

Operative

Lec:1

Operative dentistry:

Is the science that is related to the diagnosis, treatment & prognosis of these defects of teeth & to the restoration of proper tooth form, function & esthetic, & to the maintenance of the physiological integrity of teeth in a harmonious relationship with the adjacent hard & soft tissues. All to enhance the general health of the patient.

Operative dentistry has been considered as the foundation of the dentistry.

The indications of operative procedures are:

1. Caries.
2. Malformed, discolored or fractured teeth.
3. Replacement needs.

The placement of a restoration in a tooth requires the dentist practice, biological uses of the principles of mechanical engineering with highly developed skills & artistic abilities .

Cavity:

It refers to a defect in enamel or enamel & dentin, resulting from the pathogenic process of dental caries.

Cavity preparation:

Is the performance of those dental surgical procedures required to expose the carious lesion so permit removal of affected tissues & shape the remaining dentine & enamel as to contribute to a biologically & mechanically sound restoration .

Proximal surface: It is the surface of a tooth or the portion of a cavity that is nearest to the adjacent tooth , like the mesial & distal surface of a tooth .

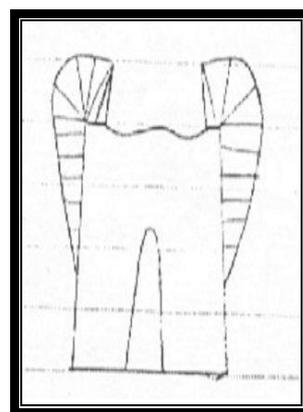
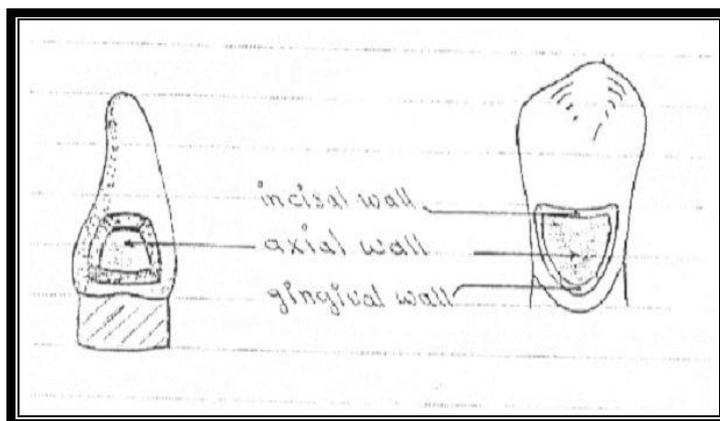
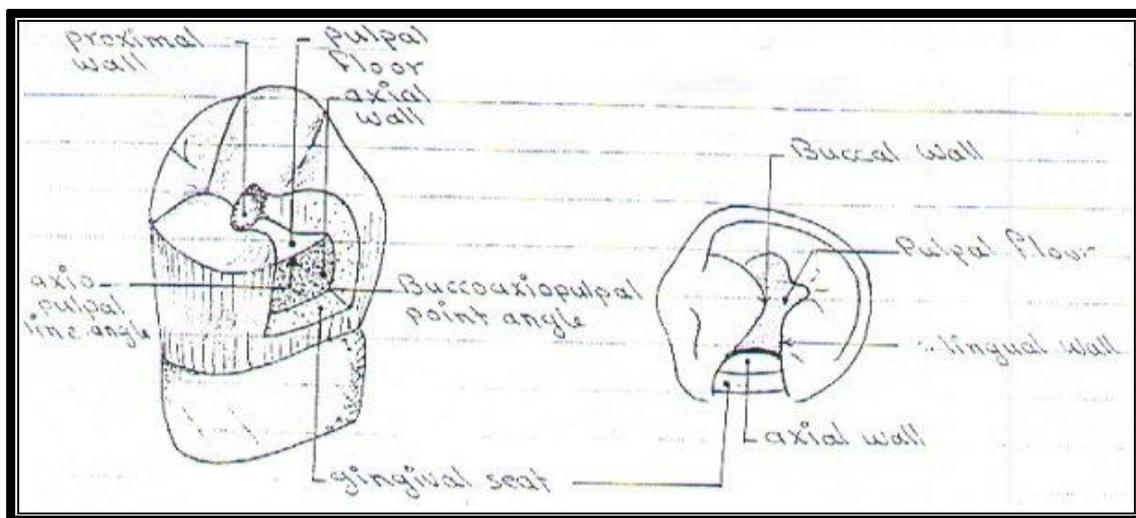
Cervical region: an area related to the cervix or neck of the tooth.

