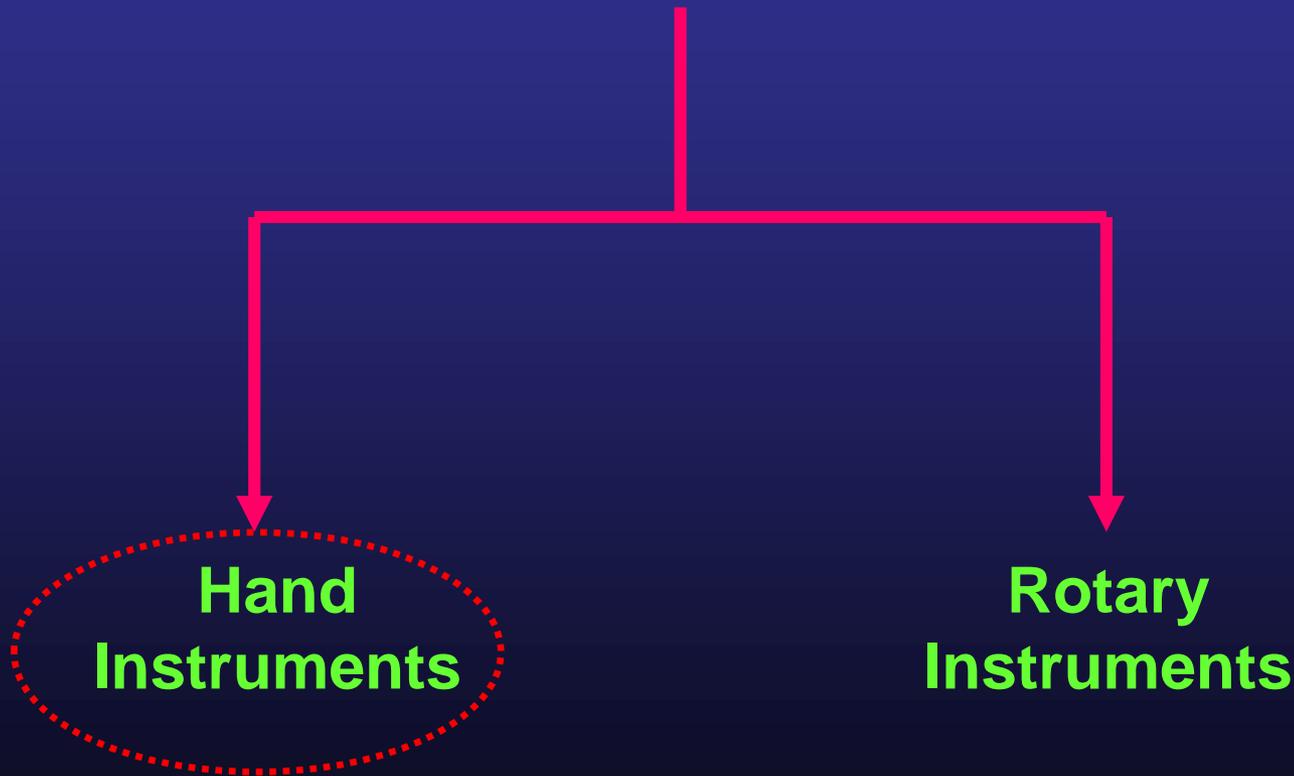
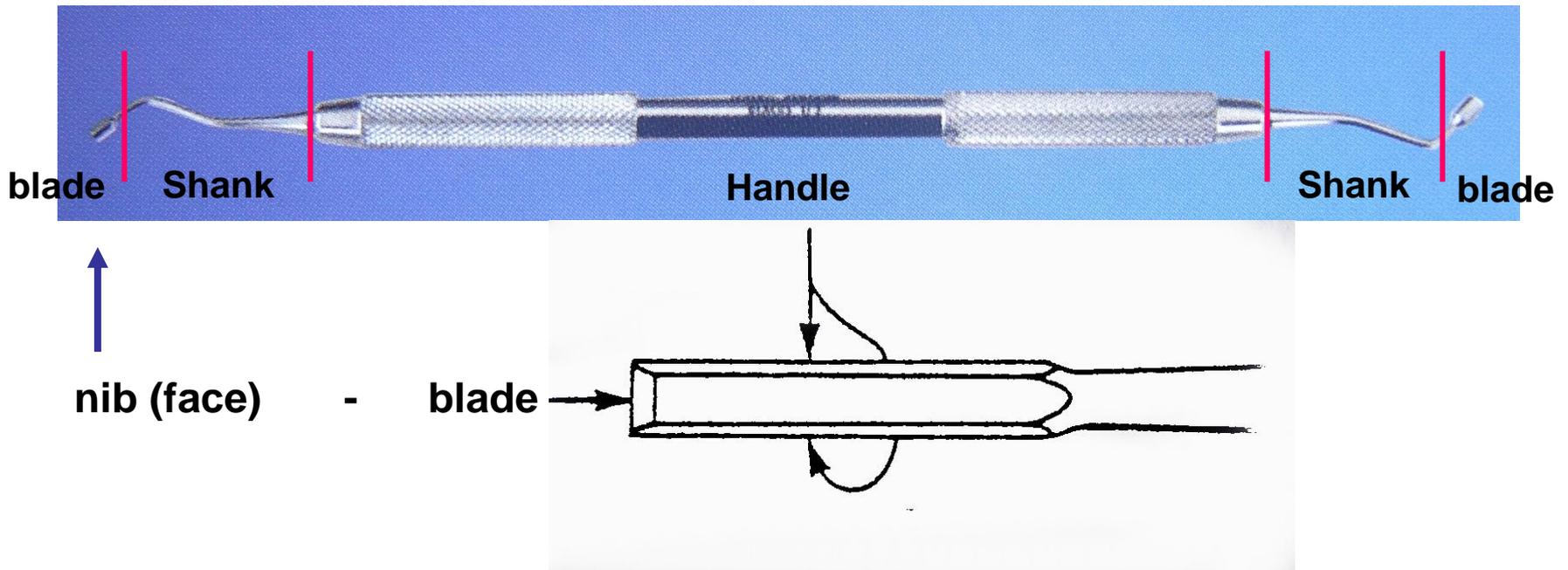


