

# Oral surgery

Lec 7 3<sup>rd</sup> class

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## EXTRACTION OF TEETH (EXODONTIA)

Extraction of teeth is the most important part of minor oral surgery and the most common procedures to general dental practitioner (dentist). Many patients suffer from extractionfobia. Many dentists still believe that speed is essential when extracting the teeth with appropriate techniques.

### Definition: -

Exodontia is a painless removal of teeth from their bony alveolar socket with relatively minimal amount of trauma to the investing or surrounding tissues, so that the wound may heal without postoperative problems.

Basically, we have two methods of extraction:-

1- Intra-alveolar extraction (forceps extraction).

2- Trans-alveolar extraction (surgical extraction).

In forceps extraction which is enough for extraction in most of cases consist of removing the tooth or root by the use of forceps or elevators or both. While in trans-alveolar extraction we dissect the tooth or root from its bony attachment by rising a flap and removal of some of the bone surrounding the roots, which are then removed by the use of elevators and/or forceps.

Teeth should not be extracted unless appropriate clinical and radiographic investigation, a satisfactory diagnosis and treatment plan have been reached and agreed with the patient.

The extraction is accomplished in two stages.

- The first stage, the tooth is separated from the soft tissues surrounding
- the second stage, the tooth is elevated from the socket.

### **Indications of extraction: -**

There are many indications for tooth extraction, if conservative treatment has either failed or is not indicated, a tooth may have to be extracted. Although the modern dentistry tries and takes all measures to preserve and maintain teeth in the oral cavity, there are still a variety of general indications for removing teeth.

1. Severe Periodontal disease .
2. Severe non-restorable carious tooth.
3. Pulp and apical pathology with non-treatable lesion with endodontic therapy.
4. Teeth in the line of a jaw fracture.
5. Impacted or ectopically present teeth.
6. Supernumery teeth.
7. Teeth involved with cysts or tumors of the jaw.
8. Teeth removed due to orthodontic reasons (for space gaining).
9. Malposed or malpositioned teeth.
10. Teeth removed due to prosthetic considerations.
11. Teeth in the direct field for radiotherapy to the jaws may be removed prophylactically before radiotherapy.
12. Over-retained deciduous teeth.
13. Teeth removed due to esthetic reasons (severely stained or fluorosis or attrition).

## **Contra indication of extraction**

In general, the contra-indications are subdivided into;

- A. Local contra-indications.
- B. Systemic contra-indications.

### **Local contra-indications: - (L.C s)**

There are several L.C s to extractions of indicated teeth:-

#### **1- Acute and uncontrolled infection:-**

Extraction in the presence of acute and uncontrolled infection may lead to spread of infection locally or systemically leading to many complications some of them are dangerous and life threatening (e.g. cavernous sinus thrombosis, mediastinitis, Ludwig's angina) and acute periapical abscess and facial abscess especially in medically compromised patient. In addition to that, limitation of mouth opening especially in lower wisdom tooth infection.

#### **2- Previous radiotherapy:-**

Previous therapeutic radiation in oral and maxillofacial region for treatment of cancer lead to fibrosis and decreased vascularity of the tissue or area of extraction and end with a condition in the bone called osteoradionecrosis

#### **3- Teeth located within area of tumors: -**

Especially in vascular lesion or malignant tumor should not be extracted because extraction may lead to dissemination of the tumor, unhealed socket and postoperative complications, for example, bleeding postoperatively and intraoperative.

## ***Systemic Contra-Indications:-***

**Systemic contra-indications preclude extraction because the patient's systemic health is such that the ability to withstand the surgical work may be compromised. So extraction should be postponed until the severity of the problem has been resolved and maybe arranged after consultation with the physician to perform extraction safely without complications so caution is advised in the following conditions:-**

- 1- Severe uncontrolled metabolic disease, e.g. uncontrolled diabetes, thyroid problems, end-stage renal disease.**
- 2- Uncontrolled leukaemia and lymphomas.**
- 3- Severe uncontrolled cardiac disease, e.g. myocardial infarction, unstable angina pectoris, dysrhythmias.**
- 4- Severe uncontrolled hypertension.**
- 5- Pregnancy.**
- 6- Bleeding disorder e.g. haemophilia, platelet disorder, patient on anticoagulants.**
- 7- Patients who take a variety of medications e.g. patient on steroid and immunosuppressive drugs, cancer and chemotherapy.**
- 8- Uncontrolled epilepsy.**

## **Pre-extraction evaluation:-**

P.E.E is very valuable and necessary for successful extraction practice. Hurry and inadequate P.E.E of the case may lead to many complications for the operator during extraction , in addition to the postoperative problems to the patient.

P.E.E include:-

*1- Clinical preoperative evaluation.*

*2- Radiological evaluation.*

*1-Clinical P.E.E also includes:-*

**A. General evaluation.**

**B. Local evaluation.**

**A -General evaluation includes:-**

- ✚ General impression of the patient.
- ✚ History of general diseases, Nervousness and orientation
- ✚ General oral hygiene.
- ✚ Gingival inflammation, calculus, neglected mouth.

**B . Local factors evaluation Includes:-**

1. Clinical examination of the tooth.
2. Adjoining structures.
3. Access to the tooth. This includes the mouth opening, location of the tooth (e.g. buccally malposed, in standing) may present difficulty in positioning the dental forceps for extraction, so you may remove such a tooth surgically.
4. Tooth mobility: The mobility of the tooth to be extracted should be assessed preoperatively, greater than normal mobility is frequently seen with severe periodontal disease, but sometimes it maybe because of the underlying pathology like neoplasm

5. Condition of the tooth: - e.g.
- a) Carious destruction.
  - b) The presence of large restoration.
  - c) Presence or absence of the adjoining teeth.
  - d) Non-vital tooth.
  - e) State of the supporting tissue.
  - f) Shape, position, long axis and size of the crown.
  - g) Attrition.

Good P.E.E resulted from correction of data collected from history, clinical examination, radiographs and laboratory aids in addition to that P.E.E need good knowledge and experience in the basic sciences e.g. anatomy, physiology, pathology.

**In general, P.E.E may help you in: -**

- a) Determine the method of extraction and type of anaesthesia.
- b) Reduce the time spend for extraction.
- c) Reduce the intra and post-operative crisis and complications.

***2- Radiological evaluation: -***

Preoperative clinical assessment may be supplemented some times by preoperative radiographs.

**indications for preoperative radiograph are:-**

- 1) History of difficult or unsuccessful extraction.
- 2) Crown with extensive caries, large restorations, non-vital tooth when diagnosis is not certain and tooth is malposed.
- 3) A tooth which is abnormally resistant to forceps extraction.
- 4) If after clinical examination you decide to remove the tooth surgically.
- 5) Any tooth which is in close relation to important or vital structures like neurovascular canal, maxillary sinus, mental nerve, nasal cavity.

6) Attrition teeth in elderly patient (maybe associated with hypercementosis).

7) If a tooth is partially erupted or completely unerupted or retained root.

8) Any tooth which has been subjected to trauma, fracture of the root and/or alveolar bone maybe present.

9) An isolated maxillary molar especially if it is unopposed and over erupted. The bony support of such a tooth is often weakened by the presence of maxillary sinus and this may predispose to certain of oro-antral communication or fracture of the maxillary tuberosity.

10) Whenever, underlying bony pathology is suspected e.g. cystic lesion, tumor.

11) Any systemic condition which may predispose to dental or alveolar abnormality like: -

a) Osteitis deformans (Paget's disease), in which the roots are hypercementosed and ankylosed leading to difficult extraction, infection of the socket.

b) Cleido-cranial dysostosis, for pseudo-anodontia (multiple impactions, hooked roots occur, supernumerary teeth).

c) Patient who have received therapeutic irradiation to the jaw which may have to predispose to osteoradionecrosis.

d) Osteopetrosis (marble bone disease), which cause extraction very difficult and predispose to chronic osteomyelitis.

- [A good radiograph and careful interpretation may give or aid the operator to many factors that may cause difficult extraction, e.g.:-](#)

1- Abnormal number and shape of roots.

2- An unfavourable root pattern.

3- Caries extending to the root mass.

4- Fracture or resorption of the root.

5- Hypercementosis of roots.

6- Ankylosis (there is no space in periodontal ligament), and sclerosis of the bone.

7- Gemination (the development of two teeth from one bud).

8- Impaction.

9- Bony sclerosis and pathological lesions.

- Also careful interpretation of the radiograph may also reveal or show the possibility of the following complications:-

1) Involvement of, and damage to inferior dental nerve and mental nerve  
e.g. on extraction of impacted lower third molar

2) The creation of oro-antral fistula or or-nasal communication.

3) The retention of intra-bony pathology e.g. cyst.

4) The displacement of root or tooth into maxillary sinus.

5) Fracture of maxillary tuberosity.

*Thank you with best  
regards*

# EXODONTIA



**PROFESSOR HAFEZ DIAB**

*Periodontal  
Therapy  
in Dental Practice*

# INTRODUCTION

- Since the earliest period of history ,the extraction of tooth has been considered a very formidable procedure by the layman.
- Many patients suffer from extractionfobia and are often difficult to care for despite modern methods of anesthesia.
- Many dentists still believe that speed is esential when extracting teeth.



# DEFINITION

- **The painless removal of the whole tooth, or root, with minimal trauma to the investing tissues, so that the wound heals uneventfully & no post operative problem is created**



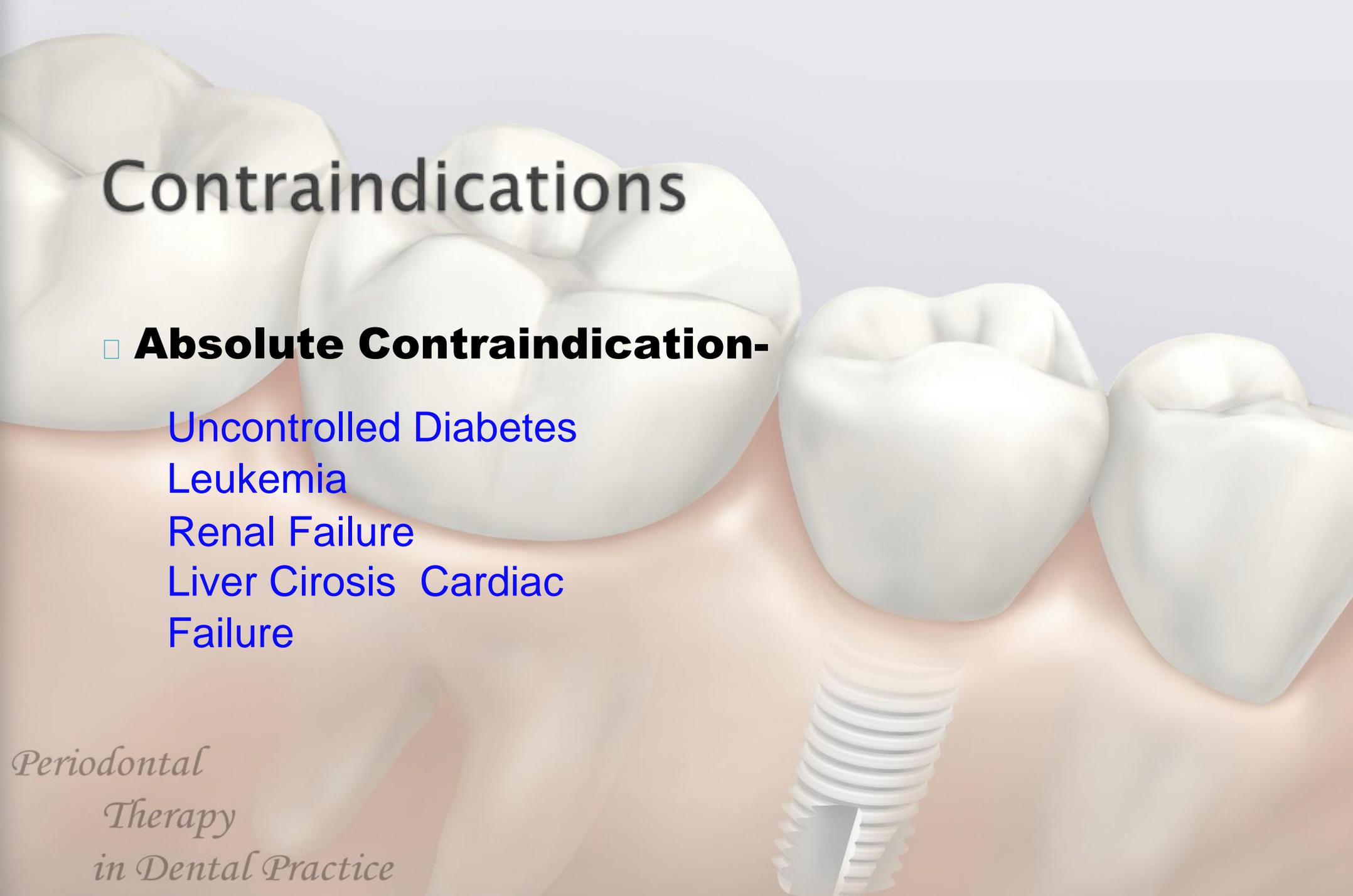
# Methods Of Extraction

- **Intra-alveolar method**- Also known as ‘forceps extraction’ and consists of removing teeth with the use of forceps/elevators. The blades of these instruments are forced down the peridontal membrane between the tooth root and bony socket.
- **Trans-alveolar extraction**-This method involves the dissection of the tooth or root from its bony attachments. This separation is achieved by removal of some of the bone investing the roots which are then extracted by the use of forceps or elevators

# Indications For Extraction Of teeth

- ❑ Severe Caries
- ❑ Pulpal Necrosis
- ❑ Peridontally weak teeth
- ❑ Teeth in the line of radiation therapy
- ❑ Teeth in line of jaw fracture
- ❑ Fractured teeth
- ❑ Pathology associated with tooth
- ❑ Orthodontic treatment
- ❑ Malposed teeth
- ❑ Retained deciduous teeth
- ❑ Extraction due to prosthetic reason
- ❑ Impacted teeth

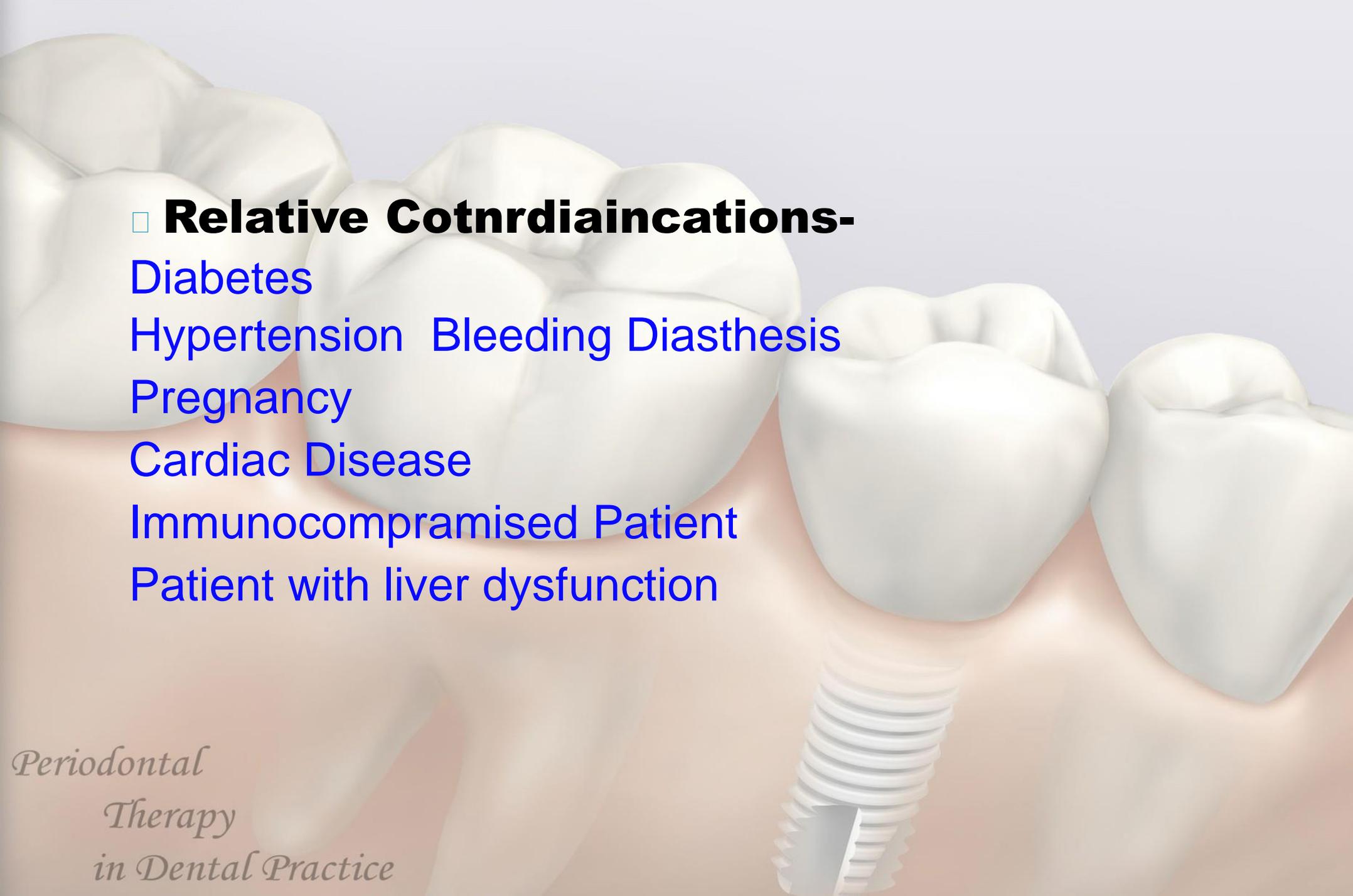
# Contraindications

The background of the slide features a close-up, artistic rendering of several teeth. In the foreground, a dental implant is shown, consisting of a white, threaded cylindrical post with a wider, flared base, partially submerged in a light-colored, textured material representing the jawbone. The overall lighting is soft and clinical, highlighting the textures of the teeth and the implant.

## □ **Absolute Contraindication-**

Uncontrolled Diabetes  
Leukemia  
Renal Failure  
Liver Cirrosis Cardiac  
Failure

*Periodontal  
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□ **Relative Contraindications-**

Diabetes

Hypertension    Bleeding    Diasthesis

Pregnancy

Cardiac Disease

Immunocompromised Patient

Patient with liver dysfunction

*Periodontal*

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*in Dental Practice*



□ **Local Contraindication-**

Accute infection

Severe Cellulitis

Accute pericronitis

Hemangioma

*Periodontal*

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*in Dental Practice*

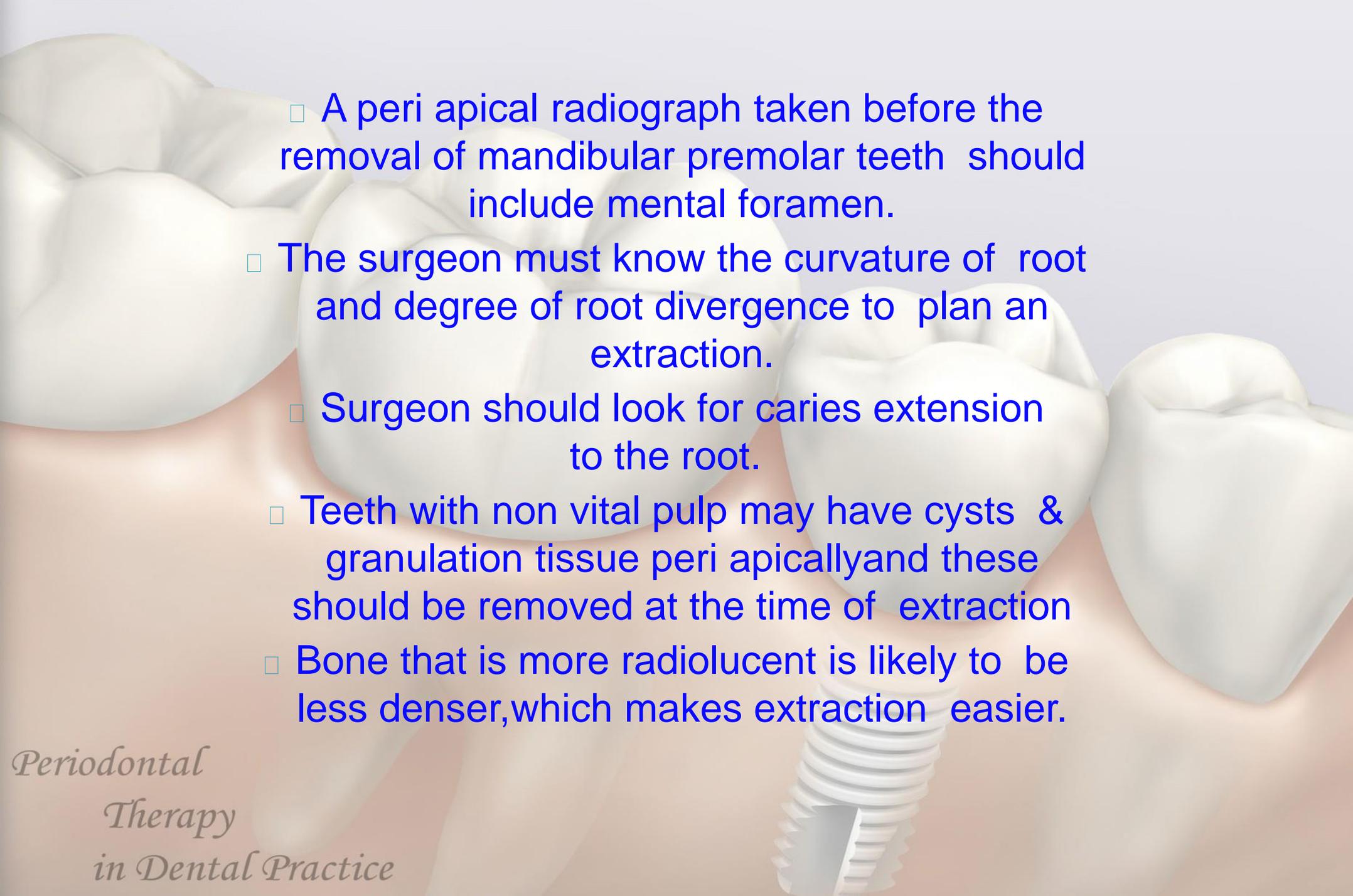
# Preoperative Assessment

- Intra Oral Examination- It is the quick examination of oral cavity- 1<sup>st</sup> soft tissue & then hard tissue.
- Assessment of tooth to be extracted- It is done for long evidence

# Radiographic Examination

- Peri apical radiograph provide the most accurate and detailed information concerning the tooth, its roots and surrounding tissue.
- Panoramic radiograph are used frequently but their greatest usefulness is for impacted teeth.
- The relationship of teeth to be extracted to adjacent erupted and unerupted teeth should be noticed
- When performing extractions of maxillary molars, its roots relation with the floor of the maxillary sinus should be noted.



