Principles of Uncomplicated exodontia

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- Principles and procedure of extraction

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 Principles of forceps use

 Role of opposite hand

 Procedure for extraction
- □ Specific techniques for removal of each tooth
- Post extraction tooth socket care
- Post extraction instructions
- Complications
- References

The ideal tooth extraction is the painless removal of the whole tooth or tooth root with minimal trauma to the investing tissues so that the wound heals uneventfully and no post operative prosthetic problem created.



"Geoffrey L Howe"

Indications for extraction









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Preradiation therapy

- •Most feared side effect of radiotherapy is osteoradionecrosis.
- •Extraction may spare the patient, months or years of suffering from osteoradionecrosis.

Tooth associated with jaw fracture





•If tooth is grossly displaced, severely mobile, or grossly decayed – remove

•If tooth is non carious & appears secure in alveolar bone – retain

Contraindications Of Extraction:

Contraindications for Dental Extraction





Systemic

Local

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Systemic contraindications

- Cardiovascular problems
- Uncontrolled hypertension
- Unstable angina pectoris
- Recent myocardial infarction
- Uncontrolled cardiac dysrhythmias
- Uncontrolled metabolic disease
 - Brittle Diabetes
 - •Hyperthyroidism
 - Osteoporosis
 - •End stage renal disease with severe uremia
- Malignant disease Leukemia Lymphoma

Blood dyscrasias

Anemia Hemophilia Hemorrhagic purpura Polycythemia

Platelet disorder.

- •Patients on medication should be treated with caution
- Corticosteroid therapy
- Pregnancy is considered a relative contraindication

Local Contraindications

- ✓ Absolute contraindication Teeth associated with central haemangioma.
- Relative contraindications
- Teeth located within an area of tumor, especially a malignancy
- History of therapeutic radiation for cancer
- Severe pericoronitis around an impacted mandibular molar

Acute dentoalveolar abscess

- ✓ Acute infection Not a contraindication to extraction.
- ✓ If access and anesthesia considerations can be met, the tooth should be removed as early as possible

Presurgical assessment

- Medical history: Determination of health status.
 Any modification of routine procedure.
- Dental history (history of difficult extraction)
- Patient's emotional maturity: Level of anxiety
- Clinical examination
- Radiographic examination

Presurgical medical assessment

- ☐ Cardiovascular Problems
- Pulmonary Problems

Asthma

COPD

Renal Problems

Renal Dialysis

Renal Transplant

- Hypertension
- Hepatic Disorders

Endocrine Disorders

Diabetes Mellitus

Adrenal Insufficiency

Hyperthyroidism

Hypothyroidism

- Hematologic Problems
- Hereditary Coagulopathies
- Therapeutic Anticoagulation
- Neurologic Seizure Disorders

Clinical examination

ACCESS TO THE TOOTH

- •First factor to be examined that is the extent to which the patient can open mouth.
- •Any limitation to the mouth opening compromise the ability of surgeon to do routine uncomplicated exodontia. Surgeon should plan for surgical approach to the tooth as well as look for the cause of reduction of opening

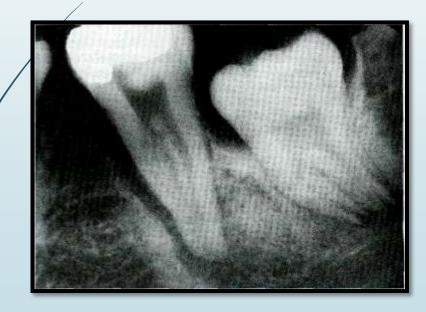
TOOTH ALIGNMENT IN THE ARCH

- •Location and position of the tooth to be extracted within a dental arch should be examined.
- Properly aligned tooth has normal access for forceps placement and elevators
- •However crowded or malposed tooth present difficulty in placing proper forceps.

MOBILITY OF TOOTH

Greater than normal mobility-periodontal disease

Less-than-normal mobility-Hypercementosis, Ankylosis.





CONDITION OF CROWN

- •Assessment of crown before extraction is related to the presence of large caries or restorations as the likelihood of crushing the crown during extraction is increased.
- •It is critical to grasp the forceps as apically as possible.
- •If the tooth has large accumulation of calculus, it should be removed with the scaler before extraction as calculus interferes with placement of forceps and fractured calculus contaminate the tooth socket.
- Assess the condition of the adjacent tooth.



RADIOGRAPHIC EXAMINATION

- * Radiographic examination provides information regarding
- ✓ The relationship of the tooth to be extracted to adjacent erupted and un erupted teeth.
- ✓ Primary teeth, the relationship of its roots to the underlying succedaneous teeth.
- ✓ Relationship of Associated Vital Structures





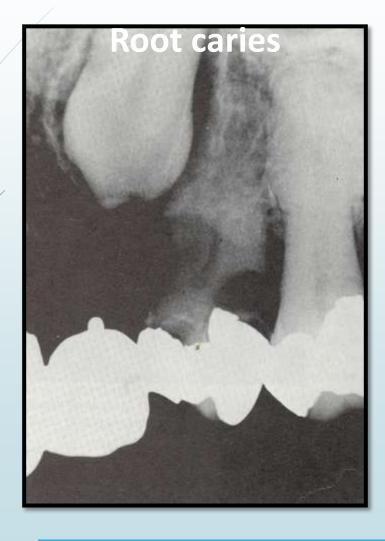
Tooth factors.



