ELEVATORS

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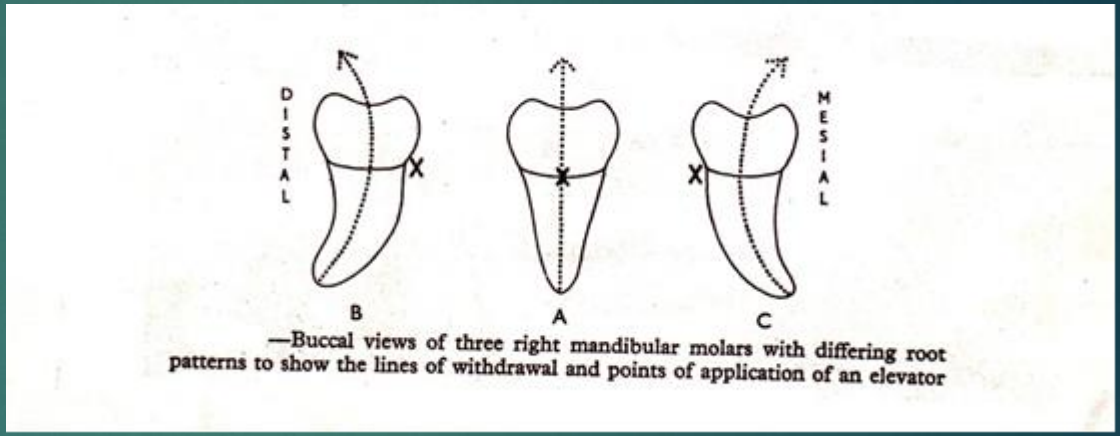
Elevators:-

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).



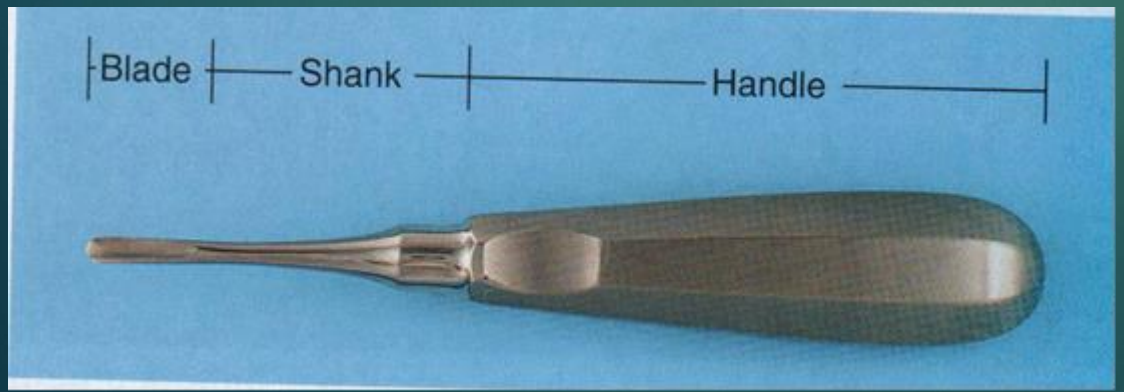
—Buccal views of three right mandibular molars with differing root patterns to show the lines of withdrawal and points of application of an elevator

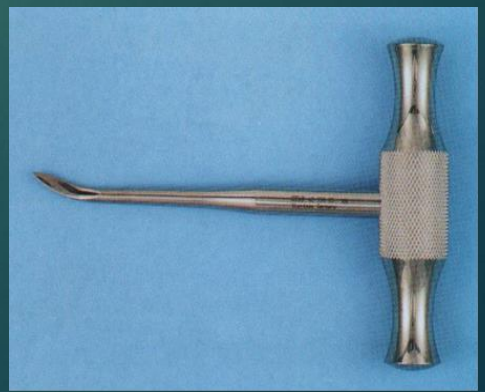
Point of application:-

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.

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 balde.
- **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.



