Periodontal instruments

Periodontal instruments are designed for specific purposes, such as removing calculus, planning root surfaces, curetting the gingival wall or removing disease tissues.

Periodontal instruments composed of**: a. Blade b. Shank c. handle**

Classification of Periodontal Instruments

Periodontal instruments are classified according **to it purposes** into: -

1**. Diagnostic instruments:**

A. Dental mirrors

B. Dental explorers used to locate calculus deposits and caries.

C. Periodontal probes are used to locate, measure, and mark pockets, as well as determine their course on individual tooth surfaces and measure BOP.

2. Debridement (scaling, root-planing, and curettage) instruments: are used for removal of biofilm and calcified deposits from the tooth, removal of altered cementum from the subgingival root surface, and debridement of the soft tissue lining the pocket. Scaling and curettage instruments are classified as follows:

- ☒ **Sickle scalers** are heavy instruments used to remove supragingival calculus.
- ☒ **Curettes** are fine instruments used for subgingival scaling, root planing, and removal of the soft tissue lining the pocket.
- ☒ **Hoe, chisel, and file scalers** are used to remove tenacious subgingival calculus and altered cementum. Their use is limited compared with that of curettes.
- ☒ **Implant instruments** are plastic or titanium scalers and curettes designed for use on implants and implant restorations.
- ☒ **Ultrasonic and sonic instruments** are used for scaling and cleansing tooth surfaces and curetting the soft tissue wall of the periodontal pocket.

3. Cleansing and polishing instruments, such as rubber cups, brushes, and dental tape, are used to clean and polish tooth surfaces. Also available are air-powder abrasive systems for tooth polishing.

4. Advance periodontal devices: **Periodontal endoscopes** are used to visualize deeply into subgingival pockets and furcations, allowing the detection of deposits. Also advance periodontal devices include ablative laser devices.

5. Surgical periodontal instruments.

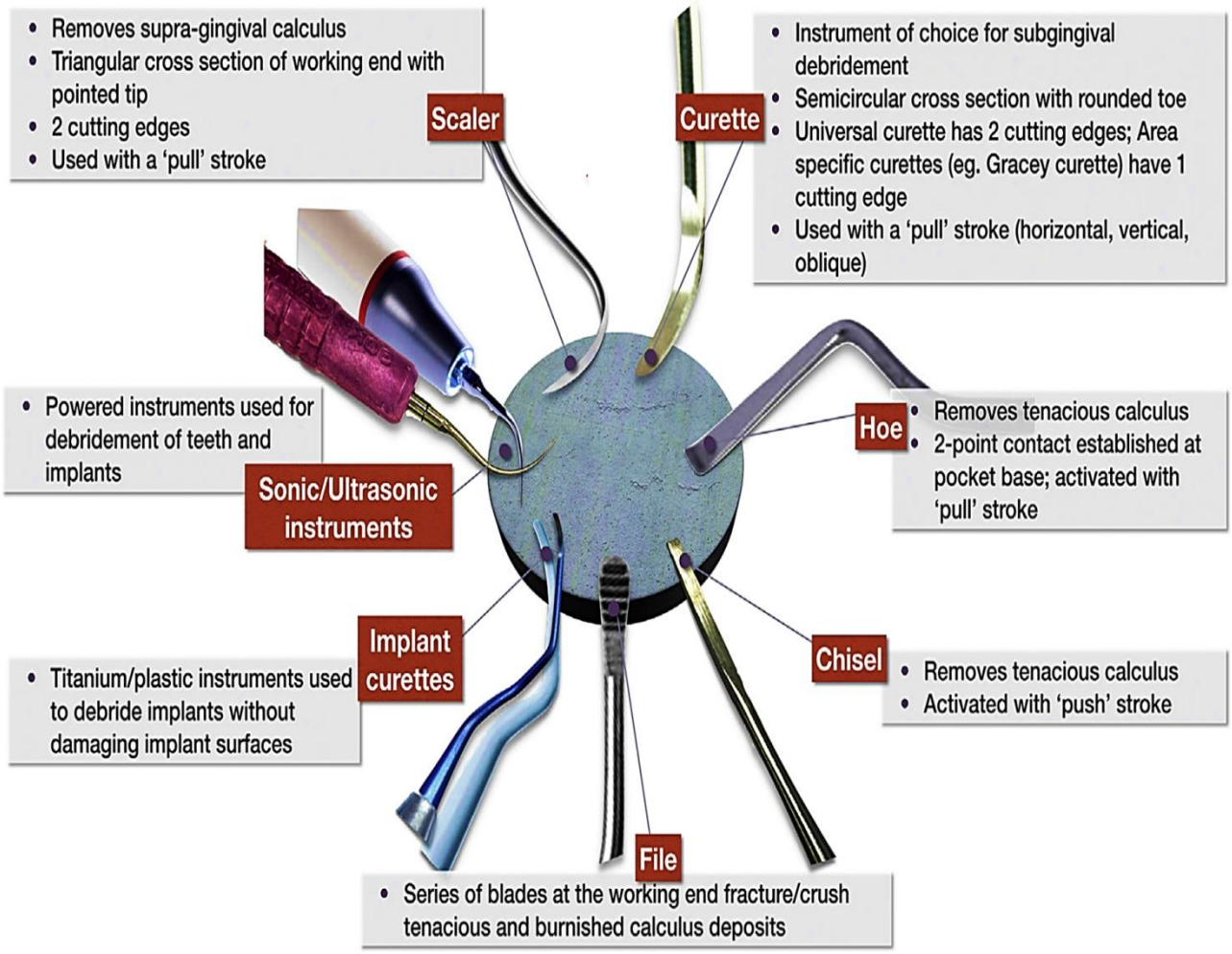


Fig.:- Debridement periodontal & implants instruments.

1- Diagnostic instruments

A. **dental mirrors** used for **specific uses**:-

- ✓ **Indirect vision**
- ✓ **Indirect illumination**
- ✓ **Transillumination**
- ✓ **Retraction**

Nonspecific uses Handles can be used for checking mobility ,percussion.

B. **Dental Explorers**: are **used to** locate calculus deposits and caries. Also used to **locate subgingival deposits** in various areas, and **to check the smoothness of the root surfaces** after root planing. Explorers are designed with different shapes and angles for a variety of use.