# Instruments in Operative Dentistry



# Hand Instruments

## Instrument Design



Cutting and non cutting

Single ended - Double ended

# Instrument shank angles

**Straight**



**Bin-angle (contra-angled)**



**Mon-angle**



**Performance,  
anti rotation**

**Triple-angle (contra-angled)**

# Instrument Nomenclature

***Function:*** e.g. condensers, carvers, cutting inst. .... etc.

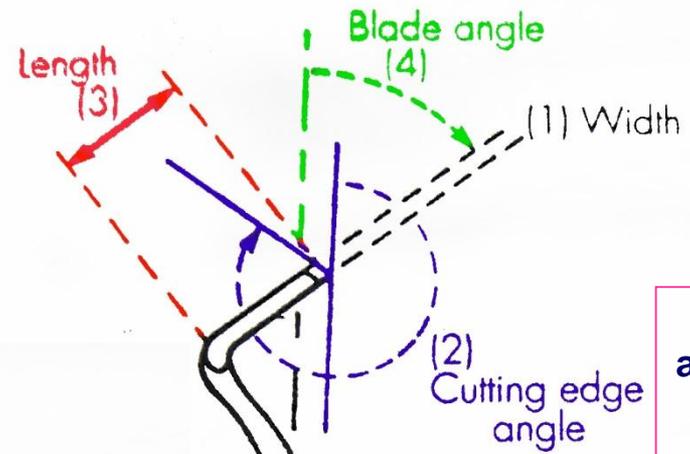
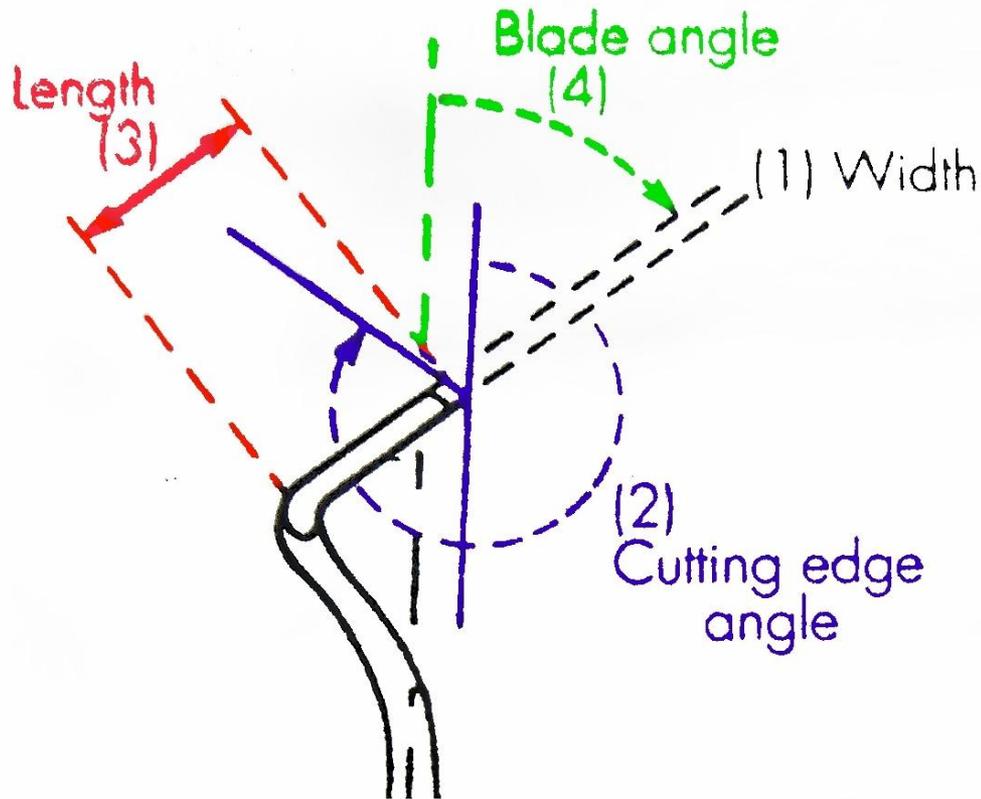
***Manner of use:*** hand condenser, mechanical condenser ...