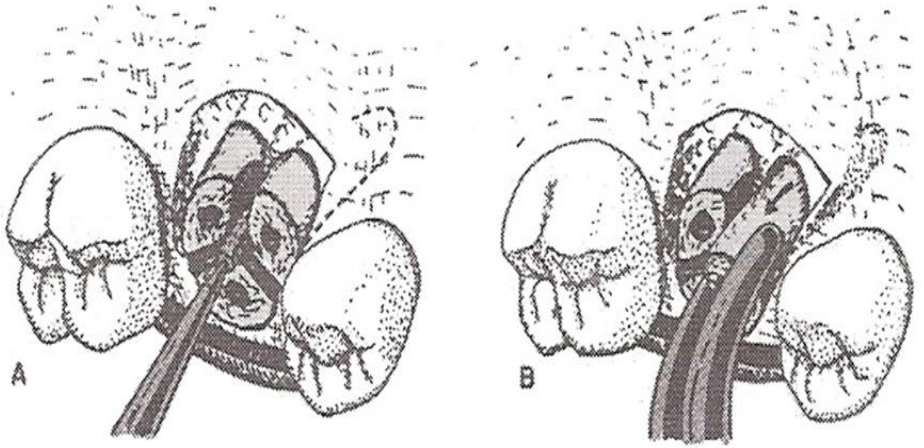


Elevators

- 1. Facilitate tooth removal
- 2. Minimize breakage of teeth
- 3. Minimize trauma in area of tooth to be extracted
- 4. Reduces amount of force applied by forceps
- 5. Most importantly- Facilitates root tip removal if crown broken off with forceps

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 ar
   for the beaks of forc
6. Any tooth resisting



Sectioning a maxillary first molar with damaged crown. A. Roots are divided

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) Straight type

a) The straight elevator

b) Coupland's chisel (elevator)

(2) Triangle or pennant-shape type

a) Cryer's elevators:

b) Winter's elevator

c) War-wick James elevators

(3) Pick type.

a) Crane pick elevators

b) Apexo elevators

Use of Elevators

Mechanical principles of use of elevators:-

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

- **Lever principle.**
- **(Displacement) Wedge principle.**
- **Wheel and axile principle.**
- **Combination of these principles**le

Displacement (Wedge)

- **Used like a shoe horn to displace:**

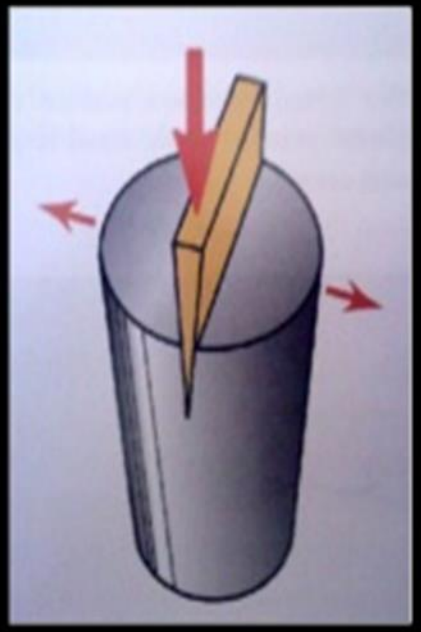
1. Residual root tips
2. Supernumerary teeth
3. Mesiodens

- **Elvators used in this movements are :**

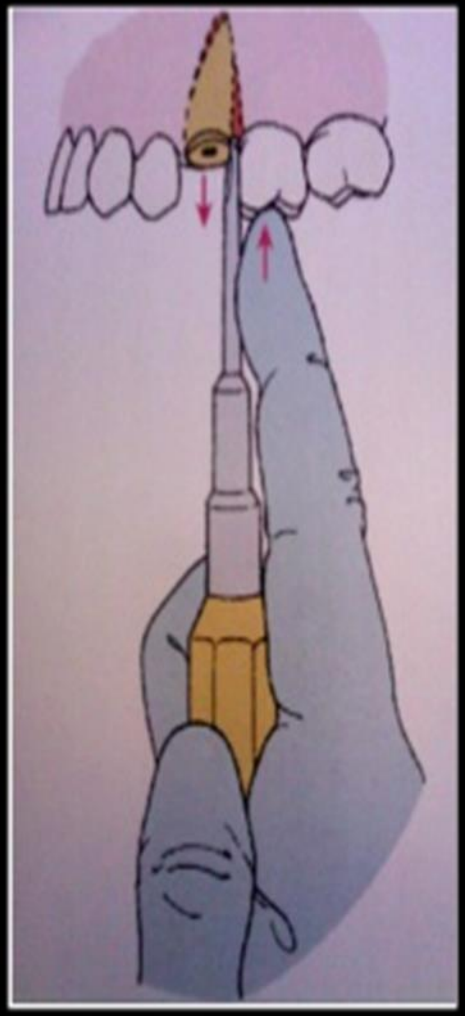
a) The straight elevator
b) Coupland's chisel (elevator)
c) Apexo elevators
d) Crane pick elevators

Displacement (Wedge)

- Root tips displaced by insertion into the periodontal ligament space.
- This action will frequently dislodge the root tip.
- **Note**: You should not use this technique for removing root tips that are in close proximity to the maxillary sinus.



