

ORAL SURGERY FOR PEDIATRIC PATIENTS

INTRODUCTION:

There are initial steps in patient management; which are:

- ❖ Diagnosis, which is developed through: history taking, physical examination, and imaging.
- ❖ Patient cooperation: Depending on the patient's age, systemic health, and planned surgery.
- ❖ Clean technique: dentist scrubs his or her hands with an antiseptic soap, dried with a disposable towel, wearing gloves, mask, gown covering the arms, eye protection, place protective eyewear on the patient, draping, instruments, or equipments should be sterile or disinfected.
- ❖ Adequate visibility: entails adequate access, adequate light, and a good suction , adequate access requires appropriate mouth-opening.

INDICATION FOR EXTRACTION OF TEETH:

- Teeth affected by advanced caries and its sequelae.
- Teeth affected by untreatable periodontal disease
- Extraction of healthy teeth to correct malocclusion
- Over-retained teeth
- Trauma to the teeth or jaws may cause dislocation of a tooth from its socket (avulsion)
- Extraction of teeth for esthetic reasons
- Extraction of teeth for prosthodontic reasons
- Impacted and supernumerary teeth
- Extraction of decayed 1st or 2nd molars to prevent impaction of 3rd molars
- Teeth involved in fracture line of the jaw.
- Teeth involved in tumors or cysts
- Tooth as foci of infection
- Teeth affected by untreatable pulpal lesions e.g. pulpitis, pink spot or pulp polyp.
- Teeth in the area of direct therapeutic irradiation.

CONTRAINDICATIONS FOR EXTRACTION

- Presence of acute oral infections such as, necrotizing ulcerative gingivitis or herpetic gingival stomatitis.
- Pericoronitis (difficult surgical procedure involving bone removal is anticipated).
- Extraction of teeth in previously irradiated areas (at least 1 year should be allowed for maximal recovery of circulation to the bone).
- There are number of relative systemic contraindications to the tooth extraction, e.g.
 - Uncontrolled diabetes
 - Acute blood dyscrasias
 - Untreated coagulopathies
 - Adrenal insufficiency
 - General debilitation for any reason.
 - Myocardial infarction (wait for 6 months period).

A number of problems peculiar to the child patient will affect the way in which extractions are carried out. The following should be considered:

- (1) natal and neonatal teeth;*
- (2) infraocclusion of teeth;*
- (3) fusion/gemination of two teeth;*
- (4) dislocation of the mandible.*
- (5) The wide splaying primary molar roots mean that more expansion of the socket is required for the extraction of primary teeth.*
- (6) Due to the relatively cervical position of the bifurcation in primary molars it is injudicious to use forceps with deeply plunging beaks (such as the adult cowhorn design) as these could damage the underlying permanent successors.*

For the extraction of a maxillary tooth, the patient is positioned in the dental chair such that the maxillary occlusal plane is at an angle between 60° and 90° to the floor at a level just below the operator's shoulder, operator stands in front of the patient, with a straight back.

For the extraction of a mandibular tooth, the patient is positioned in the dental chair such that the mandibular occlusal plane is parallel to the floor. A right-handed operator removes lower left teeth stands in front of the patient; the patient's mouth is at a height just below the operator's elbow. When removing teeth from the lower right the operator stands behind the patient with the chair as low as possible to allow good vision.

Order of extraction

- 1. Symptomatic teeth are extracted before 'balancing extractions' on the opposite side.*
- 2. Lower teeth are extracted before upper teeth (to eliminate bleeding interfering with the surgical field).*
- 3. If there are symptomatic teeth in all quadrants right-handed operators should begin with lower right extractions. This minimizes the number of changes of position of the surgeon, which will reduce general anesthetic time.*

The first step in extracting a tooth (after local anesthesia administration) is to separate the soft-tissue attachment from the cervical aspect of the tooth. This is most commonly achieved with a #9 Molt elevator. The Molt elevator is a dual-ended instrument with one end sharply pointed and is used to initiate the separation of the soft-tissue attachment from the tooth. If a flap is reflected, the broad, rounded end of the instrument may be used in a pushing - pulling motion.