***Design of working end:*** spoon excavator, sickle scaler.

***Angulations of the shank:*** mon-angle, bin-angle, triple....

# Cutting Instruments Formula

- Four number code

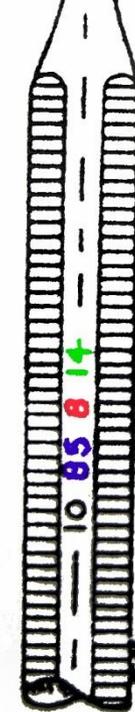


Expressed as a percent of 360 degrees

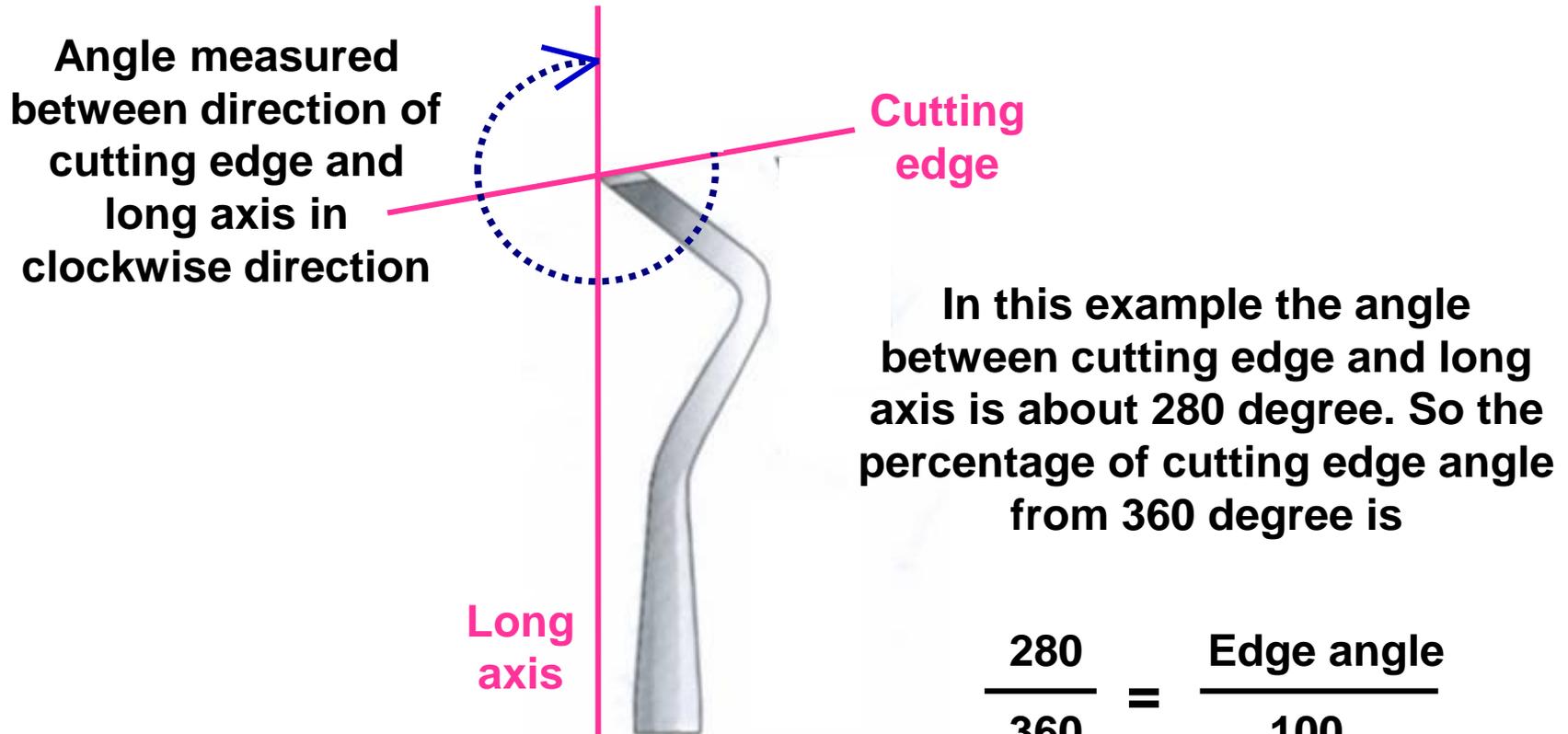
Formula

| (1) | (2) | (3) | (4) |
|-----|-----|-----|-----|
| 10  | 85  | 8   | 14  |
| 1.0 |     | 8   |     |
| mm  |     | mm  |     |

