DENTAL ELEVATORS

Teeth extraction

Instruments used in simple uncomplicated teeth extraction are:

1. Diagnostic instruments: Dental mirror, Dental probe and Dental tweezer.
2. Dental elevators.
3. Dental forceps.

The instruments are selected, sterilized and placed in a sterile dish on the dental tray.

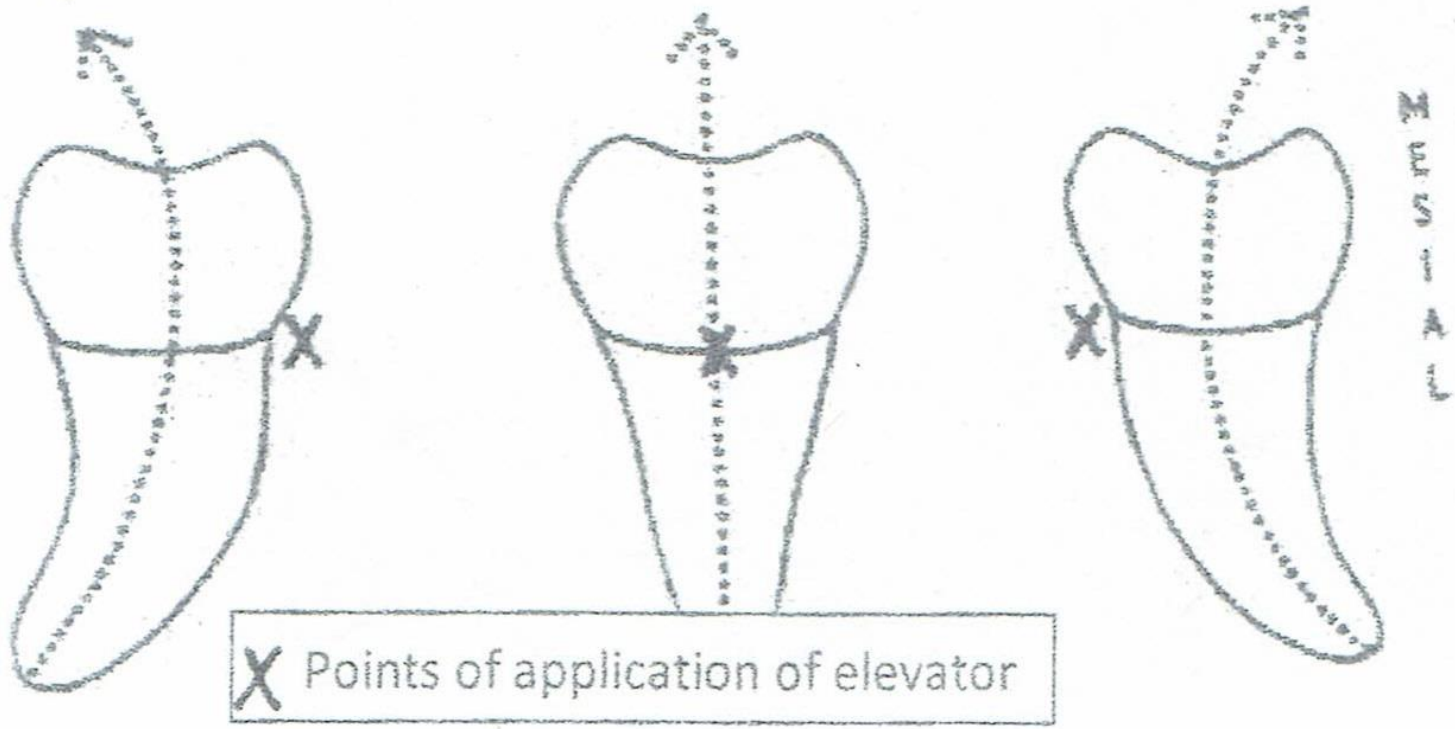
Elevators:-

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) .depending on clinical (anatomical) and radiographic assessment.

line of withdrawal



X Points of application of elevator

Point of application:-

Points of application of elevator

Is the site on *the root* at which force must be applied to effect delivery and is determined by the line of withdrawal

If the line of withdrawal upwards and distally the point of application going to be mesially,

and if it is upward and mesially the point of application going to be distally,

and if the line upward and lingually the point going to be buccally

and elevator could be applied on mesial and distal position (straight root).

We have buccal point of application, distal point of application, and mesial point of application. *lingual point* of application is relatively contraindicated because ,it is less accessible (access is difficult) and to avoid the accidental damage to the vital and important structures present in the floor of mouth like ,lingual nerve ,submandibular and sublingual glands, soft palate and oro-nasopharangeal region

- Theoretically, an elevator can be applied to any side of a straight root in order to apply the necessary dislocating force. However, if a root is curved the elevator must engage its convex aspect. If it is applied incorrectly to the concave of the root it will not displace it from the socket but will produce a further fracture of the fragment

- However, if the lines of withdrawal of the apices conflict, because of divergent or recurved root pattern ,then the roots must be separated before applying an elevator against the convex surface of each in turn.