Gingival region: an area which close to the gingiva.

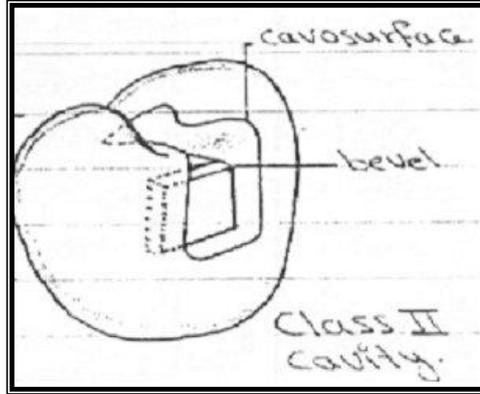
Definitions related to the cavity preparation

1. **Gingival floor (seat):** It is the base enclosed inside of the prepared cavity .It is only related to gingiva, it is horizontally oriented wall.
2. **cavity wall :** one of the enclosing sides of the prepared cavity . It takes the name of the structures of the tooth & adjoining the surface involved & towards which it is placed, e.g.: buccal wall of occlusal cavity is towards the buccal surface of a tooth.

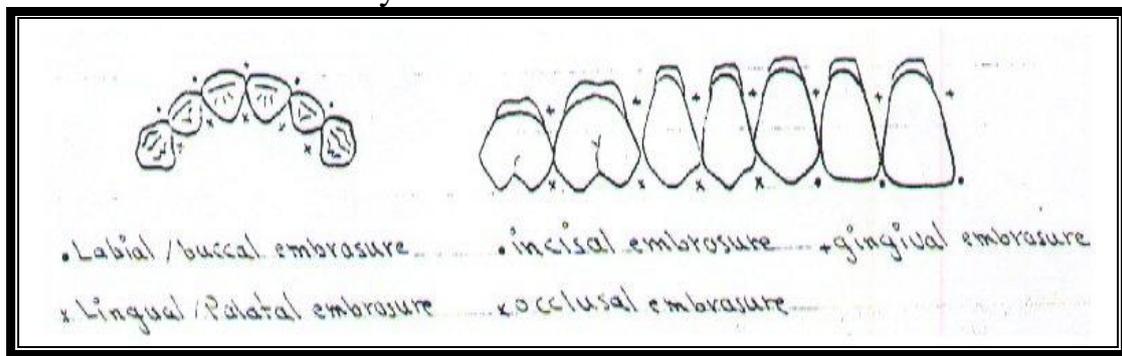
3. **Axial wall** : It is an internal cavity surface lying in the direction of the tooth & related to the pulp .
4. **Pulpal floor**: It is an internal cavity surface, horizontally oriented, perpendicular to the long axis of a tooth & related to the pulp.
5. **Line angle** : an angle formed by the junction of two walls along line , designated by combining the names of the walls forming the angle , e.g. ; Buccopulpal , Mesiopulpal , Axiopulpal , Gingivoaxial line angles .
6. **Point angle**: an angle formed by the junction of three walls at a common point . Designated by combining the names of the walls forming the point angle.
7. **Undercut**: is that portion of the prepared cavity, confined by walls which converge towards the surface or it could be a localized channel within the cavity preparation or a retention groove (cove).



8. **Cavosurface (margin)** : it's the junction between the wall of the cavity & the surface of the tooth .
9. **Bevel** : is the inclination that one line or surface makes with another when not at right angles .



10. **Enamel wall** : is that portion of the prepared cavity wall , consisting of enamel .
11. **Dentinal wall** : is that portion of the prepared cavity wall , consisting of dentin & often it contains retention grooves .
12. **Embrasure** : it's a V-shaped space that originate at the proximal contact area between adjacent teeth & are named for the direction towards which they radiate .



13. **Over-hang** : any marginal restorative material excess usually referred to the gingival margin .
14. **Contact area** : it's the area of immediate proximity of one tooth with the another in the same arch .