- Three number code

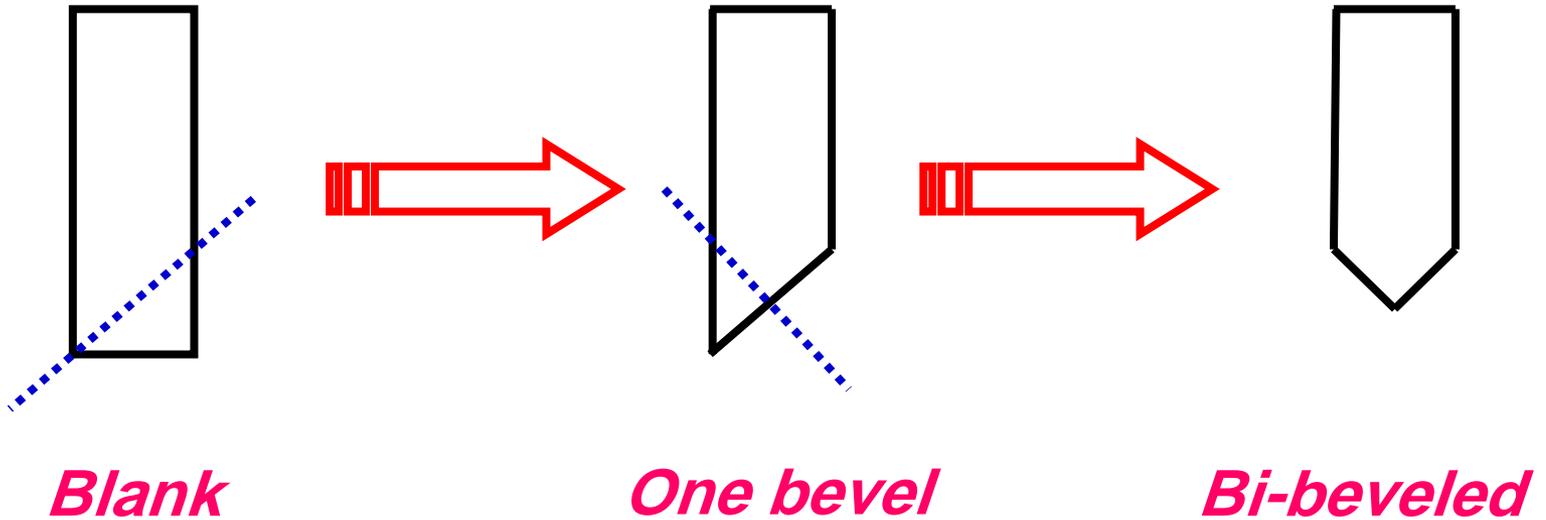


## Example for measuring the 2<sup>nd</sup> number (cutting edge angle)



Cutting edge angle = 80.5

# Cutting instruments bevel



**One bevel = Right or left,**

**Single ended safer but double ended reduce time for instruments exchange**

# Cutting instruments applications

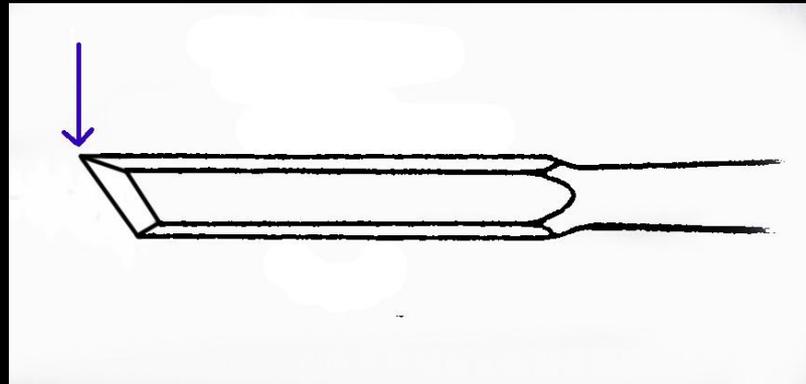
## Excavators

**Ordinary Hatchet excavator:** cutting edge with same plane as that of handle's long axis, and bi-beveled.

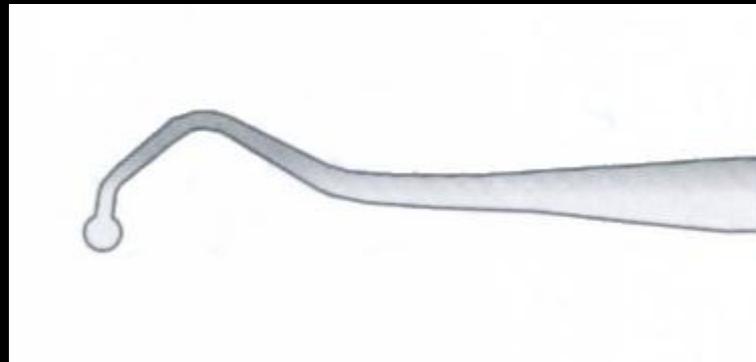
Primarily used on anterior teeth for preparing retentive areas and sharpen internal line angles for direct gold restorations.

**Hoe excavator:** planing walls and forming line angles in class III and IV for direct gold restorations.

**Angle former:** sharpen internal line angles and preparing retentive features for gold restorations. Primary cutting edge at an angle other than 90 degree to the blade.

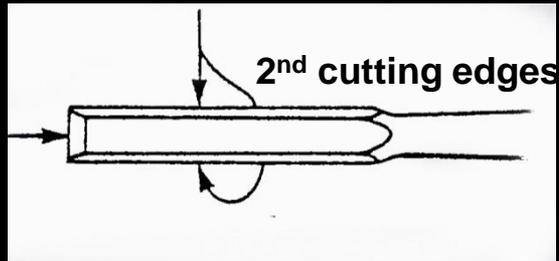


**Spoon excavator:** removal of caries, usually bin angled or triple angled to facilitate accessibility.



# Chisels

**Straight chisel:** not angulated with one side bevel and cutting edge perpendicular to long axis of handle. used for cutting enamel and no need for right and left since a 180 degree turn of the instrument allows for its use for both side of the cavity.