- Number of roots of tooth to be extracted.
- ☐ Curvature of the roots and the degree of divergence
- short conical roots easier to remove
- long roots with severe abrupt curves at apical end difficult to remove
- ☐ Size of the root
- bulbous or not
- Level of furcation
- ☐ Crown root ratio

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□Evidence of root caries



□ Root resorption- either internal or external



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CONDITION OF SURROUNDING BONE

Bone is more radiolucent, likely to be less dense which makes extraction easier.

If the bone appears radiographically opaque indicates increased density with the evidence of condensing osteitis/sclerosis.

Periapical pathology.



RELATIONSHIP OF ASSOCIATED VITAL STRUCTURES.

MAXILLARY MOLARS:

- •Proximity of the roots of maxillary molar to the floor of maxillary sinus.
- •Only a thin bone exists between the sinus and roots, the potential for perforation increases.



MANDIBULAR MOLARS.

Proximity to inferior alveolar canal.

MANDIBULAR PREMOLARS. Mental foramen.

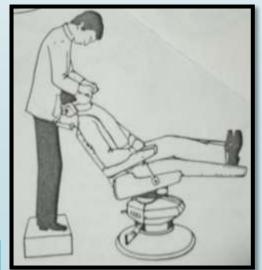
CHAIR POSITION FOR FORCEPS EXTRACTION

➤ For extraction of any teeth except right mandibular posteriors -The operator stands on the right side of the patient.



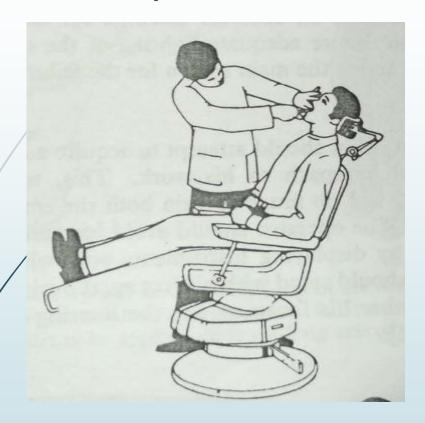
For extraction of mandibular right posteriors- The operator stands behind the patient.





Height of chair

Maxillary teeth extraction



The chair adjusted -site of operation is about 8cm (3 inches) below the shoulder level of the operator.

Mandibular teeth extraction



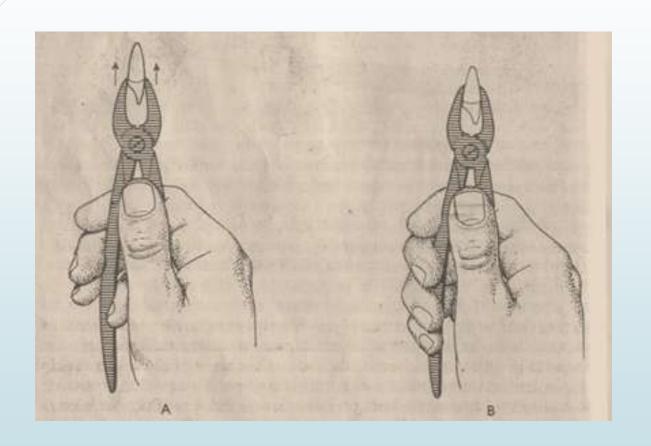
The chair adjusted -the teeth to be extracted- 16cm(6 inch)below the level of the operator's elbow.

Role of opposite hand



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Correct grip of forceps



Different techniques.

North American Technique

- Forceps are usually held with the palm of the hand below the handles of the forceps
- The patient is usually inclined 30-45 degrees for all extractions
- The dentist normally stands behind the patient in all extractions

British Technique

- Forceps always held with palm of hand above the handles of the forceps
- Patient is inclined 15-20° for extraction in the lower left quadrant & 30 45° in the other 3 quadrants
- Dentist stands behind the patient for extraction in the lower right Q & in front of the patient for all other extractions

GENERAL ANXIETY CONTROL PROTOCOL DURING APPOINTMENT

Non pharmacologic

- ✓ Frequent verbal assurances
- ✓ Distracting conversation
- √ No unnecessary noise
- ✓ Surgical instruments out of patient sight
- ✓ Relaxing background music

Pharmacologic

- ✓ Local anaesthetic of sufficient intensity and duration
- ✓ Nitrous oxide
- ✓ I.V anxiolytics

Infection control

- > Surgeons prevent transmission of infection patient themselves.
- CONCEPT OF UNIVERSAL PRECAUTIONS -All patients must be viewed as having blood-borne diseases -can be transmitted to the surgical team.
- > Prevention of transmission-surgical gloves, surgical mask, and eyewear with side shields, surgical gowns and surgical cap.
- ➤ Before the surgical procedure-a minimal amount of draping decrease the risk of contamination.
- ➤ Before the extraction-antiseptic mouth rinse-reduces the gross bacterial contamination –reduces post operative infection

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MECHANICAL PRINCIPLES OF EXTRACTION.