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- A peri apical radiograph taken before the removal of mandibular premolar teeth should include mental foramen.
  - The surgeon must know the curvature of root and degree of root divergence to plan an extraction.
  - Surgeon should look for caries extension to the root.
  - Teeth with non vital pulp may have cysts & granulation tissue peri apically and these should be removed at the time of extraction
  - Bone that is more radiolucent is likely to be less denser, which makes extraction easier.

# Surgeon Preparation

Surgeons must prevent accidental injury or transmission of infection to their patients or to themselves.

To prevent this transmission, surgical gloves, surgical mask, and eyewear with side shields are required.



# Patient Preparation

A sterile disposable towel drape should be put across the patient's chest .

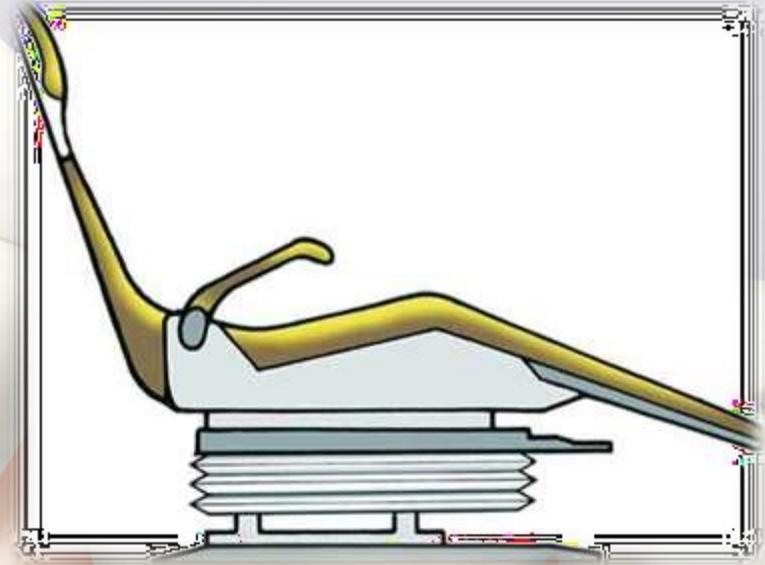
Proper oral hygiene is very important before extraction



# Patient Position



For a **maxillary extraction** the chair should be tipped backward and maxillary occlusal plane is at 60 degrees to the floor. **The height of the dental chair should be 8cm below the shoulder level of the operator.**



For the **extraction of mandibular teeth**, the patient should be positioned in a more upright position the occlusal plane is parallel to the floor. **The chair should be 16cm below the level of operators elbow.**

# Surgeon Position

□ For all maxillary teeth, anterior mandibular teeth & teeth of the 3<sup>rd</sup> quadrant the dentist is to the front and right (and to the left, for left-handed dentists) of the patient.

□ For the teeth of the IVth quadrant the dentist is positioned behind and to the right (or to the left, for left-handed dentists) of the patient.



# Light

- Good illumination of the operator field is an absolute essential for successful extraction of teeth.



# Armamentarium

## For simple closed extraction-

1. Equipment for local anesthesia.
2. Elevators-for reflection of soft tissue and luxation.
3. Forceps for removal of teeth.
4. Guaze, saline&suction.

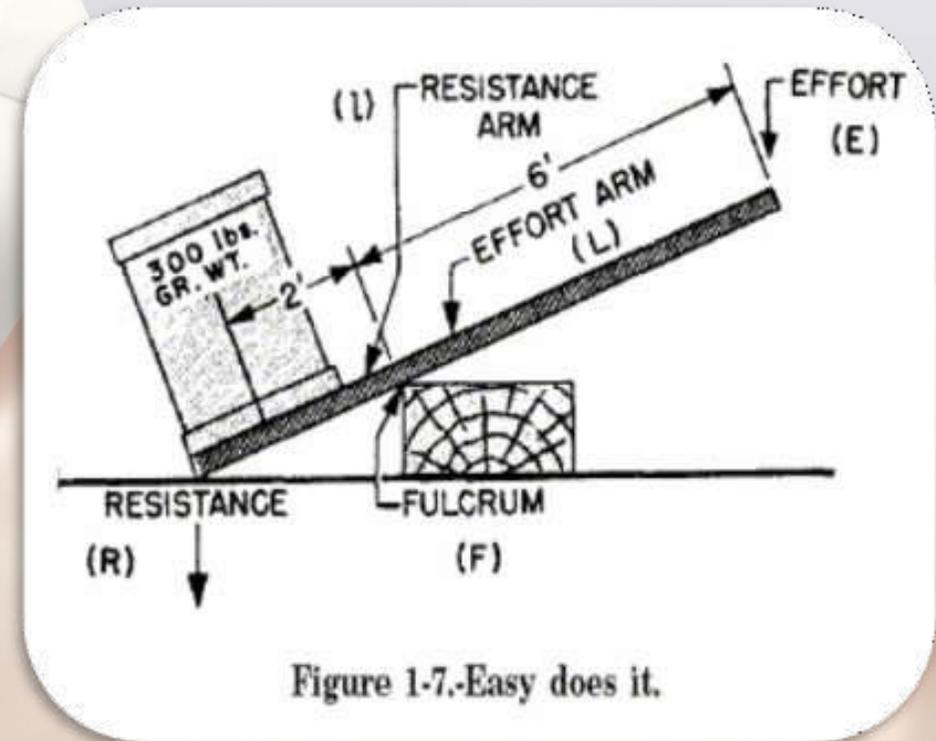


# Principles Of Elevators

- **Lever principle-** Elevators are primarily used as levers.

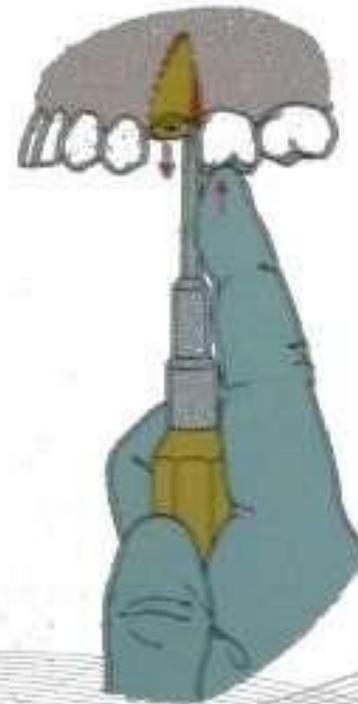
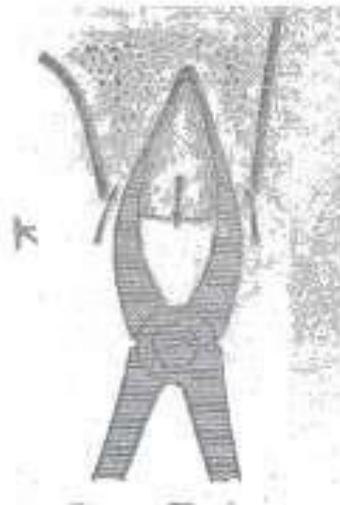
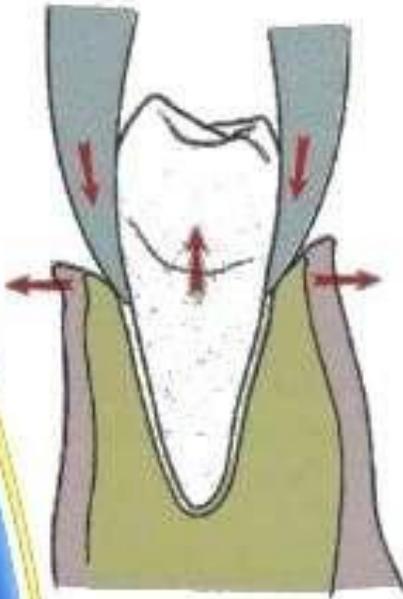
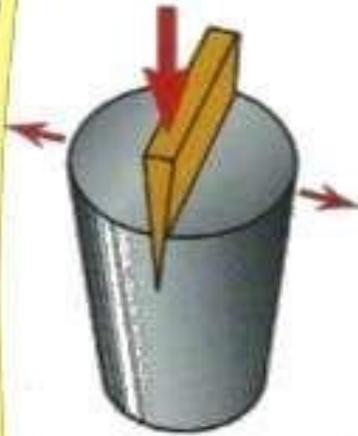
Thus elevators includes a effort arm which is the handle, fulcrum which is the crest of the alveolar bone & resistance arm which exerts the pressure on the tooth which is the resistance here.

Maximum mechanical advantage is gained by keeping the effort arm longer than the resistance arm.



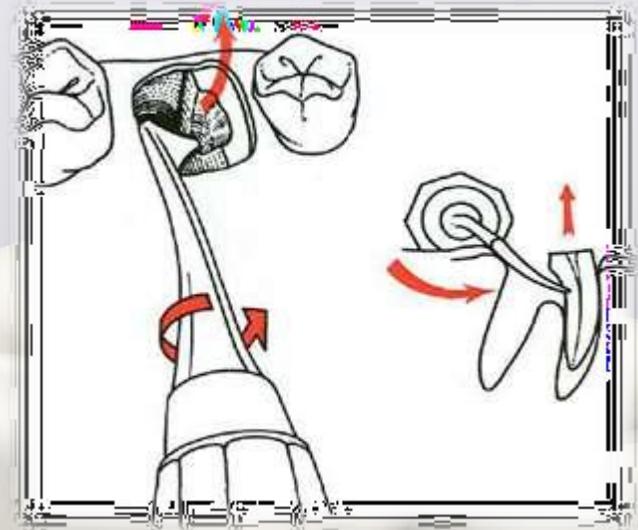
## THE MECHANICAL PRINCIPLES

2. The insertion of wedge or wedges between tooth-root & bony socket wall



# Wheel and Axle Principle

- Resembles the wheel of a vehicle attached to a axle around which the wheel moves.
- Cryers & Cross bar elevators works on these principle.
  - The handle serves as the wheel and blade engages the tooth.
  - When the handle is rotated the force created on the blade of the elevator is multiplied creating a greater mechanical advantage to elevate tooth out of its socket.



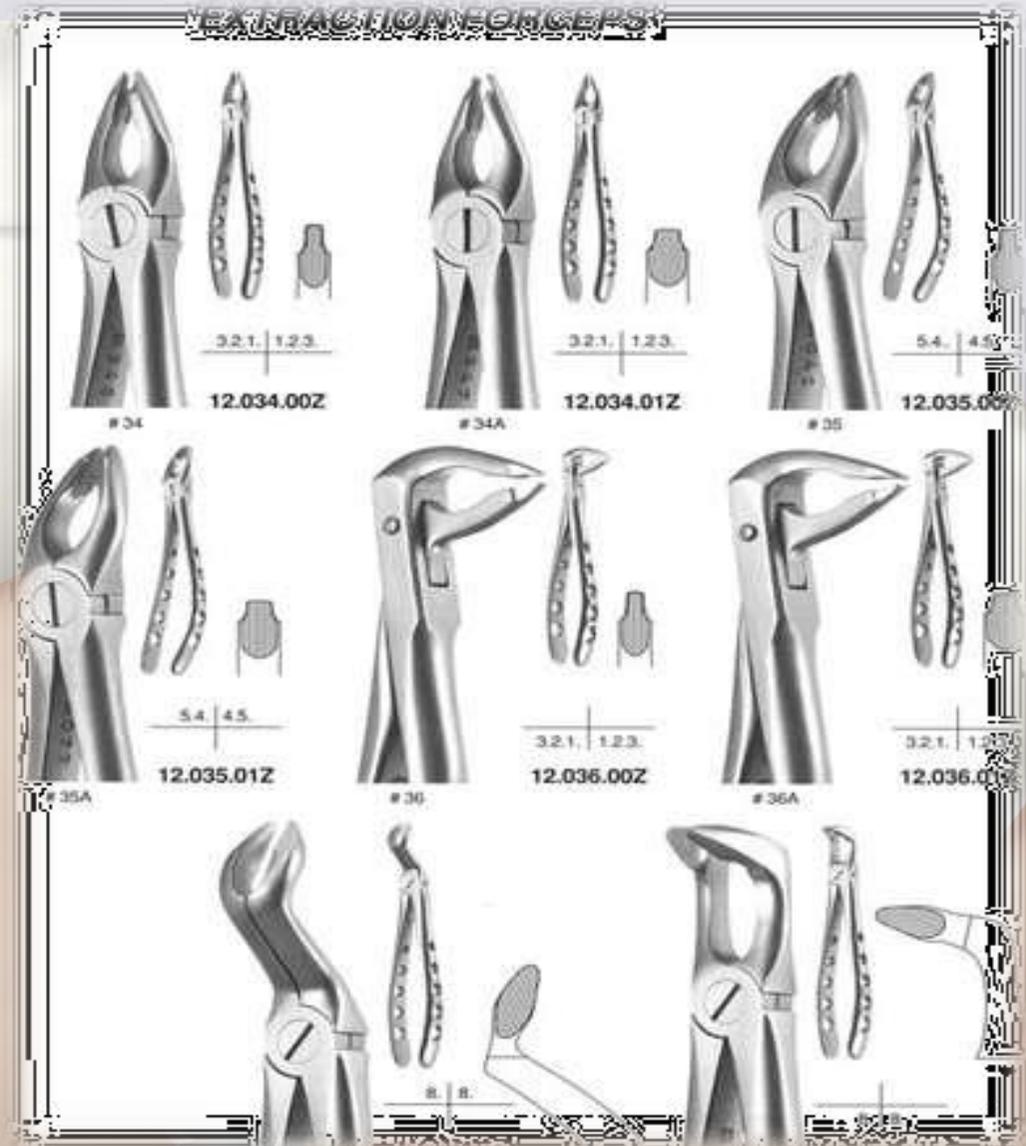
*Periodontal* out of its socket.

*Therapy  
in Dental Practice*

# Principles Of Forceps Use:

## □ Goals of forceps use:

1. Expansion of bony socket by the use of wedge shaped beaks of forceps
2. Removal of teeth from the socket.

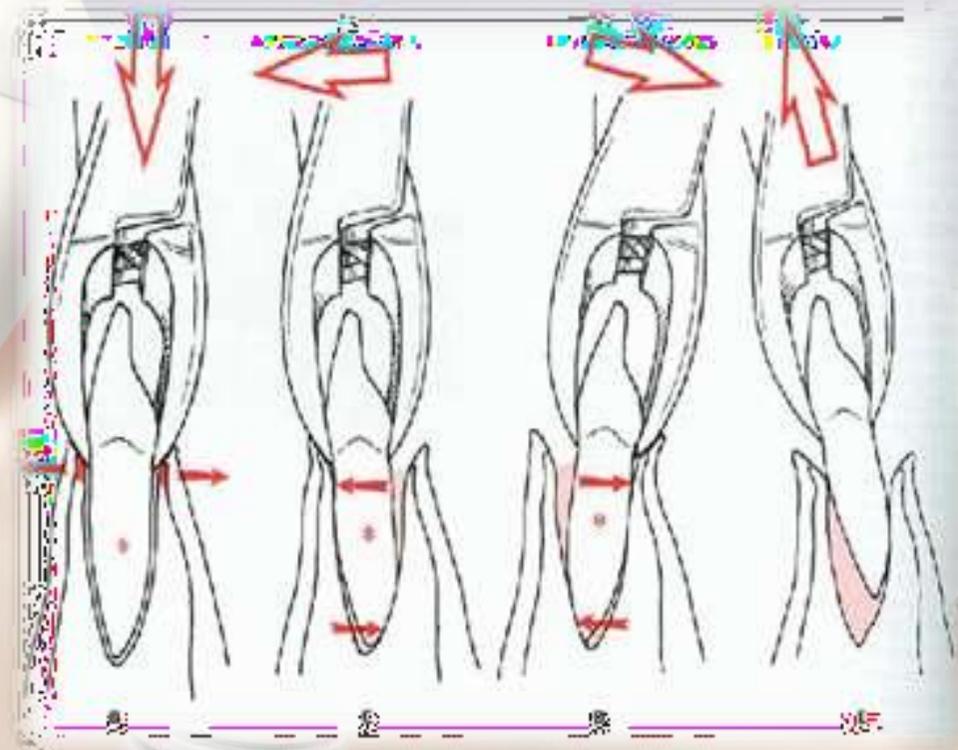


## Major motions applied by Forceps on teeth:

- Apical Force: This is the first force generated and causes expansion of bony socket.
- Buccal Force: This helps to expand the buccal cortical plate of the tooth socket.
  - Lingual Force: Causes expansion of the lingual plate.
- Rotational Force: Teeth with single conical roots are extracted by these force causes internal expansion of socket and helps in movement of teeth.
- Tractional Force: Forces finally applied to remove the tooth completely out of the socket.

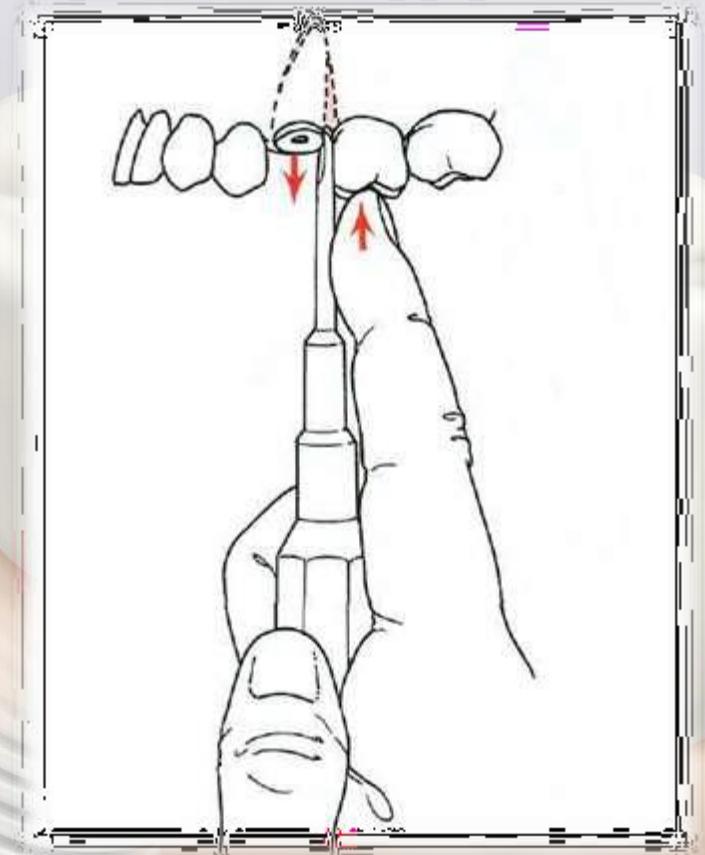
# Principles Of Extraction

- **Expansion Of Bony Socket:**  
Bone is relatively elastic so it is possible to expand the bony socket and remove the teeth.
- This is done by holding the tooth in the apical end and moved with the help of forceps causing the expansion of the bony socket.



## Wedge Principle

- This is done by wedging the elevator or beaks of the forceps between the tooth & socket in periodontal ligament space. This displaces the tooth occlusally and the instrument can further be pushed into the socket to displace the tooth further till it can be removed completely.



# Requirments For Closed Extraction

3 fundamental requirements

1. Adequate access and visualisation of field of surgery.
2. An unimpended pathway for removal of tooth.
3. Use of controlled force to luxate and remove the teeth.

# Procedure For Extraction

1. Positioning of the patient.
2. Administration of local anaesthesia.
3. Loosening and luxation of soft tissue attachment from the tooth.
4. Adaptations of forceps to the teeth.
5. Luxation of the teeth by forceps.
6. Removal of teeth.

## Loosening of soft tissue attachment around the tooth

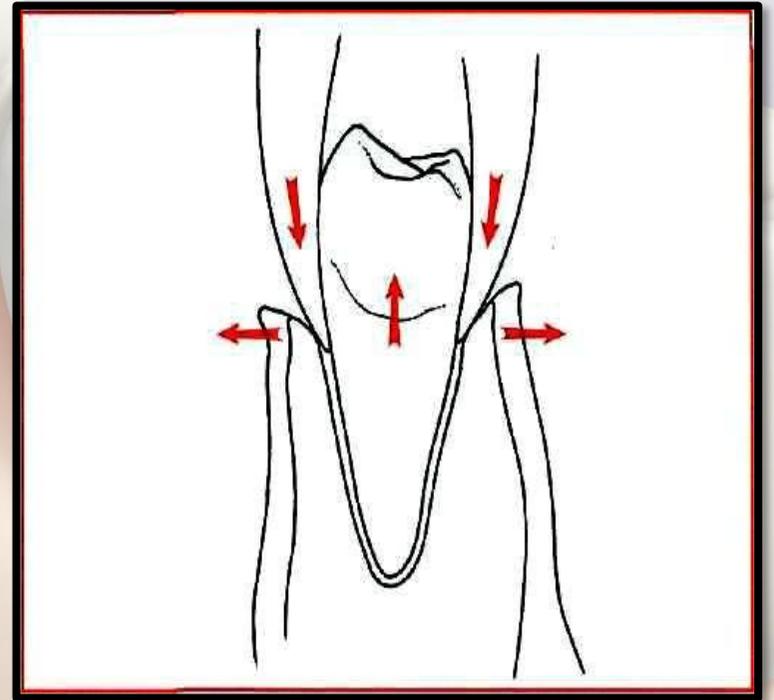
- It is done using the periosteal elevator. The instrument has sharp pointed end and broader rounded end. The pointed end is used to begin periosteal reflection and reflect dental papillae.
- The pointed end is used in a prying motion to elevate dental papillae between the teeth or attached gingiva around the tooth.