Wedge expands, splits, and displaces portion of substance that receive it.



Lever Action

1. You can break the instrument using this technique
2. Place the lever under the height of contour
3. Leverage off of interseptal bone
4. Leverage off of crestal (buccal) bone

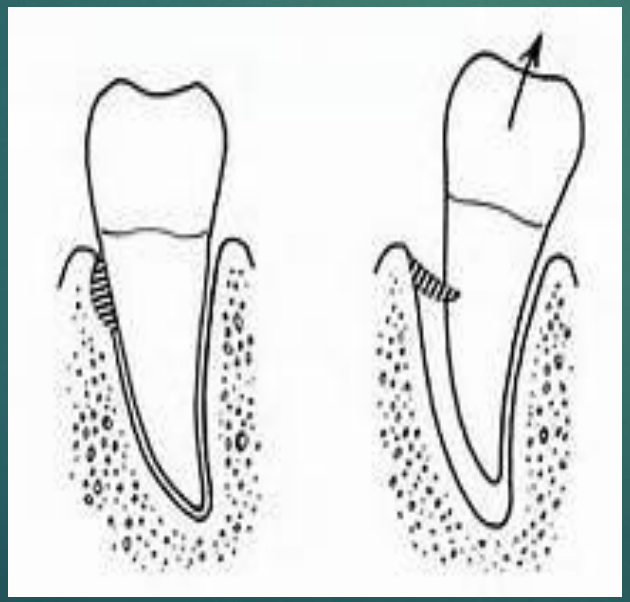
- **Elvators used in this movements are :**