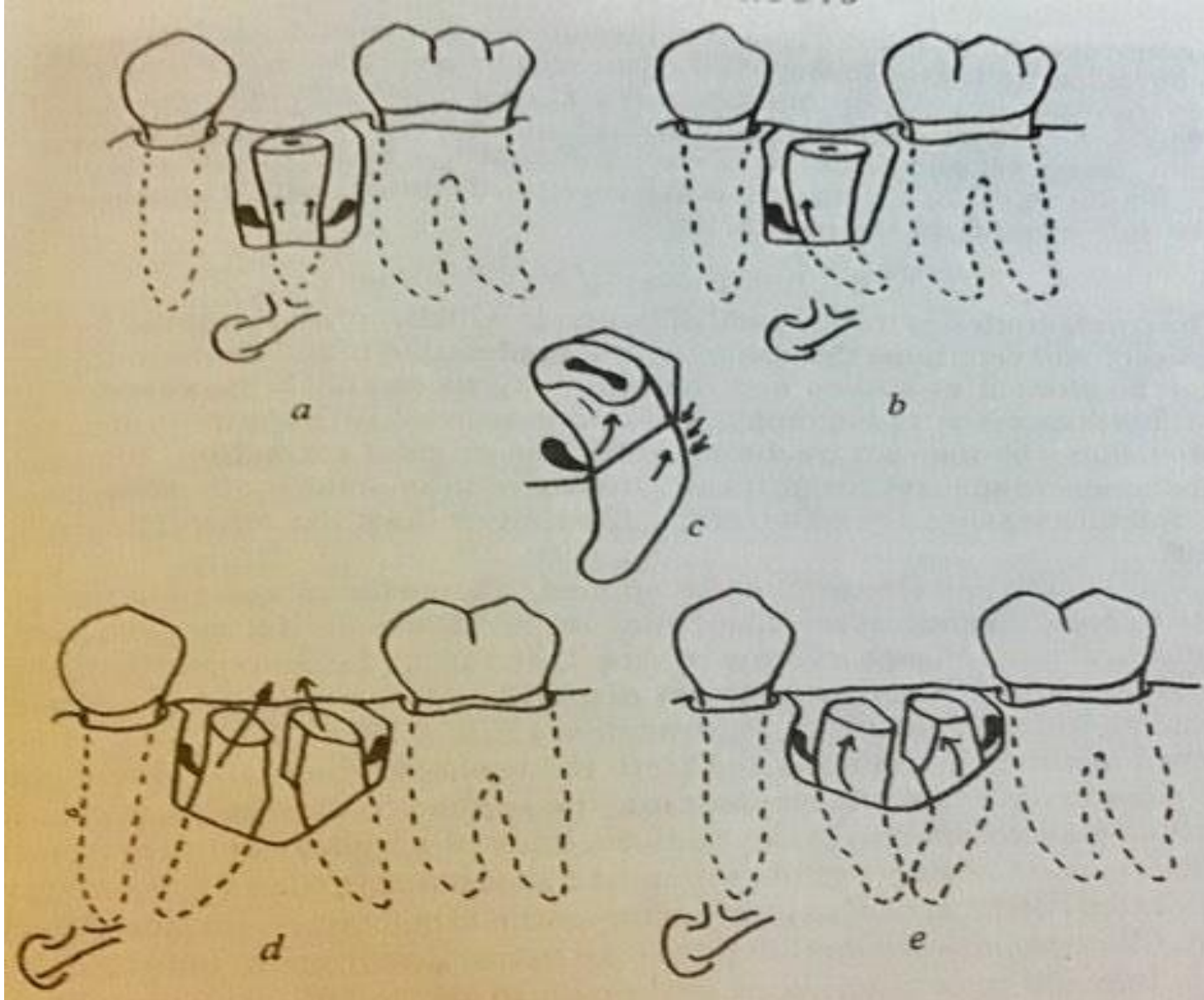
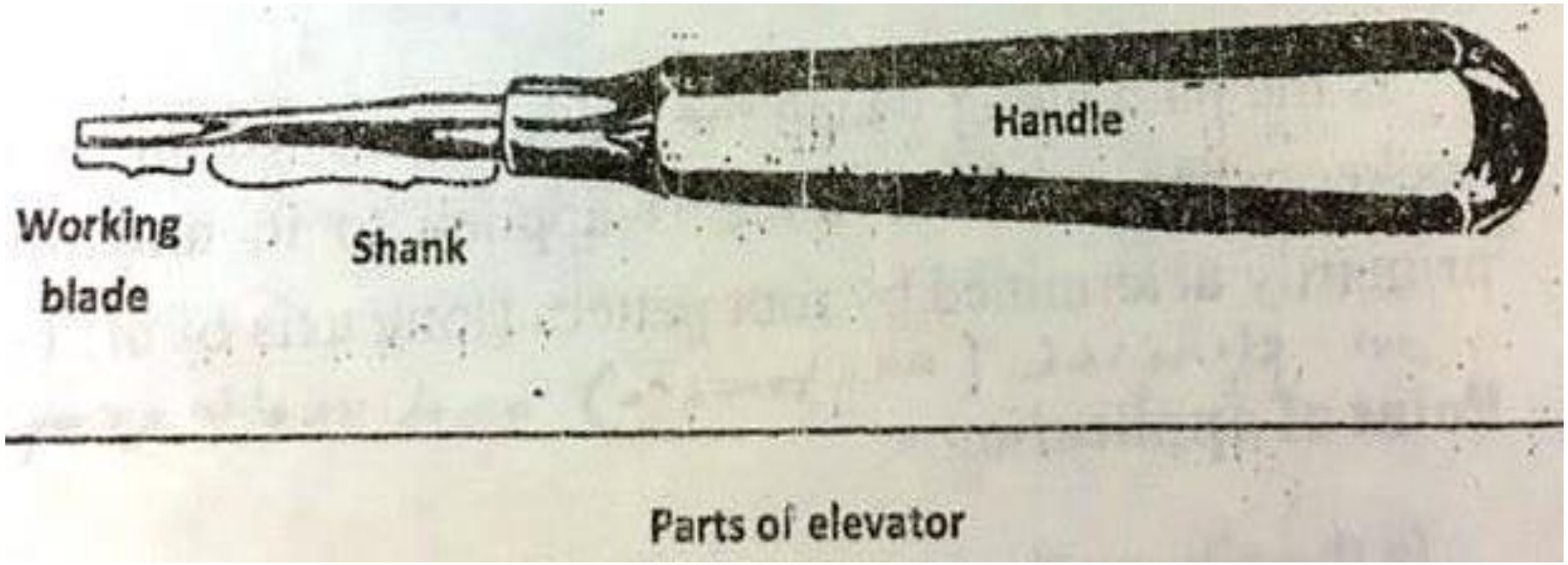