**Bin-angle and Wedelstaedt chisels:** cutting edge perpendicular to long axis of handle. used for cutting enamel.



A

Chisel



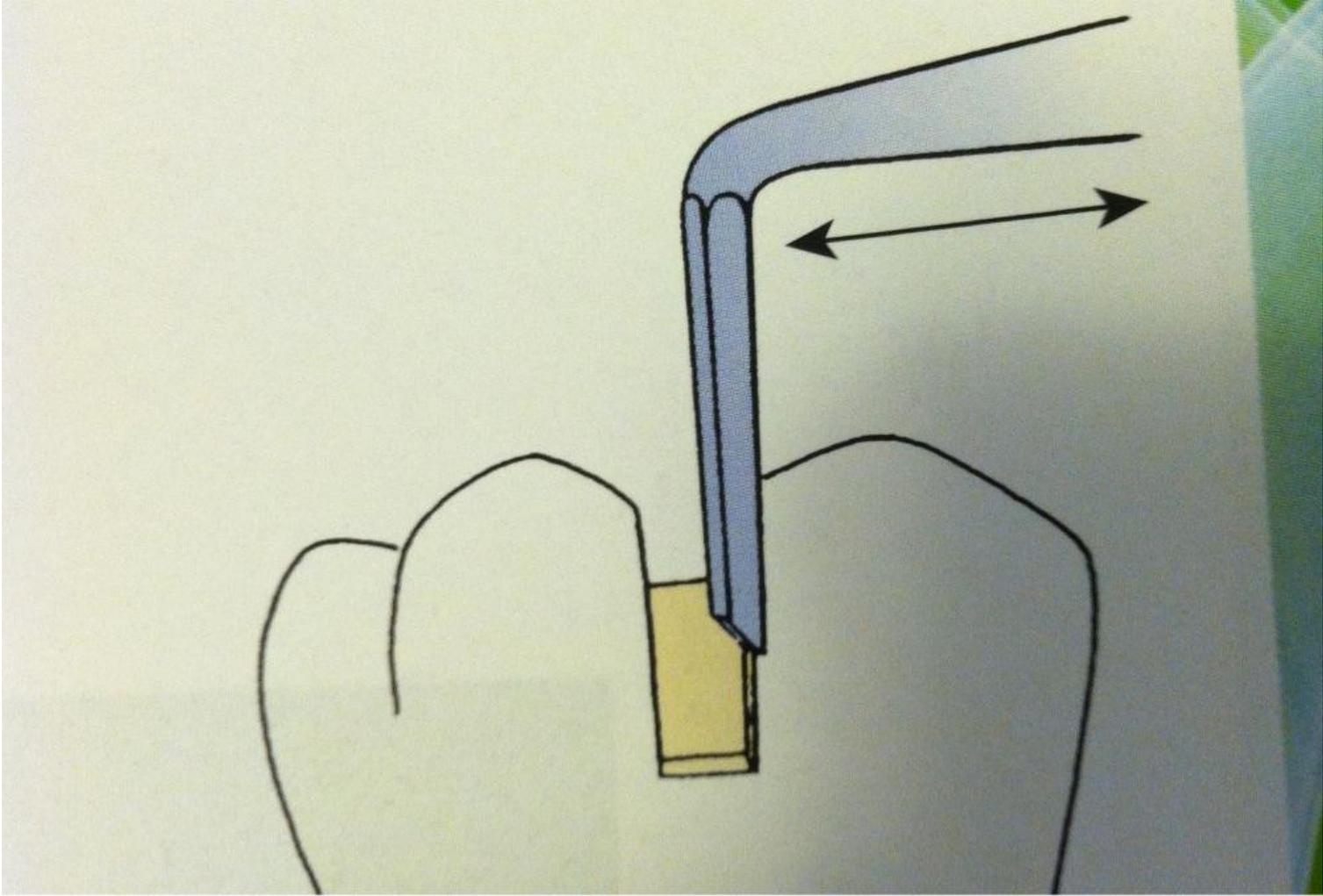
B



C

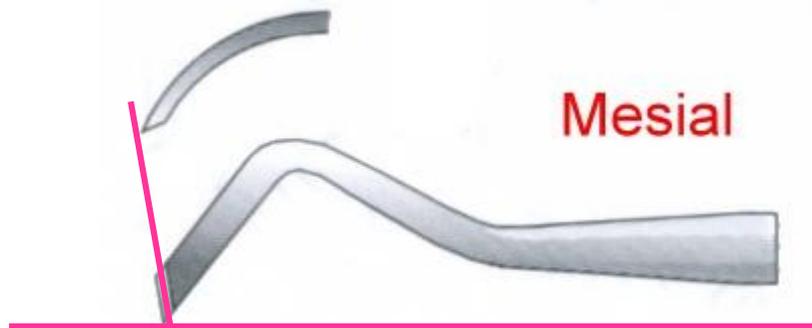
Enamel hatchet





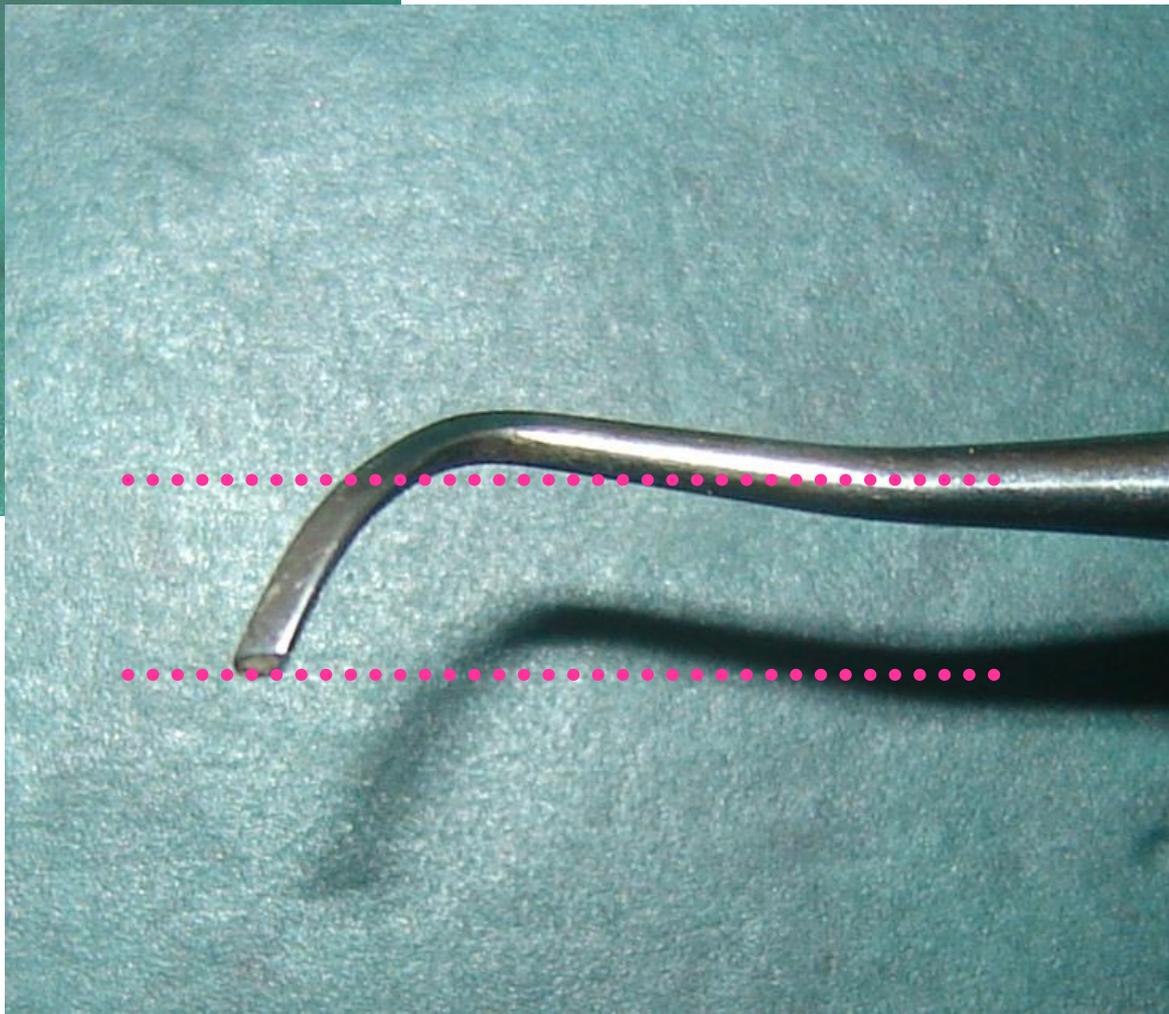
**Enamel hatchet:** similar design to ordinary hatchet in that the cutting edge is in a plane parallel to long axis of the handle, but the blade is larger and beveled on only one side, so it has left and right side.