1.Expansion of bony socket:

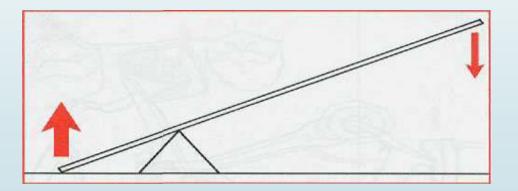
- Most important factor
- Achieved by using tooth as dilating instrument.
- Determined by root pattern and the surrounding bone
- Dilation is accompanied by multiple small fractures of buccal plate and inter-radicular septa.

2. Use of a lever and fulcrum.

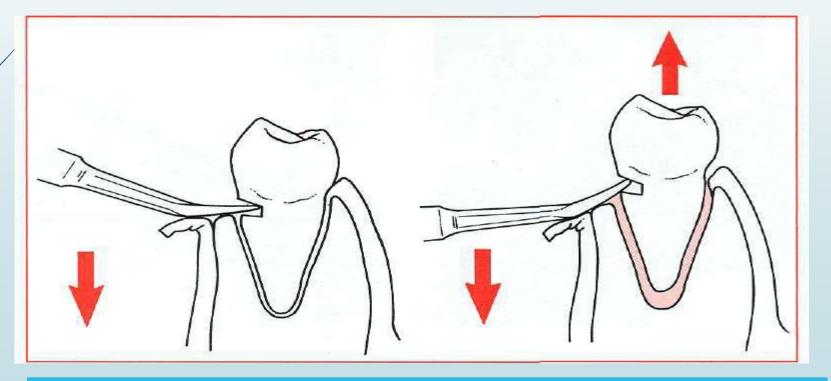
- Basic factor governing use of elevators
- To force the tooth or root out of socket along the path of least resistance.
- Three principles
- > The lever
- ►/The wedge
- The wheel and axle.

▼ The lever

A lever -mechanism for transmitting a modest force- The mechanical advantages of a long lever arm and a short effector arm—small movement against great resistance



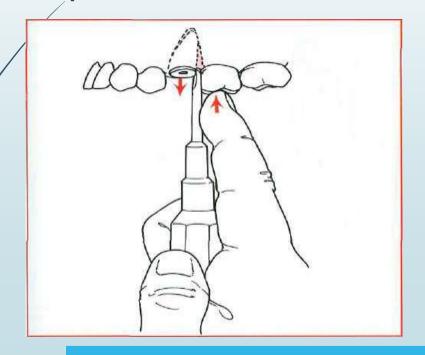
- **Elevators used primarily as levers.**
- Crane and pick elevate the tooth or a root -using the purchase point.

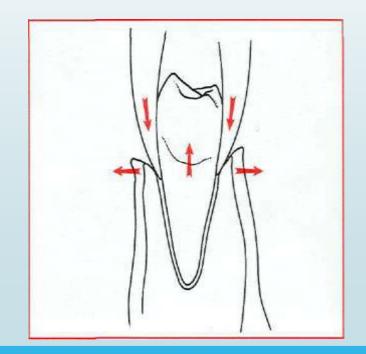


✓ Wedge principle

Wedge principle -used in straight elevator - to luxate a tooth from its socket.

A small elevator is forced into the periodontal ligament spacedisplaces the root toward the occlusion .



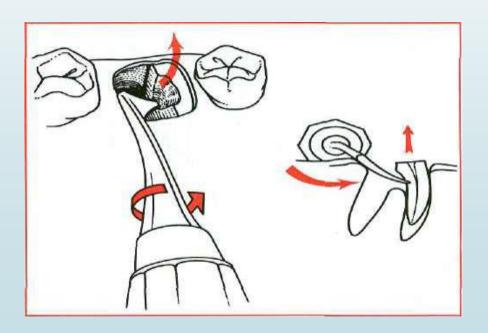


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✓ Wheel and axle principle

Wheel and axle principle used in triangular, or pennant-shaped, elevator.

One root of a multiple-rooted tooth is left in the alveolar processpennant-shaped elevator - used to remove the root.



- 3. Insertion of wedge or wedges.
- Used between the tooth-root and bony socket wall causing the tooth to rise in its socket.

PRINCIPLES OF FORCEPS USE:

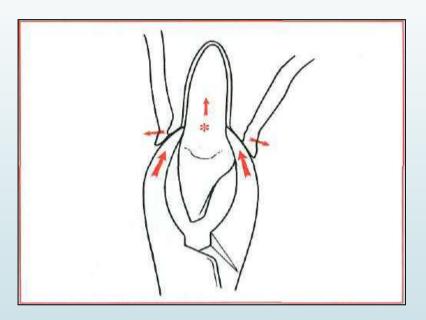
Primary instrument to remove tooth from alveolar process although elevators help in luxation of tooth.

- ☐ The goals of forceps use
- Expansion of the bony socket
- ✓ Removal of the tooth from the socket

- ☐ Five major motions
- **✓** Apical pressure: break the periodontal seal
- ✓ Buccal force: expand the buccal plate
- ✓ Lingual force: expand the lingual crest
- **✓** Rotational force: overall expansion of tooth socket
- ✓ Tractional force: deliver the tooth

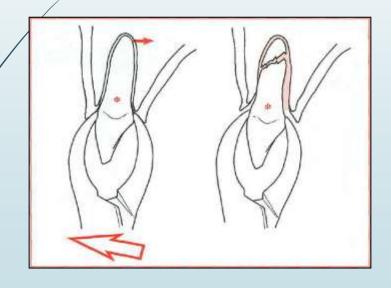
Apical Force: accomplishes two goals

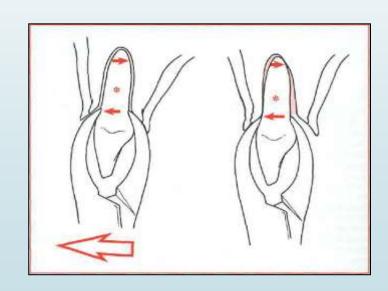
- 1. Bony expansion:
- Tooth socket expanded by the insertion of beaks into the PDL space.
- Apical pressure on the tooth causes bony expansion.