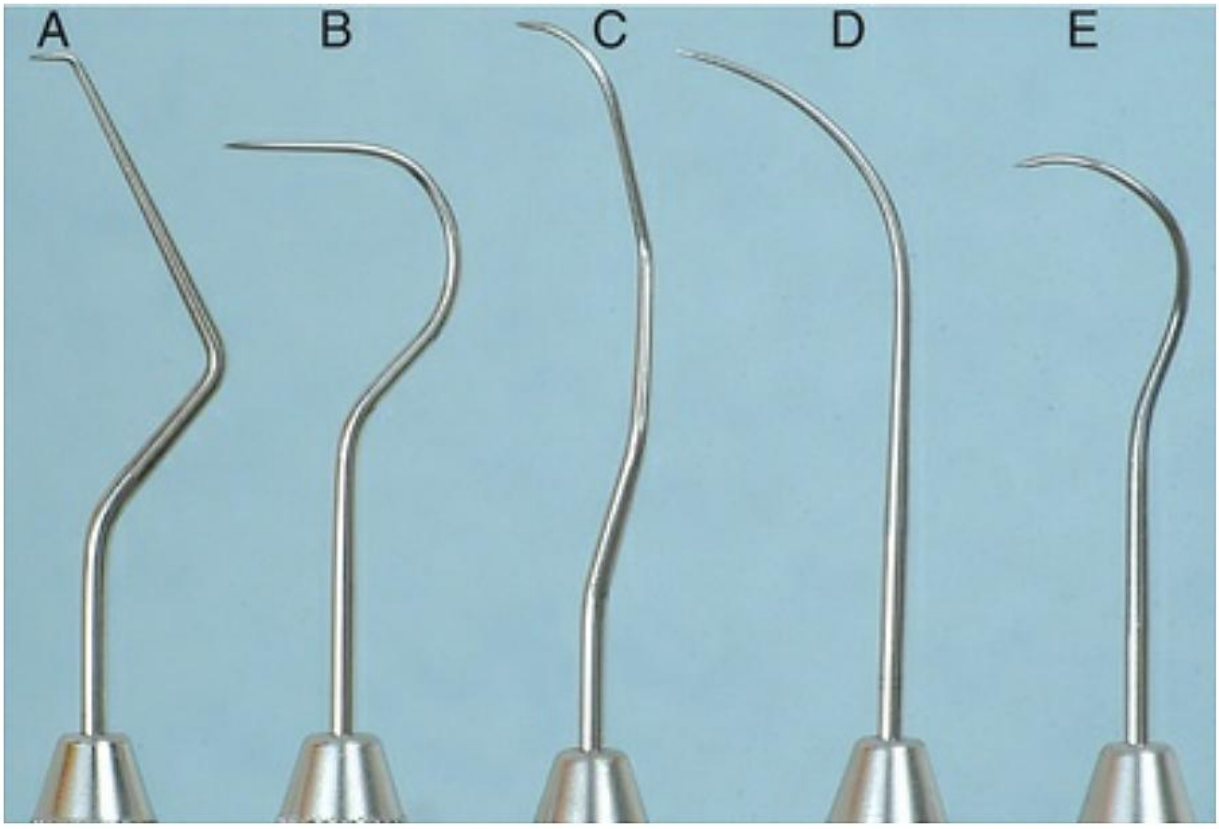


Fig.: - Five typical explorers. A, #17; B, #23; C, EXD 11-12; D, #3; E, #3CH pigtail.

C. Periodontal Probes

Periodontal probes are **used to** measure the depth of pockets and to determine their configuration and bleeding on probing measurement. The typical probe is a tapered, rod-like instrument calibrated in millimeters, with a blunt, rounded tip. There are several other designs with various millimeter calibrations. The World Health Organization **(WHO) probe** has millimeter markings and a small, round ball at the tip. Ideally, these probes are thin, and the shank is angled to allow easy insertion into the pocket.

Types of Periodontal probe shown in the following figure:

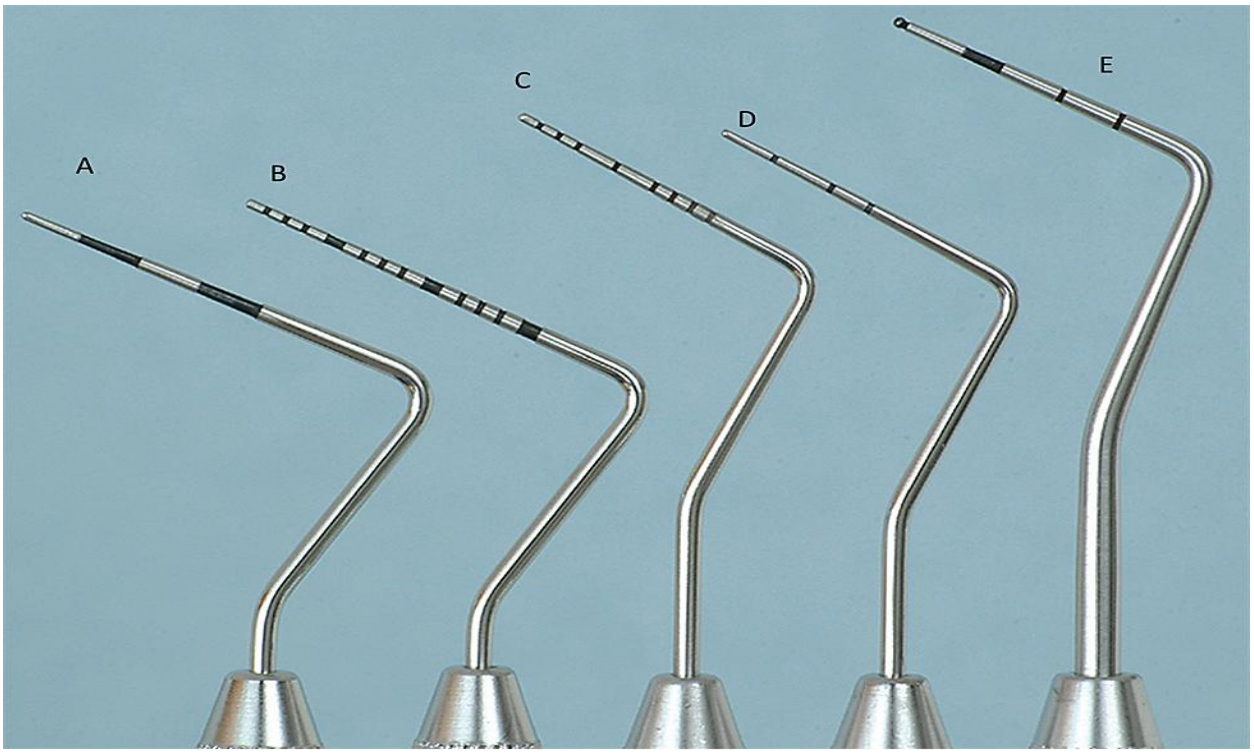


Fig.: Types of periodontal probe: A, Marquis color-coded probe. Calibrations are in 3-mm sections. B, University of North Carolina-15 probe, a 15-mm long probe with millimeter markings at each millimeter and color coding at the fifth, tenth, and fifteenth millimeters. C, University of Michigan "O" probe, with Williams markings (at 1, 2, 3, 5, 7, 8, 9, and 10 mm). D, Michigan "O" probe with markings at 3, 6, and 8 mm. E, World Health Organization (WHO) probe, which has a 0.5-mm ball at the tip and millimeter markings at 3.5, 8.5, and 11.5 mm and color coding from 3.5 to 5.5 mm.