Fig. 3.2. Elevation of roots. *a*, Elevators can be applied either side of a straight root. *b*, But can be applied only to the convex surface of a curved root. *c*, Application of an elevator to the concave surface forces the convexity against the bone. *d*, Divergent roots must be separated, creating a space between them, A similar method is used to elevate

Parts of elevators

- All elevators have the following parts:-
- I- **Handle:** This may be a continuation of shank or at right angle to it.
- II- **Shank:** The cnnnecting part between the handle and the blade.
- III- **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. *Always* Concave surface of the working blade against the root or tooth.



Parts of elevator

Mechanical principles of use of elevators :-

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

1- Lever and fulcrum principle. (First class type).
2-Wedge principle.
3- Wheel and axle principle.
4-Combination of these principles.

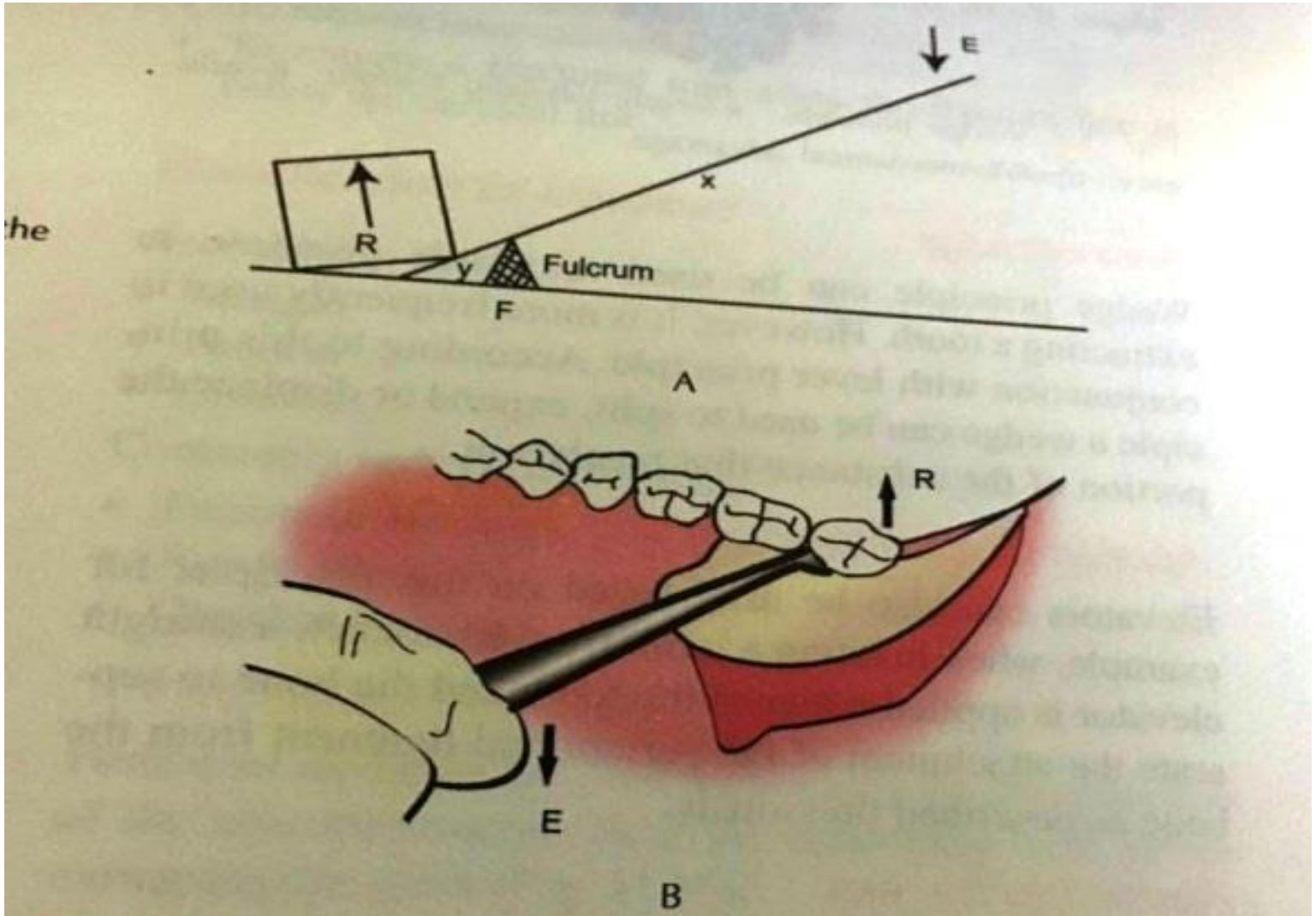
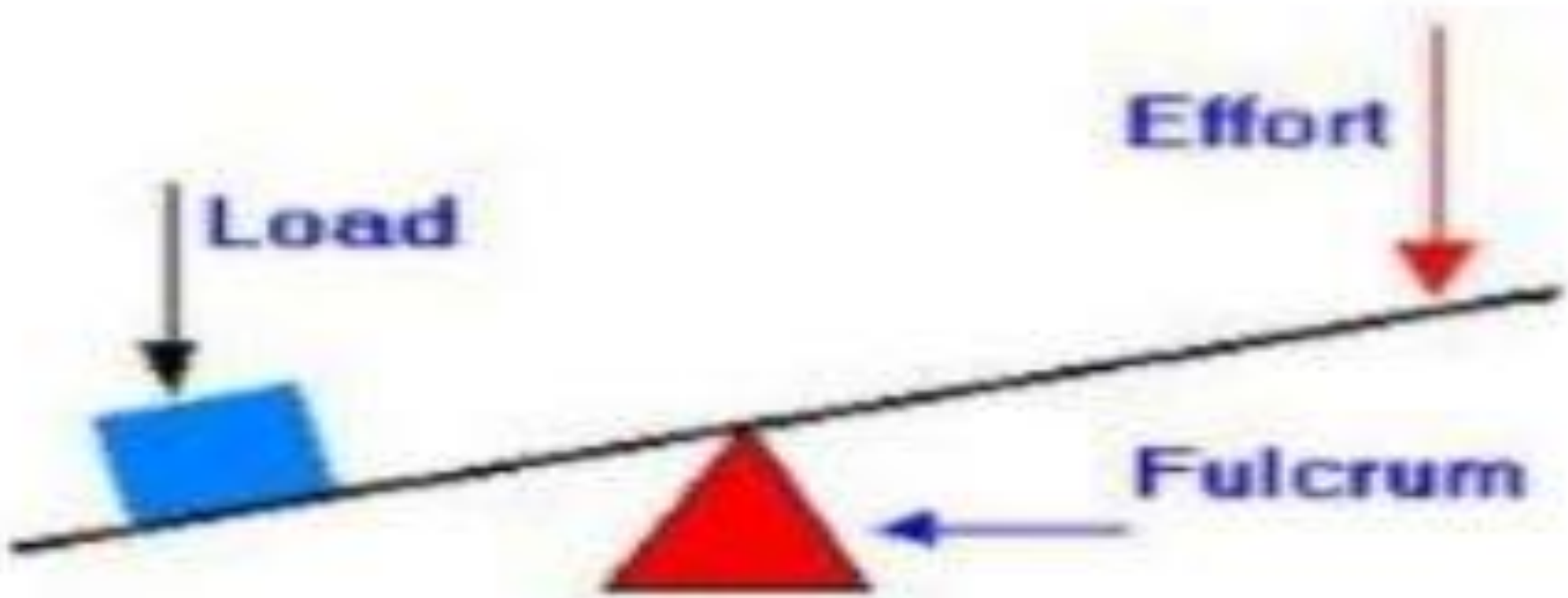


Fig. 11.6. (A) Lever principle. x-long arm; y-short arm; E-effort; R-resistance; x/y=R/E=mechanical advantage, and (B) application of lever principle for the luxation of mandibular molar.