Cavity classification

1. Cavities may be classified to the number of surfaces involved into :
 - Simple cavity** : it involves only one surface of tooth , e.g. : the occlusal surface (O) , the distal surface (D) ,...etc.
 - Compound cavity** : it involves two surfaces of tooth , e.g. : the Mesio-occlusal surface (MO) , Bucco-occlusal surface (BO) ,...etc.
 - Complex cavity** : it involves more than two surfaces of tooth, e.g.: (MOD), (MOB),...etc.
2. The 2nd classification is by locating the carious lesion to their classical clinical location . G.V.Black developed a simple cavity classification , listing one class as pit & fissure cavities & four classes of smooth surface lesion .

Black's Classification of Cavities :

Class I (cl.I): pit & fissure cavities that occur in the occlusal surfaces of molars & premolars & the occlusal 2/3s. of the buccal & lingual surfaces of molars & the lingual surfaces of incisors .

Class II (cl.II): cavities in the proximal surfaces of molars & premolars .

Class III (cl.III): cavities in the proximal surfaces of the incisors & canines .

Class IV (cl.IV): cavities in the proximal surfaces of the anterior teeth involving the incisal angle .

Class V (cl.V): cavities in the gingival 1/3 (not pit & fissures cavities) of labial/buccal & lingual surfaces of all the teeth .

Class VI (cl.VI): cavities on the incisal edges & cusp tips of the teeth .

FIG 17-15 Carious (or at risk for caries) lingual pit and fissure and restoration on maxillary lateral incisor.

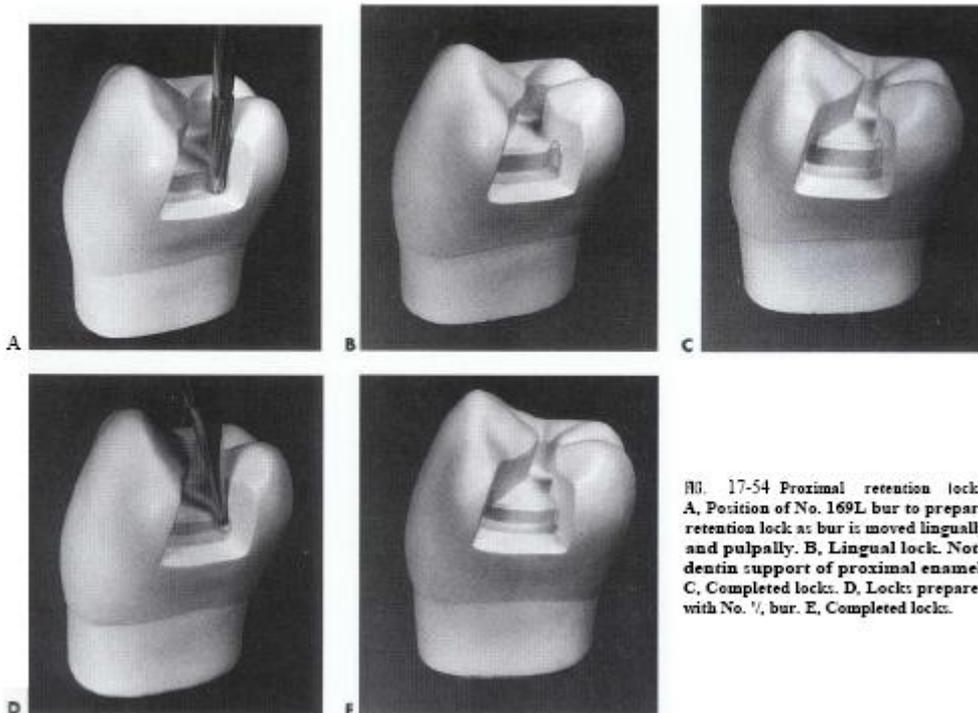


FIG. 17-54 Proximal retention locks. A, Position of No. 169L bur to prepare retention lock as bur is moved lingually and pulpally. B, Lingual lock. Note dentin support of proximal enamel. C, Completed lock. D, Locks prepared with No. 7, bur. E, Completed locks.