Furcation areas can best be evaluated with the curved, blunt **Nabers probe**. When measuring a pocket, the probe is inserted with a firm, gentle pressure to the bottom of the pocket. The shank should be aligned with the long axis of the tooth surface to be probed.

Fig.: - Curved Nabers probe for detection of furcation areas, with color-coded markings at 3, 6, 9, and 12 mm.

When measuring a pocket, the probe is inserted with **firm, gentle pressure** to the bottom of the pocket. The **shank should be aligned with the long axis** of the tooth surface to be probed. Several measurements are made to determine the level of attachment along the surface of the tooth.

2. Debridement (scaling, root-planing, and curettage) instruments:

Classified as follows:

- **For supra gingival scaling which include :** Sickle scalers, cumine , push scalers.

Sickle Scalers: -

Sickle scalers have a flat surface and two cutting edges that converge in a sharply-pointed tip. The arch-shape of the instrument makes the tip so strong that it will not break off during use. The sickle scaler appear triangular in cross-section. The sickle scaler is **used primarily** to remove supragingival calculus. The sickle scaler is inserted under ledges of calculus no more than 1 mm below the gingival sulcus. It is used **with a pull stroke**. Sickles with **straight shanks** are designed for use on anterior teeth and premolars. Sickle scalers with **contra-angled shanks** adapt to posterior teeth.

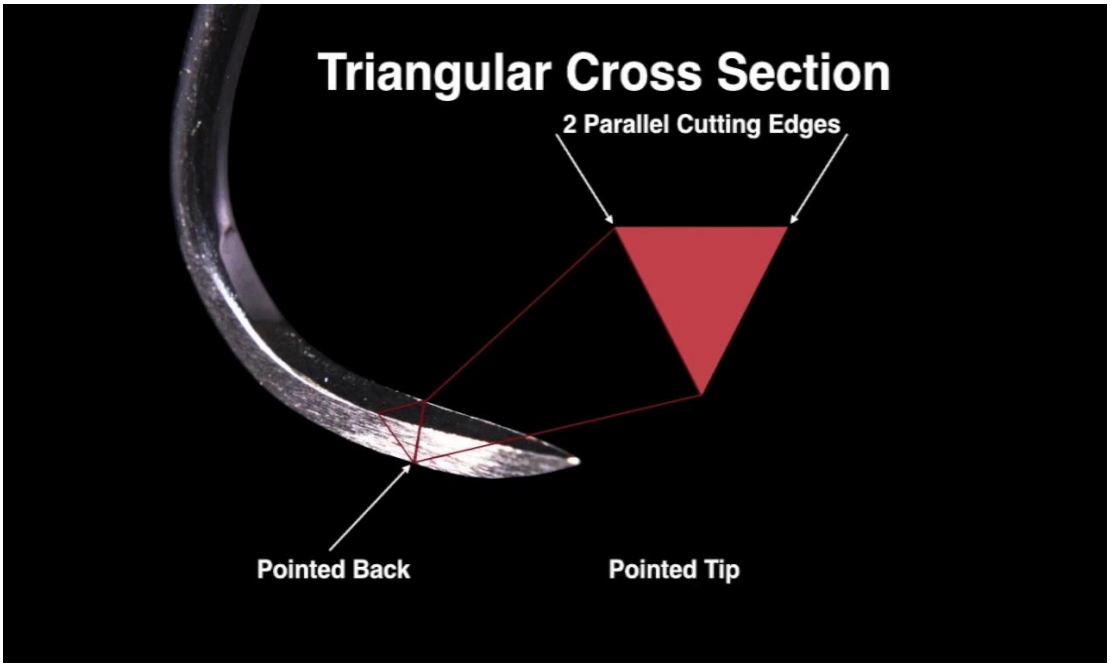


Fig. :- Sickle scaler.

Fig.:- Both ends of a U15/30 scaler.

Cumine: A hybrid (double ended) instrument – **one end** is a "spoon" curette - the **other** is a heavy duty tooth scaler. It is hook-like having a simple curved shape without offset which tapers to a sharp point.

Uses Both ends can be used to dislodge thick calculus deposits to allow visualization of the crown or prior to further scaling. **Scaler end** to remove heavy supragingival calculus deposits from interproximal area. **Curette end or spoon end** ; gentle curettage of large sockets to remove the granulation

Fig.:- Cumine double ended instrument.

tissue (if present), removal of soft tissues from sites of bony pathology e.g. to clean out the bony defect in debridement of bone cyst lesions. also used to clean labial and lingual surfaces from calculus.

Push scaler: These have been **designed for** the proximal surfaces of teeth and **primarily used** in the anterior areas. Push stroke through interproximal contact while maintaining contact with tooth surface. Needs sufficient interproximal space and care with surrounding tissues.

Fig.:- Push scaler.

❖ **For subgingival scaling :**

Hoe scaler :- used to remove tenacious subgingival deposits, Hoe scalers are used for scaling of ledges or rings of subgingival calculus. The blade is bent at a **99-degree angle**; the cutting edge is formed by the junction of the flattened terminal surface with the inner aspect of the blade. The blade has been reduced to minimal thickness to permit access to the roots without interference from the adjacent tissues.

Fig:- Hoe scaler.

Hoe scalers are used in the following manner:

1. The blade is inserted to the base of the periodontal pocket so that it makes two point contact with the tooth. This stabilizes the instrument.

2. The instrument is activated with a firm pull stroke toward the crown, pull action parallel to the long axis of the tooth.

