Dental Forceps

Dental forceps:-

Is the most widely used instrument employed in extraction of the teeth .

Dental forceps are designed in a large number of patterns & configurations which adapt to different teeth & techniques used to extract teeth.

It is composed of three parts:-

Parts of dental forceps:

1- Handles.•

2- Hinge joint.•

3- Blades (Beaks).•

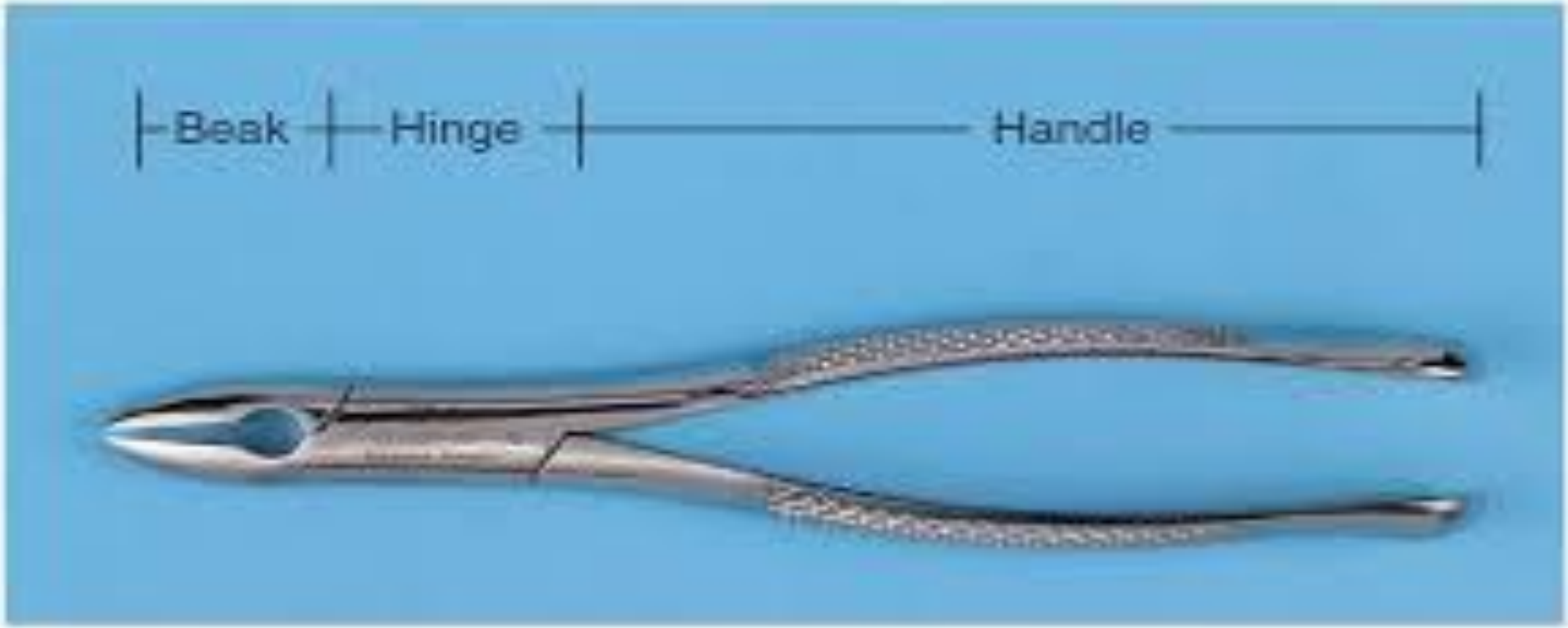
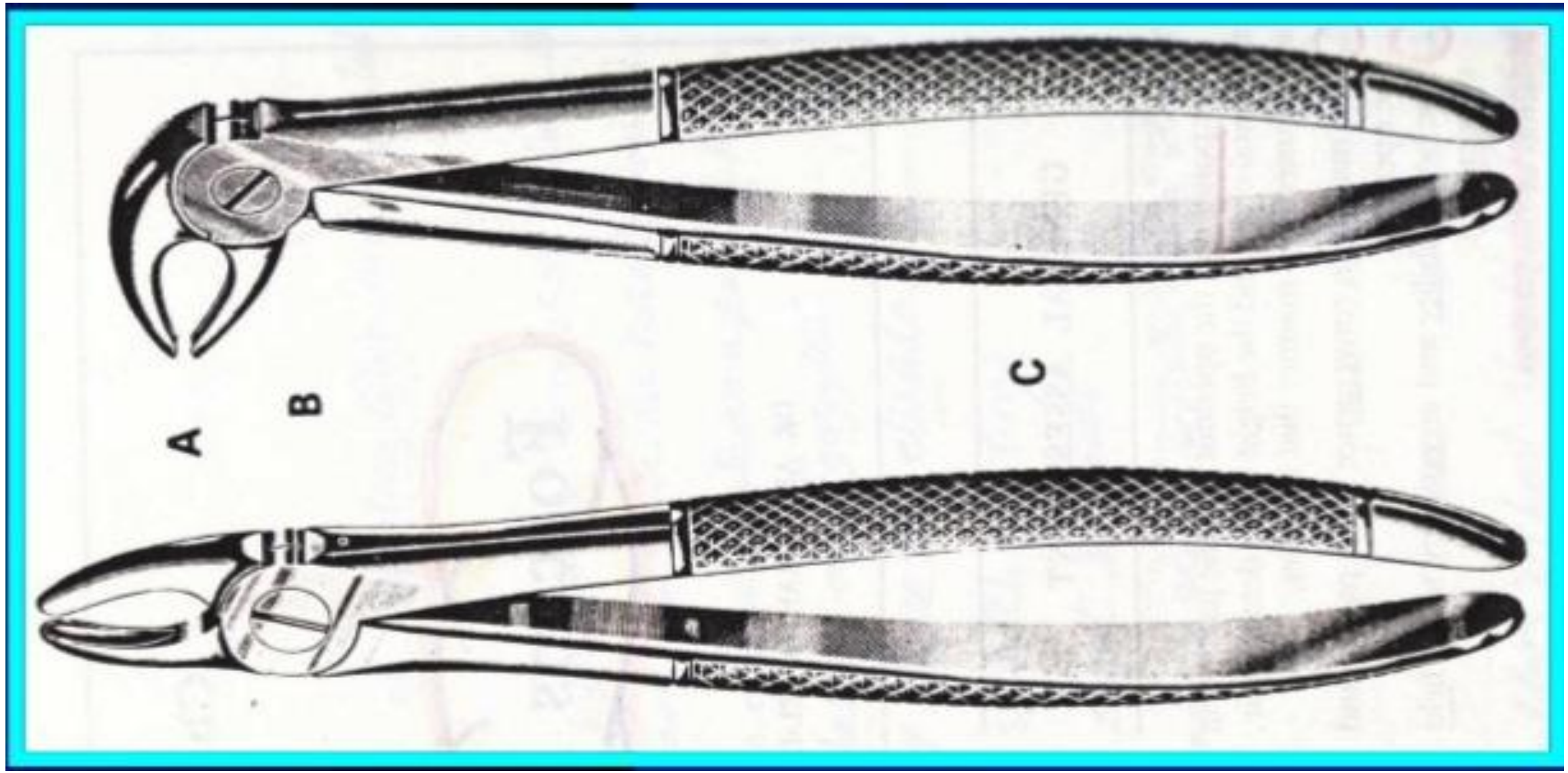