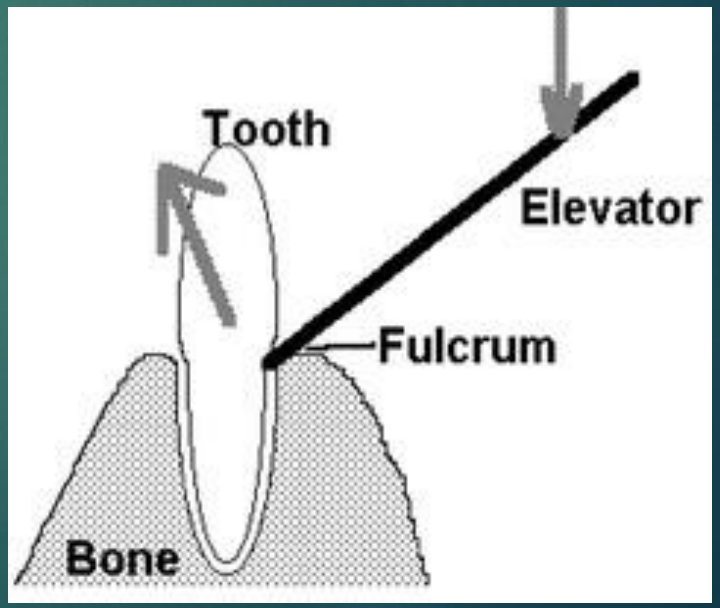
a) The straight elevator

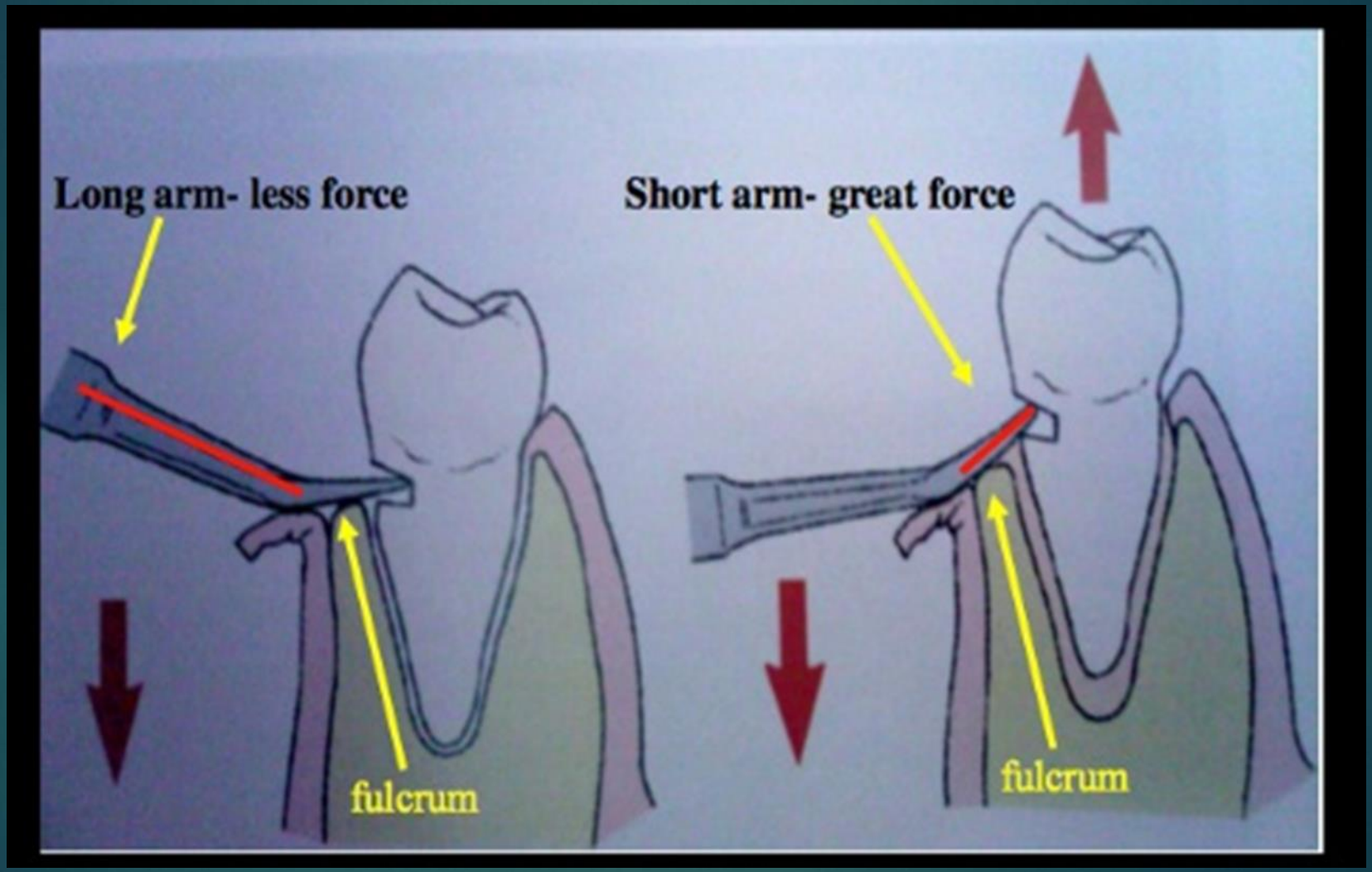
b) Coupland's chisel (elevator)

Lever Action

- Used for prying a tooth root tip from its socket.
- The elevator engages the tooth through a purchase point point of application (placed by a bur)
- Or engages the tooth through gripping the tooth with the edge of the blade and using the bone as a fulcrum to lift the tooth out of the socket