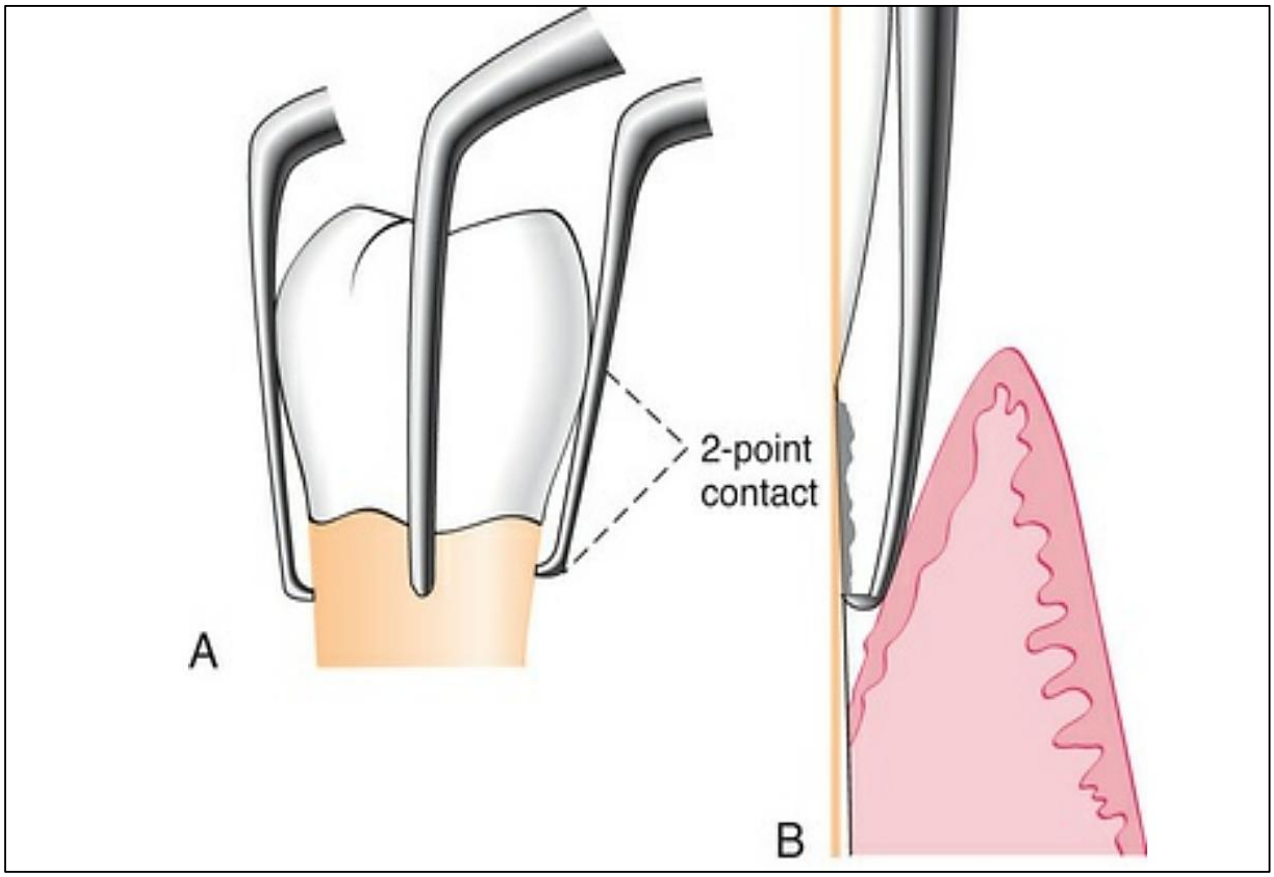


Fig.:- Hoe scaler application.

Curettes:- The curette is the instrument of **choice** for **removing deep subgingival calculus, root planing, and removing the soft tissue lining the periodontal pocket.** Each working end has a cutting edge on both sides of the blade and a rounded toe. The curette is **finer than** the sickle scalers and does not have any sharp points or corners other than the cutting edges of the blade . Therefore curettes can be adapted and provide good access to deep pockets, with minimal soft tissue trauma . There are **two basic types** of curettes: universal and area specific.

Area-Specific Curettes (Gracey Curettes)

Gracey curettes are representative of the area-specific curettes, a set of several instruments designed and angled to adapt to specific anatomic areas of the dentition. Double-ended Gracey curettes are paired in the following manner:

- **Gracey #1-2 and #3-4: Anterior teeth**
- **Gracey #5-6: Anterior teeth and premolars**
- **Gracey #7-8 and #9-10: Posterior teeth, facial and lingual**
- **Gracey #11-12: Posterior teeth, mesial**
- **Gracey #13-14: Posterior teeth, distal**

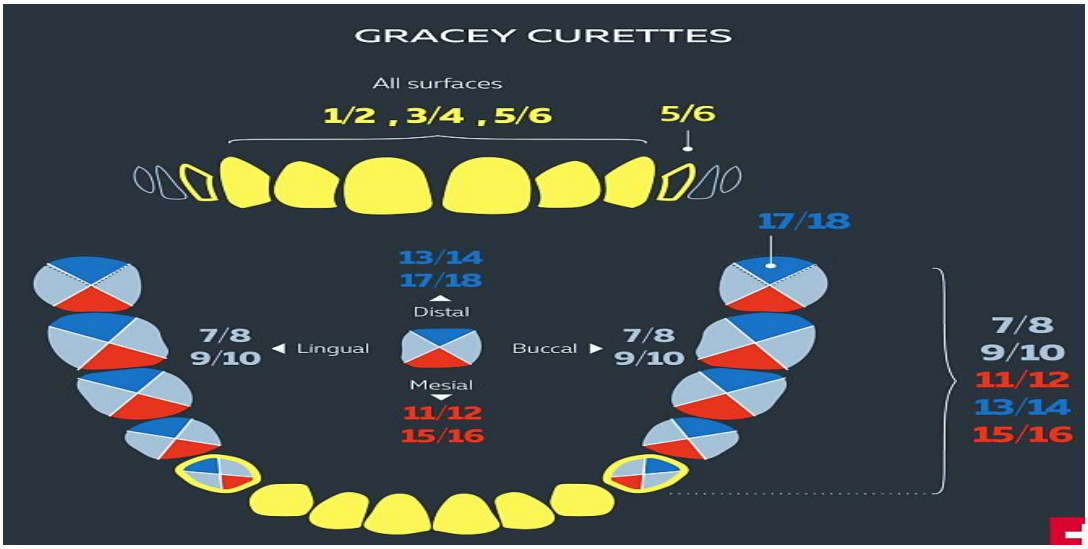


Fig. :- Gracey curettes numbers& uses.