Figure 6-38 Basic components of extraction forceps.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The more desirable properties and requirements of dental forceps:-

1- That must be made of **strong metal** so that it can resist the forces exerted during extraction movements.

2- It must be constructed of **non-corrosive metal** so that it can resist rusting during sterilization by boiling water and autoclaving.

3- The **handles of forceps should be serrated** in order to prevent slippage. And have good grip during extraction movements. The handles must of such design so that they can give the operator a chance to use **maximum leverage force**. Also it must be of **suitable shape and size** so that they can apply to area of extraction without injury to the opposing teeth and surrounding tissues.

4- The blades:- •

The blades (beaks) are the source of the **greatest variation** among • forceps. The beaks are designed to adapt to the root of the teeth at the junction of the crown and root & to **adapt to the root surface** and not to the crown. Also beaks designed for **single rooted, two rooted, and three rooted teeth** so that the tips of the blades will adapt closely to various root formation decreasing the chance for the root fracture. Other variation is the **width of the beaks**, some forceps are narrow (fine) and others are wider (heavy). **The edges** of the blades are sharp enough so they cut through the periodontal fibers without causing injury to the gingiva. The blades should fit the surface of the extracted tooth. The space between the blades should be enough to **accommodate the crown** of the extracted tooth without crushing of the crown. The design of the blades should be suitable to be applied to the surface of the root of the tooth so that the **blades are parallel to the long axis of the tooth** to be extracted.

5- The hinge joint: •

Is that part of the dental forceps which **transfers and concentrate** • **the force** applied to the handle of the dental forceps and then to the beaks. It is the part which connecting the handle to the beaks.

The joint must be: •

a- beveled so that it will not cause pinching of the lip or injury to the • lip

b- Heavy & strong allow free movement without rocking. •

c- Lubricated with oil after sterilization to prevent rusting which lead • to limitation and difficulty during application of the forceps blade to the tooth to be extracted.