A straight elevator is most commonly used; it has a concave blade that is placed toward the tooth being luxated. The blades are available in various sizes, and their edges may be serrated to better grasp the tooth. The separation and reflection of the dental papillae facilitate placement of the elevator such that it rests on the alveolus. The elevator is initially inserted perpendicular to the tooth in the axial plane, and either parallel to or with the blade of the elevator angled toward the alveolar crest up to 45° from the alveolar crest in the coronal plane. The elevator is then turned such that the portion of the blade resting on the alveolus acts as a fulcrum and the coronal portion of the blade rotates toward the tooth being extracted. This action expands the alveolus,

disrupts the periodontal ligament, and establishes initial mobility of the root. The degree of mobility need not be great to achieve benefit from an elevator.

The basic principles in selecting forceps are as follows:

1. The beaks of the forceps should adapt to the root surface of the tooth.
2. The beaks of the forceps, when positioned and engaging the tooth should be parallel to the long axis of the tooth.
3. The size of the beaks of the forceps should be small enough not to engage the adjacent teeth during luxation and removal of the tooth.

The first force applied by the dentist when using forceps is apically directed. The apically directed force positions the center of rotation as close to the root apex of the tooth as possible. The more apical the center of rotation and the closer it is to the apex of the tooth, the less the apical third of the root is subjected to translational movement, and the less likely an apical third root fracture will occur. The apically directed force also disrupts the periodontal ligaments. Rapid, jerky movements are ineffective and not recommended.

Holding the forceps:

(a) Method of holding lower forceps with thumb on top allows more directed pressure through long axis of tooth.

(b) Thumb on side of handles it is easier to perform rotatory movements on operator's contralateral side, i.e. on teeth in lower left quadrant for right-handed operators.

(c) Method of holding upper forceps. Palm is turned upwards to give most ergonomic and safe method of applying force buccally.

The dentist's opposite hand may be placed such that the index finger or thumb is positioned on either the buccal and/or lingual/palatal aspect of the alveolus so as to:

1. Retracts soft tissues to allow visibility and access.
2. Protects the tissues if the instrument slips.
3. Provides resistance to the extraction force on the mandible to prevent dislocation.
4. Provides 'feel' to the operator during the extraction and gives information about resistance to removal.

EXTRACTION TECHNIQUE:

UPPER PRIMARY AND PERMANENT ANTERIORS

Apply the forceps beaks to the root and then using clockwise and anticlockwise rotations about the long axis (the action one would employ when using a screwdriver). In older children some additional buccal expansion may be required for the removal of the permanent upper canine.

UPPER PRIMARY MOLARS

The initial movement after application of the forceps is palatal, to expand the socket in this direction. The tooth is then subjected to a buccally directed force, which results in delivery.

LOWER PRIMARY ANTERIORS:

These teeth are extracted in the same manner as their upper counterparts, in that, rotation about the long axis using lower primary anterior or root forceps is employed.

LOWER PRIMARY MOLARS:

These teeth are removed by buccolingual expansion of the socket. They can be extracted using either lower primary molar or lower primary root forceps. After application of the forceps a small lingual movement is followed by a continuous buccal force, which delivers the tooth.

UPPER PERMANENT PREMOLARS:

The two-rooted, upper first premolar is best removed by buccal expansion using upper premolar forceps. The upper second premolar is often single rooted and, although buccal expansion with premolar forceps should be attempted in the first instance, this tooth can also be subjected to a rotation about its long axis to affect delivery.

UPPER PERMANENT MOLARS: careful rocking of the tooth buccally with upper universal or bayonet forceps is used to loosen the palatal root, and buccopalatal traction aids in complete luxation of the tooth which is removed without rotation.

LOWER PERMANENT ANTERIORS: It is easy to luxate the incisors when they are rocked labially. Fine bladed forceps should be used to grasp them, e.g. lower universal. A heavier bladed forceps should be used and movement in a buccolingual direction is applied for extraction of the canines.