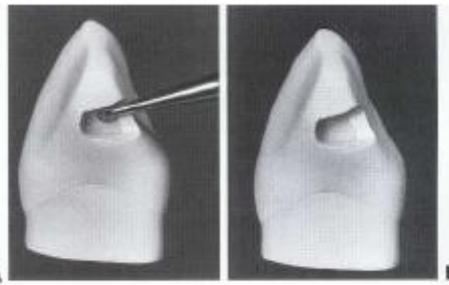


FIG 18-9 Class III tooth preparation on maxillary canine. A, Round bur shaping incisal area. Note that incisal angle remains. B, Initial shape of preparation accomplished with round bur.

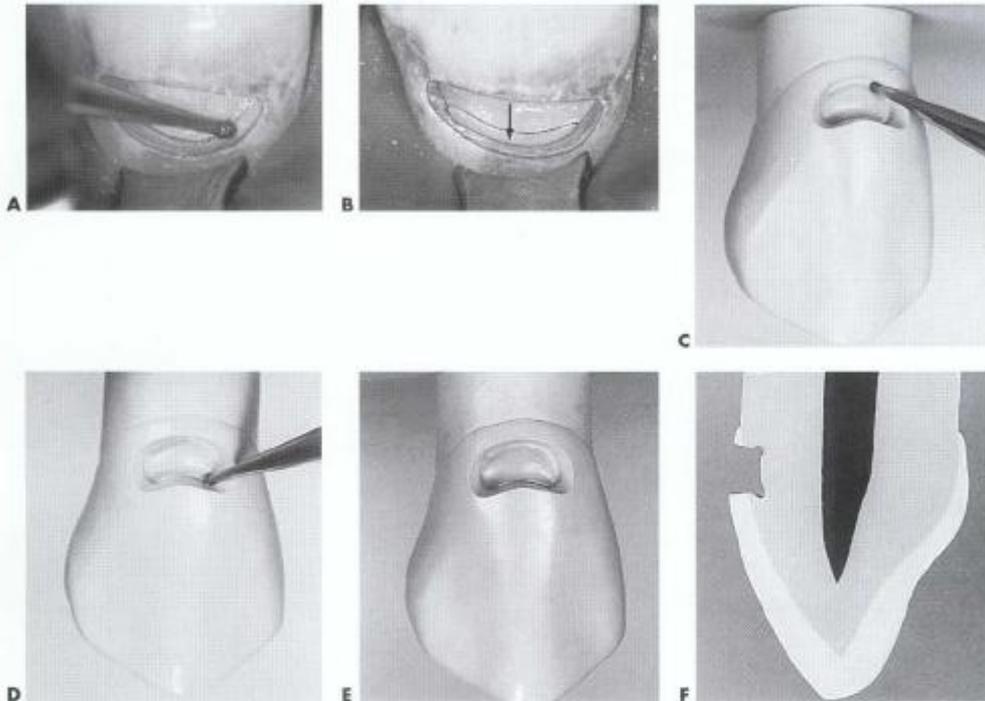


FIG 18-31 Retention form. A, A No. 7, bur positioned to prepare gingival retention groove. B, Gingival retention groove (arrow) prepared along gingivoaxial line angle generally to bisect the angle formed by the gingival and axial walls. Ideally, the direction of preparation is slightly more gingivally than pulpally. An incisal retention groove is prepared along incisooxial line angle and directed similarly. C and D, Groove is placed with No. 7, bur along gingivoaxial and incisooxial line angles 0.2 mm inside DEJ and 0.25 mm deep. Note slight pulpal inclination of shank of No. 7, bur. E, Facial view. F, Incisogingival section. Note that grooves depthwise are directed mostly incisally (gingivally) and slightly pulpally. G, Mesiodistal section.

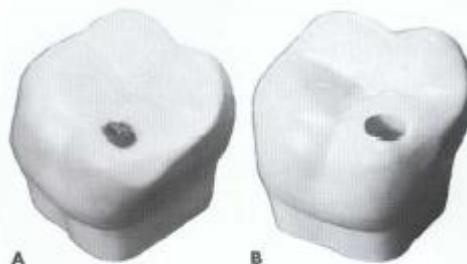


FIG 17-109 Class VI preparation. A, Exposed dentin on mesiofacial cusp. B, Tooth preparation necessary to restore involved area.