# Luxation Of Teeth using Dental Elevator

- Usually done with straight elevator.
- The straight elevator is inserted perpendicular to the inter dental space after reflection of inter dental papillae.
- The elevator is then turned in such a way that the inferior position of blade rests on alveolar bone and the superior portion of the blade is turned toward the tooth to be extracted.
- Strong,slow,steady,foeceful turning of the handle moves the tooth in a posterior direction, which results in some expansion of alveolar bone and tearing of peridontal ligament.

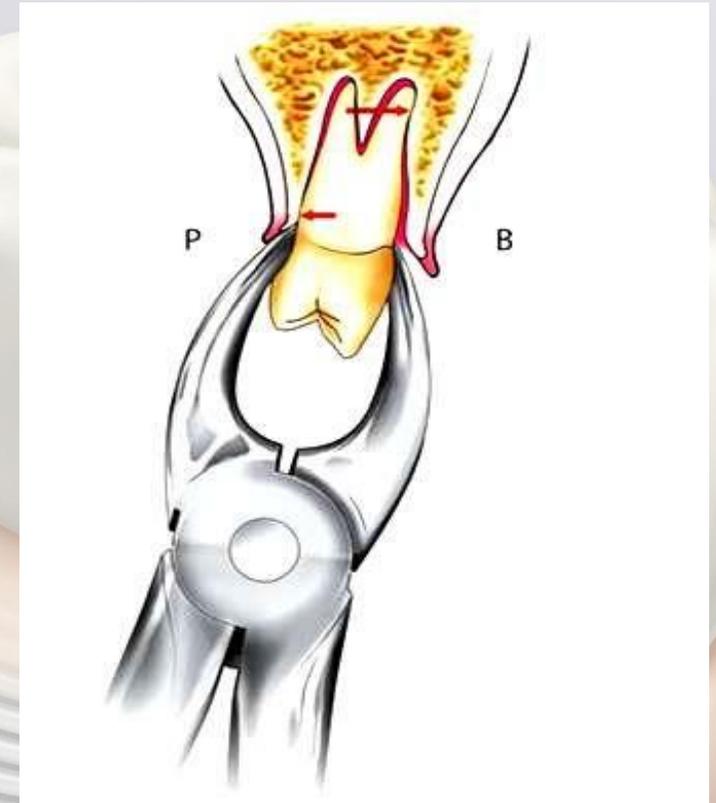
# Adaptation of Forceps To the Teeth

- Beaks of forceps are adapted anatomically to the tooth apical to the cervical line that is to the root surface so that the beaks grasps the root underneath the loosened soft tissue.
- Lingual beak is usually seated first.
- Beaks must be held parallel to the long axis.
  - The beaks acts as wedges to dilate the crestal bone on the buccal and lingual aspects.



# Luxation Of Teeth With Forceps

- The major portion of the force is directed towards the thinnest and therefore weakest bone. Thus the major movement is labial and buccal. The surgeon uses slow steady force to displace the tooth buccally.
- The tooth is then moved again towards the opposite direction with slow deliberate strong pressure. Buccal and lingual pressure continue to expand the alveolar socket.

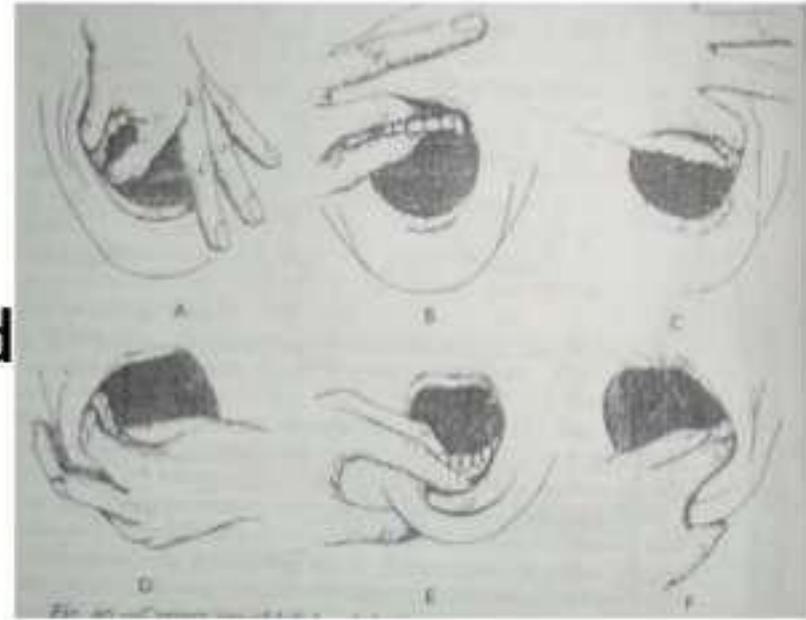


# Removal Of Teeth From The Socket

- Once the alveolar bone has expanded sufficiently and the tooth has been luxated a slight tractional force usually directed buccally can be used.

## 6. Role of opposite hand

- ▶ Reflection of soft tissue
- ▶ Protection of other teeth
- ▶ Stabilization of patient's head
- ▶ Supporting & stabilizing the mandible
- ▶ Supports alveolar bone
- ▶ Tactile information
- ▶ Compress socket
- ▶ Deliver the whole tooth, root, dislodged filling

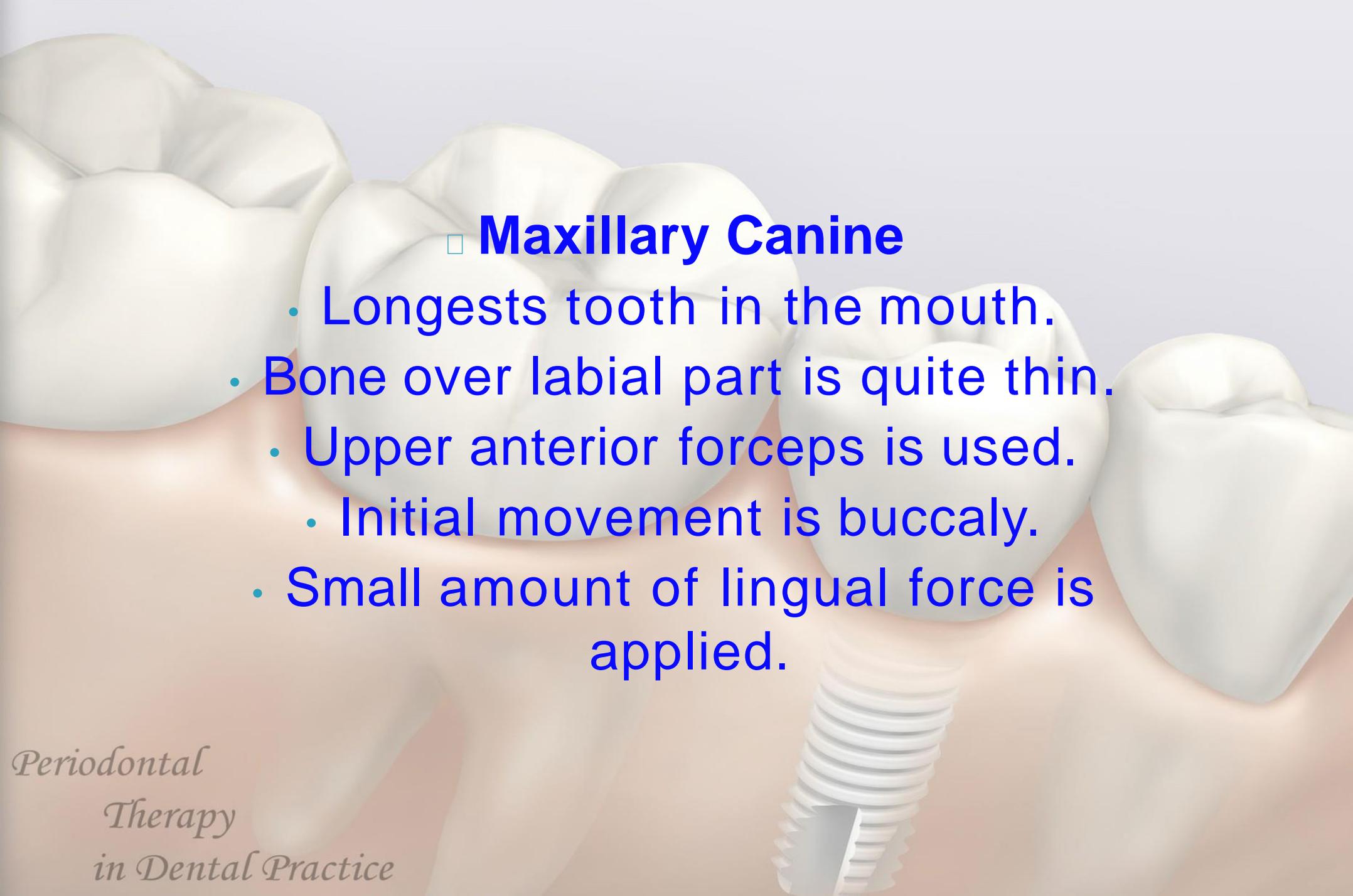


# Specific Technique For Each Tooth

## □ Maxillary Incisor Teeth

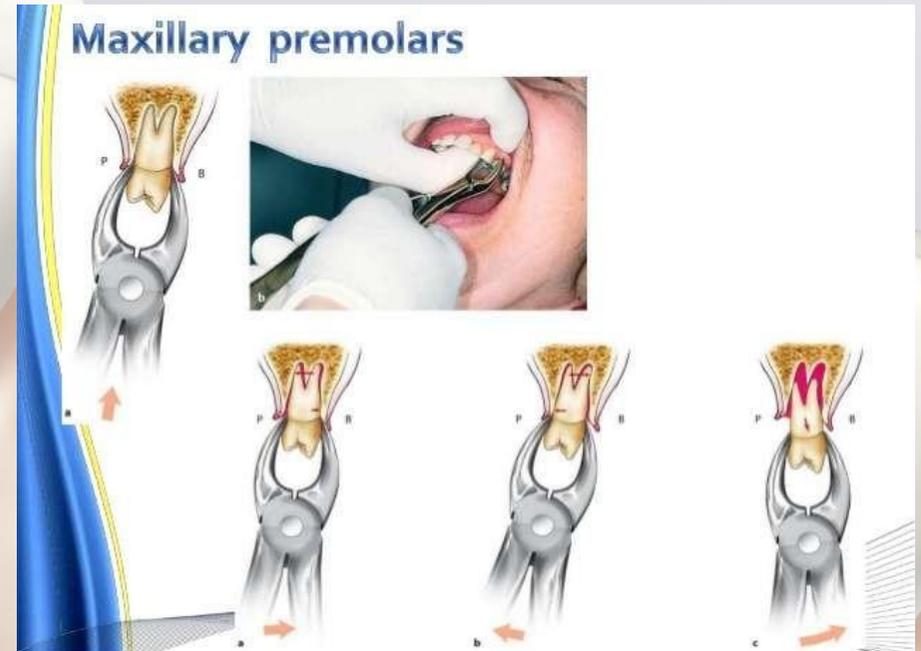
- Extracted with upper anterior forceps.
- Left hand grasp on alveolar process.
  - Forceps seated as far as apically possible.
  - Luxation begins with labial force.
  - Slight lingual force is used.
- Left index finger reflects the soft tissue & thumb rests on alveolar process.



- 
- **Maxillary Canine**
    - Longest tooth in the mouth.
    - Bone over labial part is quite thin.
    - Upper anterior forceps is used.
      - Initial movement is buccal.
    - Small amount of lingual force is applied.

## □ Maxillary 1<sup>st</sup> Premolar:

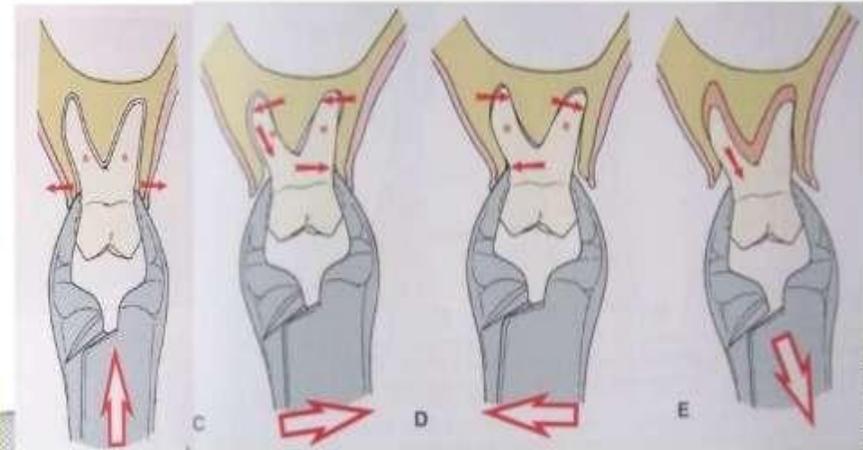
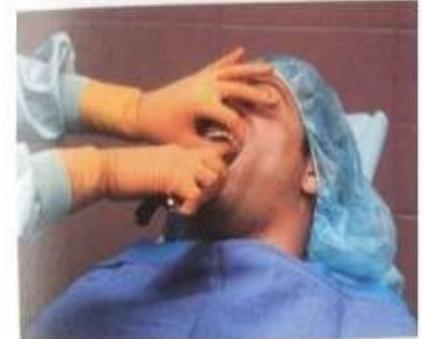
- Common root fracture occurs with this case.
- The tooth should be luxated as much as possible with straight elevator.
- Has 2 thin roots.
- Firm apical pressure is applied to lower centre of rotation as far as possible and to expand crestal bone.
- Buccal pressure is applied initially to expand buccocortical plate. Apices of the roots are pushed lingually and are therefore subjected to fracture
- Tooth is delivered in buccolingual direction with combination of buccal and tractional forces



## Maxillary Molars

- It has 3 large and relatively strong roots.
- Luxation begins with a strong buccal force.
- Lingual pressure are used moderately.
- Teeth is delivered in buccolingual direction.

Maxillary molars



An anatomical illustration of a maxillary 3rd molar tooth. The tooth is shown in a light beige color, with a prominent crown and a conical root. A surgical flap is reflected to show the root. A white extraction forceps is partially inserted into the root of the tooth. The background is a soft, light blue gradient.

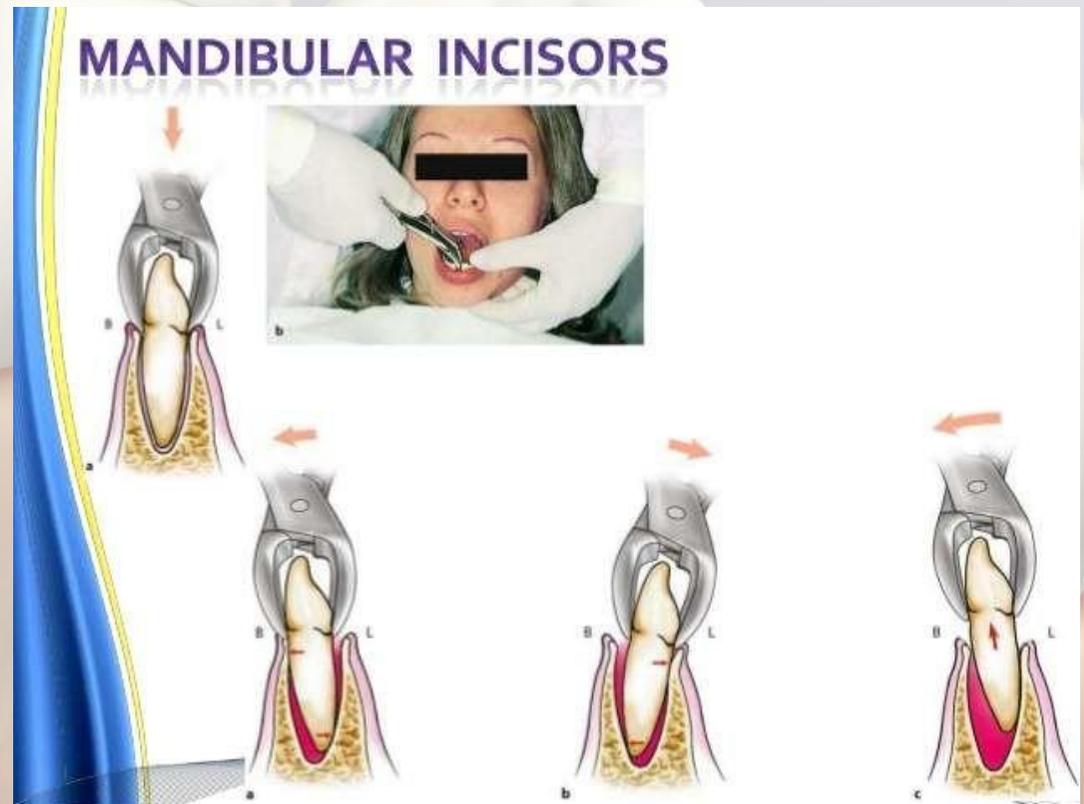
## **Maxillary 3<sup>rd</sup> molar**

Has conical roots and is usually extracted with upper third molar forceps which is universal forceps used for both right and left molars.

# Mandibular Teeth

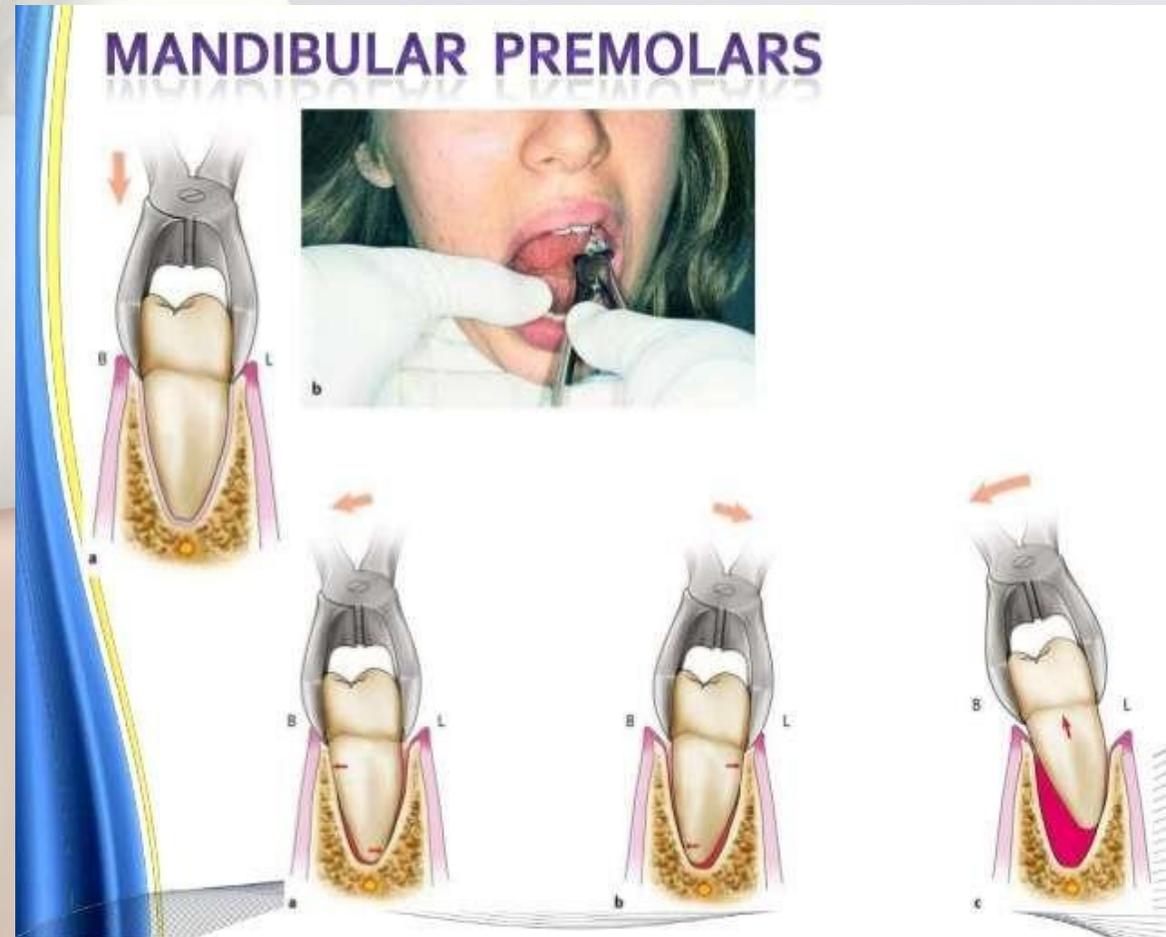
## Mandibular Incisors and Canine

- Both the teeth are similar in shape with incisor being shorter and slightly thinner and canine root being longer.
- Alveolar bone is quite thin in labial and lingual side.
  - Moderate labial force followed by lingual force is used to expand the bone.
  - Tooth is delivered in labial incisal direction.



## Mandibular Premolars

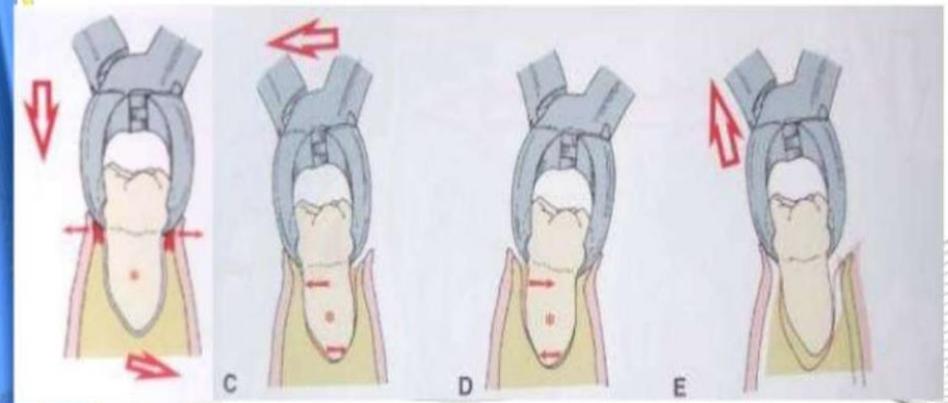
- They are easiest teeth to remove.
- The overlying bone is thin on the buccal aspect and somewhat heavier on lingual side.
- Buccal force followed by slight lingual pressure is used for luxation.