LOWER PERMANENT PREMOLARS: The first movement should be firm but gentle and torsion may be employed freely, combined with buccolingual rocking as in the case of canines.

LOWER PERMANENT MOLARS: are best extracted with full molar forceps and often loosened by buccolingual pressure and are best delivered by secondary rotation.

EXTRACTION OF ROOTS: Roots may be extracted with forceps if they are not decayed. Bayonet or universal forceps are used for roots in the upper jaw and forceps such as those used for premolars are used in the mandible. If forceps cannot be applied directly to the roots, an elevator technique may be used.

DIFFICULTIES IN EXTRACTION:

- Although they are rare, the dentist must know when the roots of the deciduous molars are configured such that they could engage the succedaneous tooth and possibly cause the succedaneous tooth to be extracted with the deciduous tooth. If this is recognized radiographically or during the extraction, then sectioning the deciduous tooth with a surgical handpiece may be indicated.
- **Submerged or ankylosed primary tooth:** Ankylosed teeth may be slightly out of occlusion or they may be completely within the alveolar process. A submerged tooth may have nonresorbed divergent roots or may have all or nearly all the root resorbed. Despite having the root significantly resorbed, the tooth may show no signs of mobility when pressure or leverage is applied and exhibit a solid sound on percussion. These teeth may be virtually welded to the surrounding bone. The radiographic and clinical examination may not entirely predict the considerable difference in the degree of ankylosis and what difficulties may be encountered in the removal of the tooth. A tooth with nonresorbed divergent roots in which the potential for a root fracture is high and the path of draw is inadequate may be best extracted if the tooth is sectioned. If luxation is not accomplished with reasonable forceps pressure when the ankylosed tooth is extracted, a surgical approach is required. An intraoperative or postoperative radiograph may be indicated to assess the situation.

The dentist may decide to leave a portion of the residual root, which is rarely associated with any adverse sequelae.

- **Root fracture:** the dentist must consider the following factors. Aggressive surgical removal of all root tips may damage the succedaneous teeth. On the other hand, leaving the root may increase the chance for postoperative infection and may increase the theoretical potential of delaying permanent tooth eruption, although most primary root tips will resorb. A commonsense approach is best. If the tooth root is clearly visible and can be removed easily with an elevator or root tip pick, the root should be removed. If several attempts fail or if the root tip is very small or is situated very deep within the alveolus, the root is best left to be resorbed, most probably by the erupting permanent tooth. In some cases, the root tips do not resorb but are situated mesially and distally to the succeeding premolar and do not impede its eruption. The patient and parents should be notified that a root fragment has been retained, and they should be assured that the chance of unfavorable sequelae is remote.

IMPACTED TEETH

The most commonly impacted tooth is the third molar. Whereas any tooth can be impacted, other commonly impacted teeth seen by the dentist include (in this frequency) the maxillary canine, second premolar, mandibular second molar, and maxillary incisors. Rare is the impaction or failure to erupt of a deciduous tooth. The latter is commonly associated with pathology, such as an odontoma or supernumerary (mesiodens and supernumerary mandibular premolars).

Management of an impacted tooth may include

- (1) Observation,
- (2) Extraction of the impacted tooth,
- (3) Surgical exposure and assisted eruption,
- (4) Surgical uprighting,
- (5) Autotransplantation.

Several factors need to be taken into consideration in deciding the management of the impacted tooth. These include the age and health of the patient, potential pathology associated with the impacted tooth, location and angulation of the impacted tooth, benefit of surgery, frequency and severity of the risks of surgery, risks and consequences of no surgical intervention, economic consequences of surgical versus nonsurgical intervention and the quality of life associated with each of these decisions.

SURGICAL EXPOSURE

The ideal time for surgical intervention to expose an impacted tooth is when the root of the impacted tooth is almost completely formed and the apex is not yet closed.