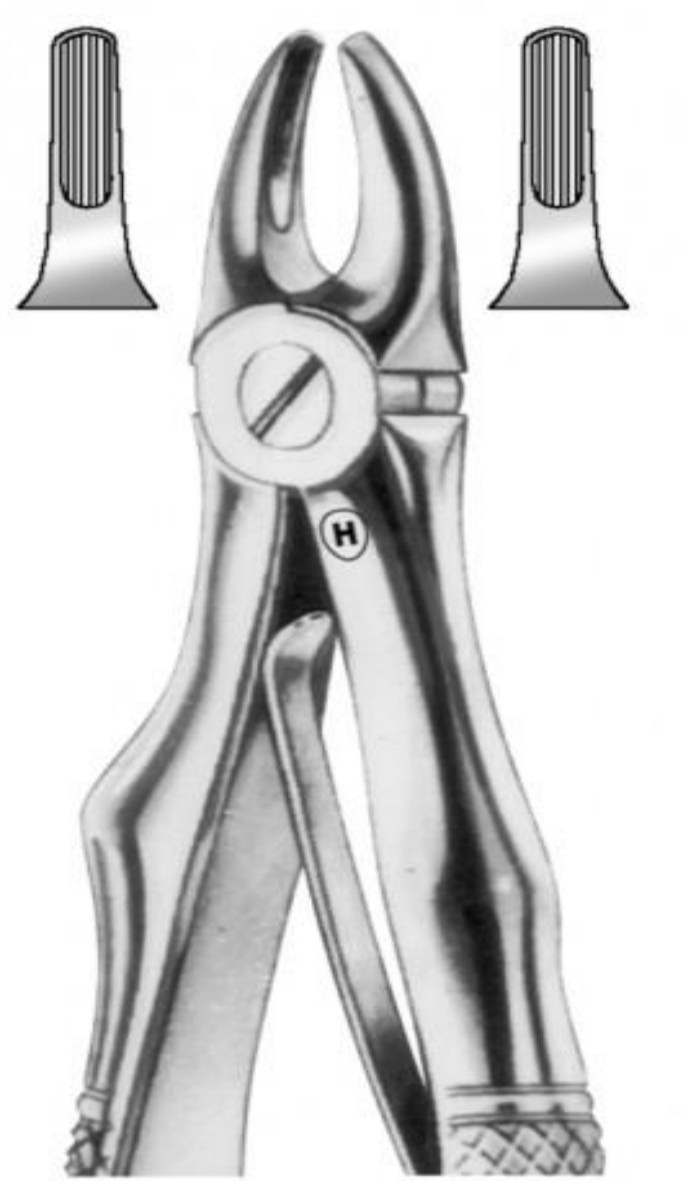
TYPES OF DENTAL FORCEPS:-

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 types of straight forceps have narrow blades or we call it ***fine blades*** for extraction of upper lateral