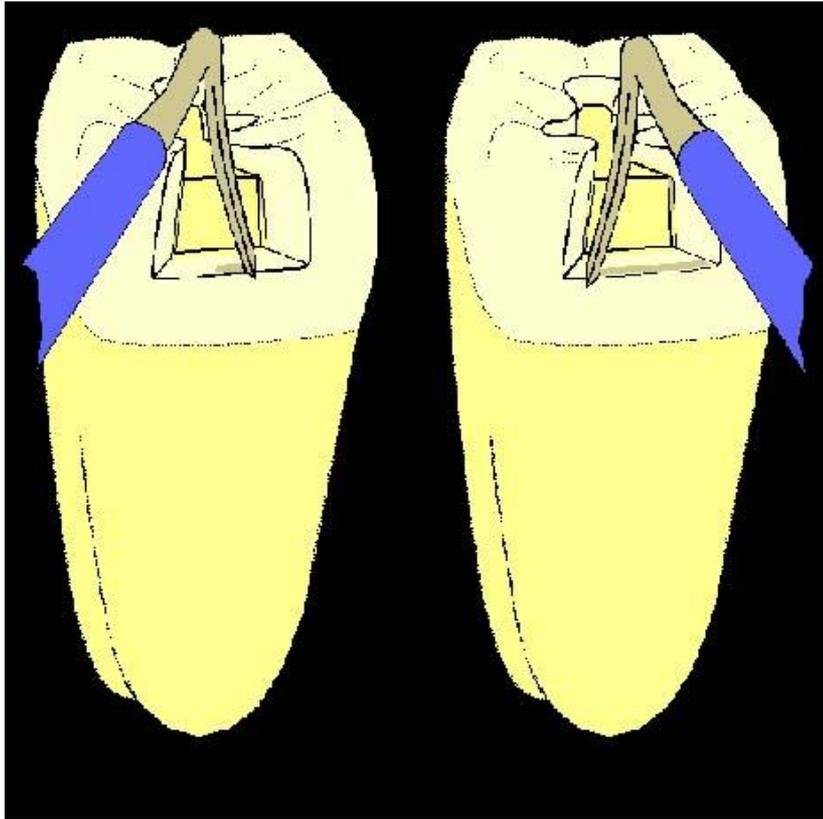
**Gingival marginal trimmer:** designed to produce proper bevels at gingival margins. Similar to enamel hatchet but the blade is curved and the cutting edge may be at angle other than 90 degree with the blade, so if the second number of the formula is 90-100 this is used for distal margins, and if its 85-75 this is used for mesial margins. 100 and 75 pairs used for beveling inlay/onlay cavities while 85 and 90 pairs used for amalgam cavities. This instrument also used for rounding or beveling the axiopulpal line angles.



Gingival trimmer





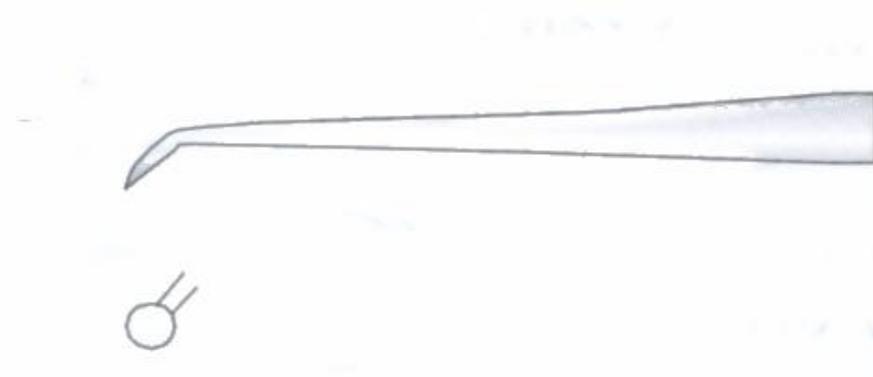


# Other cutting instruments

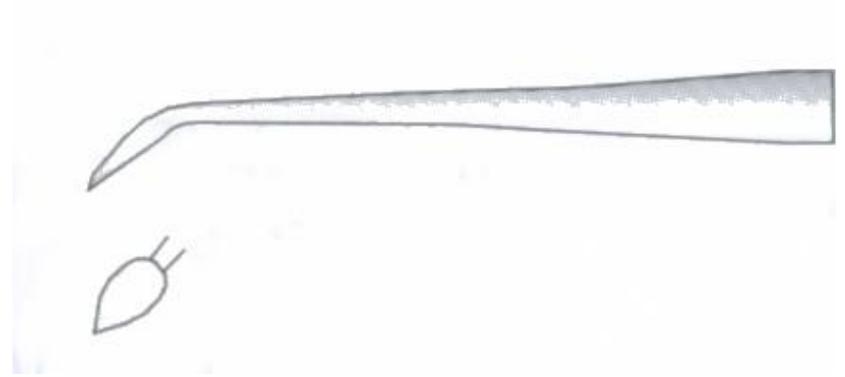
**Cleoid-discoid:** used for carving unset amalgam and burnishing inlay/onlay margins

**Knives:** finishing knives, amalgam knives, gold knives. All used for trimming the excess filling materials at cavity margins.