## Mandibular Molars:

- If tooth roots are closely bifurcated no:23 or cow horn forceps can be used.
- The forceps is seated as far apically as possible. Luxation of molar begin with a strong buccal movement. Strong lingual pressure is used to continue luxation.
- Teeth is delivered in buccolingual direction.
- **Mandibular 3<sup>rd</sup> Molar:**
  - Fixed conical roots.
  - Bi furcation is not likely the forceps a short beaked, right angled forceps is used.
  - The 3<sup>rd</sup> molar is delivered in linguo occlusal direction.

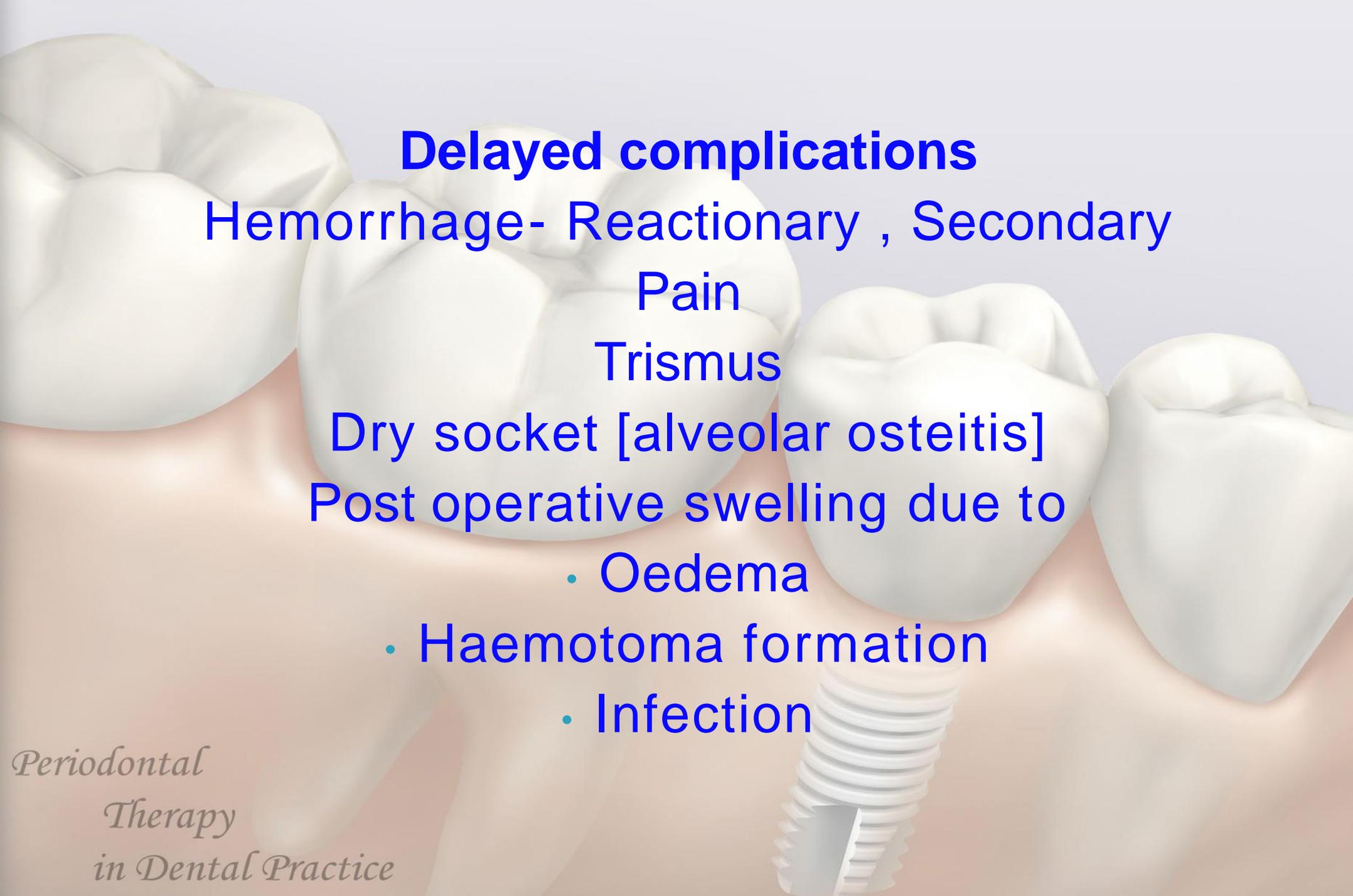
## MANDIBULAR MOLARS



# Complications Of Tooth Extraction

## **Intraoperative[Immediate] complications**

- Failure to move the tooth
- Fracture of tooth, alveolus ,mandible & maxillary tuberosity
- Mucosal laceration & puncture wounds on gums lips tongue & floor of the mouth.
  - Luxation of adjacent tooth
- Displacement of root into the facial space
  - Nerve injury
  - Hemorrhage-Primary

The background features a series of white teeth of varying sizes and a dental implant with a threaded neck and a tapered tip, set against a light, neutral-toned background.

## **Delayed complications**

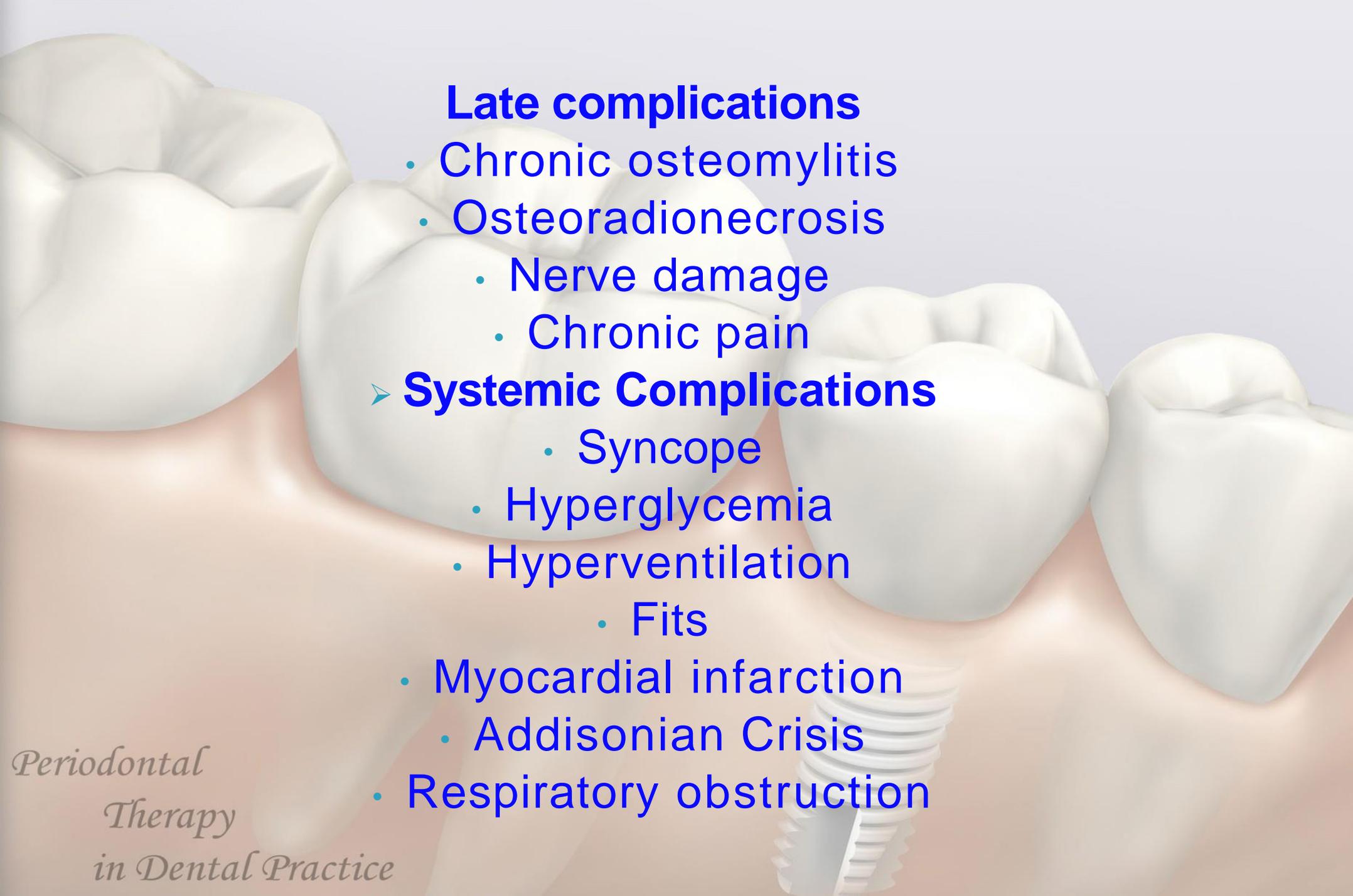
**Hemorrhage- Reactionary , Secondary  
Pain**

**Trismus**

**Dry socket [alveolar osteitis]**

**Post operative swelling due to**

- **Oedema**
- **Haematoma formation**
- **Infection**



## Late complications

- Chronic osteomyelitis
- Osteoradionecrosis
  - Nerve damage
  - Chronic pain
- **Systemic Complications**
  - Syncope
  - Hyperglycemia
  - Hyperventilation
    - Fits
  - Myocardial infarction
  - Addisonian Crisis
  - Respiratory obstruction

# Post Extraction Care

- Irrigate the site with saline.
- Remove the tissue tags and granulation tissue from the soft tissue of the site.
- Compress the alveolar bone with finger pressure.
- Suture if necessary at the papillae bordering the extraction site and across the middle of the site.
- Stop the bleeding by placing a gauze pack covering the socket and the instruct the patient to apply gentle and continuous pressure by biting on the gauze for at least 30 minutes.

# Instructions To The Patients

- Bite firmly the guaze pack over the surgical area for at least 30 mints.
- Dont spit or suck as it will promote bleeding.
  - If bleeding continues in home, advice the patient to place a guaze pad or cold wet teabag over the area and bite firmly for 30 mins.
  - Avoid rubbing the areas with tongue.
- Do not smoke for 24 hrs as it may intefere with healing
- Do not rinse or brush the tooth for 12 hrs.

# Diet & Pain Relief

- After extraction have liquid or soft diet high in protein.
- Drink a large amount of water and fruit juices.
- Avoid hot food for the first 24hrs after surgery
  - Anti inflammatory analgesics should be preferred.
- Warm saline rinses and gentle brushing should be advised from the next day.

**Thank You**



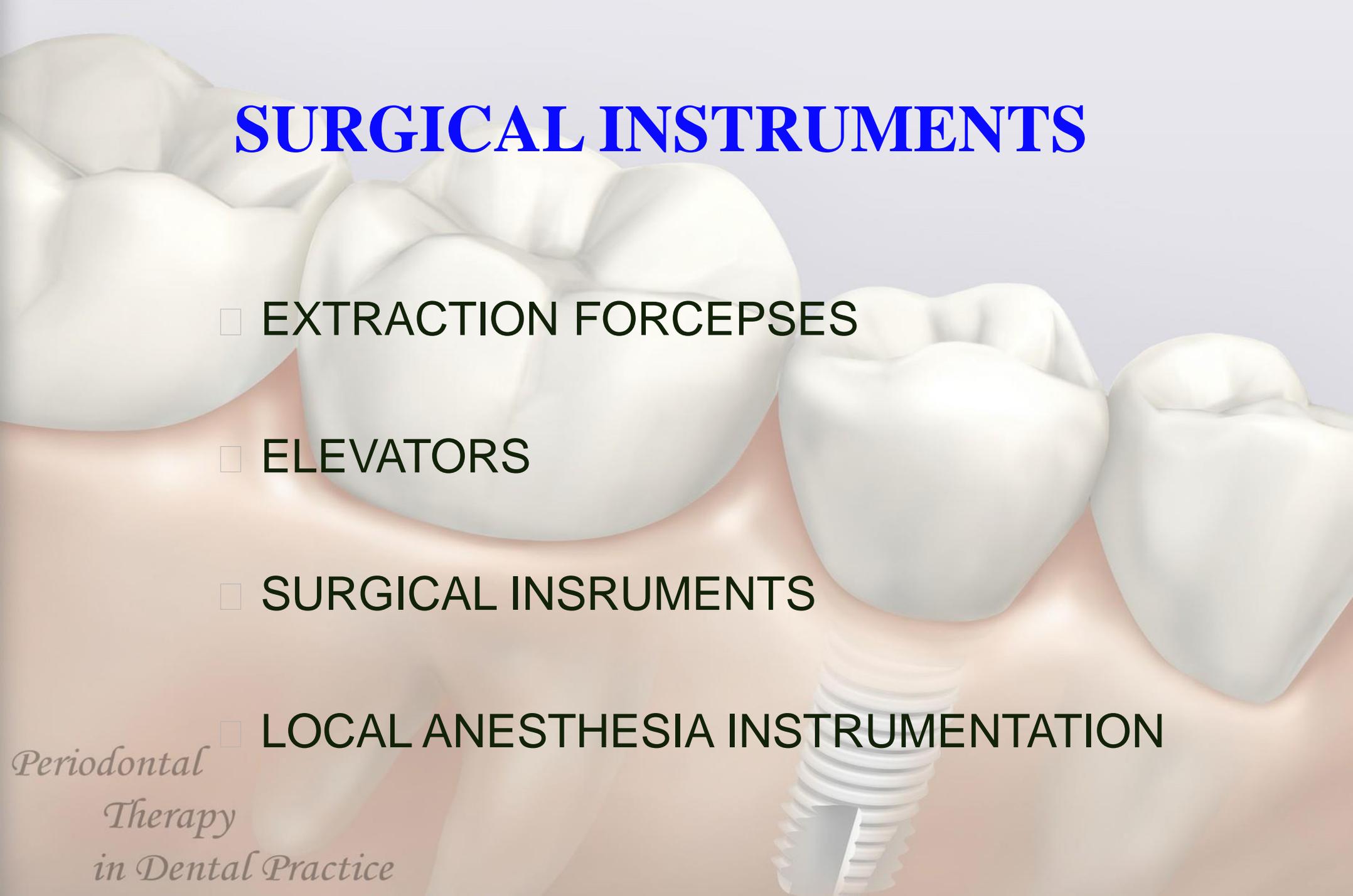
**Armamentarium for basic  
Oral surgery**



**PROFESSOR HAFEZ DIAB**

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Therapy  
in Dental Practice*

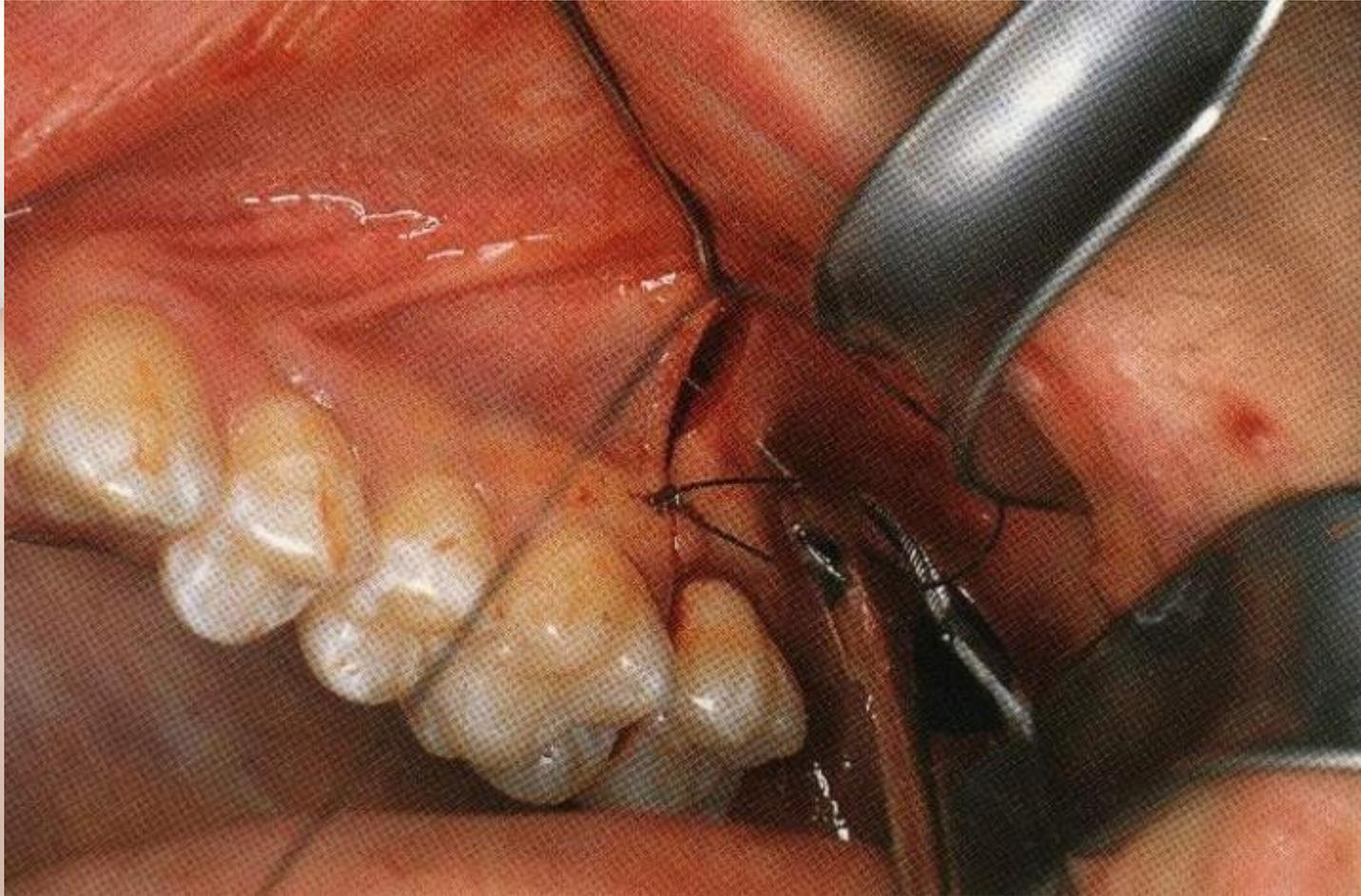
# **SURGICAL INSTRUMENTS**



- ❑ **EXTRACTION FORCEPSES**
- ❑ **ELEVATORS**
- ❑ **SURGICAL INSTRUMENTS**
- ❑ **LOCAL ANESTHESIA INSTRUMENTATION**

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# **SURGICAL INSTRUMENTS**



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# BARD-BARKER BLADE HANDLE AND BARD BARKER BLADES



**#11** used for small  
incisions



**#12** inaccessible  
areas

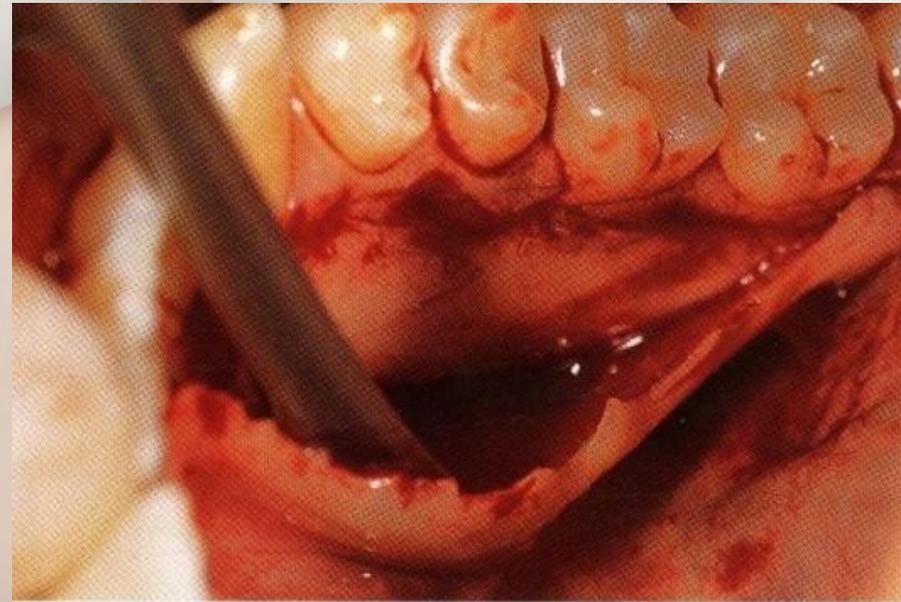


**#15** Intraoral  
Incision

# PERIOSTEAL ELEVATOR



**use: reflection of flap**



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# **MOUTH GAG**

**Use:  
forceful  
mouth  
opening**



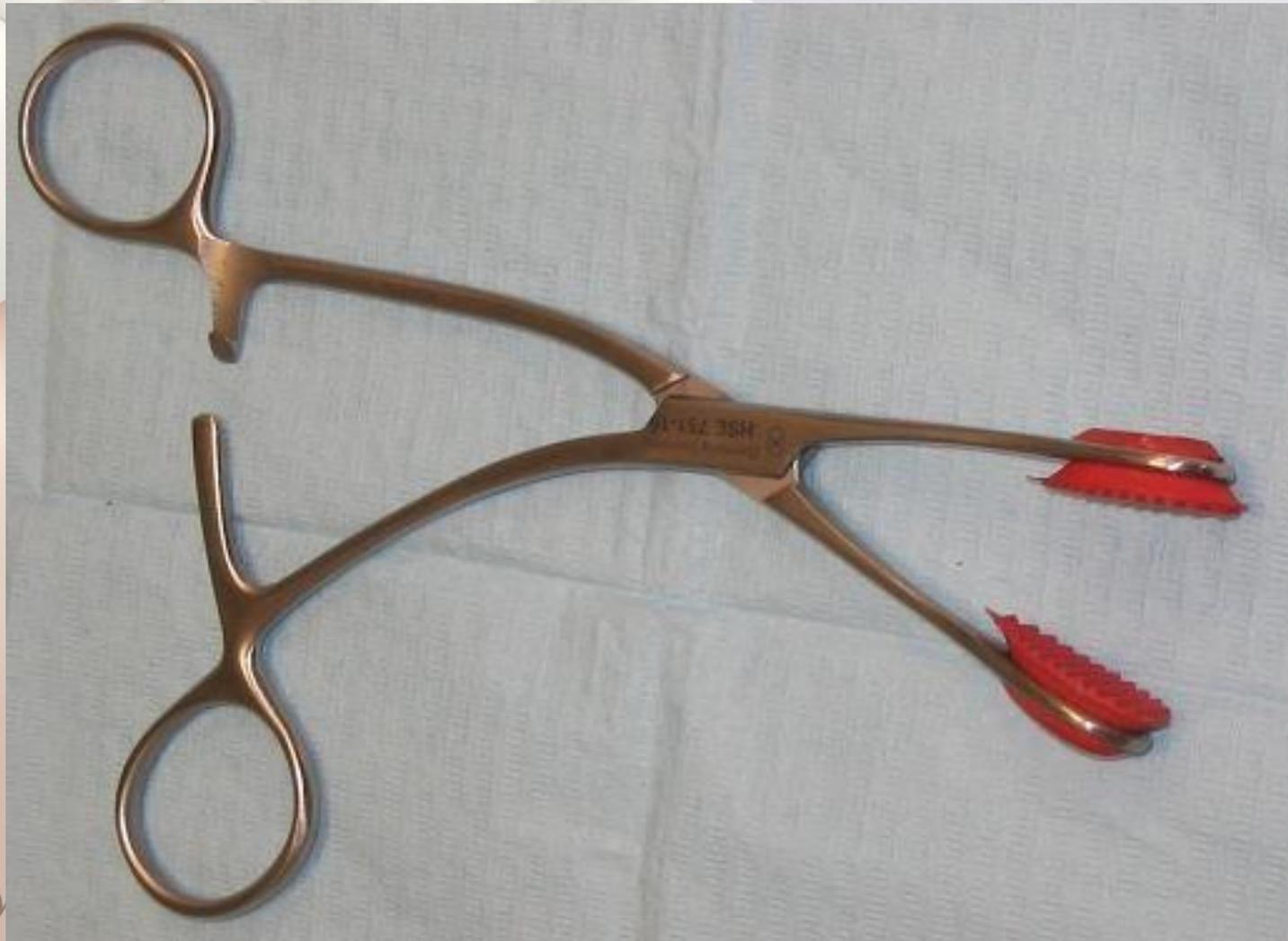
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# TONGUE DEPRESSOR