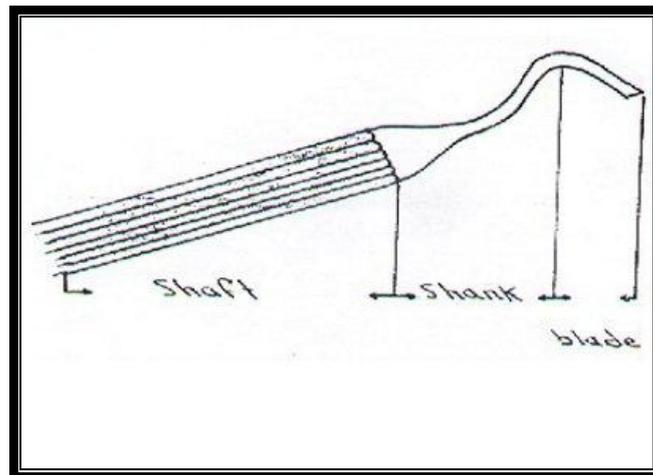
Hand Instruments

Dental equipments: it refers to items such as dental chair , operating unit , x-ray unit ,...etc.

Dental instruments : refers to the wide variety of implements held in hand & applied during the operative procedure (treatment procedure) .

The hand instrument consist of three essential parts :

1. **Handle or shaft:** it's the part that is grasped by the operator's hand while he's using the instrument.
2. **Shank:** it's the part that connects the shaft with the blade (nib).
3. **Blade:** it's the functional end of the instrument & it bears the cutting edge.



G.V.Black established an instruments formula that describes the dimension & the angulation of the hand instrument .

The name of instrument together with the formula serves as a complete description from which the instrument can be recognized & duplicated .

The 1st unit of the formula describes the width of the blade in tenth of millimeter , the 2nd unit describes the length of the blade with (mm.) , the 3rd unit describes the angle of the blade forms with the axis of the handle , this division is expressed in (100 ths.) of a circular of centigrade , e.g. :

15,8,12

15 : width of the blade = 1.5 mm .

8 : length of the blade = 8 mm .

12 : angulation .

The term (contra-angling) describes the angling of the shank in a manner designed to bring the cutting edge into close proximity to the central axis or handle of the instrument .

There are either (2) or (3) angles present in the shank in order to bring about this relationship , in order to have the greatest efficiency of the instrument for cutting .

According to the angles of the shank , instruments could be classified into :

1. **Straight:** when the blade & the shank are in the same line .
2. **Monoangle:** there is one angle in the shank .
3. **Bi angle:** there are two angles in the shank .
4. **Tripleangle:** there are three angles in the shank .

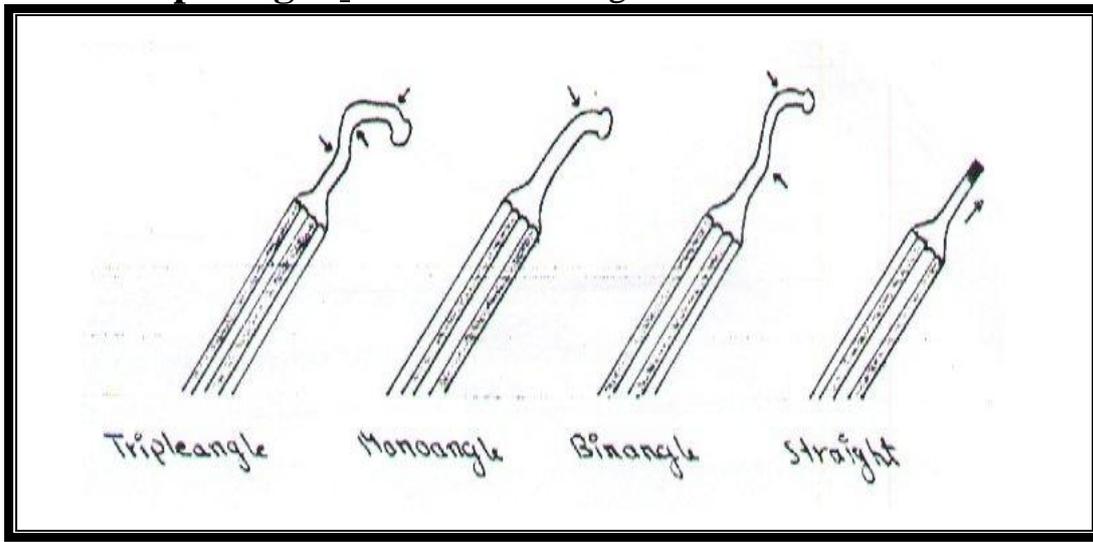


FIG 7-2 Double-ended Instrument illustrating three component parts of hand instruments: blade (a), shank (b), and handle (c).