Area-Specific (Gracey) Vs. Universal Curettes

	Gracey Curette	Universal Curette
Area of use	Set of many curettes designed for specific areas and surfaces	One curette designed for all areas and surfaces
Cutting Edge		
Use	One cutting edge used; work with outer edge only	Both cutting edges used; work with either outer or inner edge
Curvature	Blade curves from the shank toward the toe and also appears to curve to the side	Blade curves only from the shank toward the toe, not to the side
Blade angle	Offset blade; face of blade beveled at 60 degrees to shank	Blade not offset; face of blade beveled at 90 degrees to shank

Extended-Shank Curettes: - Such as **After Five curettes** (Hu-Friedy, Chicago, IL), are modifications of the standard Gracey curette design. The terminal shank is **3 mm longer**, allowing extension into deeper periodontal pockets of **5 mm or more**. Other features of After Five curettes include a thinned blade for smoother subgingival insertion and reduced tissue distention and a large-diameter, tapered shank. All standard Gracey numbers **except for the #9-10** (i.e., #1-2, #3-4, #5-6, #7-8, #11-12, or #13-14) are available in the After Five series. After Five curettes are available in **finishing or rigid designs**.

Mini-Bladed Curettes: - such as Hu-Friedy Mini Five curettes, are modifications of the After Five curettes. Mini Five curettes feature blades that are half the length of After Five or standard Gracey curettes. The shorter blade allows easier insertion and adaptation in deep, narrow pockets; furcations; developmental grooves; line angles; and deep, tight facial, lingual, or palatal pockets.

Micro Mini Five Gracey curettes (Hu-Friedy, Chicago, IL) have blades that are 20% thinner and smaller than the Mini Five curettes These are the smallest of all curettes, and they provide exceptional access and adaptation to tight, deep, or narrow pockets; narrow furcations; developmental depressions; line angles; and deep pockets on facial, lingual, or palatal surfaces.

Schwartz Periotrievers :- are a set of double-ended, highly magnetized instruments designed for the retrieval of broken instrument tips from the periodontal pocket. They are indispensable when the clinician has broken a curette tip in a furcation or deep pocket.

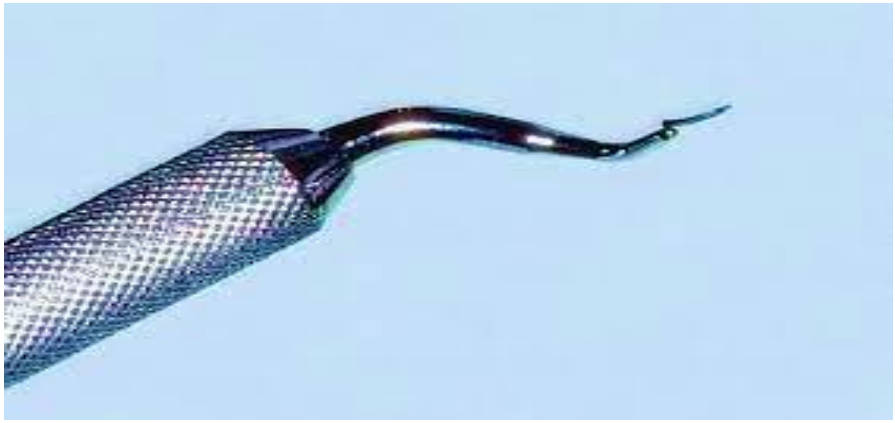


Fig. :- Schwartz Periotrievers instrument

Files: - have a series of blades on a base. Their **primary function** is to fracture or crush large deposits of tenacious calculus. Files can easily scratch and roughen root surfaces when used improperly. Therefore **are not** suitable for fine scaling and root planing. Files are sometimes used for removing overhanging margins of dental restorations.

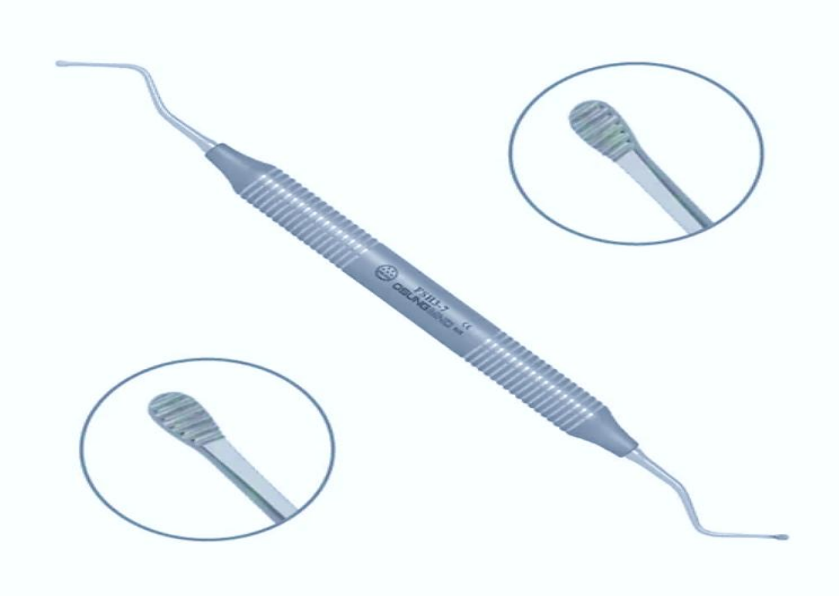


Fig.:- File.

Ultrasonic and Sonic Instruments :- used for removing plaque, scaling, curetting, and removing stain. **Sonic devices** use **air pressure** to create mechanical vibration that in turn causes the instrument tip to vibrate; the frequencies of vibration ranging from 2000 to 6500 cycles per second. **Ultrasonic scalers** convert **electrical current** into mechanical energy in the form of high-frequency vibrations at the instrument tip; the vibration frequencies ranging from 20,000 to 45,000 cycles per second.

There are two types of ultrasonic scalers: magnetostrictive and piezoelectric.

- ☒ **Magnetostrictive:** Vibration of the tip is **elliptical;** hence all the sides can be used.
- ☒ **Piezoelectric:** Pattern of vibration of the tip is **linear;** only two sides of the tip are active.

Ultrasonic vibrations range from 20,000 to 45,000 cycles/second. They operate in a wet field and have attached water outlets. Ultrasonic instrument tip must be **cooled**

by fluid to prevent overheating of the vibrating instrument tip. They have been shown to be as effective as hand instruments in subgingival calculus removal, removal of attached and unattached subgingival plaque, removal of toxins from root surfaces, and in reduction and maintenance of pocket depth.