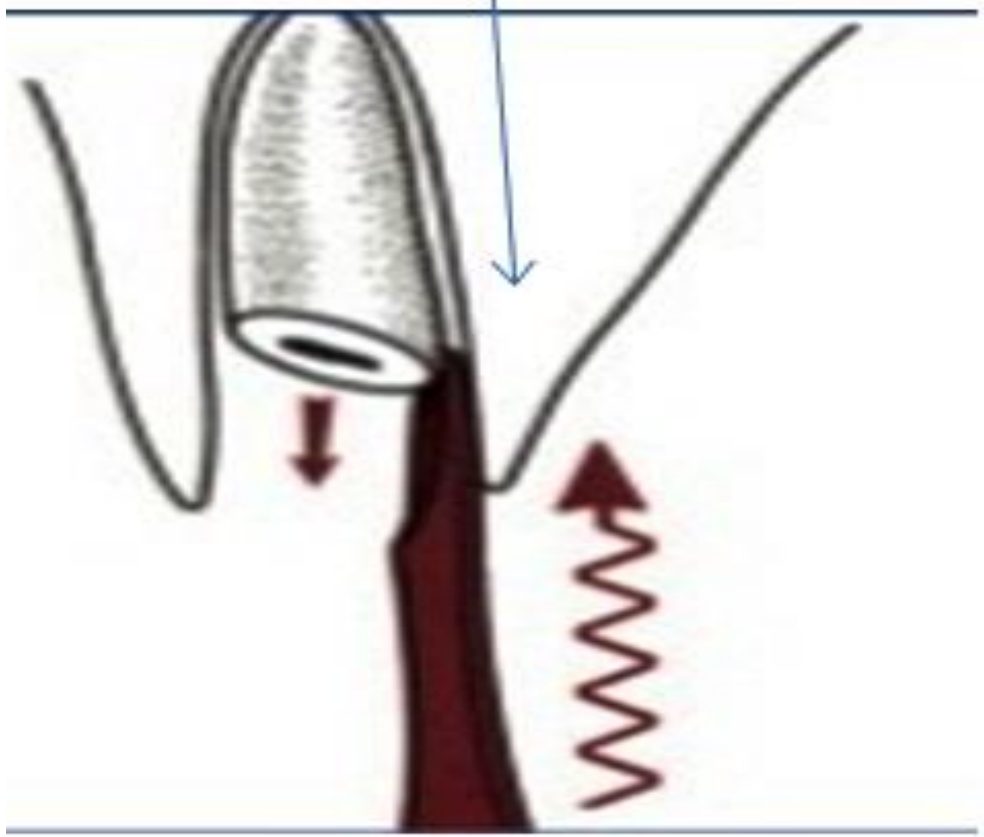


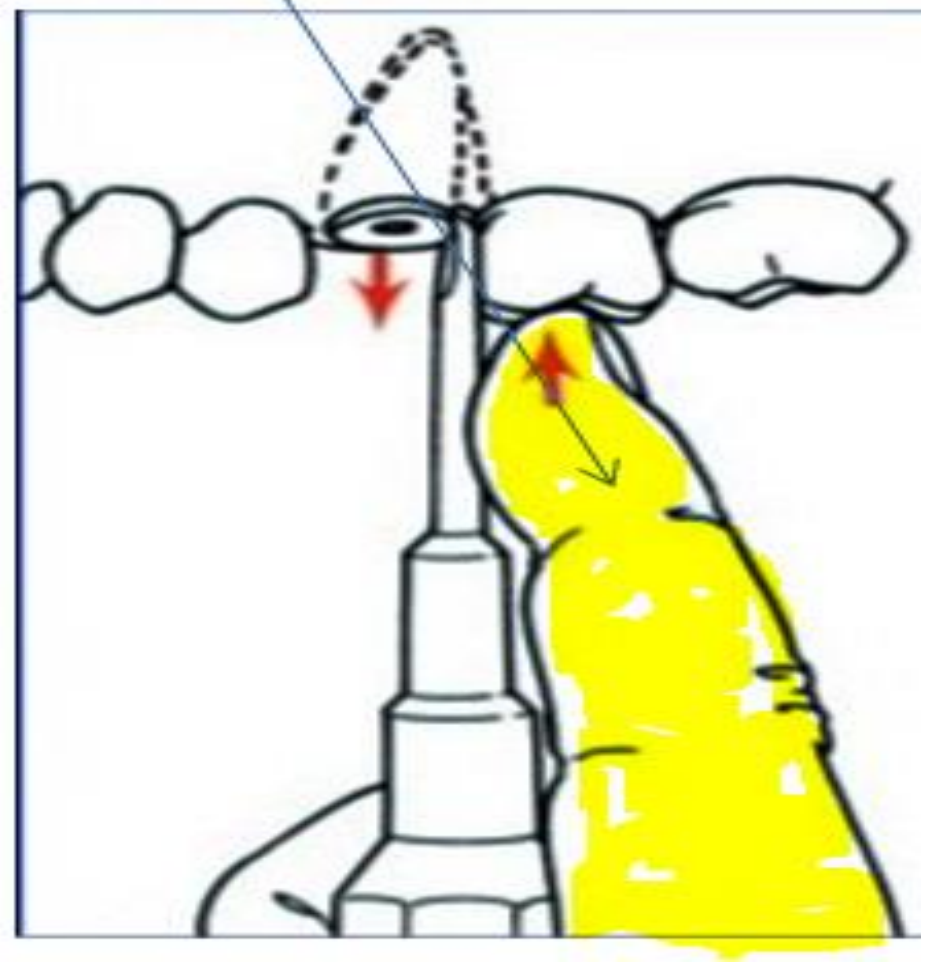
Class 1 Lever