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# TONGUE HOLDER



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# RETRACTOR

**Use:  
retraction of  
flaps or cheek**



# MALLET AND CHISELS

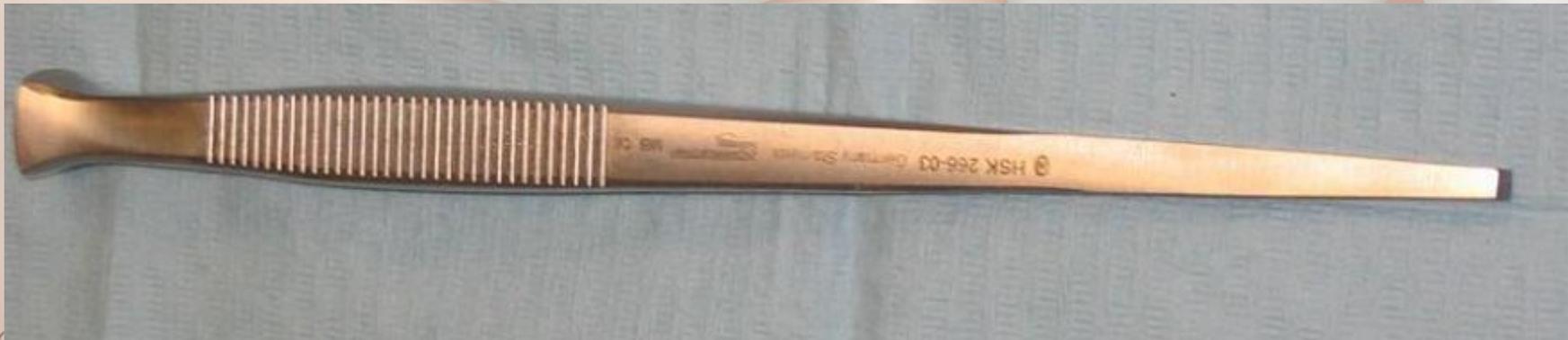
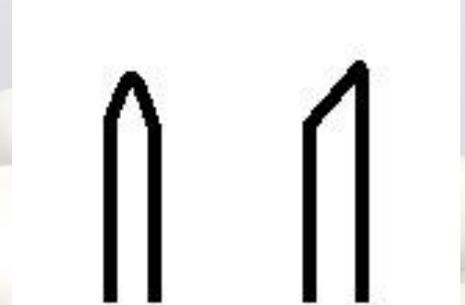
BEVELED CHISEL

UNIBEVELED **removal of bone in flaks**

BIBEVELED (OSTEOTOME):

**tooth division** **Condylotomy**

**Re-fracturing malunion bone**



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# MALLET



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## GROVED CHISEL



**Use:  
removal of  
soft bone or  
biopsy**



# BONE RONGEURS



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# BONE RONGEURS

**Use: bone cutting forceps**



# **SURGICAL BURS**



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# ARTERY FORCEPS

CURVED



MOSQUITO HEMOSTAT



**Use: ligation of blood vessels and blunt dissection during I&D**

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# TISSUE FORCEPS



**Use: handling normal soft tissues**

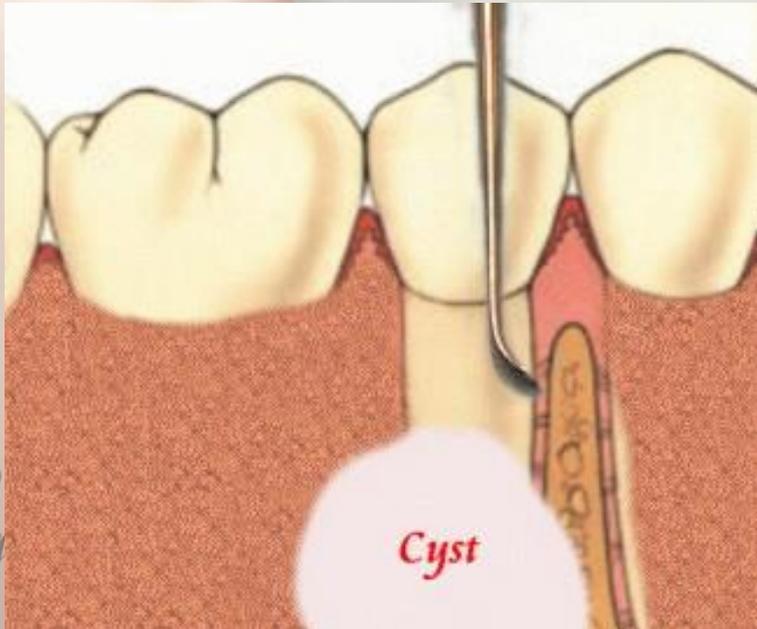
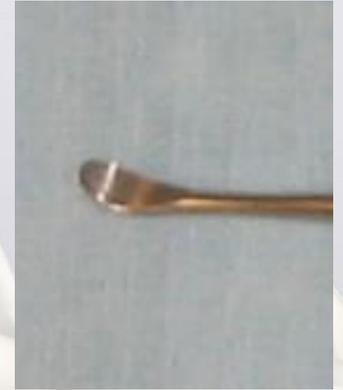
# ALLIS FORCEPS



**Use: handling  
pathologic al  
soft tissues**

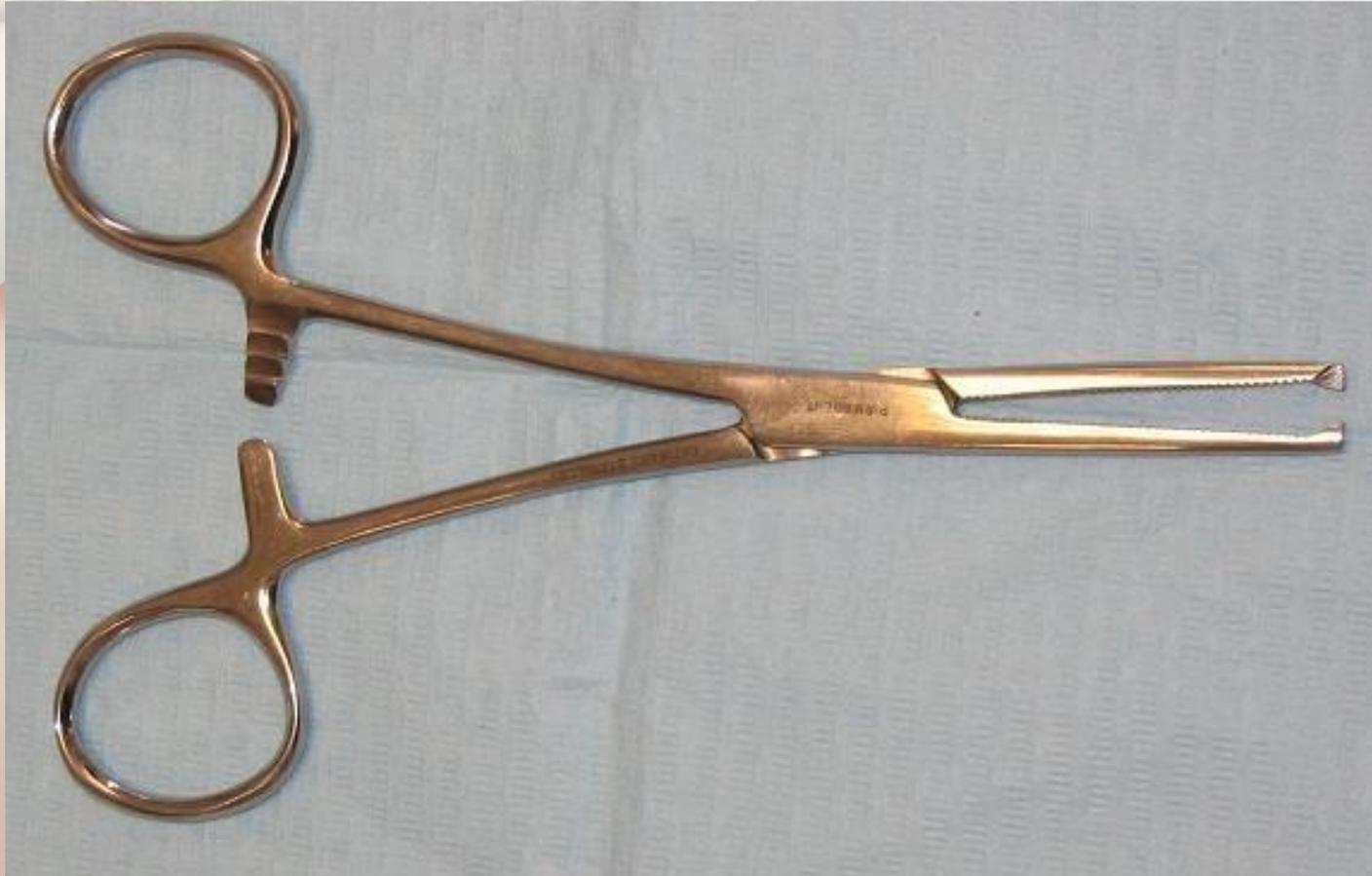
*Per*  
*Therapy  
in Dental Practice*

# BONE CURRETTE



**Use: 1-bone  
curettage  
2-cyst removal**

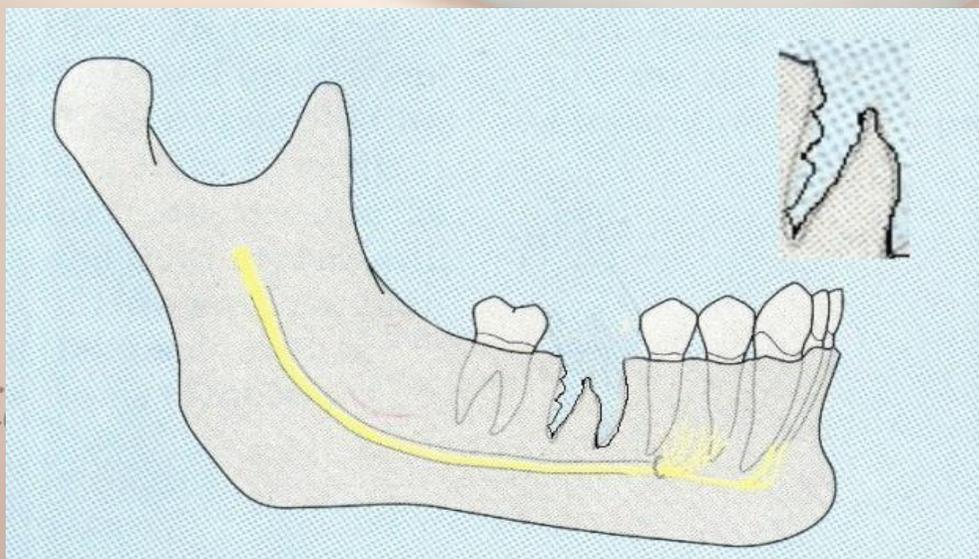
# KOCHER



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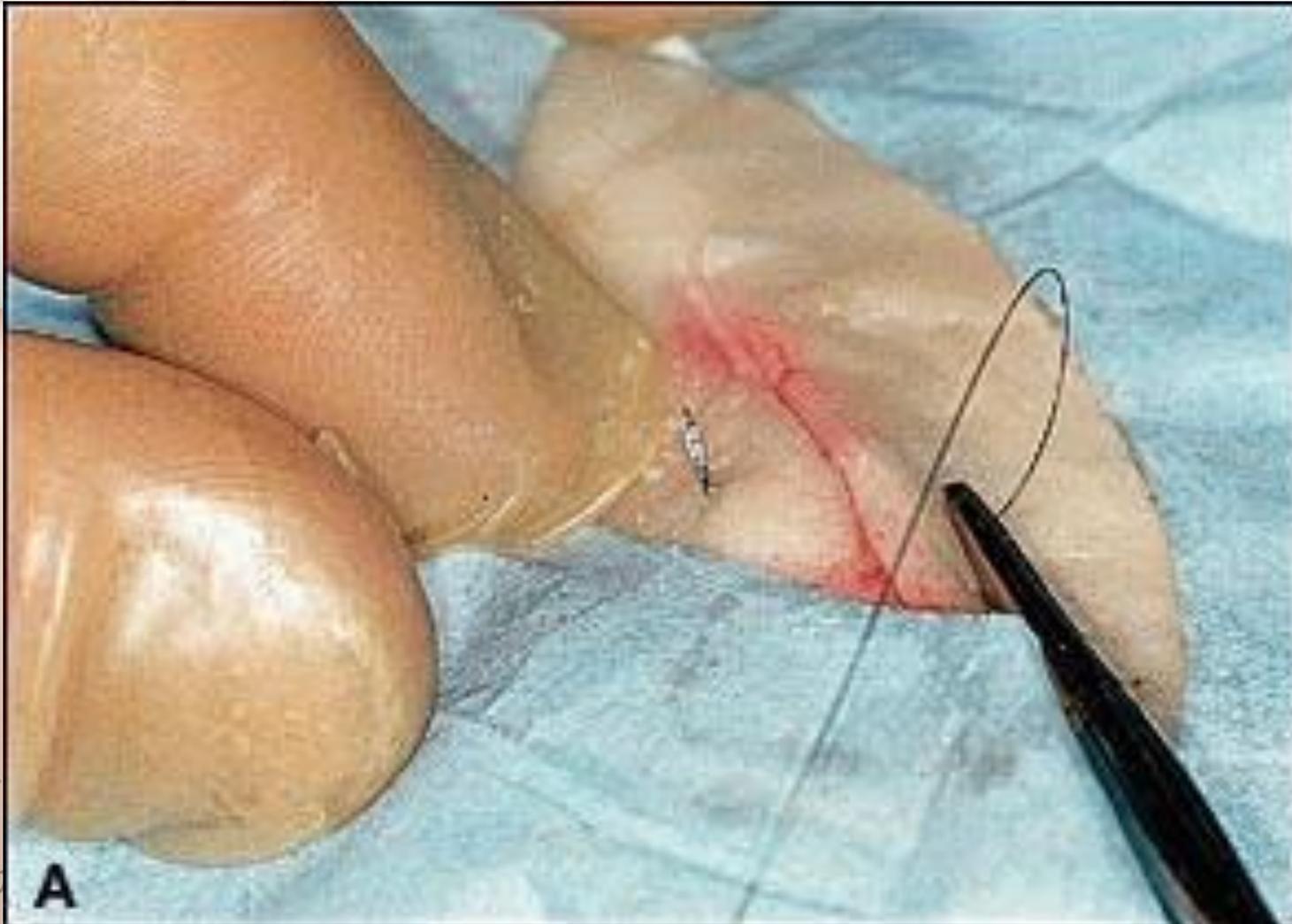
**Use: grasping of firm  
tissues(bone- ligament-  
muscles)**

# BONE FILE



**Use: smoothing of sharp bony edges**

# SUTURING INSTRUMENTS



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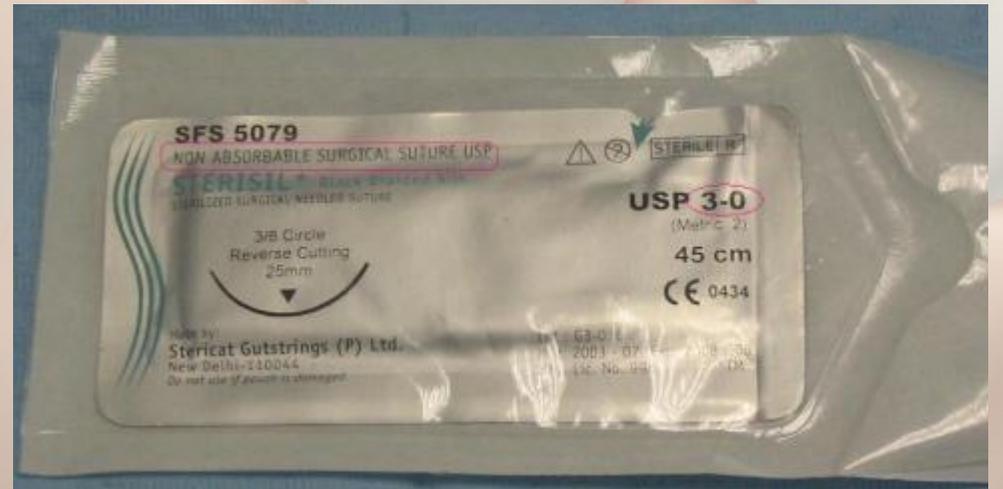
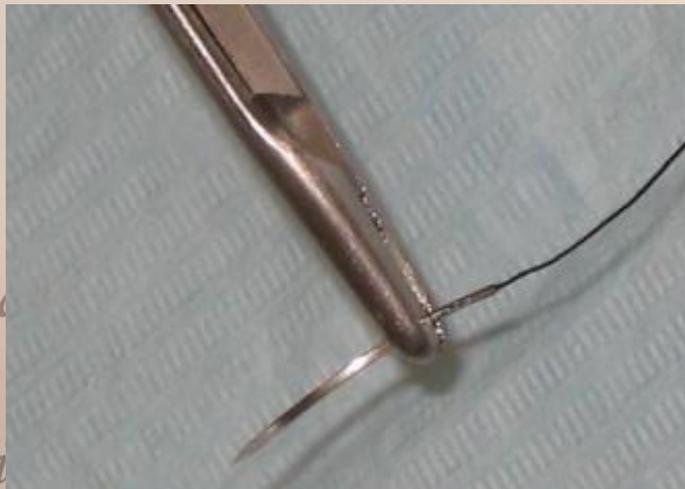
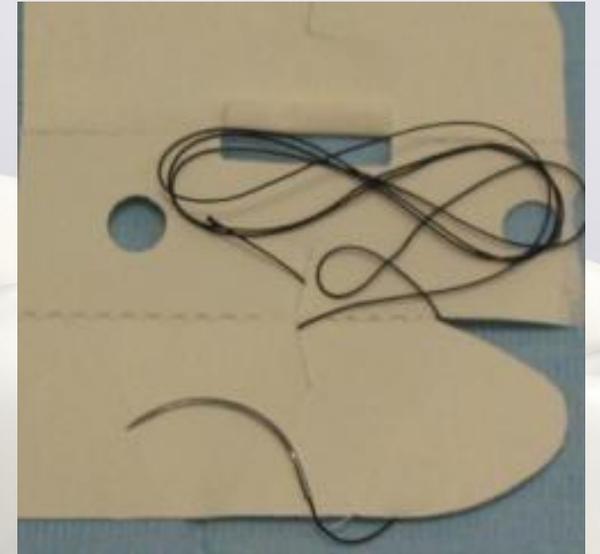
# NEEDLE HOLDER



Per

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in Dental Practice*

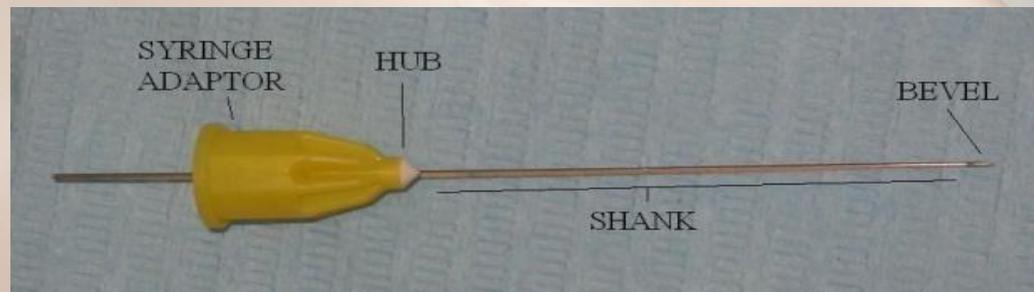
# NEEDLE & SUTURE



Period

1

# LOCAL ANAESTHESIA



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**Thank You**



# Oral surgery

## TYPES OF DENTAL FORCEPS

### THE FORCEPS FOR UPPER TEETH

1- The upper straight forceps:-

The blades, joint and handle are in one long straight line. We have two types, one with broad blades that is we call heavy blades and this is used for extraction of upper central incisors and upper canines, left and right.