2. Centre of rotation:

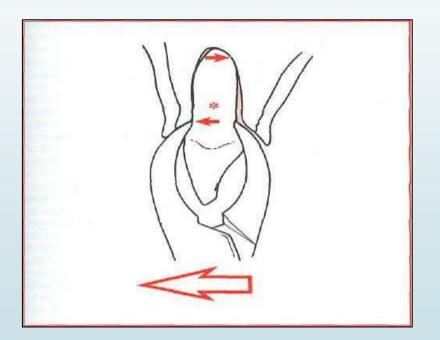
- Displaced apically.
- Greater movement of expansion forceps at the crest of ridge and less force moving the apex of tooth lingually.
- Decreased root fracture.





Buccal force:

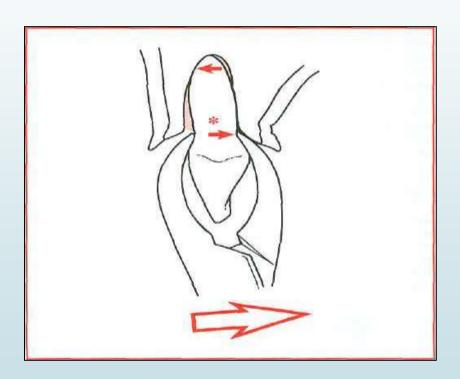
- 1. Expansion of buccal plate, at the crest of ridge.
- 2. Also causes lingual apical pressure.



Lingual pressure:

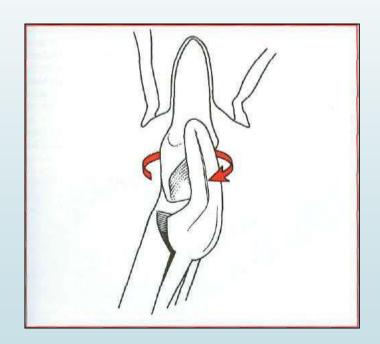
Expands the linguocrestal bone.

Avoids excessive pressure on the buccal apical bone.



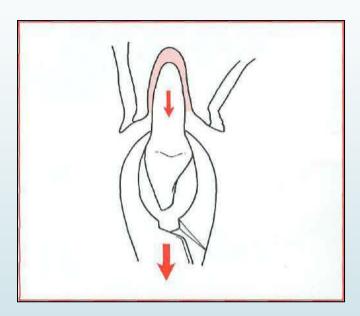
ROTATIONAL PRESSURE:

- Causes internal expansion of tooth socket, more useful for tooth with conical roots.
- Teeth with multiple roots, especially if its curved more chances to fracture under this type of pressure.



TRACTION PRESSURE

- Delivers the tooth from the socket once the adequate bony expansion achieved.
- Should be gentle
- Limited to the final portion of extraction process.



Procedure for closed extraction

- ☐ Three fundamental requirements for a good extraction
- ✓ Adequate access and visualization of the field of surgery
- ✓ An unimpeded pathway for the removal of the tooth
- **✓** The use of controlled force to luxate and remove the tooth
- **☐** Five general steps for the closed-extraction procedure:

Step 1: Loosening of soft tissue attachment from the tooth.

Instrument: Woodson elevator.

Sharp end of no 9 periosteal elevator

Purpose:

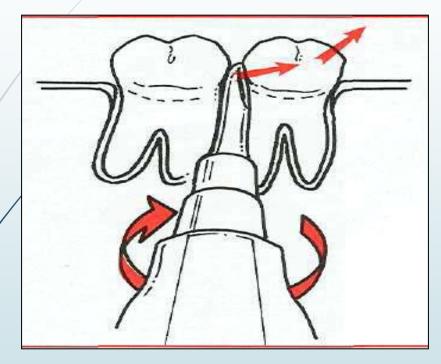
- ✓ Ensure profound anaesthesia achieved
- ✓ Allow proper forceps positioning more apically



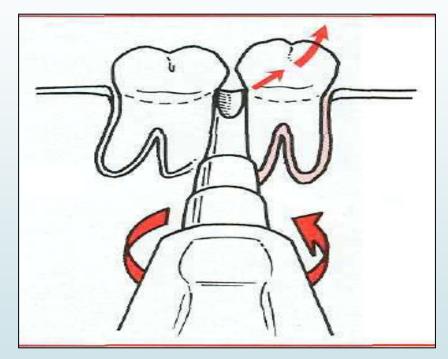
Step 2: Luxation of the tooth with a dental elevator

Expansion and dilation of the alveolar bone and tearing of the periodontal ligament requires the tooth luxation.

- Straight elevator inserted perpendicular to the tooth into interdental space.
- Elevator is turned so that inferior portion rests on alveolar bone, superior or occlusal portion of the blade turned toward the tooth being extracted.
- Type of force: Strong, slow, forceful turning.