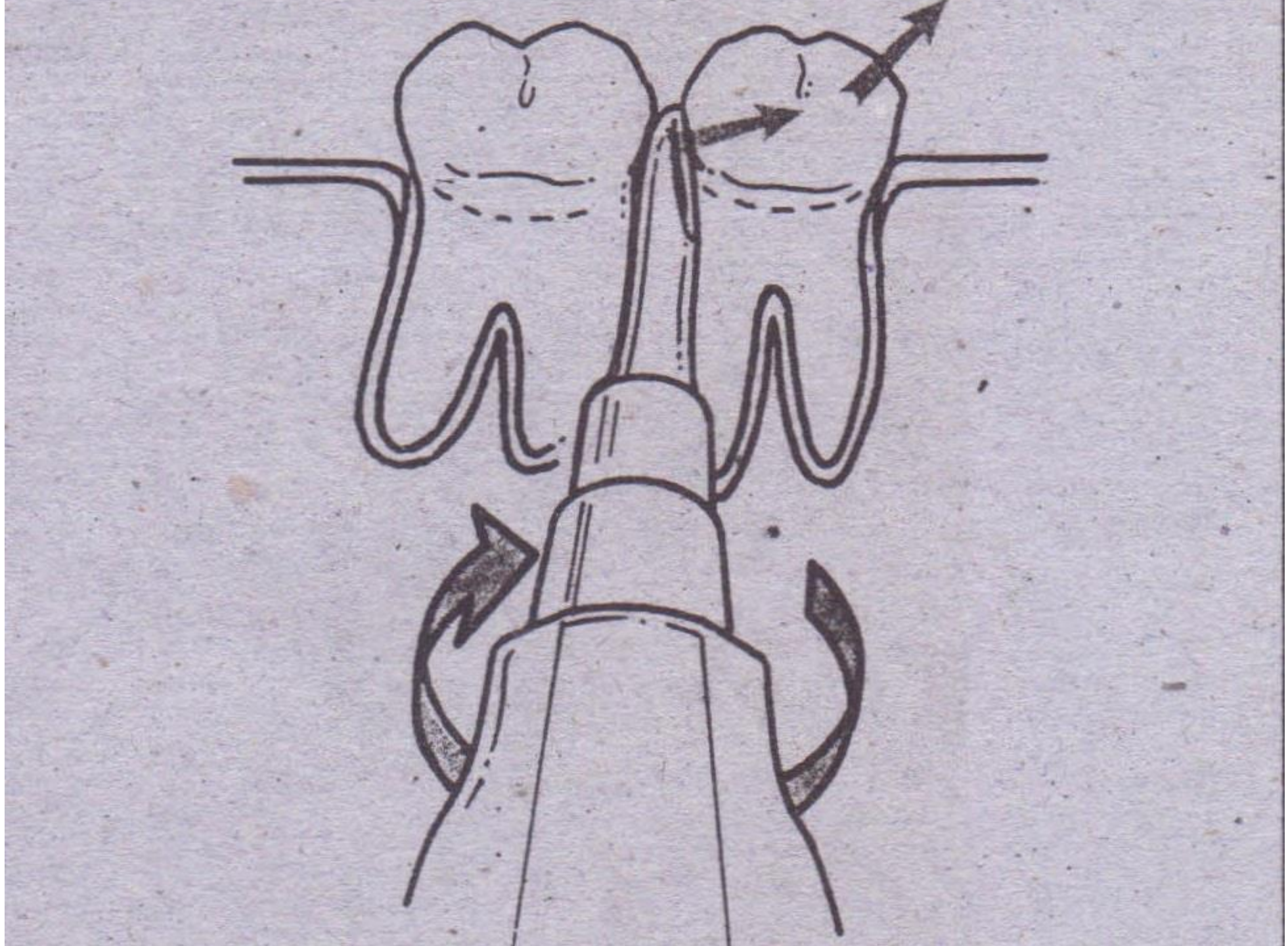
Wheel and Axle Principle

- 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.