The water lavage from ultrasonic instruments has **three** benefits on the treatment site.

- **Flushing action–**flushes calculus, blood, bacteria, plaque from treatment site**.**
- **Cavitation.** As the water exits from instrument tip, it forms a spray of tiny bubbles that collapses and releases shock waves in a process known as cavitation. It causes disruption of bacterial microflora
- **Acoustic streaming.**

Advantage of ultrasonic over hand instruments :

1. Less effort, pressure, trauma and time.
2. Simple manipulation.
3. Water sprays clean debris.

Disadvantage of sonic & ultrasonic instrumentations:

1. Lack of tactile sensation because of light pressure during manipulation.
2. Heat generation, required coolant system.
3. Impair of visibility because of water spray.
4. Aerosol contamination.
5. Damage restorative materials (porcelain, amalgam, gold, composite &Titanium implant abutments).

Contraindication of ultrasonic device: 1-Infectious diseases. **2-**Cardiac pacemaker & hearing aids. **3-**Gag reflex. **4-**young children **5-** pain.

Aerosol Production Universal infection control procedures can help minimize the amount of aerosol produced. **Three levels of defense in the reduction of dental aerosols have been recommended :-**

- ☒ **The first recommended layer of defense is personal protective barriers such as a mask, gloves, and safety glasses.**
- ☒ **The second layer is routine use of an antiseptic preprocedural mouth rinse.**
- ☒ **The final layer is the use of a high-speed evacuation device.**

- **A preprocedural rinse with 0.12% chlorhexidine gluconate** should be used to minimize the microbial content of the aerosol. **High-speed evacuation** should also be used to eliminate as much of the aerosol as possible.
- **Cardiac Pacemakers** :- Magnetostrictive devices have been reported to **interfere** with the function of older cardiac pacemakers.

Plastic and Titanium Instruments for Implants: Different companies are manufacturing plastic and titanium instruments for **use on** titanium and other implant abutment materials. It is important that plastic or titanium instruments be **used to avoid** scarring and permanent damage to the implants.

Fig.: - Plastic probe & New Implacare (plastic curette tips).

Dental Endoscope: - has been introduced for use subgingivally in the diagnosis and treatment of periodontal disease. The **Perioscopy** system consists of a 0.99-mm-diameter, reusable fiberoptic endoscope over which is fitted a disposable, sterile sheath. This device allows clear visualization deeply into subgingival pockets and furcation's. Magnification ranges from **24 to 48 times**, enabling visualization of even minute deposits of plaque and calculus.

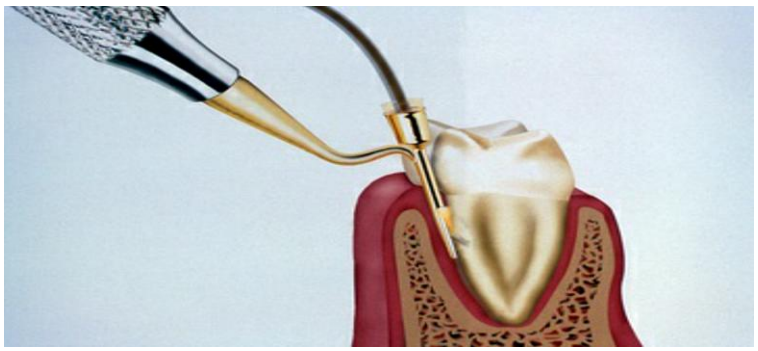


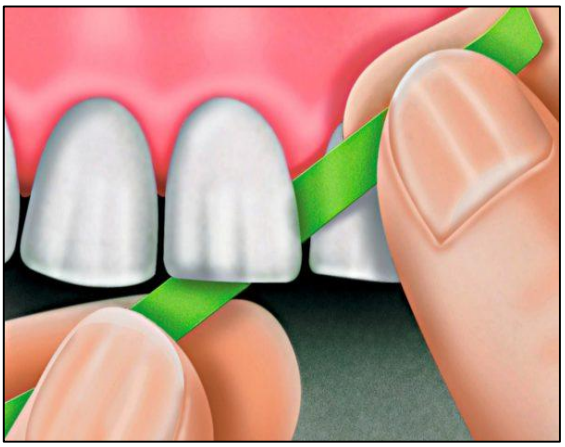
Fig. :- Perioscopic instrumentation permits deep subgingival visualization in pockets and furcations.

Cleansing and Polishing Instruments

Rubber Cups:- consist of a rubber shell with or without webbed configurations in the hollow interior. They are used in the handpiece . The **handpiece, must be sterilized after** each patient use, or a disposable plastic prophylaxis angle may be used and then discarded. A good cleansing and polishing paste that contains fluoride should be used and kept moist to minimize frictional heat as the cup revolves. Polishing pastes are available in fine, medium, or coarse grits. Aggressive use of the rubber cup with any abrasive may remove the layer of cementum, which is thin in the cervical area.

Bristle Brushes: - are available in wheel and cup shapes. The brush is used with a polishing paste. Because the bristles are stiff, use of the brush should be confined to the crown to **avoid injuring** the cementum and the gingiva.

Dental tape: - with polishing paste is **used for polishing proximal surfaces** that are inaccessible to other polishing instruments. The tape is passed interproximally while being kept at a right angle to the long axis of the tooth and is **activated** with a firm **labiolingual motion**. Particular care is taken to avoid injury to the gingiva. The area should be cleansed with warm water to remove all remnants of paste.



Air-Powder Polishing. The first specially designed handpiece to deliver an air-powered slurry of warm water and sodium bicarbonate for polishing was introduced in the early 1980s. This device, called the Prophy-Jet is **very effective for the removal of extrinsic stains and soft deposits.** The slurry removes stains rapidly and efficiently by mechanical abrasion and provides

warm water for rinsing and lavage. The flow rate of the abrasive cleansing power can be adjusted to increase the amount of powder for heavier stain removal. Polishing powders containing glycine or erythritol rather than **sodium bicarbonate** are commonly used for subgingival biofilm removal from root surfaces and implants. Both supragingival and subgingival air polishing with glycine or erythritol powder are safe and very effective for the removal of biofilm from titanium implant surfaces and restorative materials. The use of glycine or erythritol powder in an air-polishing device with a subgingival nozzle is more effective for subgingival biofilm removal than the use of either manual or ultrasonic instruments.

Surgical instruments

Excisional and incisional instruments, surgical curettes and periodontal elevators scissors and nippers Knives are basic instruments and can be obtained with both fixed and replaceable blades.