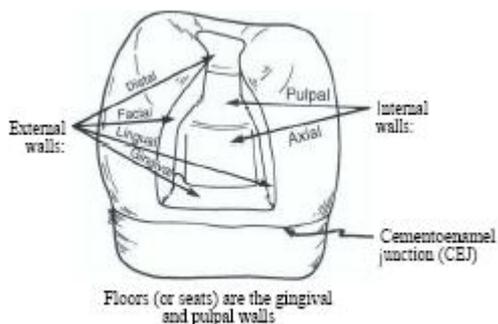


FIG. 6-10 Illustration indicating external and internal walls.

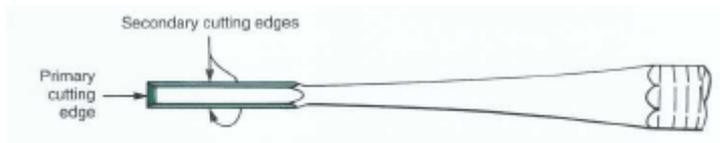


FIG 7-4 Chisel blade design showing primary and secondary cutting edges.

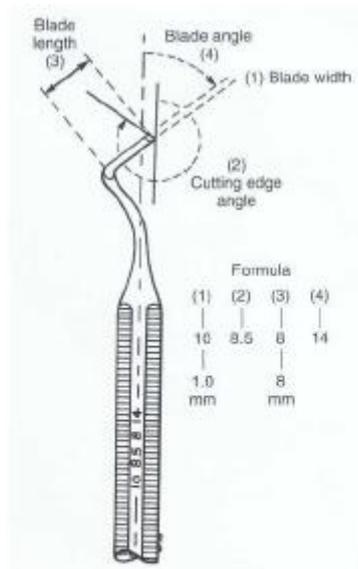


FIG 7-3 Instrument shank and blade design (with primary cutting edge positioned close to handle axis to produce *balance*). The complete instrument formula (four numbers) is expressed as the *blade width (1)* in 0.1-mm increments, *cutting edge angle (2)* in centigrades, *blade length (3)* in millimeters, and *blade angle (4)* in centigrades.

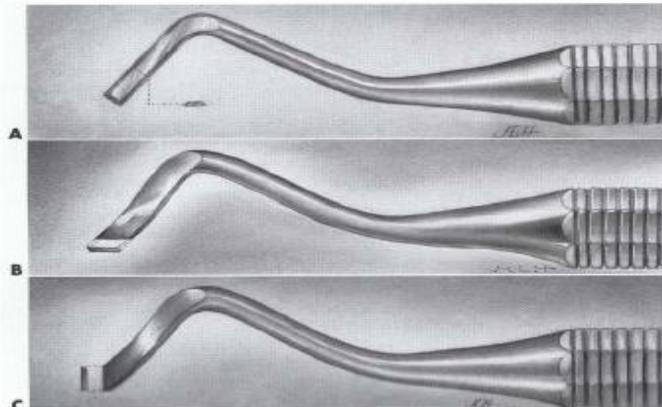


FIG 7-7 Examples of hand instruments called *chisels* (with corresponding instrument formula). A, Enamel hatchet (10-7-14). B, Gingival margin trimmer (12 1/2-100-7-14). C, Gingival margin trimmer (12 1/2-75-7-14).

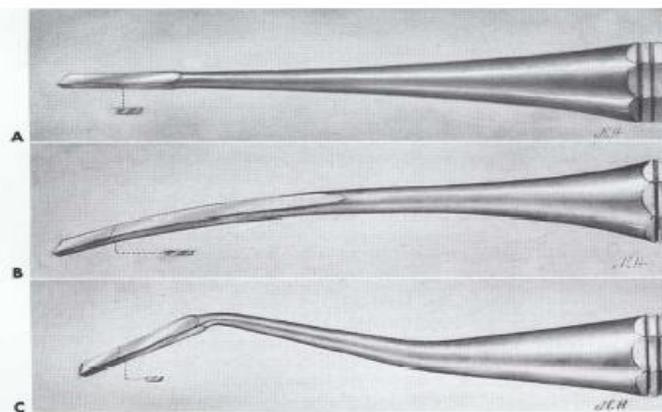


FIG 7-8 Examples of hand instruments called *chisels* (with corresponding instrument formula). A, Straight (12-7-6). B, Wedgetraed (11 1/2-15-3). C, Bin-angle (10-7-8).