Long arm- less force
Short arm- great force
fulcrum
fulcrum

Wheel and Axle

- Rotational movements
- I Elvators used in this movements are

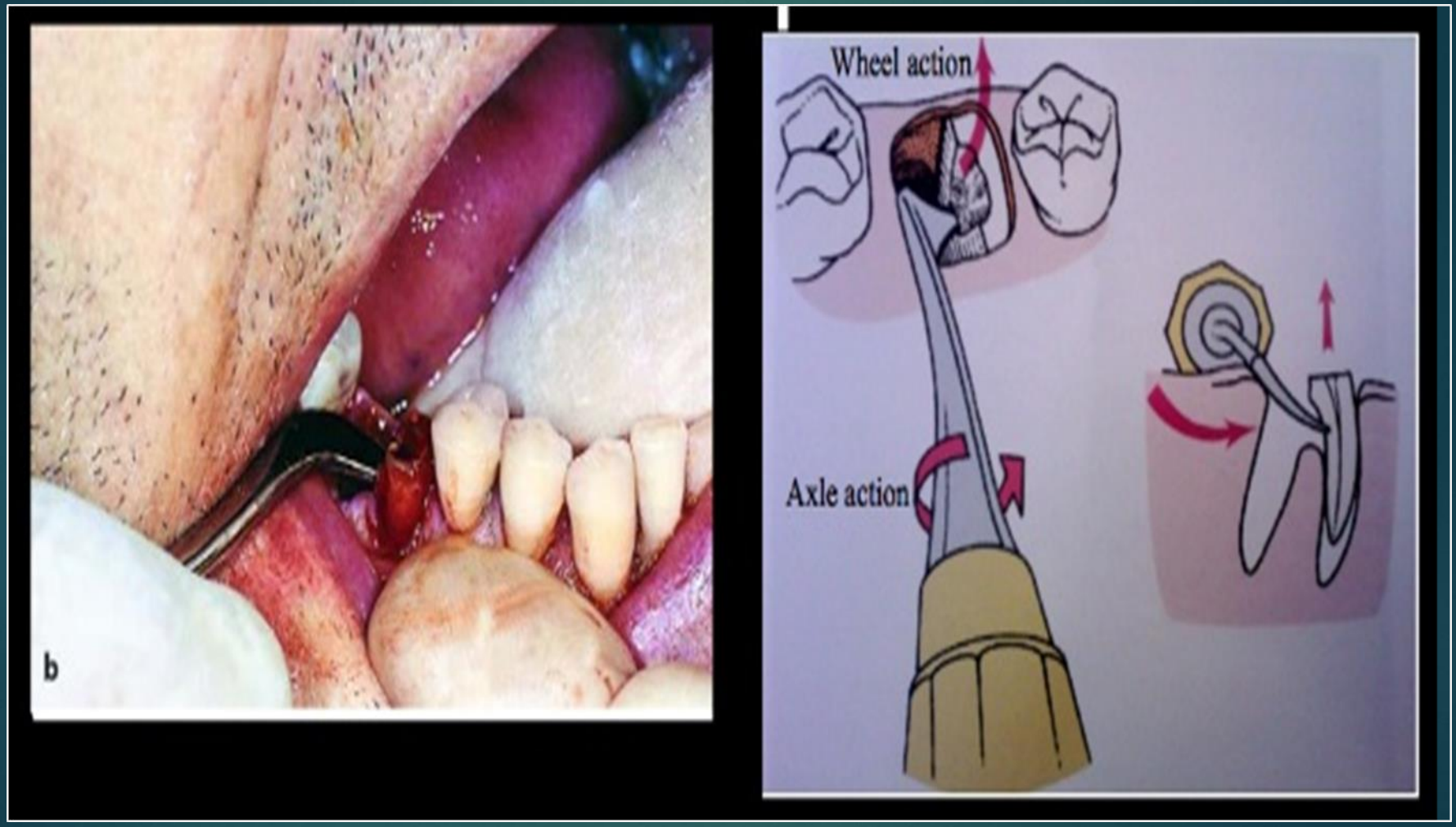
a) Cryer's elevators:

b) Winter's elevator

c) War-wick James elevators

Wheel and Axle

- Produced when the elevator engages a purchase point
- Using the bone as a fulcrum, rotating the handle
- Transmits rotation to tip of elevator to root tip
- Good for elevating root tips from mandibular molars


b
Wheel action
Axle action

•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. 1). The blade of the straight elevator has a concave surface on one side that is placed toward the tooth to be elevated (Fig. 2). The small straight elevator, No. 301, is frequently used for beginning the luxation of an erupted tooth, before application of the forceps (Fig. 3). 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.