Exposure of a palatally impacted tooth is frequently accomplished by making a sulcular incision between the palatal tissue and teeth and reflection of a full-thickness mucoperiosteal flap. Frequently, a prominence or bulge is evident where the impacted tooth's crown lies. The bone overlying this bulge is removed with a curette or periosteal elevator or a surgical handpiece with bur and copious irrigation, with care taken not to damage the tooth. Bone is removed to expose enough surface of the tooth's crown so that an orthodontic bracket can be attached to aid in eruption. Depending on the

impaction and path of eruption, additional bone may be removed to facilitate eruption. Care must be exercised to maintain the integrity of bone around the crestal margins of the adjacent teeth. Additionally, an impacted tooth may be close to the roots of the adjacent teeth, and care must be exercised not to damage or devitalize these adjacent roots. The mucoperiosteal flap is repositioned into its original position, and the soft tissue overlying the impacted tooth's crown is excised, exposing the crown and orthodontic bracket. The gold chain attached to the orthodontic bracket is passed through this window of soft tissue and frequently secured to the orthodontic arch wire with silk suture. The palatal mucoperiosteal flap is anatomically aligned and secured with a resorbable suture. The soft-tissue window overlying the crown of the impacted tooth can be left open or packed with a periodontal dressing for approximately 4 days. If the tooth is deeply impacted within the palate, no overlying tissue may be excised and the gold chain is brought through the soft tissue at the crestal margin, frequently corresponding with the incision.

Exposure of a labially impacted canine: Two surgical techniques exist:

(1) Apical positioned flap

It consists of a horizontal crestal incision that is made in the edentulous region with two vertical releasing incisions on the mesial and distal aspects of this edentulous region. The flap is reflected and the tooth is exposed, with bone removed to the cervical margin as necessary. The bracket is attached and the flap is repositioned apical to the bracket, ideally at the level of the cervical margin of the tooth. The premise of the apical positioned flap is to maintain a collar of attached gingiva that will advance coronally as the tooth erupts.

(2) Closed technique: It consists of a crestal-sulcular incision with or without a vertical release that allows for the development of a full-thickness mucoperiosteal flap. The tooth is exposed, removing necessary bone, and a bracket is attached. The gold chain attached to the bracket is attached to the orthodontic arch bar, generally with silk suture, and the flap is closed with resorbable suture. The gold chain generally exits the wound through the crestal incision. The closed technique can be used for all labially impacted canines; however, it is indicated for high impactions or midalveolar impactions when the apical positioned flap is contraindicated.

SURGICAL UPRIGHTING

Surgical uprighting is a technique that has most commonly been used for bringing an impacted mandibular second molar into occlusion. The optimal time for performing the procedure is when the root is two-thirds formed and the apex is open. The tooth should have a mesial inclination not exceeding 90° and should be neither labially nor lingually inclined, for optimal results.

Excessive mesial inclination has an increased risk for devascularizing the tooth. In this situation the surgical procedure would be more consistent with an autotransplantation than a surgical uprighting. Excessive labial or lingual inclination is associated with diminished crestal bone on the respective surface, compromising initial stability and ultimate bone height on that respective surface of the tooth.

The surgical technique entails the making of a sulcular incision that extends from the mesial of the first molar to the distal buccal of the second molar. The incision is then

extended distally along the alveolar crest angling into the buccal sulcus along the external oblique ridge.

A full-thickness mucoperiosteal flap is reflected. Adequate space must be created distal to the impacted second molar tooth. Prophylactic removal of the third molar is commonly performed. Using a surgical drill with a bur, the dentist may find it necessary to remove bone on the distal aspect of the second molar to the level of its greatest concavity. This ensures that there is adequate space into which the impacted second molar can move. An elevator is then used to elevate and reposition the tooth. The repositioned tooth should be slightly out of occlusion.

Most frequently, the surgically uprighted tooth is stable in its new position and requires no additional stabilization.

If the tooth is mobile, it should be splinted with an orthodontic arch wire for approximately 2 weeks. The mucoperiosteal flap is approximated into position, accommodating the newly uprighted tooth, and sutured. Antibiotics are generally prescribed for the first week. Prophylactic endodontic therapy is generally not required.