Wedge principle--- safe support







- **Clinical uses of elevators:-**

- **1-** Elevators are used to subluxation or luxation of a tooth or root which cannot be engaged or grasped by the beaks of forceps (e.g. impacted teeth, malposed), also badly carious teeth, and teeth with heavy filling.
- **2-** To remove old roots, fractured roots and sectioned roots.
- **3-** To loosen teeth prior to using dental forceps.
- **4-** To split teeth which have had grooves cut in them, as in separation of roots.
- **5-** To remove small amounts of bone to create point of application for the beaks of forceps, or removal of inter-radicular bone.
- **6-**any tooth resisting normal extraction force by extracting forceps.

Elevators commonly used

There are so many elevators available but few are widely used. •

1. Straight elevators: •

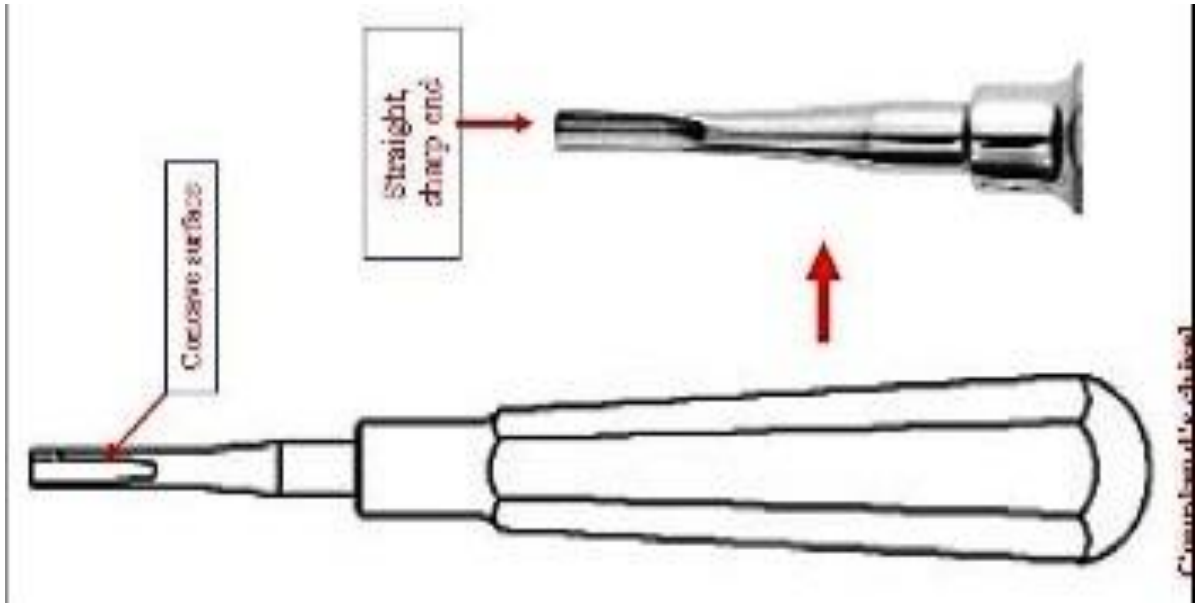
In which the blade, shank, and the handle are straight. The working • blade or end is blind and round, there are many types and sizes of straight elevators.

It is used mostly for mobilization or movement (luxation or • subluxation) of teeth prior to the application of dental forceps.


J0041a
J0041b
J0041c

2- 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.



Size 3

Size 1

3-Cryer's elevators:-

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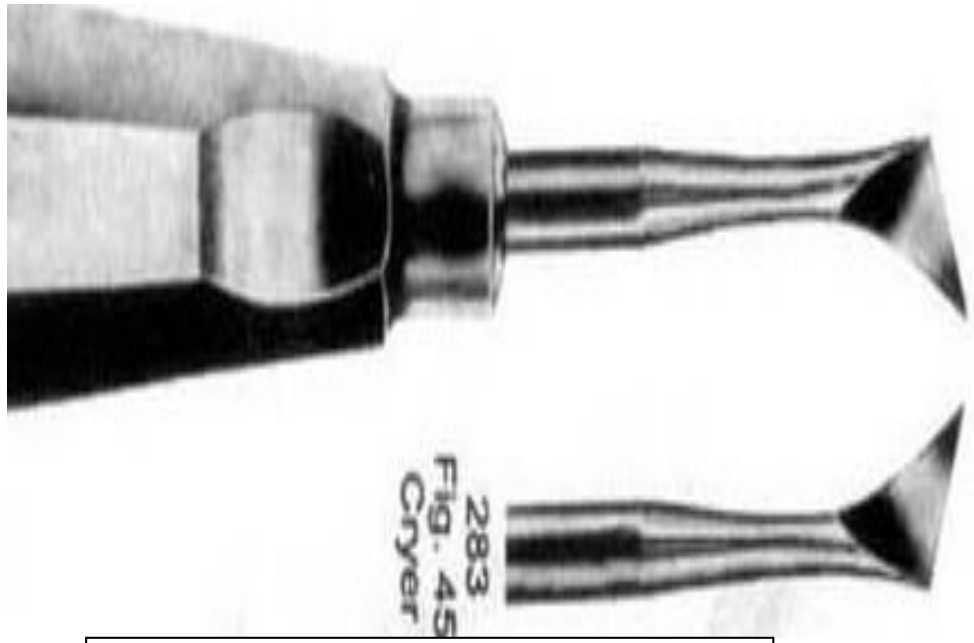
- In this type the working blades are sharp, pointed and triangular in shape just like a claw, forming an angle with the shank of the elevators.
- These are pair instrument mesial and distal (right & left) designed to fit the root surface on mesial and distal.
- It's mostly used for removal of retained root of the lower molar and for elevation for impacted teeth after surgical exposure of the bifurcation of the tooth.