The second type of straight forceps has narrow blades or we call it fine blades for extraction of upper lateral incisors (left and right) and upper anterior retained roots.

2- The upper premolar forceps:-

Here we have two bends in the design of the forceps, one where the beaks (blades) bend in relation to the joint of the forceps to apply the forceps parallel to long axis of premolar, the 2<sup>nd</sup> bend or curvature is of the handle to avoid injury to the lower lip and apposing teeth (mandibular). The upper premolars teeth has either one root or two roots (one buccal and one palatal), so there is no difference in the anatomy of the tooth root of the premolar on the buccal and palatal surface so the two blades of the premolars forceps are mirror image to each other.

3- The upper molar forceps (full crown upper molar forceps):-

Since upper molar teeth have three roots, two buccal and one palatal, the blade of palatal side is round to conform or fit on palatal root, while blades on buccal has pointed tip or projection so it can enter or fit the bifurcation between the two buccal roots (mesial and distal) on the buccal side of the tooth. So we have two forceps; one for the right molars and one for the left molars and these forceps also double bend for the same requirement as mentioned for premolar teeth.

The Bayonet forceps, the blades of the forceps are off set to the long axis of the handles, used for extraction of upper 3<sup>rd</sup> molars right and left. In addition, there is another bayonet with fine curved blades for extraction of upper posterior roots.



Bayonet forceps for crowned maxillary 3<sup>rd</sup> molars

## **THE FORCEPS OF LOWER TEETH;-**

Here we have the long axis of the blades is in right angle to the long axis of the handle so the blades can be applied apical to the cemento-enamel junction (on the root) of the tooth surface parallel to the long axis of the tooth and the handle not to cause injury to the upper lip. The forceps for the lower teeth are:-

### **1- Forceps for extraction of lower central and lateral incisors and canine:-**

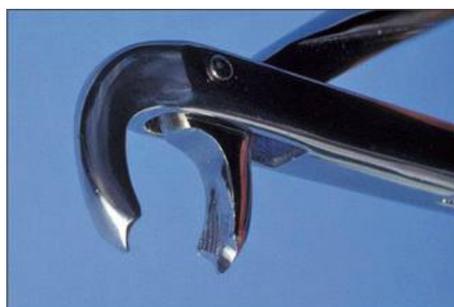
We have fine blades for extraction of the lower central and lateral incisors and lower anterior retained roots which have fine roots with flattened sides (mesiodistally) and heavy blades used for extraction of canines.

### **2- Premolar forceps:-**

Because the bucco-lingual width of the crown in the premolar teeth is larger than that of lower incisors and canines we use forceps with heavy blades but partially away from each other when close to accommodate the crowns of these teeth without crushing for the crown.



Lower premolar tooth forceps



Lower molar tooth forceps

### **3- Full crown lower molar forceps: -**

Since the lower molar teeth have two roots, one mesial and one distal root so the buccal and lingual blades of the forceps designed with projected tapered tip to fit the bifurcation of these teeth on the buccal and lingual sides, so the buccal and lingual blades are identical so the same forceps can be used on the right and left sides on opposite to that in upper molar teeth.

In addition to that we have two Bayonet forceps for lower 3<sup>rd</sup> molars; one for left side

and the other for right side.

## **Mechanical principles of extraction:-**

The removal of teeth from the alveolar process employs the use of the following mechanical principles:-

### **I- Expansion of the bony socket:-**

This is achieved by using the tooth itself as a dilating instrument, and this is the most important factor in forceps extraction, and this principle need:-

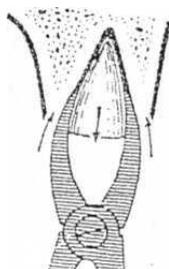
- 1- Sufficient tooth substance be present to be firmly grasped by the forceps.
- 2- The root pattern of the tooth in such that it is possible to dilate the socket to permit the complete dislocation of the tooth from its socket, e.g. dilacerated, divergent, converge roots.
- 3- Nature of the bone, elastic bone especially in young patients is maximal and decreased with age, older patients usually have denser, more highly calcified bone that is less likely to provide adequate expansion during extraction of the teeth.
- 4- Thickness of the bone. Thick bone expansion is less likely to occur by using normal force.

### **II- The use of a lever and fulcrum**

This is used to force a tooth or root out of the socket along the path of least resistance and the principle is the basic factor governing the use of elevators to extract teeth or roots

### **III-The insertion of a wedge or wedges:-**

Between the tooth-root and the bony socket wall, thus causing the tooth to rise in its socket and this explains why some conically rooted mandibular premolar and molars sometimes shoot out of their socket when forceps blades are applied to it.



## Physics forceps:

The Physics Forceps uses first-class lever mechanics. One handle of the device is connected to a “bumper,” which acts as a fulcrum during the extraction and stabilizes the beak during wrist movements. The beak of the extractor is positioned most often on the lingual or palatal root of the tooth and into the gingival sulcus



**Standard Physics forceps set.**



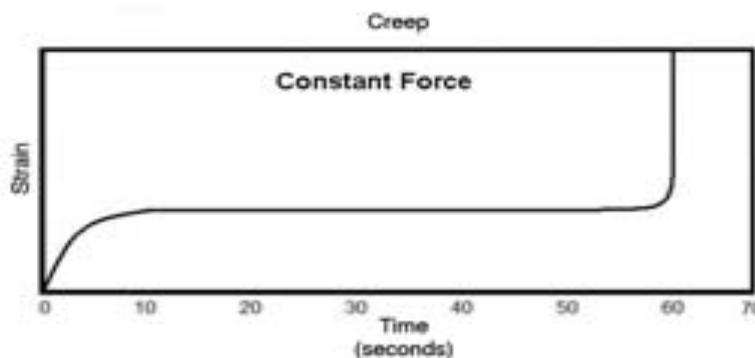
**Bumper guards**



The bumper is most often placed on the facial aspect of the dental alveolus, typically at the mucogingival junction. Unlike conventional forceps, only one point of contact is made on the tooth being extracted. No squeezing pressure is applied to the handles or to the tooth. Instead, the handles (once in position) are rotated as one unit for a few degrees, and then the action is stopped for approximately 1 minute. The torque force generated on the tooth, periodontal ligament, and bone is related to the length of the handle to the bumper (8 cm), divided by the distance from the bumper to the forceps beak (1 cm). As a result, a force on the handle connected to the bumper will increase the force on the tooth, periodontal ligament, and bone by 8 times. No force is required to be placed on the beak, which is only on the lingual aspect of the tooth root. Therefore, the tooth does not split, crush or fracture.

Moment of force in physics represents the magnitude of force applied to a rotational system at a distance from the axis of rotation. The principle of moment is derived from Archimedes' operating principles of the lever and is defined as  $M=rF$ , where "F" is the applied force and "r" is the distance from the applied force to the object. This is referred to as the moment arm. The length of the moment arm (or lever arm) is the key to the operation of the lever, pulley, and most other simple machines capable of generating mechanical advantage. This means that if the force applied to generate work cannot be increased, it is still possible to gain a greater amount of work by increasing the moment arm of the lever.

"Creep" is a phenomenon whereby a material continues to change shape over time under a constant load. In a tooth extraction, creep may occur in bone and the periodontal ligament. Reilly established the creep curve of bone, whereby under a constant load of 60 Mpa, the bone over time changes shape (strain) in 3 different stages



**A creep curve demonstrates that a constant force applied to bone or a periodontal ligament results in initial changes in shape, with a prolonged period (horizontal line) necessary before the material fractures or releases (the vertical aspect of the line on the right at 60 seconds).**

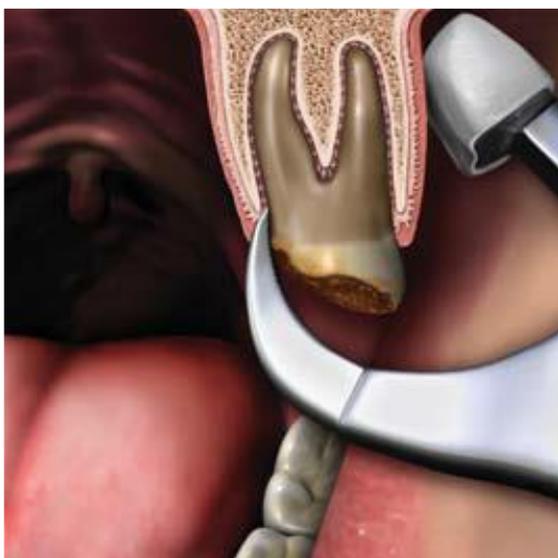
The majority of bone changes occur within the first minute, whereby the strain of bone (the change of length divided by the original length) is modified. The higher the force that is applied, the greater the deformation of the bone. This process allows the tooth socket to expand and permits the tooth to exit the socket.

A secondary creep action occurs over time and allows the bone to further deform when the force is applied during a 1- to 5-minute period. The longer the time, the greater the

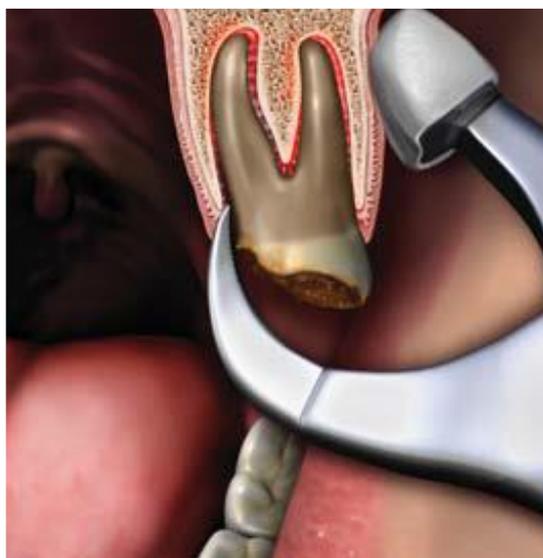
deformation; however, it expresses only a 10% to 20% difference compared to the initial one-minute strain. Eventually, the third phase of the curve causes the bone to fracture if the load is applied over a long time frame, representing creep rupture. A similar phenomenon occurs in the periodontal complex.

Mechanical forces shift lateral force to a tooth, causing primary movement to the periodontal ligament and space. A greater force overtime causes a slight additional tooth movement. Therefore, the creep of the periodontal complex is similar to the creep of the bone, whereby the constant load weakens the periodontal ligament. Thus, a constant load on the tooth over time increases the tooth socket dimension and decreases the strength of the periodontal complex.

Once creep has expanded and weakened the periodontal ligament and bone, the handle of the extraction device may be slowly rotated another few degrees for 10 to 30 seconds. This action contributes to the creep rupture of the ligament and usually elevates the tooth a few millimeters from the socket. At this point the tooth is loose and ready to be removed from the socket using any pincer-like device, i.e, pickups, extraction forceps, or hemostats.



**The Physics Forceps is in position, and constant pressure is applied.**



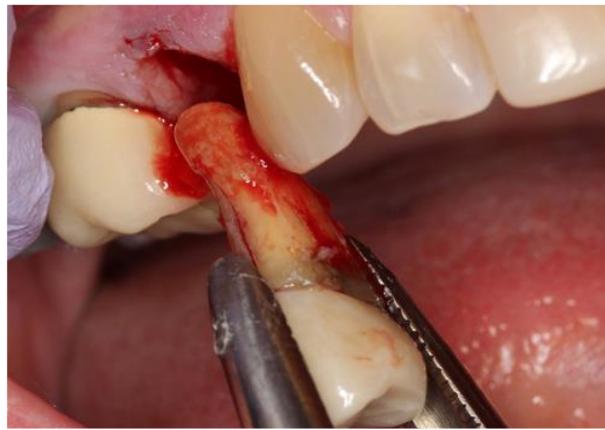
**Creep is expanding the bone and rupturing the periodontal ligament.**



**The tooth is rotated slightly and elevated from the socket.**



**The tooth was delivered from the socket with a pincer-type instrument as the Physics Forceps are not designed to remove the tooth all the way from the socket but simply to elevate the tooth or release the periodontal ligaments.**



**The tooth was easily removed from the socket.**

The extraction of a tooth using the Physics Forceps is similar to the removal of a nail from wood using a hammer versus a pair of pliers (Figures below). The handle of the hammer is a lever, and the beaks of the hammer's claw fit under the head of a nail. The hammer's head acts as a fulcrum. A rotational force applied to the hammer handle magnifies the force by the length of the handle, and the nail is elevated from the wood. Unlike a nail in wood with parallel sides and friction along its full length, a tooth is tapered. After being elevated a few millimeters, the periodontal ligament fibers are broken and the tooth may then be easily removed without additional rotational force. This is important to note, since further rotational force on the tooth may fracture the

facial plate of bone.



**A “traditional” dental forceps removes a tooth similar to how a pair of pliers removes a nail.**



**A claw hammer uses class I lever mechanics, with the handle one lever, the head of the hammer as the fulcrum, and the claw as the short lever applied to the nail. The Physics Forceps uses a similar action to remove a tooth.**

Stress is the internal distribution of force per unit area that balances and reacts to external loads applied to a body. Stress can be broken down into its shear, tensile, and compressive components. Materials in general are weakest to shear forces and strongest to compressive loads. For example, bone is strongest to force in compression, 30% weaker to tension, and 65% weaker to shear forces (*Reilly DT., 1975*). When a rotating force is applied to the Physics forceps on a tooth, the stress to the tooth and the periodontal complex is a shear component of force. The force applied to the gums and bone by the bumper of the Physics Forceps is over a greater surface area and is a compressive force, thus bracing the buccal bone. This permits the lingual plate to expand more and protects the facial plate from fracture.

The instrument is uniquely designed to allow tension to be placed on the periodontal ligament and to achieve excellent leverage. This tension results in the physiologic release of an enzyme by the body that breaks down the periodontal ligament over a short period of time which is called hyaluronidase (hyaluronate

glycanohydrolase). This is an enzyme that catalyzes the hydrolysis of the interstitial barrier, hyaluronan (hyaluronic acid), which is the cement substance (extracellular matrix) of all human tissues (*KUMAR DM., 2015*). This process may take 20 seconds or up to 4 minutes depending on the tooth and surrounding bone structure of the patient. The clinician must be patient, as the technique will feel like nothing is happening since none of the usual operator movements are employed. With the breakdown of the periodontal ligament, the tooth will release or “pop” out of the socket in an upward and outward motion, mirroring the arch form of the head of the instrument. This innovative instrument allows tooth dislodgment with little or no pressure, simply utilizing leverage. The handles are never squeezed like a conventional forceps; rather they are held lightly in the hand, and the wrist is rotated to simply create tension on the palatal aspect of the root. There is no forearm, bicep, or shoulder pressure used. The handles simply allow the beak to engage the root structure without slipping off. During a short time of constant tension, the root will disengage or pop from the socket incisally and facially. Although the facial bone may expand slightly, the movement of the tooth out of the socket is not straight facial, but rather up and out of the socket. This allows for maintenance of the facial plate of bone, when the instrument is used correctly. One of the biggest misconceptions of this innovative technique is that it is a “forceps” as the names implies, when it fact it is a lingual elevator (*Kosinski T, Golden R., 2015*).



**Atraumatic extraction with the Physics Forceps (Golden Dental Solutions). Using the proper hand position and hold are a must when utilizing the Physics Forceps technique.**



# Elevators

## Elevators:-

Are exo-levers, instrument designed to elevate or luxate the teeth or roots from their bony socket in close or surgical method of extraction to force a tooth or root along the line of withdrawal.

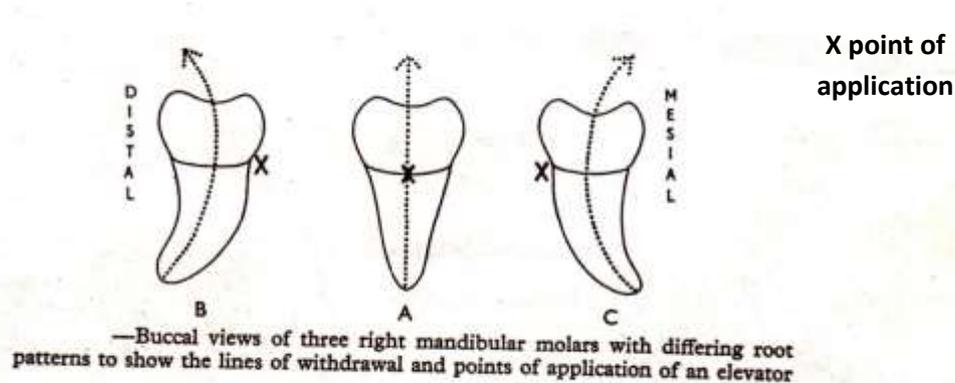
## Line of withdrawal:-

Is the path along which the tooth or root will move out of its socket when minimal force is applied to it, and this line is primarily determined by root pattern (long axis of the tooth).

## Point of application:-

Is the site on the root at which force must be applied to effect delivery, is determined by the line of withdrawal. We have buccal point of application, distal point of application, and mesial point of application.

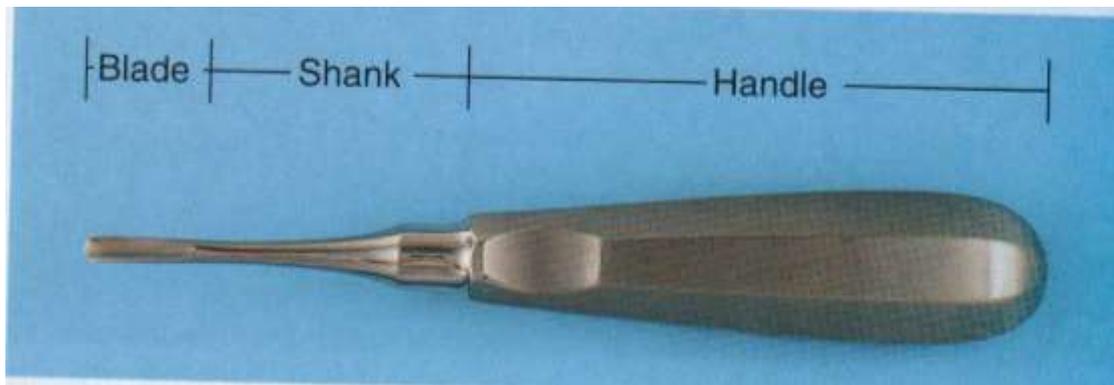
### Line of withdrawal



## Parts of elevators:-

There are three major components of the elevator are:-

- **Handle:** is usually of generous size, so it can be held comfortably in the hand to apply substantial but controlled force. In some situations, cross bar or T-bar handles are used.
- **Shank:** simply connects the handle to the working end, or blade of the elevator. It is generally of substantial size, and is strong enough to transmit the force from the handle to the blade.
- **Blade:** This part engages the crown or root and transmit force to the tooth, bone or both. The working side of the blade either concave or flat.



**Fig. 1: Parts of elevator**



**Fig. 2: T-bar handle**

**Mechanical principles of use of elevators:-**

The work principles as applied to the use of elevators maybe that of:-

- 1- **Lever principle.**
- 2- **Wedge principle.**
- 3- **Wheel and axle principle.**
- 4- **Combination of these principles.**

**Clinical uses of elevators:-**

- 1- Elevators are used to luxate and remove teeth which cannot be engaged or grasped by the beaks of forceps (e.g. impacted teeth, malposed teeth), also badly carious teeth, teeth with heavy filling.
- 2- To remove old roots and fractured roots and sectioned roots.
- 3- To loosen teeth prior to using forceps.
- 4- To split teeth which have had grooves cut in them, as in separation or roots.

- 5- To remove small amounts of bone to create point of application for the beaks of forceps, or removal of interseptal bone.
- 6- Any tooth resisting normal extraction force by extracting forceps.

### **Types of elevators:-**

The biggest variation in the type of elevator is in the shape and size of the blade. The three basic types of elevators are:

- (1) the straight type
- (2) the triangle or pennant-shape type
- (3) the pick type.

### **1- Straight elevators:-**

A. The straight elevator: is the most commonly used elevator to luxate teeth, elevator in which the blade, shank, and the handle are straight. (Fig. 3). The blade of the straight elevator has a concave surface on one side that is placed toward the tooth to be elevated (Fig. 4). The small straight elevator, No. 301, is frequently used for beginning the luxation of an erupted tooth, before application of the forceps (Fig. 5). Larger straight elevators are used to displace roots from their sockets and are also used to luxate teeth that are more widely spaced or once a smaller-sized straight elevator becomes less effective. The most commonly used large straight elevator is the No. 34S, but the No. 46 and No. 77R are also used occasionally.



**Fig. 3: Straight elevator**



**Fig. 4: The shape of the blade**



**Fig. 5: the different size of straight elevator**

The shape of the blade of the straight elevator can be angled from the shank, allowing this instrument to be used in the more posterior aspects of the mouth. Two examples of the angled-shank elevator with a blade similar to the straight elevator are the Miller elevator and the Potts elevator.

B. Coupland's chisel (elevator): It is similar to straight elevator but the working end is sharp and straight cut, used for chiseling of bone to create point of application or to split of teeth. It's of different sizes, size 1, size 2, size 3. Depending on the width of the working end. (fig. 6).



Fig. 6: Coupland's chisel

## 2- The triangle or pennant-shape type

A. Cryer's elevators: The second most commonly used type of elevator (Fig. 7). These elevators are provided in pairs: a left and a right. The triangular elevator is most useful when a broken root remains in the tooth socket and the adjacent socket is empty. A typical example would be when a mandibular first molar is fractured, leaving the distal root in the socket but the mesial root removed with the crown. The tip of the triangular elevator is placed into the socket, with the shank of the elevator resting on the buccal plate of bone. The elevator is then turned in a wheel-and-axle rotation, with the sharp tip of the elevator engaging the cementum of the remaining distal root; the elevator is then turned and the root is delivered. Triangular elevators come in a variety of types and angulations, but the Cryer is the most common type.