Occlusal side of elevator blade is turned toward tooth



Handle of elevator, turned in opposite direction to displace tooth. accomplished only if no tooth is adjacent posteriorly

➤ If the tooth is intact and in contact with stable teeth anterior and posterior to it- amount of movement achieved with the straight elevator-minimal.

- The usefulness of this step greater- if patient does not have a tooth posterior to the tooth being extracted.
- > Excessive forces -damage and even displace the teeth adjacent to those being extracted.
- > Tooth luxation with elevator-only the initial step in the extraction process-the forceps are the major instrument for tooth luxation.

Step 3: Adaptation of the forceps to the tooth

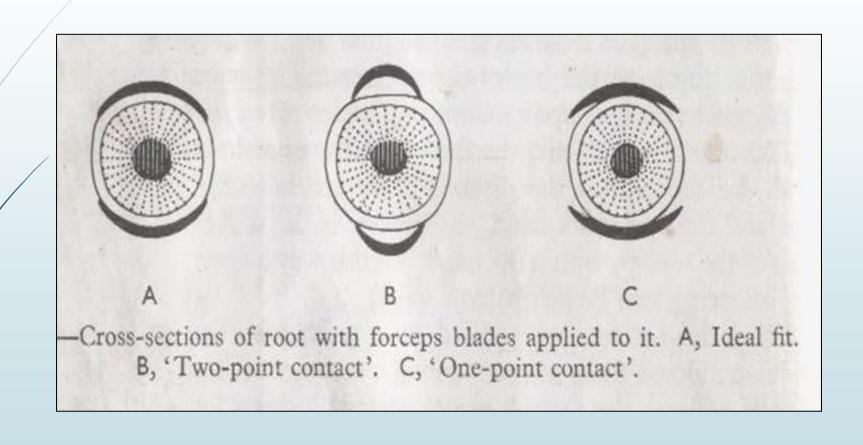
- Proper forceps chosen
- •Beaks of the forceps to adapt anatomically to the tooth, apical to the cervical line.
- •Lingual beak seated first.
- •Once the forceps positioned surgeon grasps handle of the forceps at very end to increase mechanical advantage.
- •Beaks be held parallel to the long axis of tooth for maximal effectiveness in dilating and expanding the alveolar bone.





☐ The surgeon -apply force with the shoulder and upper arm without any wrist pressure.

Different types of adaptation of forceps blades to tooth



Step 4: luxation of the tooth with the forceps.

- ➤ The major portion of the force -toward the thinnest and weakest bone
- In the maxilla and all but the molar teeth in the mandible-major movement is labial and buccal.
- Type of force: slow steady force to displace tooth buccally.
- > Tooth is again moved toward the opposite direction.
- Alveolar bone expands

Forceps apically reheated with strong deliberate motion

Additional expansion of alveolar bone

Further displaces centre of rotation apically.

Three factors

(1)The forceps apically seated as far as possible and reseated periodically

(2) The forces- in the buccal and lingual directions -slow, deliberate pressures -not jerky wiggles.

(3) The force -held for several seconds to-allow the bone time to expands.

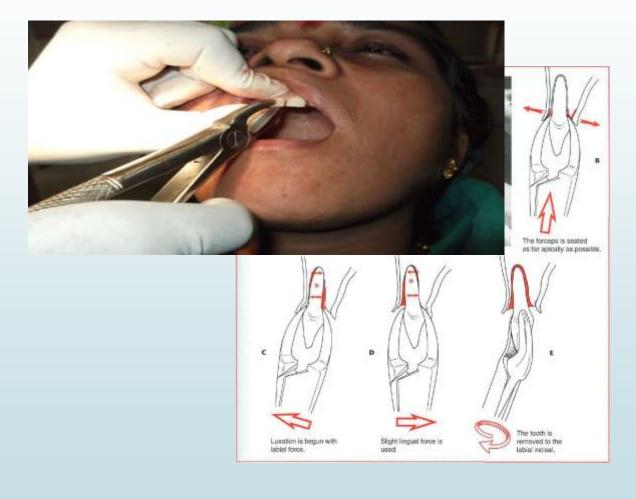
Step 5: Removal of the tooth from the socket

Once the alveolar bone expanded sufficiently and the tooth luxated-slight tractional force-buccally used.

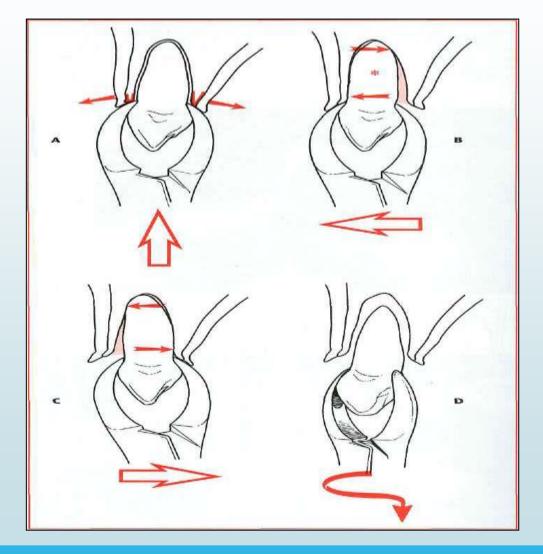
Major role of the forceps - not to remove the tooth but rather to expand the bone so that the tooth can be removed.