FIG. 7-5 Examples of hand instruments called excavators (with corresponding instrument formulas). A, Bibeveled ordinary hatchet (3-2-28). B, Hoe (4 h-1 (h-22). C, Angle former (12-85-5-8).

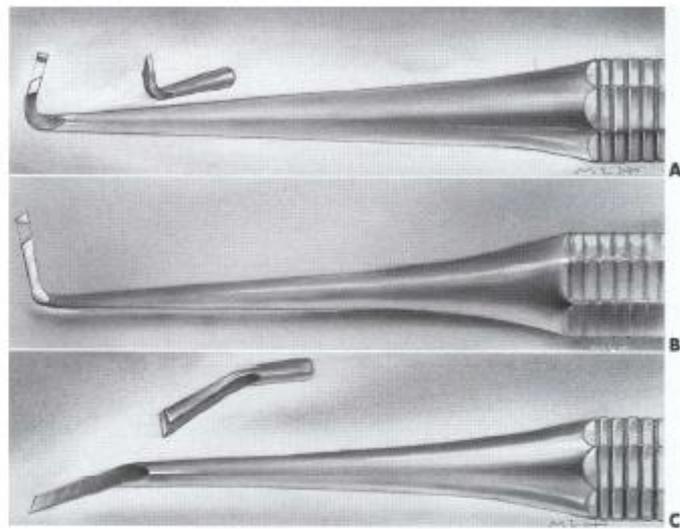


FIG. 7-6 Examples of hand instruments called spoon excavators (with corresponding instrument formulas). A, Bin-angle spoon (13-7-14). B, Triple-angle spoon (13-7-14). C, Spoon (15-7-14).

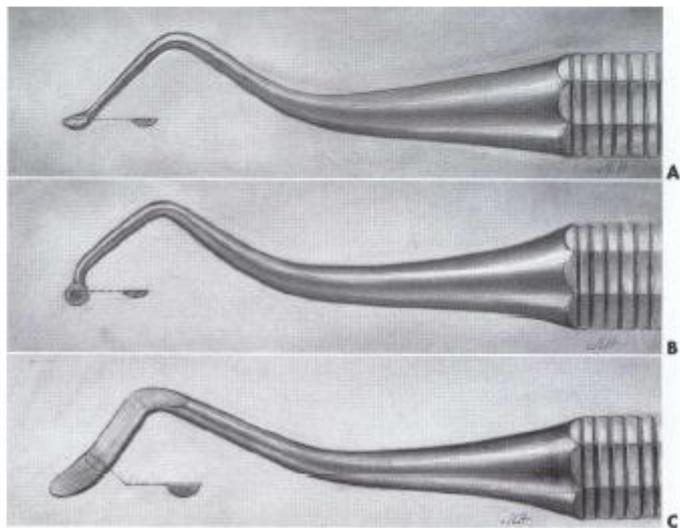


FIG. 7-32 Normal designation of three parts of rotary cutting instruments.

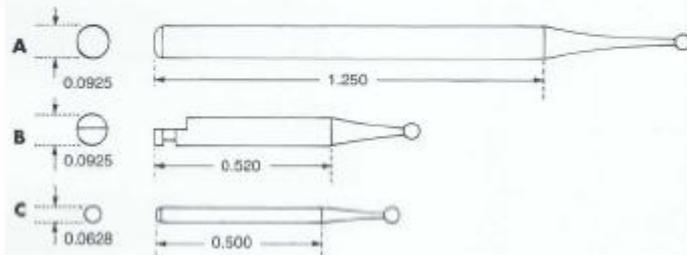


FIG. 7-33 Characteristics and typical dimensions (in inches) of three common instrument shank designs for (A) straight handpiece, (B) latch-angle handpiece, and (C) friction-grip angle handpiece type.