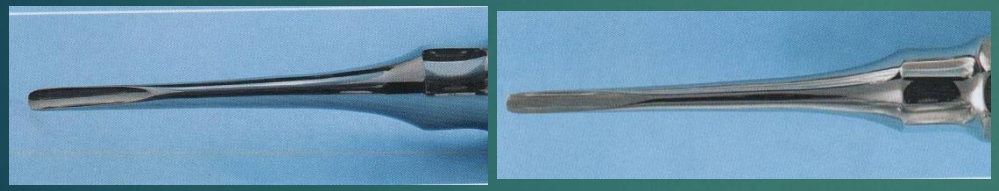


Fig. 2: The shape of the blade

Fig. 1: Straight elevator

Fig. 3: the different size of straight elevator

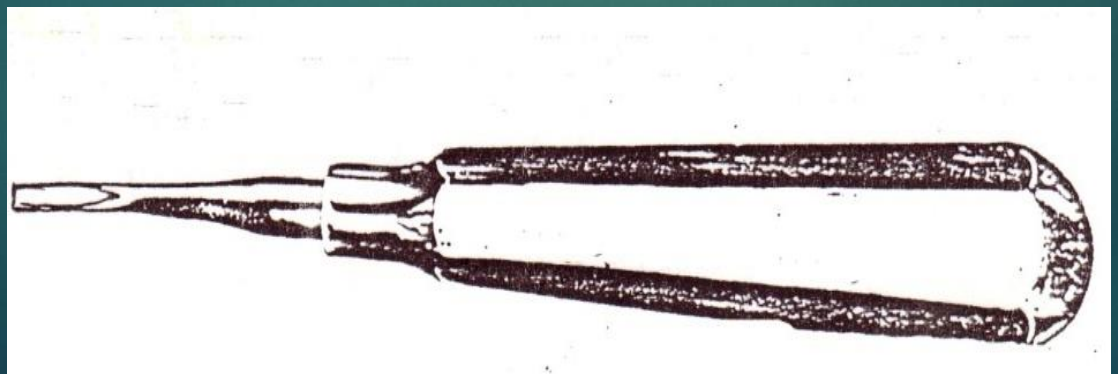
MILLER’S AND POTT’S ELEVATOR

Modefide straight elevators:

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.

. **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.



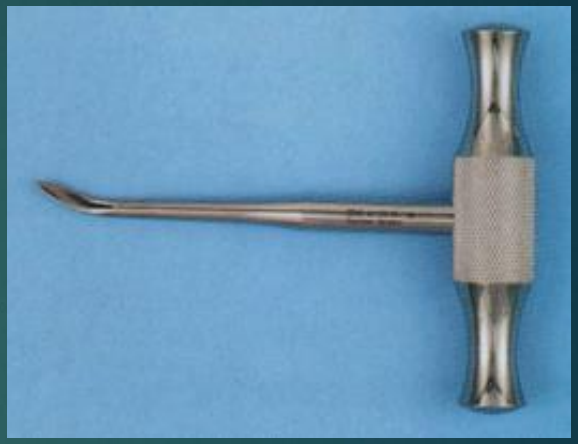
Coupland's chisel

.Cryer’s elevators:

The second most commonly used type of elevator .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.

. 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.



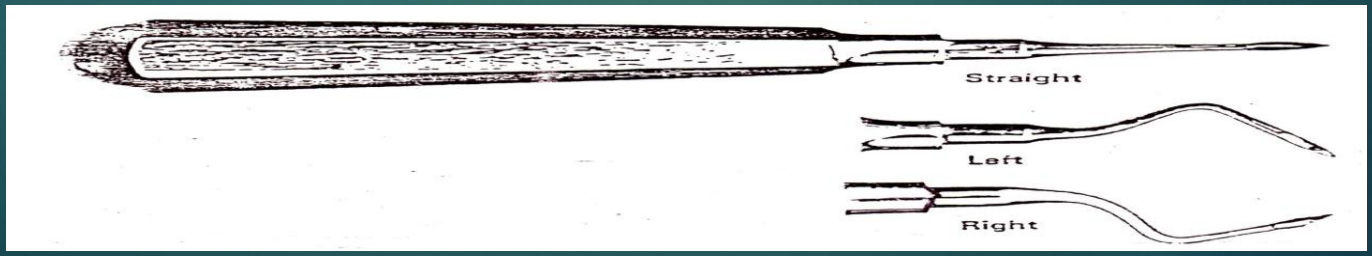
War-wick James elevators:

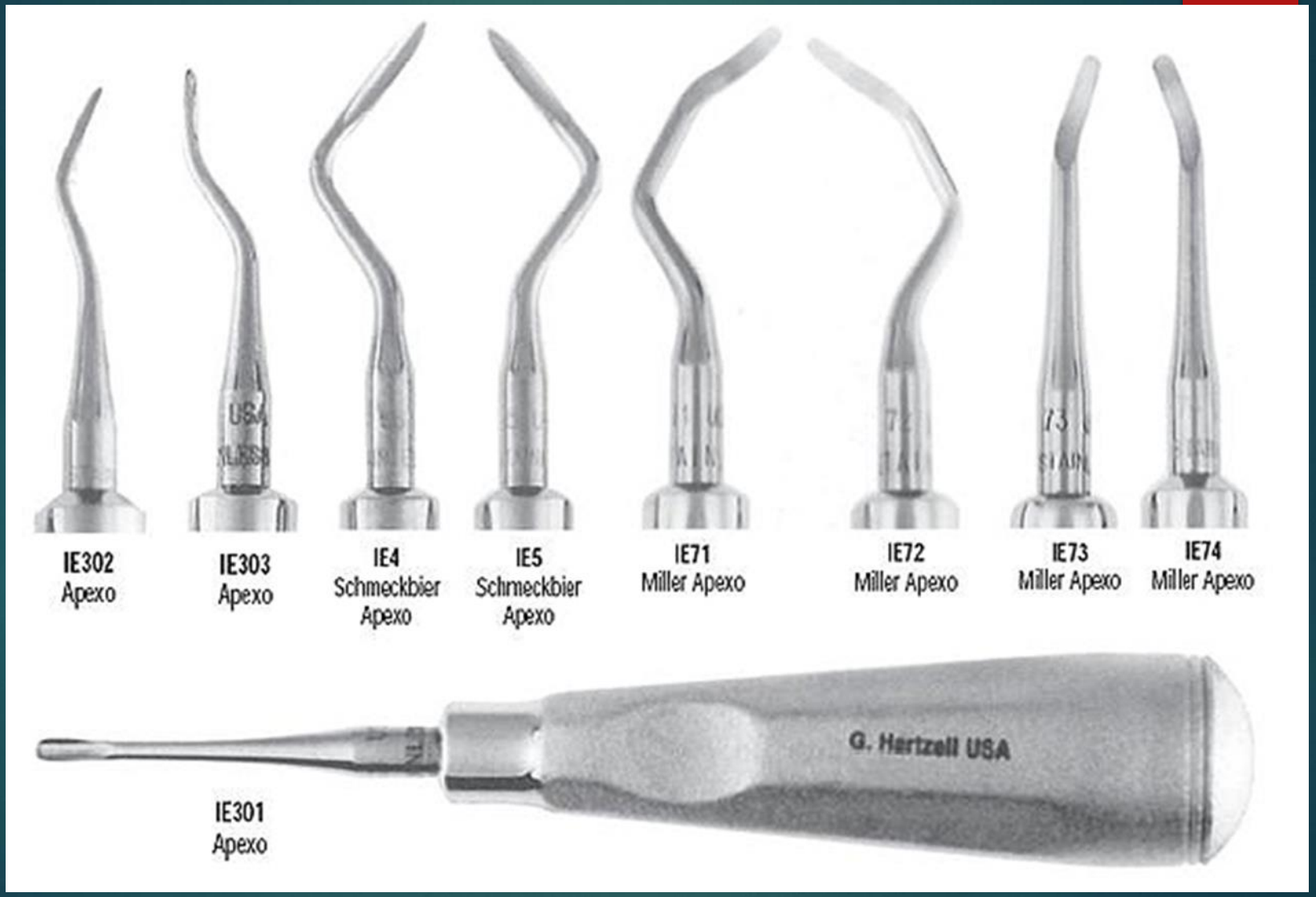
It is a light duty elevator. It’s like Cryer’s elevator, also we have two angled (mesial and distal) and one straight. The blade is short and the end is rounded and the handle is flattened, it’s used for extraction of retained roots, deciduous teeth, anterior lower teeth extraction, and where there is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

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.

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.




IE302
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IE4
Schmeckbier
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IE5
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IE71
Miller Apexo
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Miller Apexo
IE73
Miller Apexo
IE74
Miller Apexo
G. Hartzell USA
IE301
Apexo

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.
7. Elevators should always be sterile and sharp.
8. The sharp edges of the working blades re 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:-

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.


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