SPECIFIC TECHNIQUES FOR REMOVAL OF EACH TOOTH

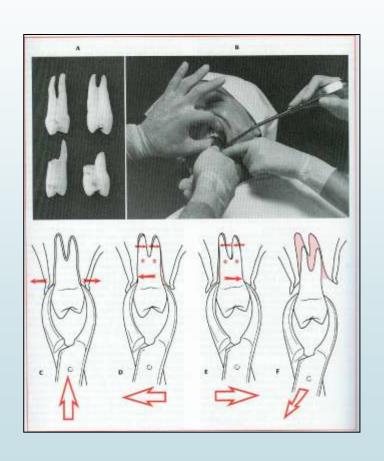
Maxillary incisors



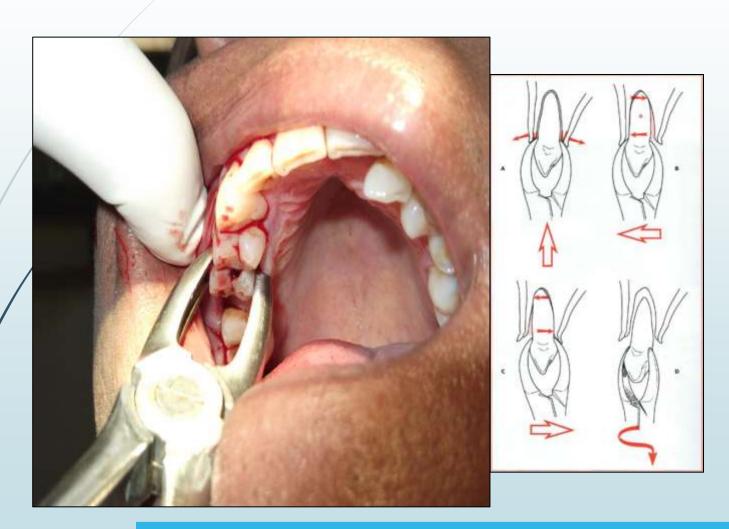
Maxillary canine



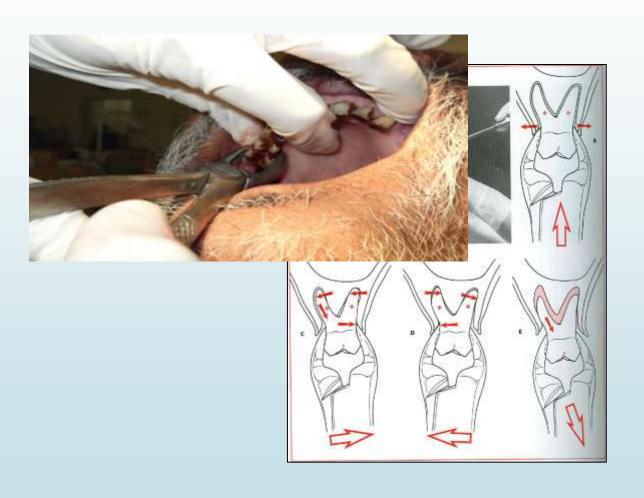
Maxillary first premolar



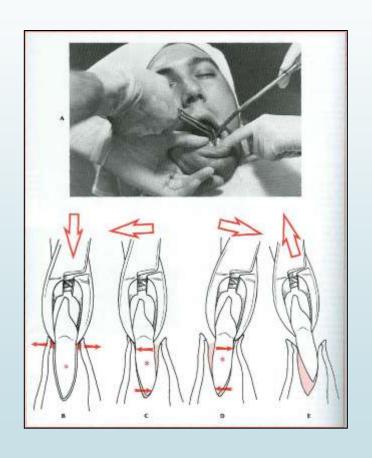
Maxillary second premolar



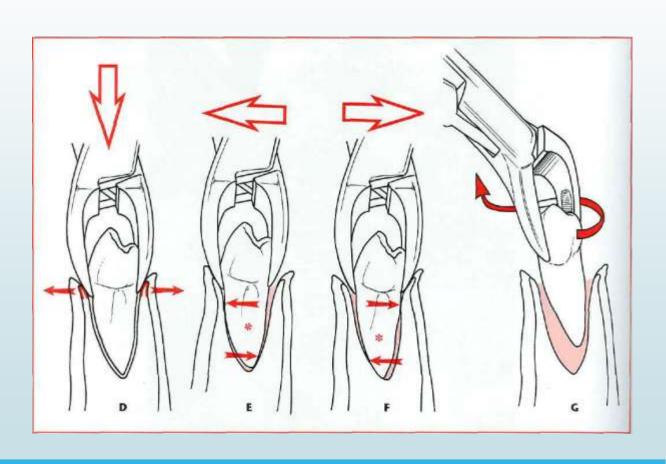
Maxillary molars



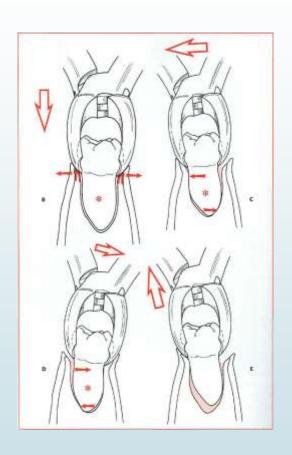
mandibular anteriors



Mandibular premolars



Mandibular molars



Policy for leaving root fragments

3 conditions must exist for a tooth to be left in the alveolar process

- Root fragment must be small
- Root deeply embedded in bone
- Root must not be infected