incisors (left and right) and upper anterior retained roots.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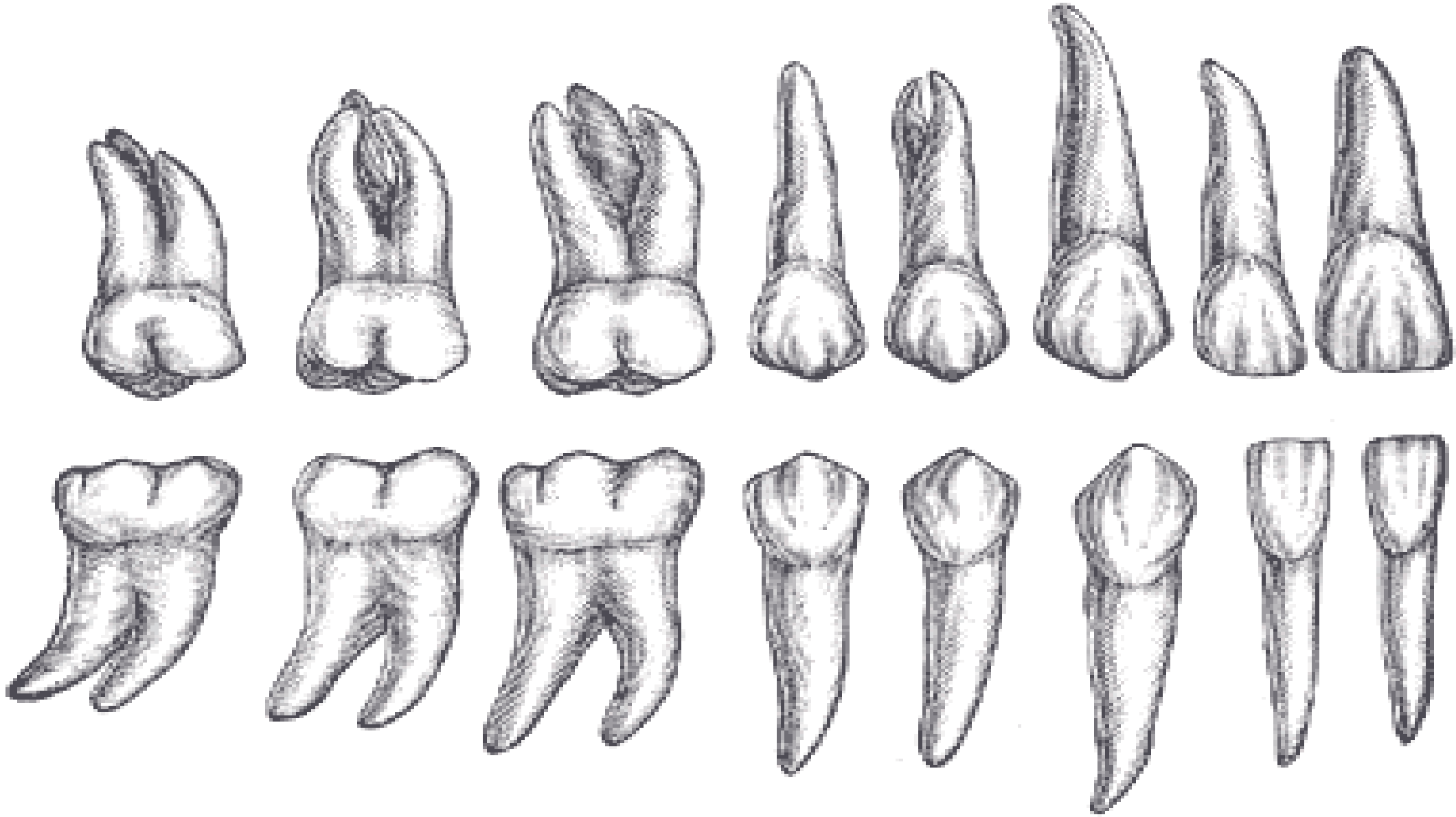
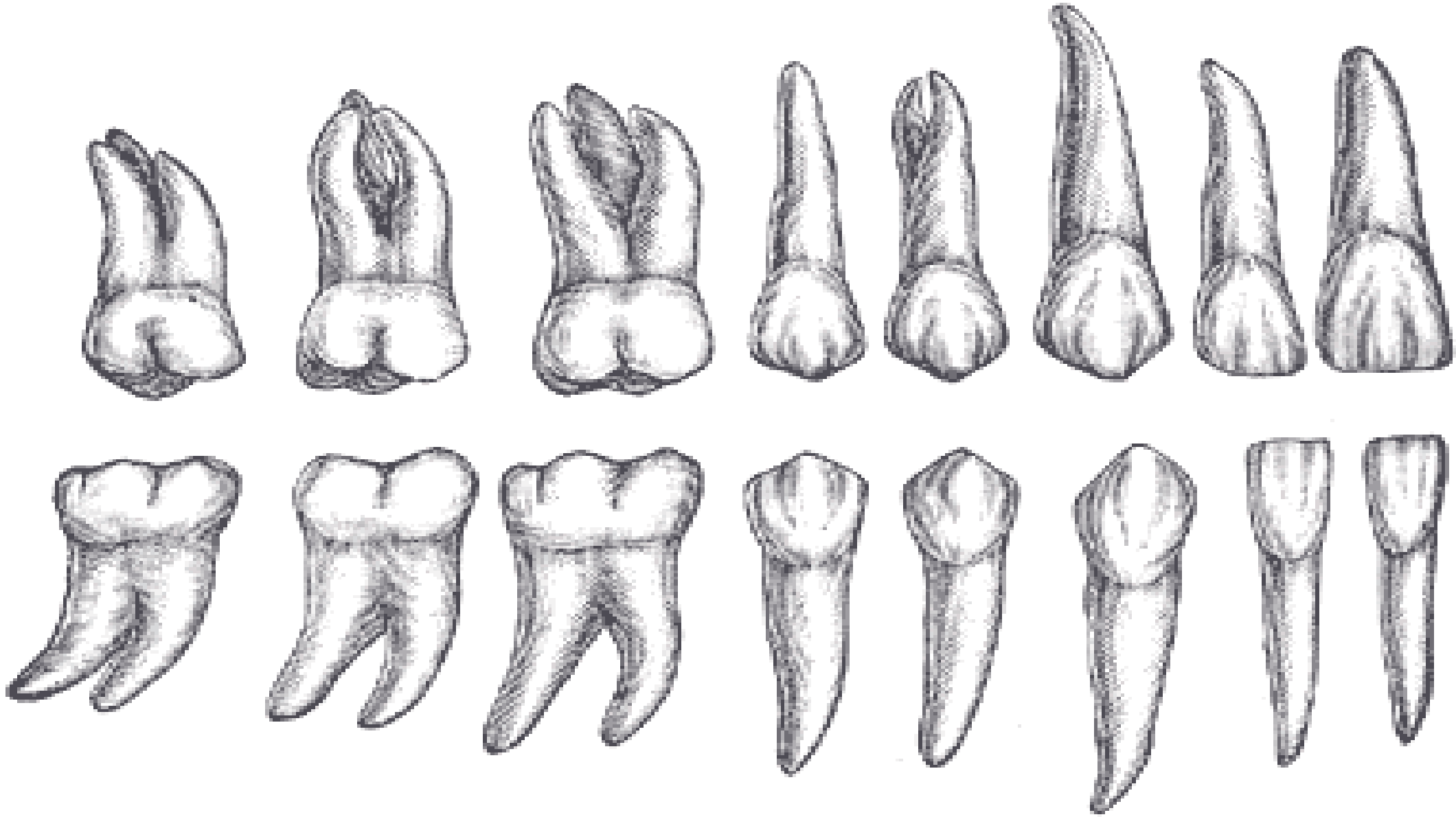
2-The upper premolar forceps:-