Fig. 7: Cryer's elevator right and left

B. Winter's elevator: In which the working end is the same that of Cryer's elevator but the handle is in right angle to the shank so it is called winter's (T-bar) cross-bar handle elevator. Winter's elevators are very powerful and great force maybe applied or generated (sufficient to fracture the mandible) so the use of this elevator with great care to avoid fracture of the jaw. (Fig. 8)



Fig. 8 Winter's elevator

C. War-wick James elevators: It is a light duty elevator. It's like Cryer's elevator, also we have two angled (mesial and distal) and one straight. The blade is short and the end is rounded and the handle is flattened, it's used for extraction of retained roots, deciduous teeth, anterior lower teeth extraction, and where there is less resistance area. E.g. extraction of upper 8. (Fig.9)



Fig. 9: War-wick James

### 3. The pick-type elevator

A. Crane pick elevators: third type of elevator that is used with some frequency is. This type of elevator is used to remove roots. The heavy version of the pick is the Crane pick (Fig. 10). This instrument is used as a lever to elevate a broken root from the tooth socket. Usually it is necessary to drill a hole with a bur (purchase point) approximately 3 mm deep into the root just at the bony crest. The tip of the pick is then inserted into the hole, and with the buccal plate of bone as a fulcrum, the root is elevated from the tooth socket. Occasionally the sharp point can be used without preparing a purchase point by engaging the cementum or furcation of the tooth.



Fig. 10: Crane pick elevator

B. **Apexo elevators:** The second type of pick is the root tip pick or apex elevator (fig. 11 ). The apexo elevator is a delicate instrument. The working blade is long, the margins are sharp, we have 3 apexo, 2 angled and 1 straight (mesial, distal, straight). The blade forming an angle with the shank, this elevator is used mainly for removal of apical fragments of root deeply present in the socket of the lower jaw especially morals. It must be emphasized that this is a thin instrument and should not be used as a wheel-and-axle or lever type of elevator. We push it between the socket and the root to loosen the fractured tip and remove it from the socket.

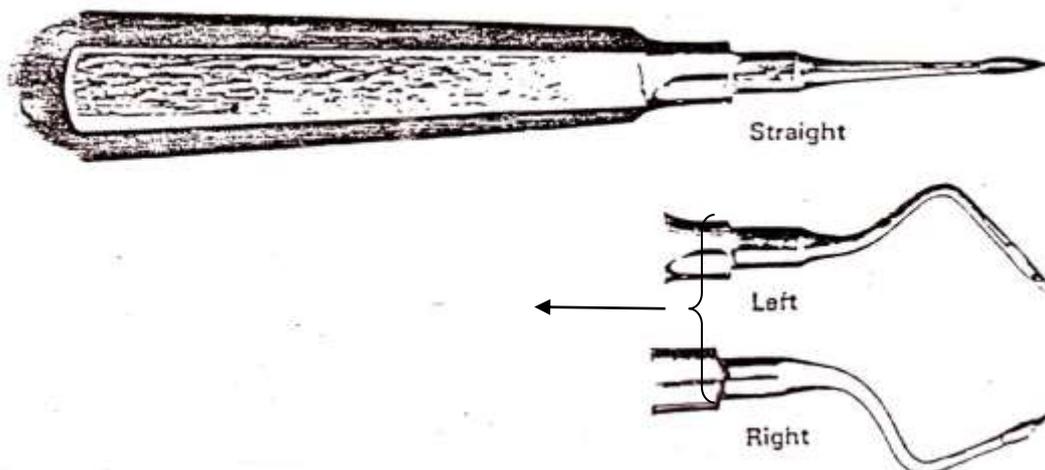


Fig. 11; Apexo elevator

## **Guiding principles for use of elevators:-**

The following rules should be observed when using elevators in general:-

- 1- Never use an adjacent tooth as a fulcrum, unless that tooth to be extracted itself in the same visit, and the fulcrum should always be bony one (alveolar bone).
- 2- An elevator should always be supported to avoid slippage and injury to the patient.
- 3- Avoid the use of excessive force if the tooth/root resist luxation, by gentle rotation, then stop, look for the obstruction to elevation and deal with it.
- 4- The direction of force should be such that the roots are not directed toward major structures such as the maxillary antrum.
- 5- An elevator should never be used "blind" in the socket.
- 6- If an application point is not present, then this should be created by careful removal of bone.

Elevators should always be sterile and sharp.

- 7- The sharp edges of the working blades are placed between the alveolus and the root surface and gently rotated apically along the long axis of the elevator to luxate or displacing the tooth or root.

## **Complications of use of elevators:-**

Although elevators are very useful instrument for facilitating extraction of teeth, but misuse or miss-judgment may lead to some complications, part of it may be serious:-

- 1- **Injury to the soft tissues**, like injury to the tongue, floor of the mouth, soft and hard palate, caused by slipping of elevator during its use.
- 2- **Wrong application of force or excessive force** may lead to fracture of jaw especially the lower jaw at the angle of the mandible, also excessive force may lead to crushing of the alveolar bone and fragmentation.
- 3- **Fracture of maxillary tuberosity** especially in extraction of upper third molars.
- 4- **Uncontrolled force** may lead to displacement of roots into maxillary sinus, infratemporal fossa, buccal soft tissue, submandibular space or inferior dental canal.
- 5- **Use of elevator in periapical are of abscessed tooth** may cause spread of infection to the surrounding tissue.
- 6- **Tip of instrument (working blade) may be fractured** and remain in the socket causing postoperative infection or delay healing, so always check the tip of instrument after use.

## **So most problems with elevators arise from:-**

- a) Miss-judgment of amount of force exerted.
- b) Improper positioning of the elevators.

So these factors should be remembered and kept in our mind when using elevators.

## **The combined use of forceps and elevators**

The first instrument to be applied should be elevator ( ex. a Coupland's )driven vertically up the long axis. This will cut the periodontal membrane and dilate the bony socket on both buccal and lingual aspects. When there is some response to the elevators, forceps may be applied.

## **ORDER OF EXTRACTION OF TEETH**

In case of multiple extractions there are certain rules to be followed for the order of extraction.

These are:

- Maxillary tooth should be extracted before the mandibular tooth as maxilla gets anesthetized easily and also prevents the fall of fractured crown, debris, or restorations into the otherwise open extracted mandibular socket.
- Posterior tooth should be extracted before anterior tooth as post extracted blood gets collected in the posterior region which does not alter the visibility of the anterior region.

## **The supporting hand**



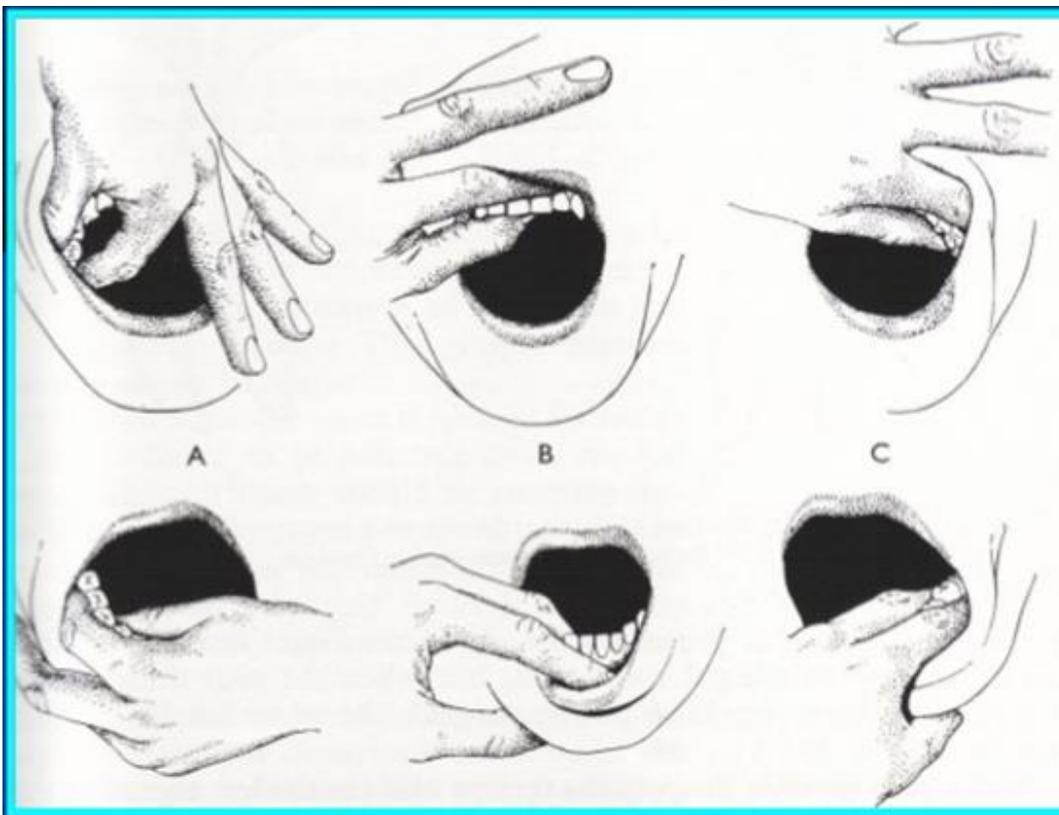
\*This is particularly important in the mandible where the downward force must be resisted .

The other function of the supporting hand is to retract the cheeks and tongue and to protect the tissues. This is done by placing a finger and thumb (or two fingers) one on each side of the gum on the buccal and the lingual or palatal aspects of the tooth.

\*At the same time the operator is able to feel that the blades of the forceps are under the mucous membrane and correctly applied to the tooth.

\*During the second movement of extraction, the watching fingers can feel any slipping of the forceps on the tooth or any tendency of adjacent teeth to move, or alveolar bone to fracture.

\*When working on the maxilla the free fingers of the supporting hand should be kept closed to avoid the fingers causing accidental damage to the patient's eyes.



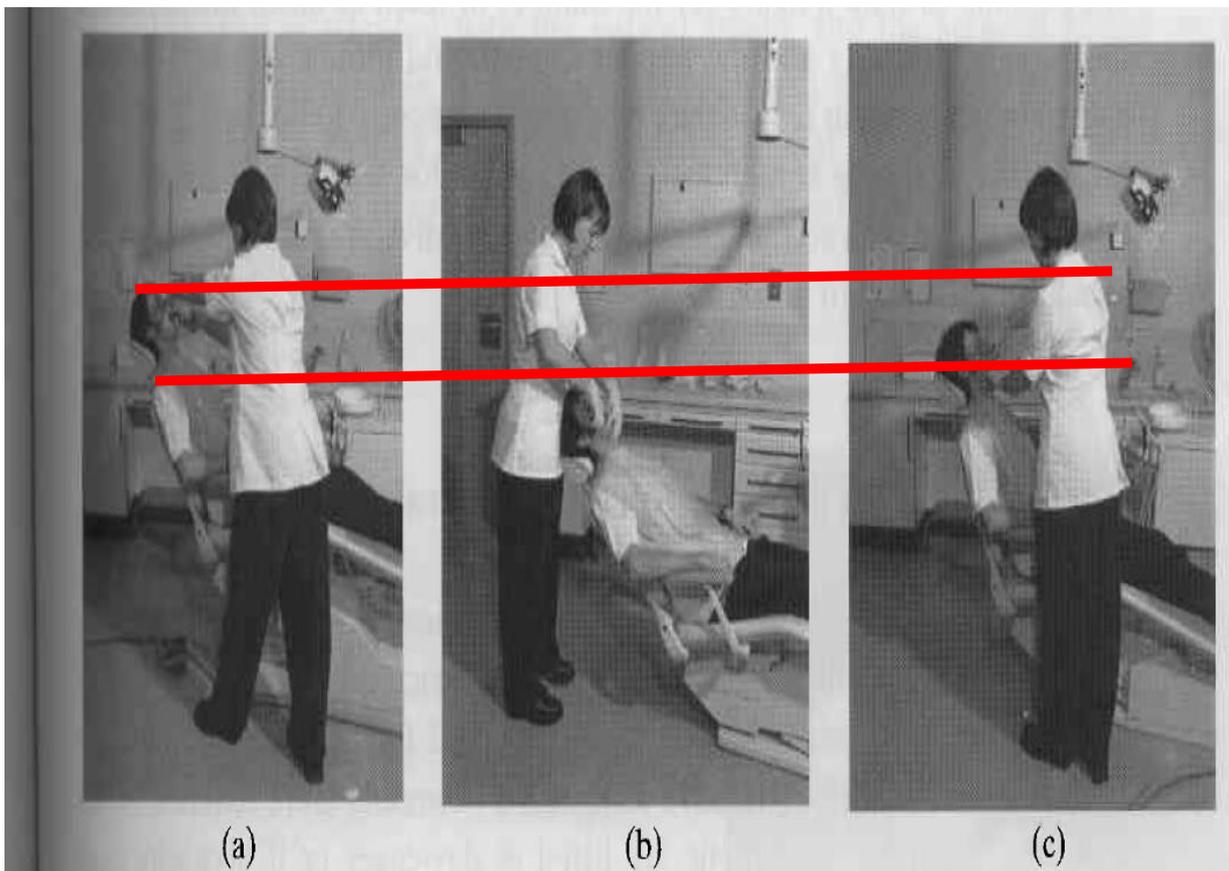
## Stance

The right - handed operator stands facing the patient to the left of the chair but not too close. The left foot is advanced, the weight balanced on both feet, with the arms slightly bent.

The left hand is put forward to support the jaw while the right grasps the forceps. This position is adopted for the extraction of **all upper teeth and for those in the left mandible.**

**Teeth in the right mandible are extracted from behind the patient.**

The feet are approximately shoulder width apart, and the left arm is placed round the patient 's head to support the lower jaw . Ideally the axis of the tooth should lie on the operator 's center line.



**Fig. 8.8** Position of operator: (a) for extractions in upper jaw; (b) lower right; (c) lower left.

## Chair position

### For maxillary extraction

Chair should be tipped backward so that the maxillary occlusal plane is at an angle of about 45-60 degrees to the floor.

Raise the patient's legs to help improve the patient's comfort.

The height of the chair should be such that the patient's mouth is at or **slightly below the operator's elbow level**.

During an operation on the maxillary right quadrant The patient's head should be turned substantially toward the operator so that adequate access and visualization can be achieved.

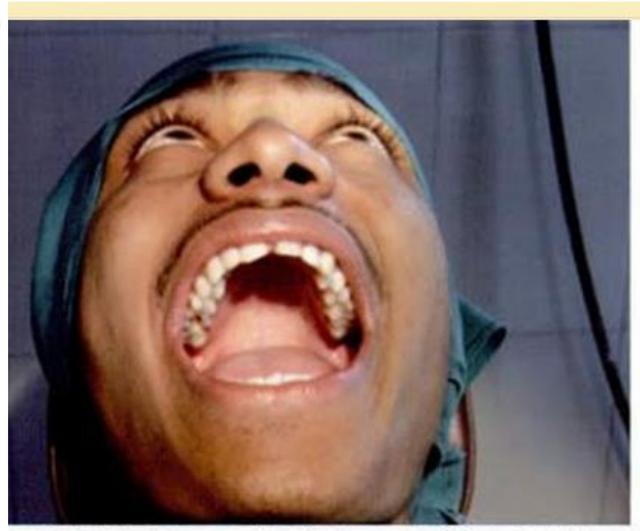
For extraction of teeth in the maxillary anterior portion of the arch the patient should be looking straight ahead

For the maxillary left portion of the arch the patient's head is turned slightly toward the operator.

### For mandibular extraction

patient should be positioned in a more upright position so that when the mouth is opened wide, the occlusal plane is parallel to the floor.

generally the chair is higher for extractions in the upper jaw and lower for those in the lower jaw.



# Instrumentation for Basic Oral Surgery other than forceps and elevator

## 1-Artery forceps

Occasionally, pressure does not stop bleeding from a larger artery or vein. When this occurs, an instrument called a hemostat is useful

### Artery Forceps (Hemostat)

It has following features:

- The inner margins of the blades are serrated and on closure, the blades are tightly apposed without any gap in between.
- The blades are held together by means of a catchlock mechanism.
- The blades are conical and blunt. Based on the shape of the blades, artery forceps can be straight or curved.
- The artery forceps has following types:

#### *Small or Mosquito Forceps (straight and curved)*

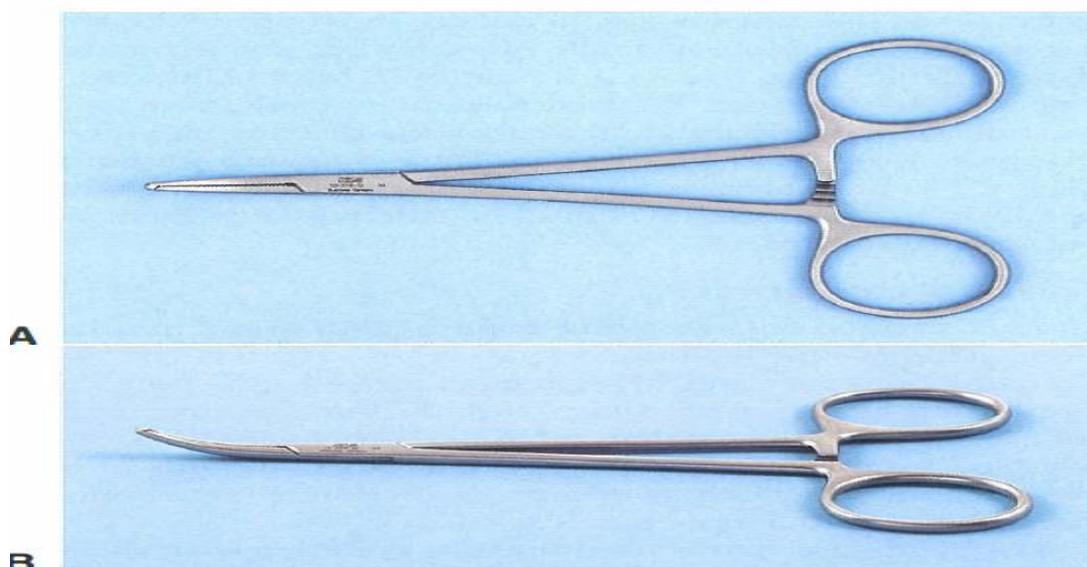
It is very small in size and has relatively pointed tips.

- It is used for holding small bleeding points.
- It is very useful in plastic surgical procedures, e.g. cleft lip, cleft palate.

#### *Medium Artery Forceps*

It is the most commonly used type of artery forceps. It can be straight or curved artery forceps

#### *Large Artery Forceps*



## 2- Needle Holder

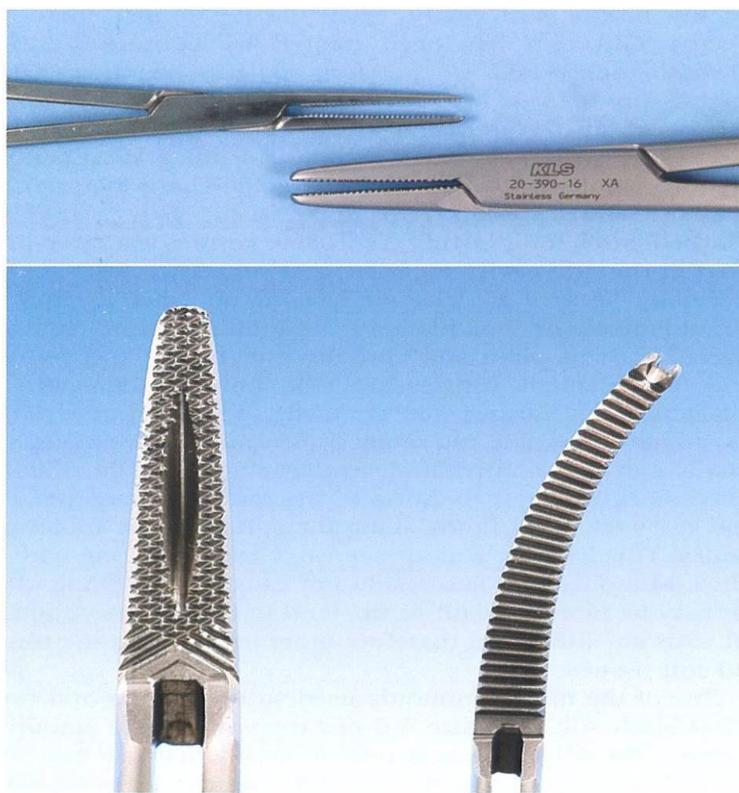
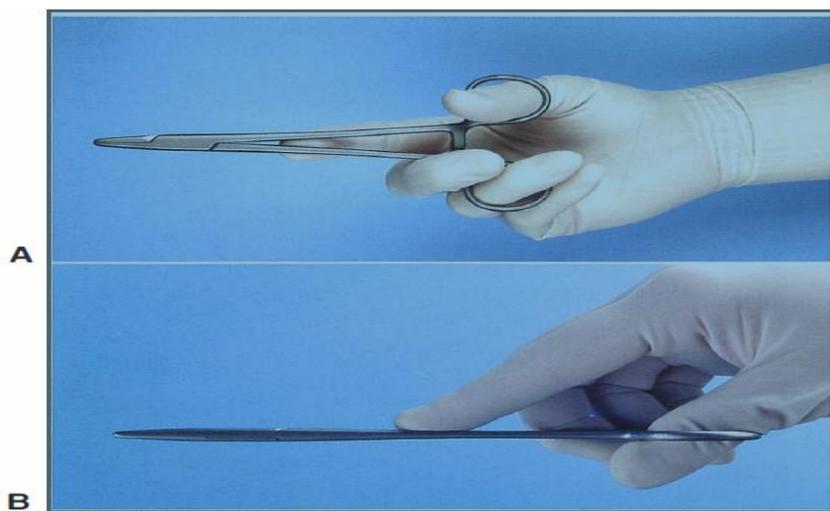
It has following features

\*The beaks of a needle holder are shorter and stronger than the beaks of a hemostat.

\*The face of a beak of the needle holder is crosshatched to permit a positive grasp of the suture needle.