1. Kirkland knife:- typically used for **gingivectomy**. These knives are kidney shaped and can be obtained as either double -ended or single-ended instruments.

2. Interdental knives:- Orban knife These spear-shaped knives having cutting edges on both sides and are designed with either double-ended or single-ended blade. useful for excising interproximal tissue.

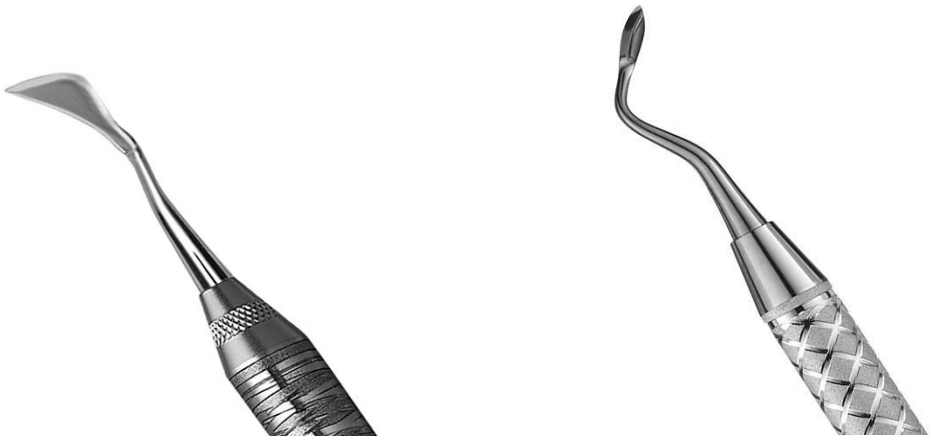


Fig:- Kirkland knife & Orban knife.

3. Surgical blades: - Scalpel & blades of different shapes and sizes are used in periodontal surgery. The **most common** blades **are #12D, #15, and #15C.**

4. Periodontal elevators These are needed to reflect and move the flap after the incision has been made for flap surgery.

5. Tissues forceps: used to hold the flap during suturing and used to position and displace the flap after reflection.

6. Scissors are used in periodontal surgery for such purposes as removing tags of tissue during gingivectomy, trimming the margins of flaps, enlarging incisions in periodontal abscesses, and removing muscle attachments in mucogingival surgery.

7.Surgical nippers: Serve same purpose as Scissors

8.Needle holders: Used to suture the flap at the desired position after surgical procedure has been complete.

Instrumentation

General Principles of Instrumentation

Positioning of Patient and Operator

The clinician should be seated on a comfortable operating stool that has been positioned so that the clinician's feet are flat on the floor with the thighs parallel to the floor. The clinician should be able to observe the field of operation while keeping the back straight and the head upright.

The patient should be in a supine position and placed so that the mouth is close to the resting elbow of the clinician. For instrumentation of the maxillary arch, the patient should be asked to raise the chin slightly to provide optimal visibility and accessibility. For instrumentation on the mandibular arch, it may be necessary to raise the back of the chair slightly and request that the patient lower the chin until the mandible is parallel to the floor. This will especially facilitate work on the lingual surfaces of the mandibular anterior teeth.

Visibility, Illumination, and Retraction

Whenever possible, direct vision with direct illumination from the dental light is most desirable. If this is not possible, indirect vision may be obtained by using the mouth mirror and indirect illumination may be obtained by using the mirror to reflect light to where it is needed. Indirect vision and indirect illumination are often used simultaneously.

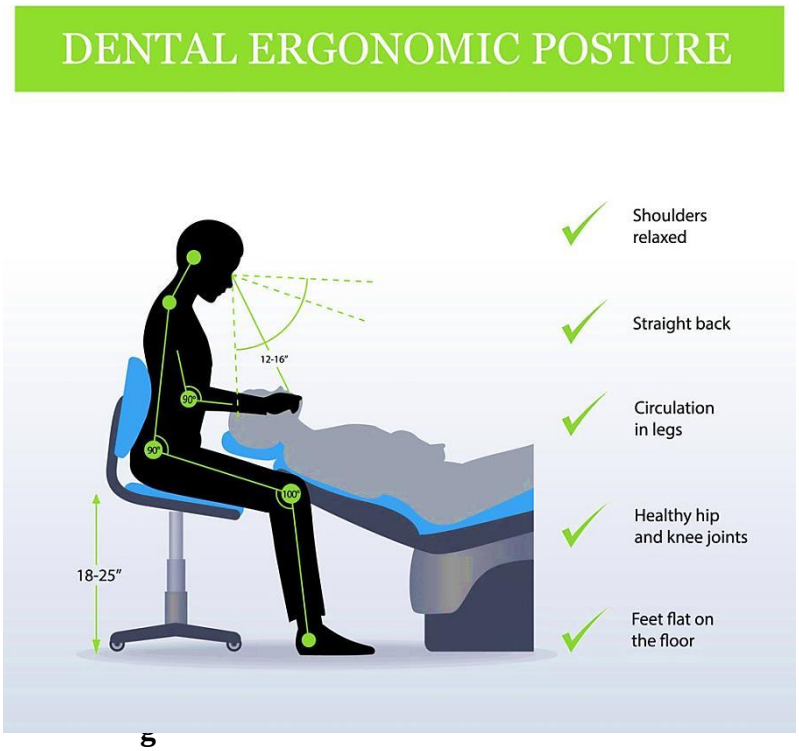


Fig. :- Positioning of patient and operator.

Instrument Stabilization

Stability of the instrument and the hand is the primary requisite for controlled instrumentation. Stability and control are essential for effective instrumentation and avoidance of injury to the patient or clinician. The two factors of major importance in providing stability are the instrument grasp and the finger rest.

Instrument Grasp. The most effective and stable grasp for all periodontal instruments is the **modified pen grasp**. Although other grasps are possible, this modification of the standard pen grasp ensures the greatest control in performing intraoral procedures.

The thumb, index finger, and middle finger are used to hold the instrument as a pen is held, but the middle finger is positioned so that the side of the pad next to the fingernail is resting on the instrument shank. The pad of the thumb is placed midway between the middle and index fingers on the opposite side of the handle. This creates a triangle of forces, or tripod effect . This stable modified pen grasp enhances control over instrument and enhances tactile sensitivity .