Here we have **two bends** in the design of the forceps, to apply the forceps parallel to long axis of premolars, and these bends or curvature of the handle to avoid injury to the lower lip and apposing teeth (mandibular). The upper premolar teeth has either **one 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 premolar 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 the palatal side is round to conform or fit on palatal root , while blades on buccal side 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.



1003
Fig 17
upper molars, right

Bayonet forceps:-

- The Bayonet forceps, the blades of the forceps is off set so the **long axis of the blades parallel to long axis of the handle** of the forceps. The forceps is suitable fox extraction of upper 3rd molars right and left .we have TWO design one for extraction of upper third molar **(bayonet tooth**) and the other design with narrow blades **(bayonet root)** for extraction of retained root of upper third molar and we can use it for all posterior retained roots .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Bayonet forceps of the upper 3rd molar

- For extraction of Upper third molar (right and left with the same forceps)

- The blades are parallel To the long axis of The handle

- There is a space between the blades

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 easily apical to the cemento-enamel junction (on the root) of the tooth surface parallel to the long axis of the tooth **without interference** of the handle of the forceps with upper teeth or upper lip.

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 which have fine roots with flattened sides (mesio-distally) and **heavy blades** used for extraction of canines.

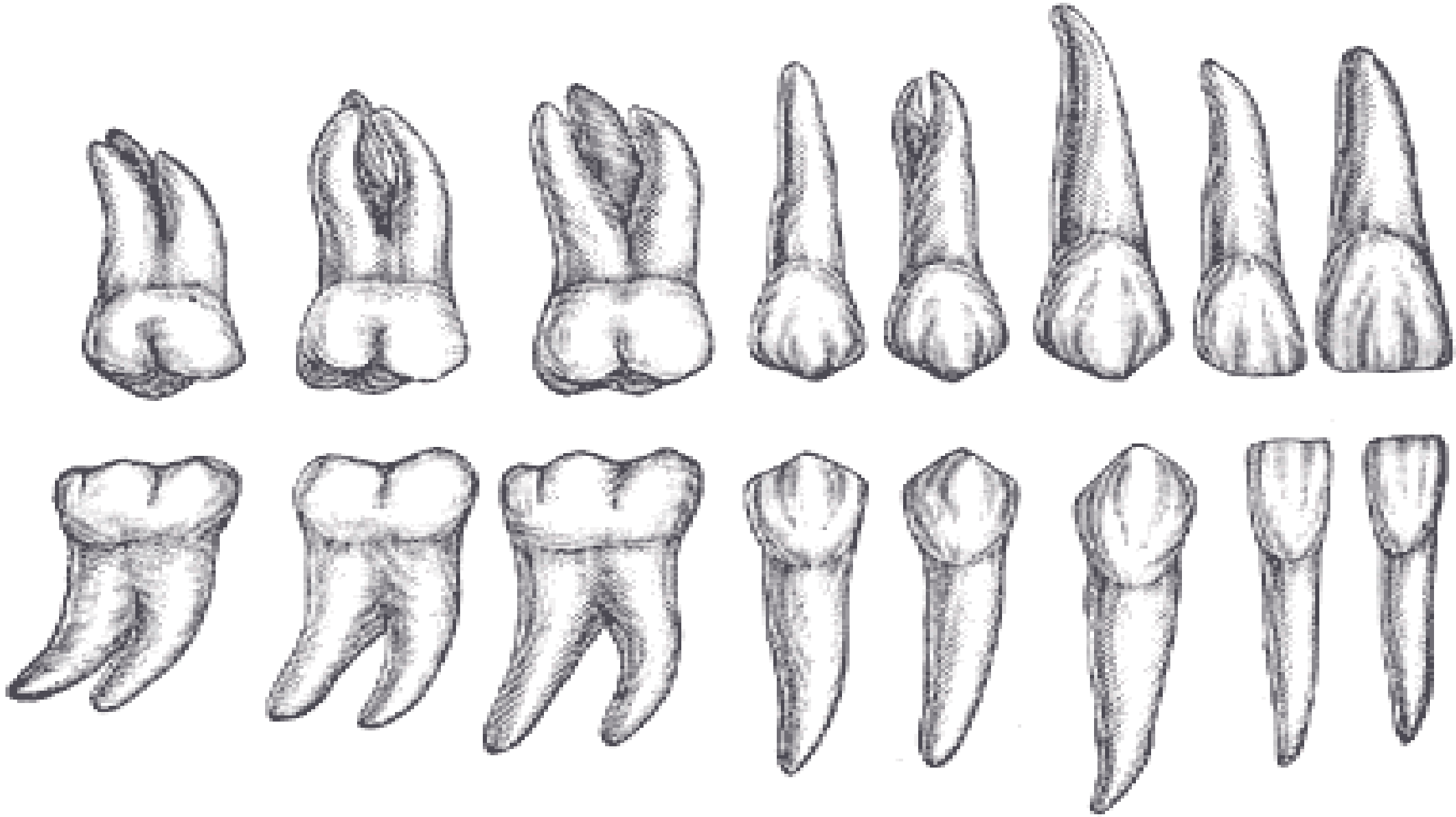
2-Premolar forceps:-

- 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 closed to accommodate the crowns of these teeth without crushing for the crown.


LOWER PREMOLARS

3-Full crown lower molar forceps:-

Since the lower molar teeth has **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.

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Cowhorn forceps

Lower 3rd molar forceps


Upper Anterior
Upper Right
Upper Left
Lower Universal
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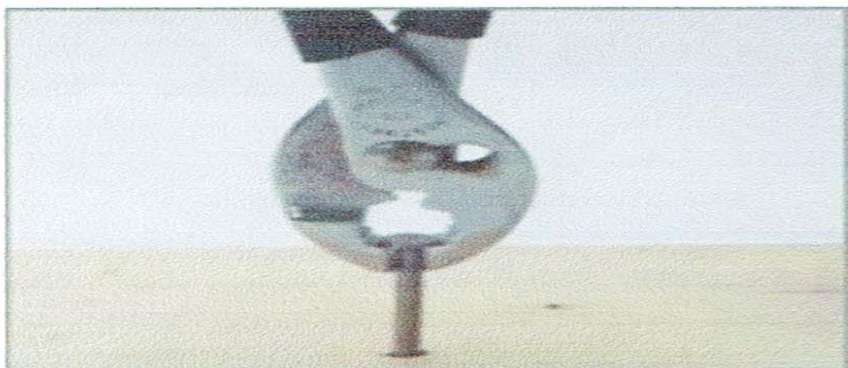
Physics foreceps: a recently advanced method in dental extraction invented by dr.richard golden(2004).it utilize the combination of biomechanical advantage of **a first-class lever** (A **first-class lever** is a simple machine that lifts a load across a pivot point called a fulcrum) and the biochemical reaction by the hyaluronidase which breakdown the P.D.L therefore ease tooth release.it also utilize **creep phenomena**(mean material shape tendency to change under a **constant** load.**the forceps consist of : 1**.the beak(which positioned mostly on the **lingual or palatal** tooth root into the gingival sulcus.**2**.the bumper(which placed mostly facial alveolar aspect,**typically** at the **mucogingival junction**.beak and bumper designed to allow **only wrist**

movement based on first-class lever.**THIS** forceps differ from the **conventional** in the followings:**1.**lever mechanism(see the figure below.**2.**it provide steady rotational trauma to the PDL which quantitatively creat an increased release of hyaluronidase in a **shorter** period than the conventional one since the later provide **intermittent** force.**3.**since there is no squeezing pressure is applied to the handles or tooth and no force is required to be placed on the beak therefore the tooth does not split or crush.

CLINICAL ADVANTAGES OF PHYSICS FORCEPS: **1.Bone and soft tissue preservation(atraumatic extraction) which is beneficial for dental implants in the esthetic zone 2.very little operator force is necessary 3.no need for flap elevation+elimination of root tip fractures.**

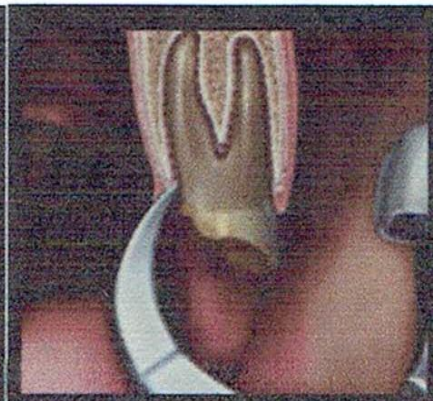


A "traditional" dental forceps removes a tooth similar to how a pair of pliers removes a nail.

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.