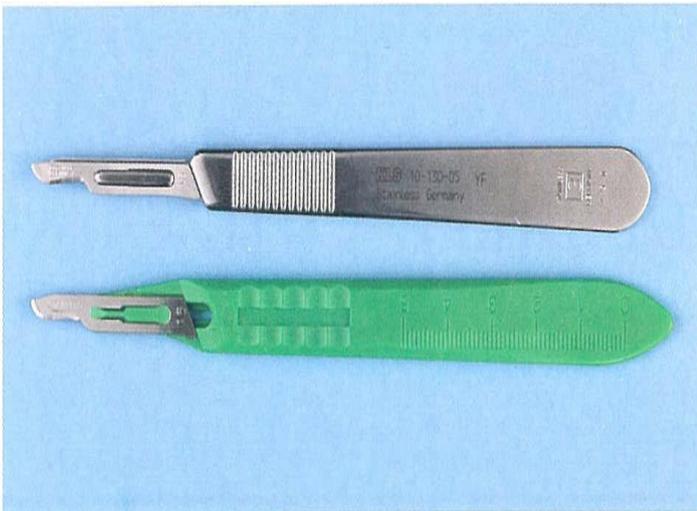
\*Longitudinal groove is present on serrated surface

The hemostat has parallel grooves on the face of the beaks, thereby decreasing the control over needle and suture. Therefore the hemostat is a poor instrument for suturing.

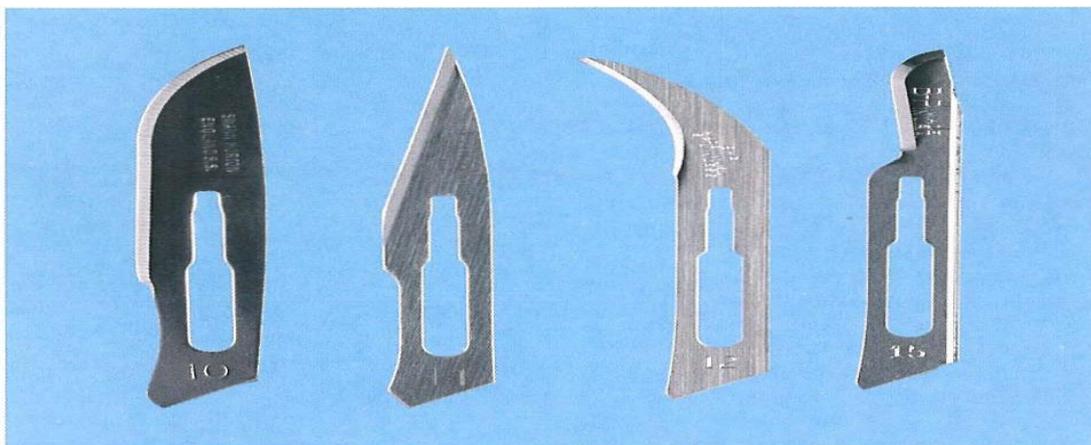


The needle holder and artery forceps are useful in oral surgery to remove granulation tissue from tooth sockets and to pick up small root tips, pieces of calculus, amalgam, fragments, and any other small particles that have dropped into the wound or adjacent areas.

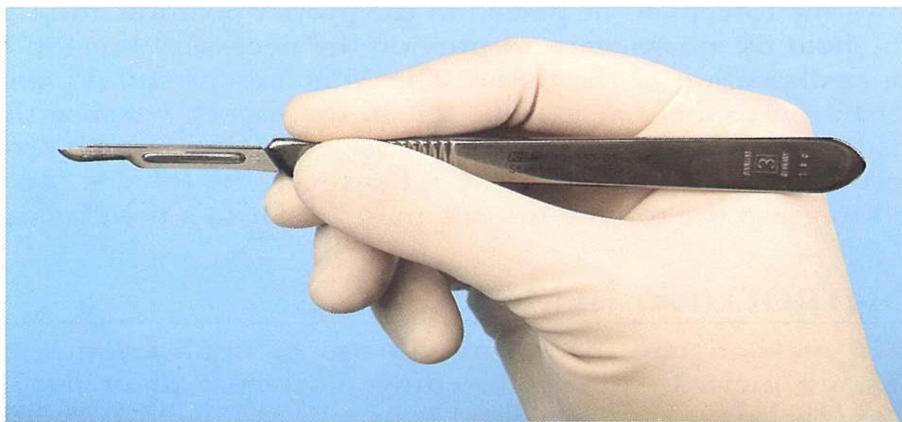
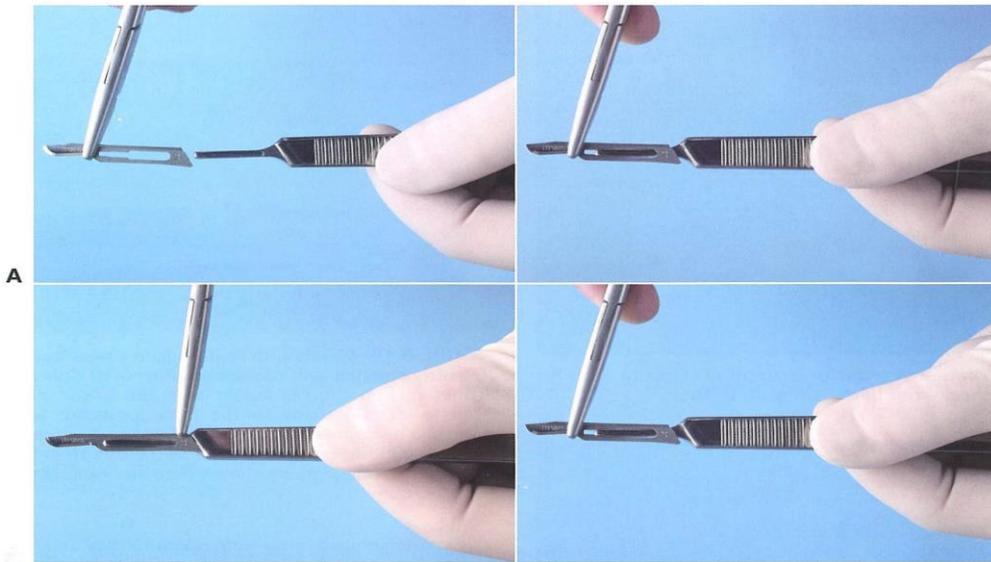
### 3- scalpel and blade



Scalpels are composed of handle and sharp, disposable blade. Scalpel No. 3 handle with No. 15 blade is most commonly used



Scalpel blades used in oral surgery include No. 10, No. 11, No. 12, and No. 15, going from left to right.



When loading scalpel blade, surgeon holds blade in needle holder and handle, with male portion of fitting pointing upward. Surgeon then slides blade into handle until it clicks into place. To remove blade, the surgeon uses needle holder to grasp end of blade next to the handle and lifts it to disengage it from the fitting. Surgeon then gently slides blade off the handle.

#### 4-Elevating Mucoperiosteum

When an incision through periosteum is made, ideally the periosteum should be reflected from the underlying cortical bone in a single layer with a periosteal elevator. The instrument that is most commonly used in oral surgery is the No. 9 Molt periosteal elevator.



## 5- Retractor

The two most popular cheek retractors are

- 1- The right angle Austin retractor
- 2- The broad offset Minnesota retractor .

These retractors can also be used to retract the cheek and a mucoperiosteal flap simultaneously.



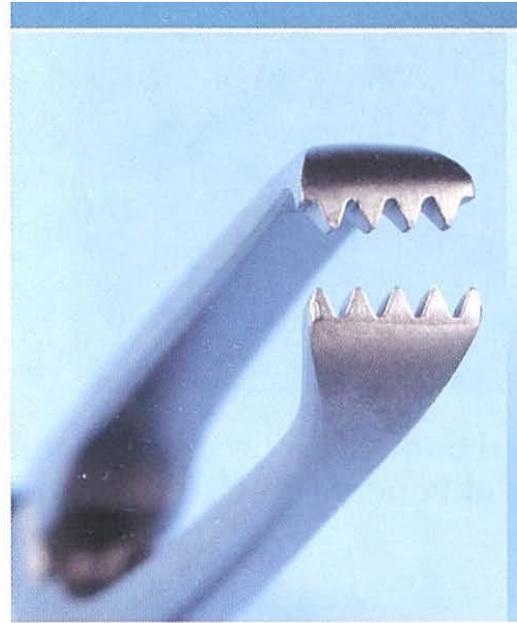
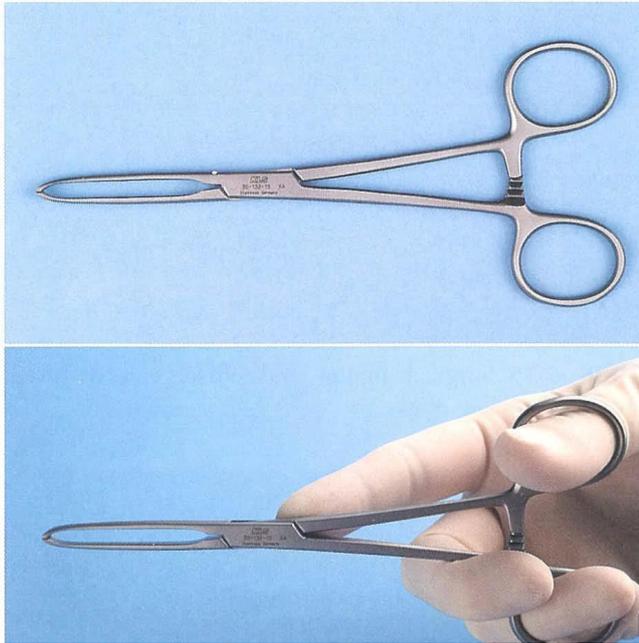
## Grasping Soft Tissue

A-Adson forceps: - These are delicate forceps with or without small teeth at the tips, which can be used to hold tissue gently and thereby stabilize it.



## B-Allis tissue forceps

some types of surgery, especially when removing larger amounts of tissue or doing biopsies, forceps with locking handles and teeth that will grip the tissue firmly are necessary. In this situation the Allis tissue forceps are used.



## 7-Removing bone instrument

### A- Rongeurs

The instrument commonly used for removing bone in dentoalveolar surgery is the rongeur forceps. This instrument has sharp blades that are squeezed together by the handles, cutting or pinching through the bone. The surgeon should not use the rongeurs to remove large amounts of bone in single bites. Rather, smaller amounts of bone should be removed in multiple bites.



## B-Bur and Hand piece

This is the technique that most surgeons use when removing bone for surgical removal of teeth. High-speed, high torque handpieces with sharp carbide burs remove cortical bone efficiently. The handpiece must not exhaust air into the operative field, making it unwise to use typical high-speed turbine drills for routine restorative dentistry. The reason is that the air exhausted into the wound may be forced into deeper tissue planes and produce tissue emphysema, a dangerous occurrence.



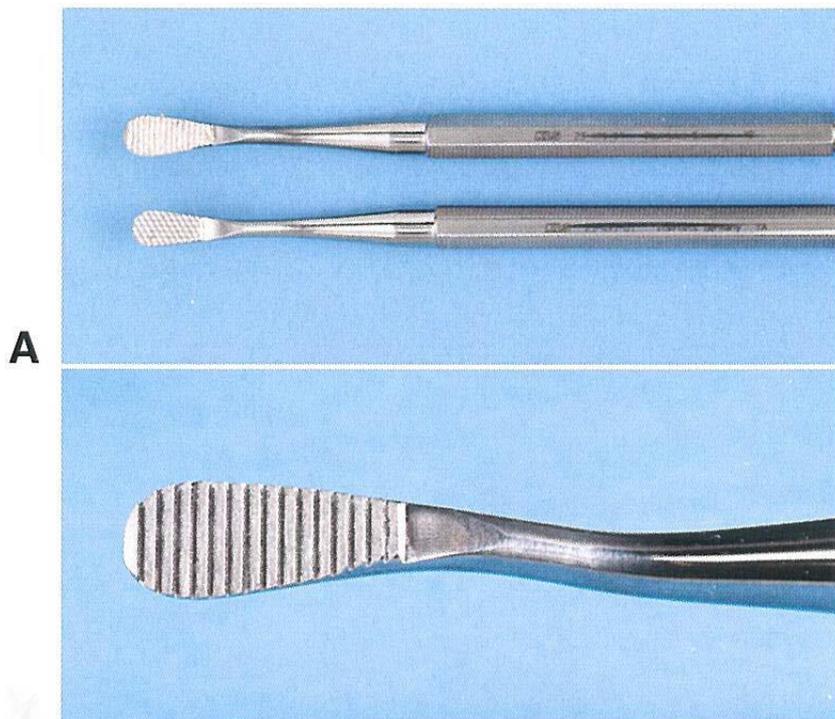
## C-Mallet and Chisel

Occasionally, bone removal is performed using a mallet and chisel



## D-Bone File

Final smoothing of bone before suturing a mucoperiosteal flap back into position is usually performed with a small bone file. The bone file cannot be used efficiently for removal of large amounts of bone; therefore, it is used only for final smoothing.



## Scissors

It is used for placing sutures. The scissors are held in the same way as the needle holder.

The two major types of tissue scissors are:

The Iris scissors. It is small, sharp-pointed, delicate tools used for fine work

The Metzenbaum scissors. These scissors can have straight or curved blades also used for undermining soft tissue and for cutting.



**Fig.** Soft tissue scissors are of two designs: Iris scissors (top) are small, sharp-pointed scissors. Metzenbaum scissors (bottom) are longer, delicate scissors. Metzenbaum scissors are available as either sharp-tipped (shown here) or blunt-tipped.

### **Postextraction Care of Tooth Socket**

After extraction of the tooth, the bottom of the socket is curetted (as long as the tooth is nonvital) with a periapical curette, to remove any periapical lesion from the area. Curetting must be done carefully, because if any remnants of granulation tissue remain in the socket, there is a chance they will develop into a cyst, because a large percentage contain epithelial cells.

Afterwards, and only if considered necessary (e.g., there are sharp bone edges), the alveolar margin is smoothed using rongeur forceps or a bone file, and then the lingual and buccal plates are compressed using finger pressure. This is done to restore the expansion of the socket caused by the extraction, and also for initial control of hemorrhage. Hemostasis is also aided by the patient applying pressure on gauze placed over the socket for 30–45 min



### THE TRANSALVEOLAR APPROACH[1]

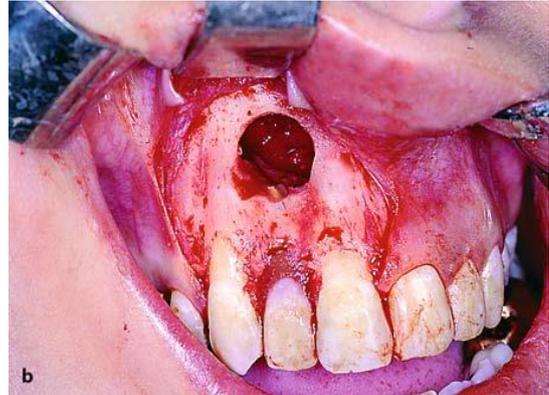
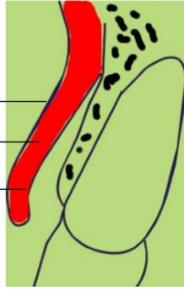
If it is not possible to remove a tooth (or root) directly from within the socket (what might be called an **intra-alveolar approach**), access is made through the side of the alveolus (a **transalveolar approach**).

#### **Indications of Transalveolar Extractions**

1. Any tooth that is resistant to normal intraalveolar extraction
2. Retained roots or teeth with severe carious destruction that cannot be grasped with forceps or delivered by an elevator.
3. Impacted teeth
4. Sclerosed, dense and unyielding bone which is resistant to expansion.
5. Hypercementosis and ankylosed teeth.
6. Teeth with anatomic anomalies like dilacerations.
7. Teeth with multiple or unfavorable roots.
8. Any tooth or root close to important structures like maxillary sinus, Mandibular canal

## Mucoperiosteal Flap

- Mucosa
- Connective tissue
- Periosteum



### Flap design

There are several principles underlying the design of a mucoperiosteal flap. The flap must:

1. Give adequate access to the site of interest
2. Be designed to maintain a good blood supply
3. be amenable to repair with its margin on sound bone
4. Not risk damage to adjacent structures

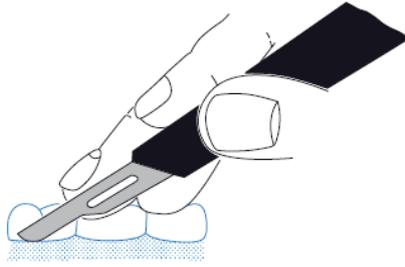


5. The vertical releasing incisions always extend to the interdental papilla and never to the center of the labial or buccal surface of the tooth. This ensures the integrity of the gingiva proper, because if the incision were to begin at the center of the tooth, contraction after healing would leave the cervical area of the tooth exposed.

6. A satisfactory surgical field is ensured when the incision extends at least one or two teeth on either side of the area of bone removal. The fact that the base of the resulting flap is broader than its free gingival margin ensures the necessary adequate blood supply for the healing process.

### *Incision*

The scalpel is held in a pen - grip and the hand is supported against slipping. The incision is made with one firm, slow stroke of a sharp blade, which is kept vertical to the epithelial surface



## **Incision should be avoided (HW)**

1. Incision over bony prominences?
2. Incision through papillae
3. Incision over facial aspect midcrwon
4. Incision not placed over sound bone
5. Vertical incision on area of mental foramen
6. Lingual incision in the posterior mandible
7. Vertical releasing incision in the posterior palate

## **Types of Flaps**

### **1.Trapezoidal Flap(THREE SIDED FLAP)**

It is formed by a horizontal incision along the gingivae, and two oblique vertical releasing incisions extending to the buccal vestibule



### **Advantages.**

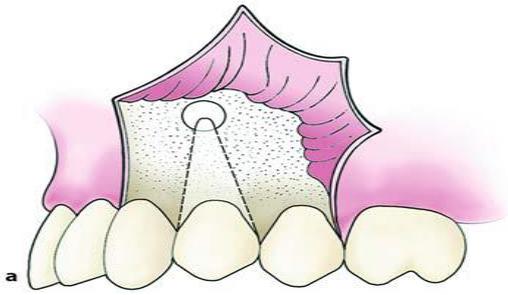
1. Provides excellent access,
2. allows surgery to be performed on more than one or two teeth,
3. produces no tension in the tissues,
4. allows easy reapproximation of the flap to its original position and hastens the healing process.

**Disadvantages.** Produces a defect in the attached gingiva (recession of gingiva).

### **2. Triangular Flap**

This flap is the result of an L-shaped incision with a horizontal incision made along the gingival sulcus and a vertical or oblique incision.

The vertical incision begins approximately at the vestibular fold and extends to the interdental papilla of the gingiva. The triangular flap is performed labially or buccally on both jaws and is indicated in the surgical removal of root tips, small cysts, and apicoectomies.

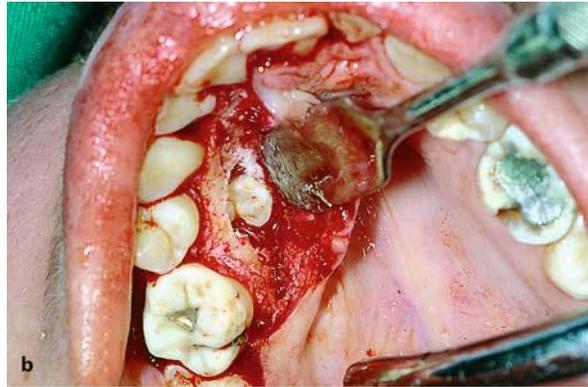


**Advantages.** Ensures an adequate blood supply, satisfactory visualization, very good stability and reapproximation; it is easily modified with a small releasing incision, or an additional vertical incision, or even lengthening of the horizontal incision.

**Disadvantages.** Limited access to long roots, tensions created when the flap is held with a retractor, and it causes a defect in the attached gingiva.

### 3.Envelope Flap

This type of flap is the result of an extended horizontal incision along the cervical lines of the teeth. The incision is made in the gingival sulcus and extends along four or five teeth. It is usually indicated when the surgical procedure involves the cervical lines of the teeth labially (or buccally) and palatally (or lingually), apicoectomy (palatal root), removal of impacted teeth, cysts.



**Advantages.** Avoidance of vertical incision and easy reapproximation to original position.

**Disadvantages.**

- Difficult reflection (mainly palatally),
- great tension with a risk of the ends tearing,
- limited visualization in apicoectomies,
- limited access,
- possibility of injury of palatal vessels and nerves,
- defect of attached gingiva.

**4.Semilunar Flap**

This flap is the result of a curved incision, which begins just beneath the vestibular fold and has a bows haped course with the convex part towards the attached gingiva. The lowest point of the incision must be at least 0.5 cm from the gingival margin, so that the blood supply is not compromised. Each end of the incision must extend at least one tooth over on each side of the area of bone removal. The semilunar flap is used in apicoectomies and removal of small cysts and root tips.



**Advantages.** Avoidance of vertical incision and easy reapproximation to original position.

**Disadvantages.** Difficult reflection (mainly palatally),

great tension with a risk of the ends tearing,

limited visualization in apicoectomies,

limited access,

possibility of injury of palatal vessels and nerves,

defect of attached gingiva

### **Postoperative Instructions**

Analgesia: Take a painkiller .

Edema: After the surgical procedure, the extraoral placement of cold compresses (ice pack wrapped in a towel) over the surgical area is recommended. This should last for 10–15 min at a time, and be repeated every half hour, for at least 4–6 h.

Bleeding: The patient must bite firmly on gauze placed over the wound for 30–45 min. In case bleeding continues, another gauze is placed over the wound for a further hour.

Antibiotics: These are prescribed only if the patient has certain medical conditions or inflammation

Diet: The patient's diet on the day of the surgical procedure must consist of cold, liquid foods (pudding, yogurt, milk, cold soup, orange juice, etc.).

Oral hygiene: Rinsing the mouth is not allowed for the first 24 h. After this, the mouth may be rinsed with warm or salt water, three times a day for 3–4 days. The teeth should be brushed with a toothbrush and flossed, but the patient should avoid the area of surgery.

Removal of sutures: If sutures were placed on the wound, the patient must have the removed a week later