**Files:** different size and shape also used for trimming the excess of filling material particularly at gingival margins.



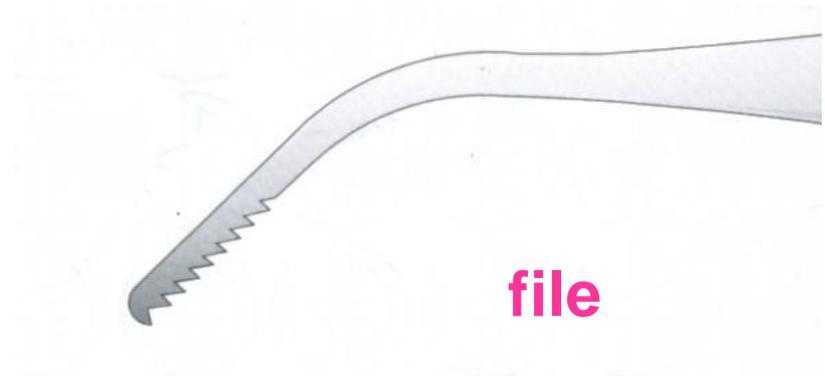
**disoid**



**Cleoid**



**knife**



**file**

# Non cutting instruments

Diagnostic: mirror, probe (dental explorer), tweezers.

## Filling :

- ❖ Dycal applicator,
- ❖ Cement spatula,
- ❖ Ash 49,
- ❖ Glass slap,
- ❖ Retainer,
- ❖ Dappen dish,
- ❖ Amalgam carrier,
- ❖ Condenser,
- ❖ Hollenback carver,
- ❖ Burnisher,
- ❖ Plastic instrument.....



# Instruments Techniques (Grasping)

*Modified pen grasp:*



**Pen Grasp**



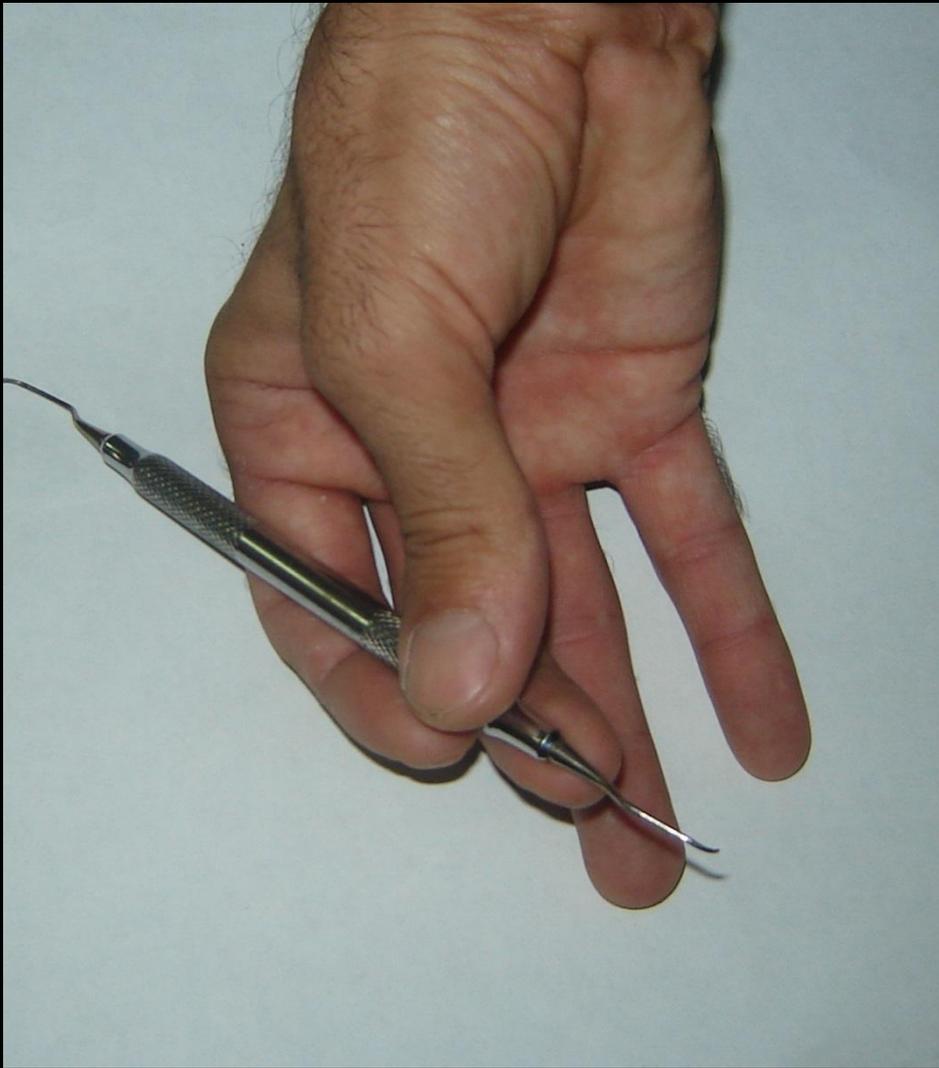
**Modified Pen Grasp**

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**Modified pen grasp:** greatest touch delicacy is permitted with this grasp. A pad of thumb, index and middle fingers contacting the instrument. While tip of ring and/or little fingers is used for rest or support on the nearby teeth surface of the same arch for better controlling the action and the magnitude of force applied. Palm is usually facing away from the operator.

**Inverted pen grasp:** same as modified pen grasp except that the hand is rotated so that palm is facing more toward operator. Usually used with lingual surfaces of anterior teeth.