Step by step procedure

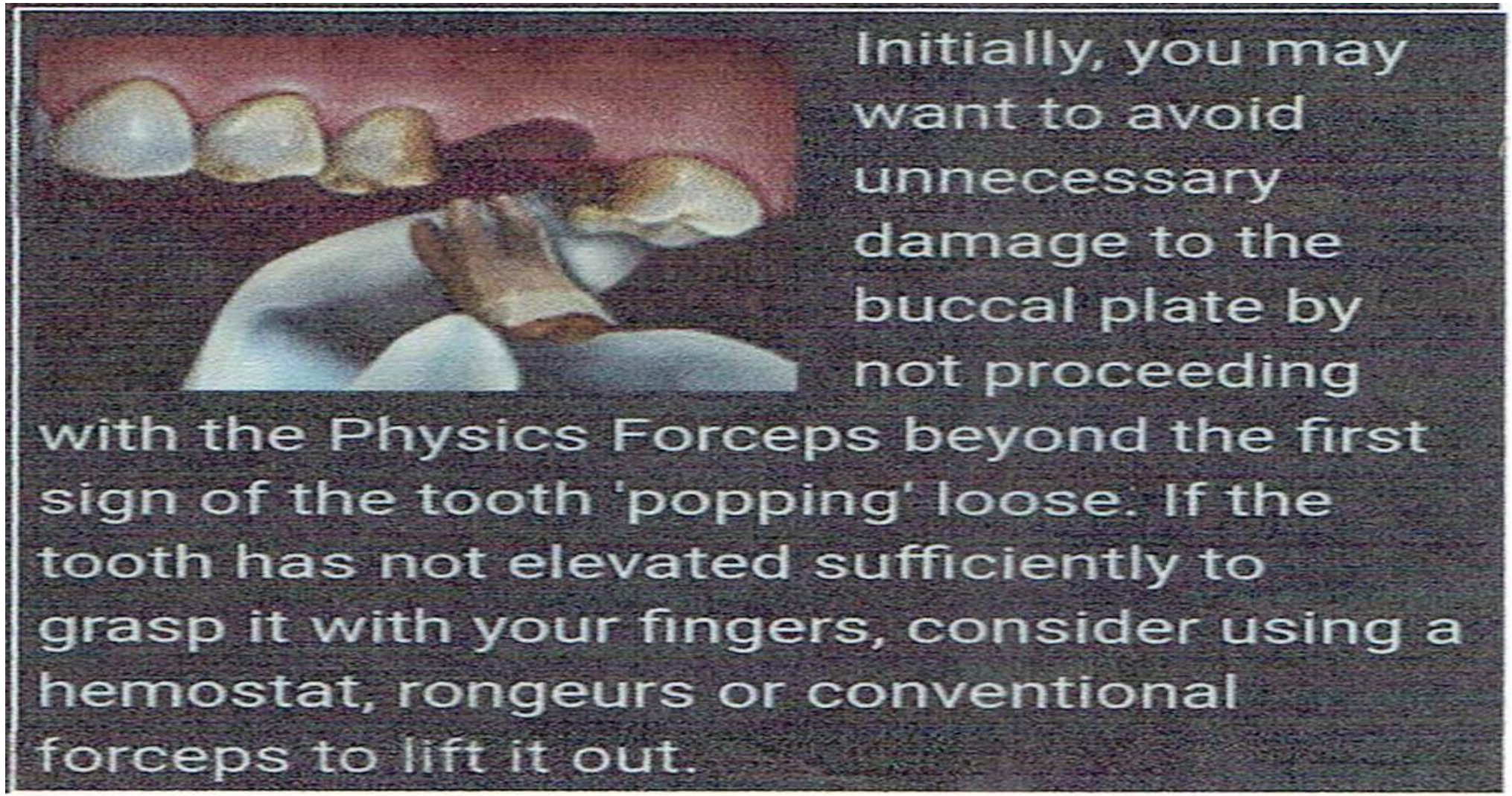
Separate the gingival attachment from the tooth. All upper teeth, including molars can be extracted without any sectioning. Lowers molars occasionally need to be sectioned (lingual buccal) to ensure a more predictable extraction, by significantly reducing resistance to extracting forces.