Risks is considered greater when

- Removal cause excessive destruction of surrounding tissue
- Endangers vital structures
- Attempts of recovering the root can displace it into the maxillary sinus or tissue spaces

Surgical plan for full mouth extraction

- Maintain the vertical dimension
- > Best to perform surgery in opposing quadrants
- Maxillary teeth should be removed first
 - Infiltration anesthesia has more rapid onset
 - Debris may fall into empty sockets of lower teeth
 - Teeth removed with a major component of buccal force
 - Disadvantage hemorrhage may interfere with visualization
- Extract the most posterior teeth first, anterior teeth last ones to be extracted.
- > 2 teeth most difficult to remove are the first molar and canine

POSTEXTRACTION CARE OF TOOTH SOCKET

- ➤ If a periapical lesion is visible on the preoperative radiograph -no granuloma attached to the tooth when it was removed- the periapical region curettage- to remove the granuloma or cyst.
- If any debris obvious(calculus, amalgam) or tooth fragment remaining in the socket-gently removed with a curette.
- ➤ If neither periapical lesion nor debris present- the socket should not be curetted.

- ➤ The expanded buccolingual plates -compressed back to their original configuration.
- ➤ It prevent bony undercuts caused by excessive expansion of the buccocortical plate.
- In periodontal disease, there is accumulation of excess granulation tissue around the gingival cuff.
- ➤ Removing this granulation tissue-a curette or haemostat –avoid chances of excessive bleeding.

- > The bone palpated through the overlying mucosa-check for any sharp, bony projections.
- > The mucosa reflected and the sharp edges smoothed-bone file.
- ➤ Initial control of haemorrhage- moistened 2X2 inch gauze-over the extraction socket.
- Biting the teeth together on the gauze –pressure transmitted to the sockethaemostasis.

Postoperative instructions

- > Do not remove the cotton for half an hour
- > Avoid rinsing, spitting, and touching the site of extraction
- > Avoid consuming hot beverages, maintain soft diet for 24 hours.
- > Take the medication properly
- > Use warm saline mouth rinse after 24 hours.

Methods of performing pre-radiation extraction

- Principles of atraumatic exodontia apply
- Good portion of alveolar process along with teeth removed to achieve primary soft tissue closure
- Extraction done in a surgical manner with flap reflection with atraumatic handling of flap
- Bur/ files used to remove smooth bony edges
- Ensure rapid soft tissue healing

INTERVAL

- 7-14 days between extraction and radiotherapy
- If possible following extraction to ensure sufficient soft tissue healing
- Delayed if local wound dehiscence occurs

ORAL SURGERY DURING PREGNANCY

- Defer surgery until after delivery if possible
- Consult the patients obstetrician
- Avoid radiographs
- Avoid drugs with teratogenic potential
- Use local anaesthesia
- Avoid keeping the patient in supine position
- Allow frequent breaks
- Second trimester-period of choice for elective operations.

ATRAUMATIC EXTRACTION BY USE OF ELASTICS

- Alternative extraction technique avoids bone exposure
- Indications:Hemophilic patients

Bis phosphonate treated patients

Technique:

- Elastic/orthodontic band placed around cervical part of affected tooth
- Elastic slide from cervical to lesser apical perimeter of root
- Band moved apically cause PDL destruction
- Extrusive movement of tooth
- Fresh band added around the root once a weak thus pushing the previous elastic apically
- Crown protrudes beyond bite plane, its ground allowing additional extrusive movement.

Mandibular premolar and molar before the procedure



Exfoliation of first molar and extrusion of second molar



Extrusion of the mesial root



Sockets after exfoliation of both the teeth



Dentin bulge preventing the band move apically



- Technique suitable for conical roots
- •Multiple divergent roots-split and placed on each split root
- •RCT required before sectioning, in case of vital tooth

Atraumatic Teeth Extraction in Bisphosphonate-Treated Patients

Eran Regev, DMD, MD,* Joshua Lustmann, DMD,† and Rizan Nashef, DMD‡

Purpose: The purpose of this study was to suggest an alternative technique for atraumatic teeth extraction that would prevent bone exposure and the associated complication of osteonecrosis of the jaws in bisphosphonate (BP)-treated patients, without terminating the treatment.

Patients and Methods: A total of 10 patients treated with BPs for multiple myeloma, metastatic breast cancer, and osteoporosis, requiring dental extractions of nontreatable teeth, were included in this study. The extractions were performed by means of orthodontic elastics placed around the roots, causing slow and gradual exfoliation of the teeth.

Results: The technique was applied to 21 roots of 15 teeth. A total of 19 roots exfoliated spontaneously. Two roots had to be removed with minimal manipulation by forceps. The mean time required for exfoliation was 5.8 weeks. All sockets showed soft tissue secondary healing and there were no signs of inflammation or exposed bone during the 9-month follow-up.

Conclusions: Atraumatic extraction by use of elastics is a safe technique that may be used in BP-treated patients to prevent osteonecrosis of the jaws.

