6

Pearson compared the exposure of palatally impacted canines by the creation of a window and the initiation of orthodontics several months later with the exposure procedure which included the placement of a bonded bracket at the same appointment. Orthodontics was started sooner (8-12 weeks post-op) in the latter group but more of the patients, 30% vs. 15.3% required a second surgical procedure for the removal of soft tissue overgrowth.7

Transalveolar transplantation has been described by Sayne and Thilander as an alternative to the surgical exposure of impacted canines followed by orthodontics. They reported on over 100 cases where the impacted teeth were exposed and repositioned during the same surgical appointment. After a period of light fixation the teeth were aligned into the dental arch. The authors found satisfactory long-term results following the use of this procedure.8

Shaw et al reported on one case where two impacted, ankylosed cuspids were transplanted successfully into the dental arch and aligned orthodontically afterward. Both canines were treated endodontically after transplantation and both remained symptom-free during the follow-up period. In the discussion, the authors caution against drawing any conclusions regarding the success rate of this procedure.9

Conclusion

Evidence suggests that surgical exposure of impacted canines followed by orthodontics is a treatment modality which yields stable long-term results even though some attachment loss may occur. Procedures which preserve or create a band of keratinized gingiva around the previously-impacted teeth should be favoured as keratinized gingiva is beneficial for the long-term maintenance of periodontal attachment and gingival health.

References:

Bishara S E Impacted maxillary canines: a review. AJO Dental Orthopedics 1992; 101:159-171.

Vanarsdall R et al. Soft tissue management of labially positioned unerupted teeth. AJO Dental Orthopedics 1977; 72:53-64.

Kokich VG et al. Surgical and orthodontic management of impacted maxillary canines. AJO Dental Orthopedics 2004; 126:278-283.

Wisth PJ et al. Periodontal status of orthodontically treated impacted maxillary canines. Angle Orthodontist 1976; 46:69-76.

Hansson C, Rindler A. Periodontal conditions following surgical and orthodontic treatment of palatally impacted maxillary canines – a follow-up study. Angle Orthodontist 1998; 68:167-172.

Becker A et al. Periodontal status following the alignment of palatally impacted canine teeth. AJO Dental Orthopedics 1983; 84:332-336.

Pearson MH, Robinson SN et al. Management of palatally impacted canines: the findings of a collaborative study. European J of Ortho 1997; 19:511-515.

Sayne S, Thilander B. Transalveolar transplantation of maxillary canines. Acta Odont Scand 1997; 55:1-8.

Shaw B, Schneider SS, Zeyer J. Surgical management of an -ankylosed impacted maxillary canines. JADA 1981; 102:497-500.

Article Reviewed By

Dr. Michael Goldberg & Dr. Howard Tenenbaum