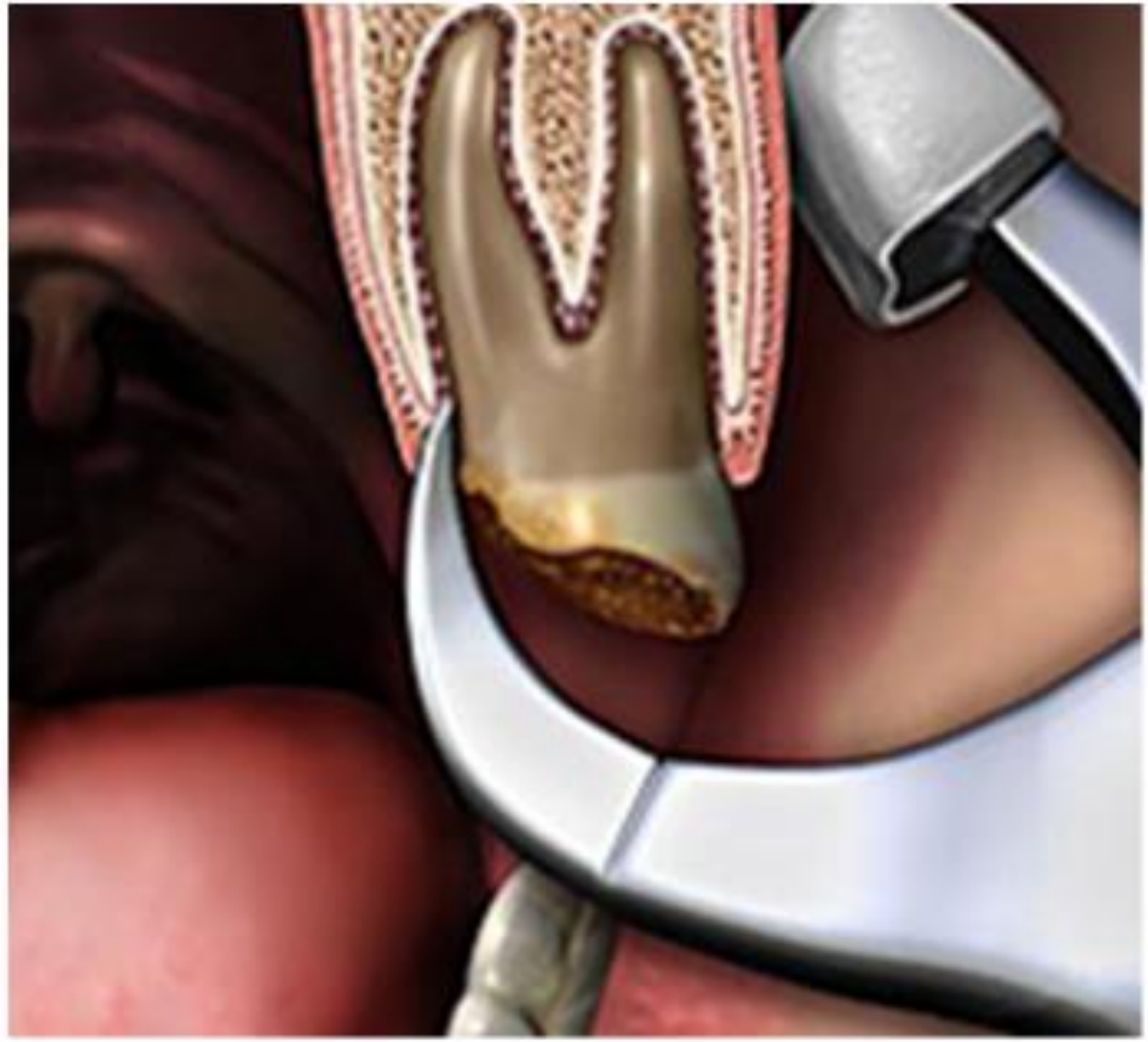
With the handles wide open, set the beak into the depth of the lingual or palatal sulcus on solid root surface. A secure purchase point on solid root surface is critical to successfully rolling out the tooth. When necessary, create a small trench with a small flame shaped diamond burr to engage the beak more securely on solid root surface.

Set the bumper perpendicular to the tooth at about the level of the mucogingival junction. Holding that position securely, freeze don't squeeze the handles. Note: the greater the distance between the beak and the bumper, the greater the arc of rotation, consequently achieving vertical lift.

Without squeezing the handles or moving your arm, begin to apply a steady, very slow rotational force in the direction of the bumper patiently, continue to apply this steady force for 30 to 40 seconds. This force or creep will continue to build, allowing time for the periodontal ligament to release, the bone to slowly expand & the tooth to disengage.


Initially, you may want to avoid unnecessary damage to the buccal plate by not proceeding with the Physics Forceps beyond the first sign of the tooth 'popping' loose. If the tooth has not elevated sufficiently to grasp it with your fingers, consider using a hemostat, rongeurs or conventional forceps to lift it out.

Note: **no squeezing** pressure is applied to the handles or to the tooth instead the handles(once in position) are rotated as one unit for few degrees and then is stopped for approximately **one** minute.



Mechanical principles of extraction :-

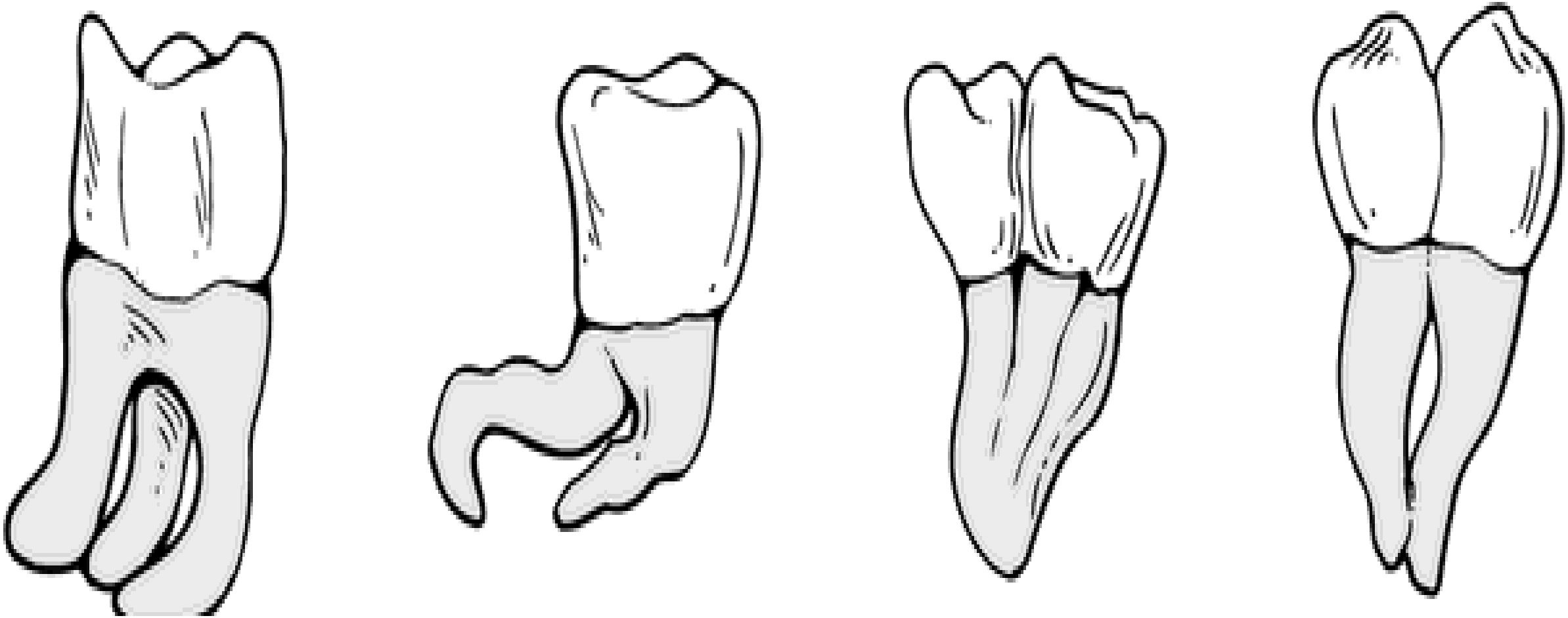
The removal of teeth from the alveolar process employs the use of the following mechanical principles:-