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complications

Intraoperative

- SOFT TISSUE INJURY
- Tearing mucosal flap
- Puncture wound of soft tissue
- Abrasion injury
- ☐ COMPLICATIONS WITH TOOTH BEING EXTRACTED
- Root fracture
- Root displacement
- Tooth lost into oropharynx
 - INJURY TO ADJACENT TEETH
- Fracture of adjacent restoration
- Luxation of adjacent teeth
- Extraction of wrong teeth
- INJURIES TO OSSEOUS STRUCTURE
- Fracture of alveolar process
- Fracture of maxillary tuberosity
- ☐ INJURIES TO ADJACENT STRUCTURE
- Nerve
- **■** TMJ
- ORO ANTRAL COMMUNICATION

Postoperative

- □ Haemorrhage
- ☐ Ecchymosis & hematoma
- Swelling
- ☐ Pain
- □ Dry socket
- Infection

Soft tissue injury

- Puncture wound: Due to instrument slip from the surgical field
- Prevention: minimal force for retraction

Controlled force to be used
Use of supporting fingers

Treatment: Prevent infection and healing by secondary intention.

Complications with tooth being extracted

- ☐ Root fracture: long, curved, divergent roots in dense bone most common to fracture
- Root displacement: tooth-maxillary molar root into antrum
- Displaced fragment 2 or 3mm with no pre existing infection, then irrigate through small opening in the socket apex. This flushes the root out of the sinus.
- Large root or entire tooth –Caldwell
 Luc approach into sinus in the canine
 fossa
- ☐ Tooth lost into oropharynx:

Patient turned toward dentist, mouth down position. Patient encouraged to cough and spit the tooth.

INJURY TO ADJACENT TEETH

- ☐ Fracture of adjacent restoration:
- Recognise potential to fracture large restoration
- Warn preoperatively
- Employ judicious use of elevators
- If restoration dislodged-remove from the mouth so that it doesn't fall into the empty socket.
- ☐ ∠Luxation of adjacent teeth:
- Common in crowding cases
- Prevention:

Thin forceps

Judicious use of elevators

Treatment:

Reposition the tooth into appropriate position

If needed stabilise with suture that crosses occlusal table and sutured to adjacent gingiva

Rigid fixation-external resorption

INJURIES TO OSSEOUS STRUCTURE

- ☐ Fracture of alveolar process
- Site:

Buccal cortical plate over maxillary canine and first molar

Floor of maxillary sinus

max tuberosity

Labial bone on mandibular incisors

Prevention:

Thorough pre-op clinical and radiological examination

Do not use excessive force

Use of surgical extraction when required

Treatment:

Bone completely removed with the tooth then not to be replaced-smooth the sharp margins suture the soft tissues back

If attached to the periosteum then carefully separate it from the tooth and then replaced back to the socket

INJURIES TO ADJACENT STRUCTURE

- Be aware of nerve anatomy in surgical area
- Avoid making incision or affecting periosteum in nerve area.
- Support mandible during extraction
- Do not open mouth too widely

ORO ANTRAL COMMUNICATION

- Conduct thorough preoperative radiographic examination
- Use surgical extraction early and section roots
- Avoid excess apical pressure

Postoperative bleeding

- ☐ Causes:
- Tissues are highly vascular
- Extraction leaves open wound
- Almost impossible to attain dressing material with enough pressure
- Patients tend to plat with the areaand dislodge the clot
- Tongue cause secondary bleeding by creating negative pressure
- ☐ Prevention:
- Obtain history
- Use atraumatic surgical technique
- Obtain good haemostasis at surgery
- Provide proper instructions

- ☐ Treatment:
- Check for the bleeding from bone. Isolated vessel bleeding, then foramen can be crushed with closed end of haemostat.
- Regenerated cellulose
- Liquid preparation of topical thrombin
- Collagen

Delayed healing and infection

- Rare complication after routine dental extraction
- Wound Dehiscence:

Soft tissue flap replaced and sutured without bony foundation

If sutures placed under tension

Prevention:

Use aseptic technique

Perform atraumatic surgery

Close incision over intact bone

Suture without tension

Dry socket

- PRESENTATION
- Persistent dull boring pain
- 2 to 4 days of extraction,
- Radiates to ear and not relieved by oral analgesics.
- Foul odor and taste.
- Clot has dirty gray colour ultimately leaving yellow bony socket.
- Exposed bone extremely sensitive.
- Edema of surrounding gingiva, region
- TREATMENT
- **■** AIM: Relief of pain+speeding of resolution.

Irrigate the socket with warm normal saline.

Loose dressing: zinc oxide+eugenol on cotton wool tucked into socket. The gauze packing replaced every 24 hours until symptoms subside.

Prescribe NSAIDS or narcotic based preperations Metronidazole 400mg for 5 days

- **►** WHAT NOT TO DO?
- Curettage:Predisposes to spread of infection,destroys at any previous attempt at normal healing.
- No antibiotics unless there is systemic infection

To conclude,

☐The surgeon should

Have thorough anatomical knowledge of oral structures,

Know pharmacology of anaesthetics and medicines,

Evaluate the level of anxiety,

Determine the health status,

Do the necessary modifications of routine procedures,

Apply the exact mechanical principles,

Provide proper postoperative instructions and care.

☐ Prevention of complication should be a major goal of surgeon