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**Inverted Pen Grasp**



**Palm and Thumb Grasp**

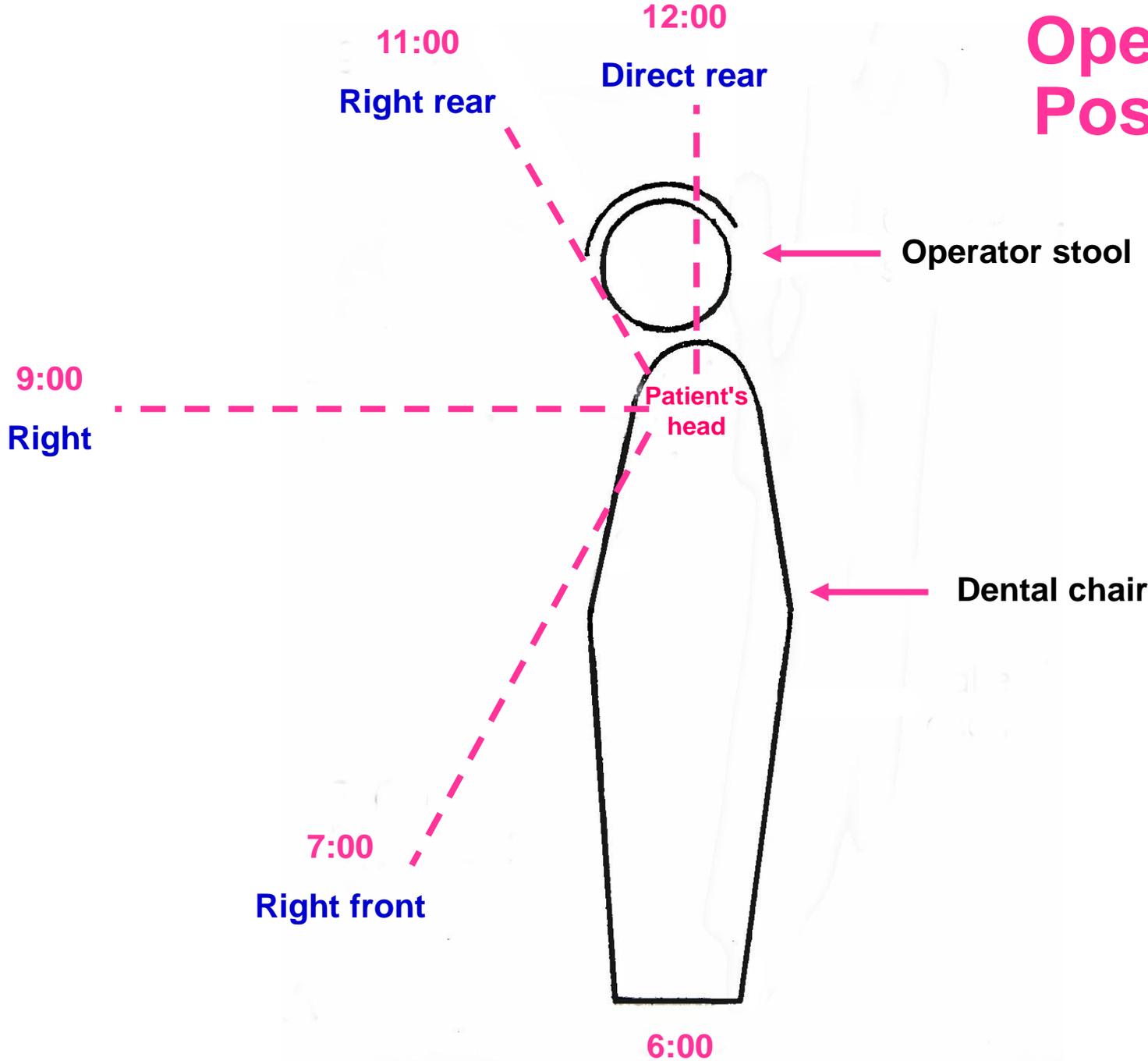
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**Palm and thumb grasp:** similar to that used for holding a knife while paring the skin from an apple. Rest is provided by supporting the thumb on nearby teeth. Used for preparing incisal retention in class III cavities.

**Modified palm and thumb grasp:** only used when its feasible to rest the thumb on the tooth to be prepared or the adjacent tooth.

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# Operating Positions



## *Right front:*

- Mandibular anterior.
- Maxillary anterior.
- Mandibular posterior “Occlusal” (right and left).

## *Right:*

- Buccal surface of maxillary and mandibular posterior.
- Occlusal of right mandibular posterior.

## *Right rear:*

- All maxillary teeth (indirectly by mirror)
- Directly without mirror for labial surface of maxillary anterior and lingual surface of mandibular anterior specially right side.

## *Direct rear:*

- Directly for lingual surface of mandibular anterior (both sides).

# General position considerations

- Miner rotation for patient head to accommodate the demands of accessibility and vision is acceptable.
- When working on maxillary arch, the occlusal surfaces or maxillary teeth oriented to be approximately perpendicular to the floor.
- When working on mandibular arch, the occlusal surfaces of mandibular teeth oriented to be approximately 45 degree with the floor.
- Avoid close face proximity to the patient (the ideal distance is as reading a book).
- Minimize body contact and avoid resting forearm on patient's shoulders, head or face as possible.
- Left hand usually free and used for holding mirror for viewing or retracting soft tissues and tongue and reflecting light onto operating field to view the cavity indirectly.
- For long operations, operator must change the position even for a short period to reduce muscle strain and fatigue.
- Proper distribution of balance on both feet in standing position.
- In sitting position, the stool must be adjustable up and down and well padded with smooth cushion, backrest adjustable all directions as well.
- Operator stool without foot ring to permit resting the feet on floor. Thighs parallel to the floor.
- Spinal column straight or slightly forward bended with minimal tension.
- Assistant's stool 4-6 inches higher than operator for better vision, so assistant stool is provided by foot ring for feet rest.