I - Expansion of the bony socket:-

- Expansion of the bony socket to permit the removal of the tooth. This is achieved by **using the tooth it self** as a dilating instrument, and this is the most important factor in forceps extraction , and this principle need:-

- 1-Sufficient tooth substance is present to be firmly grasped by the forceps blades.

- 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. (Root pattern. Favorable or non-favorable).



3-Nature of the bone-the socket can be dilated only if the bone of which it is composed is **sufficiently elastic** to permit such expansion. This property is maximal in young bone and decrease with **age**; older patients usually have denser, more highly calcified bone that is less likely to provide adequate expansion during extraction of the teeth. If the root pattern or consistency of the investing bone is such that the dilatation of

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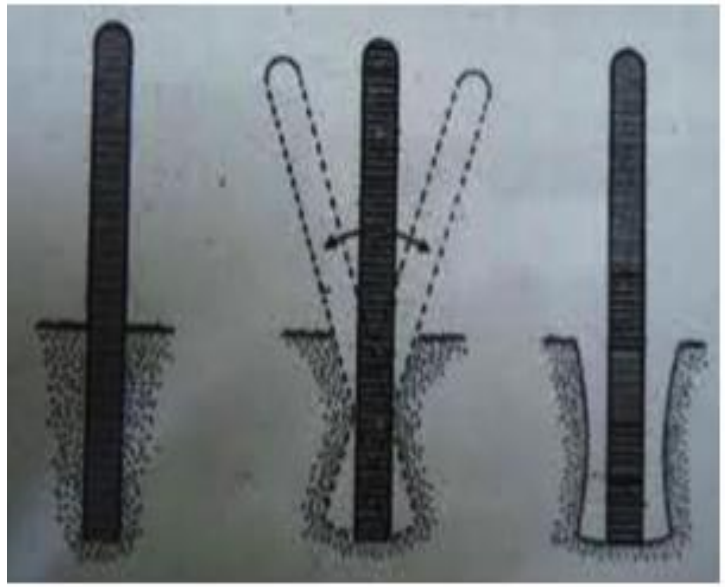
the socket is impracticable ,then the **surgical method of extraction**, with or without the division of the roots of multi-rooted teeth, must be employed.

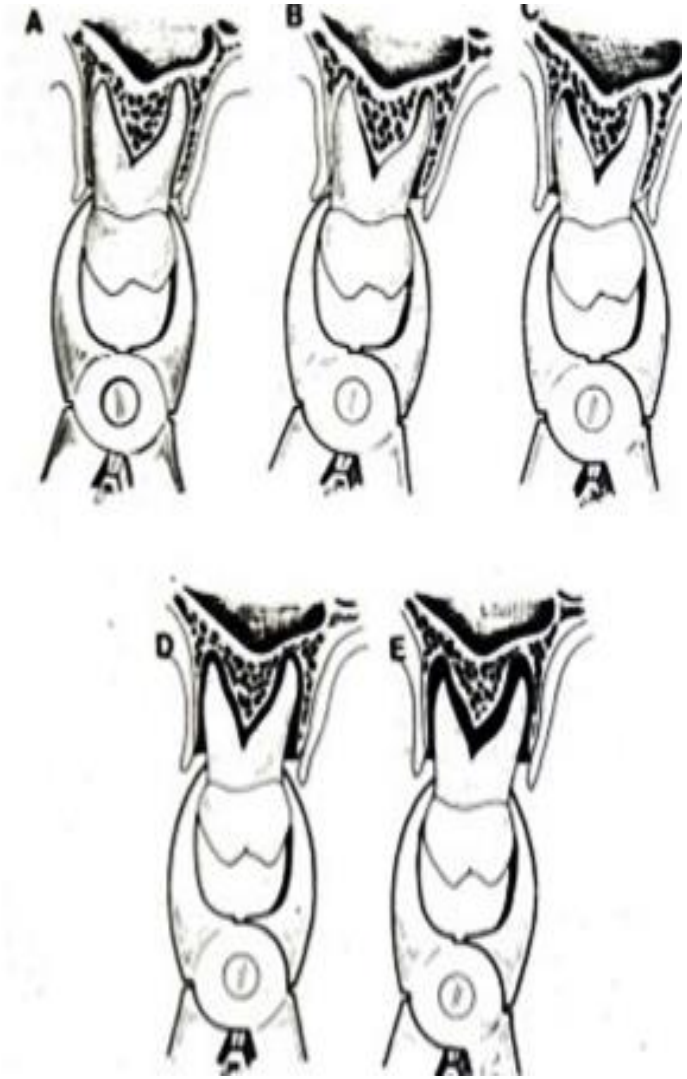
4-**Thickness of the bone**. Thick bone expansion is less likely to occur by using normal force.

Π- 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 this principle is the basic factor governing the use of elevators to extract teeth or roots.

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III - The insertion of a wedge or wedges:-

- Wedging means :- the insertion of the forceps blade between alveolar bone and the root of the teeth. This can be explained by sudden elevation of teeth from their socket on application of the dental forceps especially those teeth with **conical root** like lower second premolars or lower second molars sometime.