It is mostly used to elevate fractured roots of lower molar teeth, when one root is retained a cryer elevator may be inserted into the adjacent empty socket and the sharp point used to remove the inter-radicular bone until it can engage the cementum.

The bone is removed away starting at occlusal margin of the septum and working towards the root fragment applying *wheel and axle* principle.



mesial and distal–Cryers elevators

Wheel and axle principle

- **4- Winter's elevator:- (heavy duty elevator).**
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- In which the working end is the same that of Cryer's elevator but the handle is at right angle to the shank so it is called winter's (T-bar) cross-bar handle elevators. 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 especially in lower third molar to avoid angle fracture.
- Its uses are similar or the same to the uses of cryers elevators.


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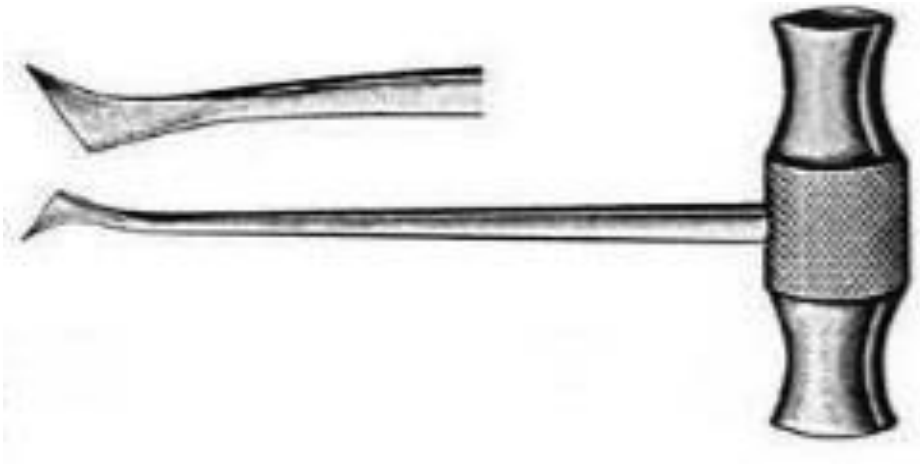

Winters elevator

5- Apexo elevators: - (root tip pick/apex).

The working blade is long, The margins are sharp and pointed,
we have 3 apexo, two angled and one straight (mesial, distal, straight)

The blade forming an angle with the shank ,
this elevator is used manly for removal of *apical fragments of root* (root tip) deeply present in the socket of the lower and upper jaw especially molars .

We push the working blade between the socket bone and the root to loosen the fractured tip and remove it from the socket.

6-War-wick James elevators: - (light duty elevator).

It is a light duty,delicate 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, extraction of upper maxillary third molars

(its design prevent the exertion of heavy force to avoid fracture of maxillary tuberosity).since the handle is flat the amount of force exerted is decreased so incidence of fracture is reduced.

Warwick-James Elevator Set

medical-tools.com/shop

Guiding principles for use of elevators:-

The following *rules* should be observed when using elevators in general

1-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 from alveolus.

2-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). Since this will damage or even luxate the adjacent tooth.

3-An elevator should always be supported to avoid slippage and injury to the patient, use finger guard (index finger) to protect the patient tissue like nerves or blood vessels on slipping of the elevator.

- **4- 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(use controlled force).
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- **5-The *direction of force*** should be such that the roots are not directed toward major structures such as the maxillary sinus.
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- 6- An elevator should never be used ***"blind"*** in the socket.
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- 7-If an **application point** is not present, this should be created by careful removal of bone.
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- 8-Elevators should always be **sterile and sharp**.
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- **Complications of using 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 month , 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 area 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.
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- **So most problems with elevators arise from:-**
- 1- Miss-judgment of amount of force exerted.
- 2- Improper positioning of the elevators.
- So these factors should be remembered and kept in our mind when using elevators.
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Luxating and removal of tooth using coupland elevator