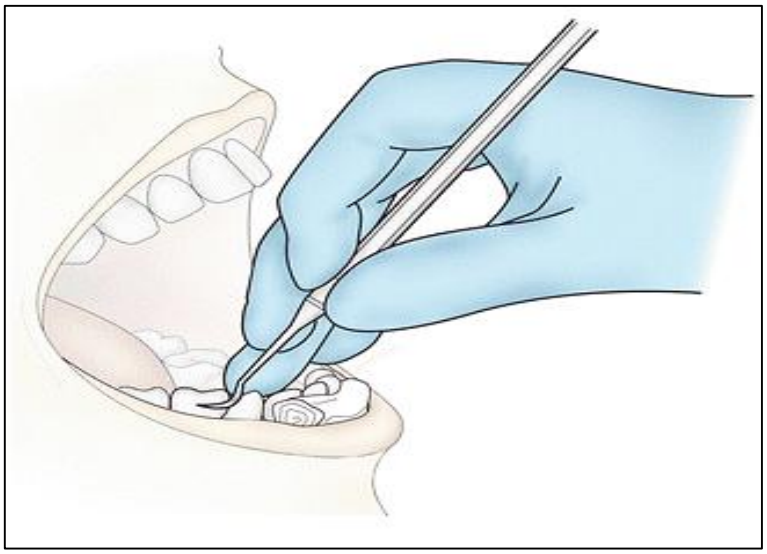


Fig. :- Modified pen grasp.

The palm and thumb grasp is useful for stabilizing instruments during sharpening, but it is not recommended for periodontal instrumentation. Maneuverability and tactile sensitivity are so inhibited by this grasp that it is unsuitable for the precise, controlled movements necessary during periodontal procedures.

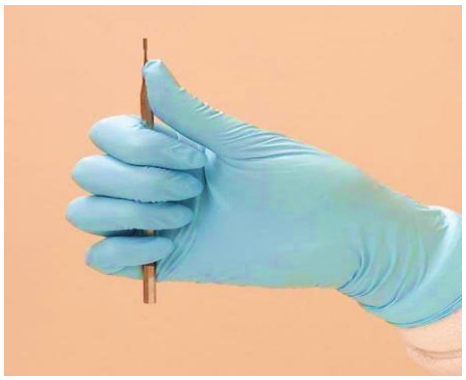


Fig. :- The palm and thumb grasp.

Finger Rest. The finger rest serves to stabilize the hand and the instrument by providing a firm fulcrum as movements are made to activate the instrument. A good finger rest prevents injury and laceration of the gingiva and surrounding tissues by poorly controlled instruments. The fourth (ring) finger is preferred by most clinicians for the finger rest.

Finger rests may be generally classified as intraoral finger rests or extra oral fulcrums. The following examples illustrate the different variations of the intraoral finger rest:

1. Conventional: The finger rest is established on tooth surfaces immediately adjacent to the working area.

2. Cross-arch: The finger rest is established on tooth surfaces on the other side of the same arch .

3. Opposite arch: The finger rest is established on tooth surfaces on the opposite arch (e.g., mandibular arch finger rest for instrumentation on the maxillary arch).

4. Finger on finger: The finger rest is established on the index finger or thumb of the non-operating hand.

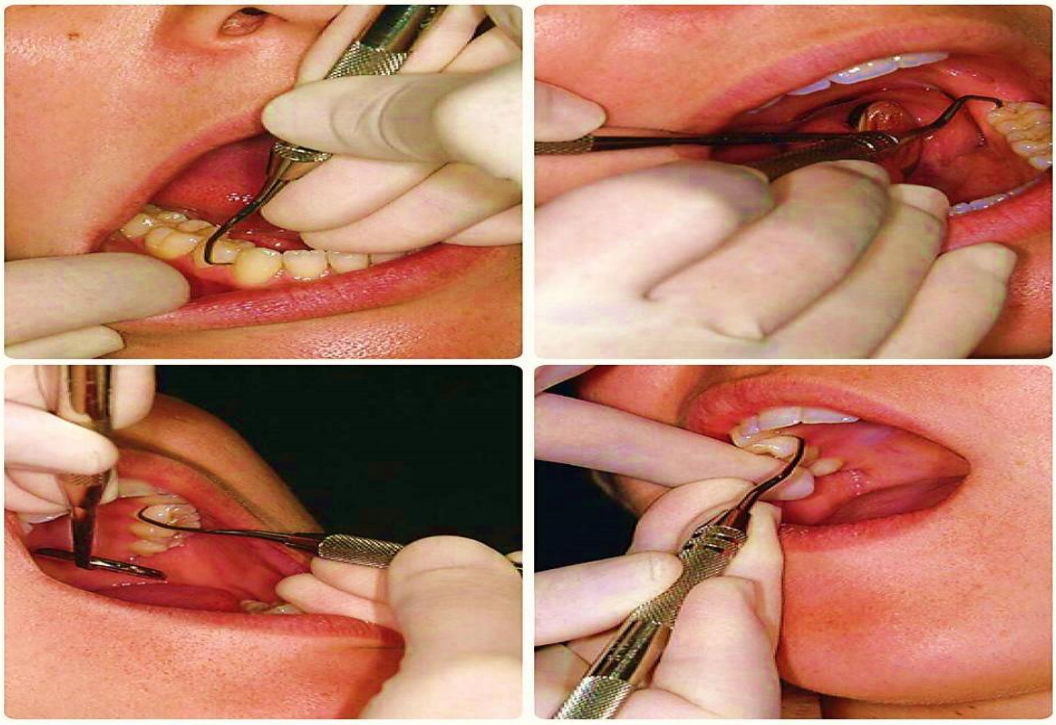


Fig. :- Different variations of the intraoral finger rest.

Extraoral fulcrums are essential for effective instrumentation of some aspects of the maxillary posterior teeth. When properly established, they allow optimal access and angulation while providing adequate stabilization. Extraoral fulcrums are not "finger rests" in the literal sense because the tips or pads of the fingers are not used for extraoral fulcrums as they are for intraoral finger rests.

The two most common extraoral fulcrums are used as follows:

1. Palm up (Knuckle rest technique): The palm-up fulcrum is established by resting the backs of the middle and fourth fingers on the skin overlying the lateral aspect of the mandible on the right side of the face.

2. Palm down (Chin-cup technique): The palm-down fulcrum is established by resting the front surfaces of the middle and fourth fingers on the skin overlying the lateral aspect of the mandible on the left side of the face.

Both intraoral finger rests and extraoral fulcrums may be reinforced by applying the index finger or thumb of the non-operating hand to the handle or shank of the instrument for added control and pressure against the tooth. The reinforcing finger is usually employed for opposite-arch or extraoral fulcrums when precise control and pressure are compromised by the longer distance between the fulcrum and the working end of the instrument.

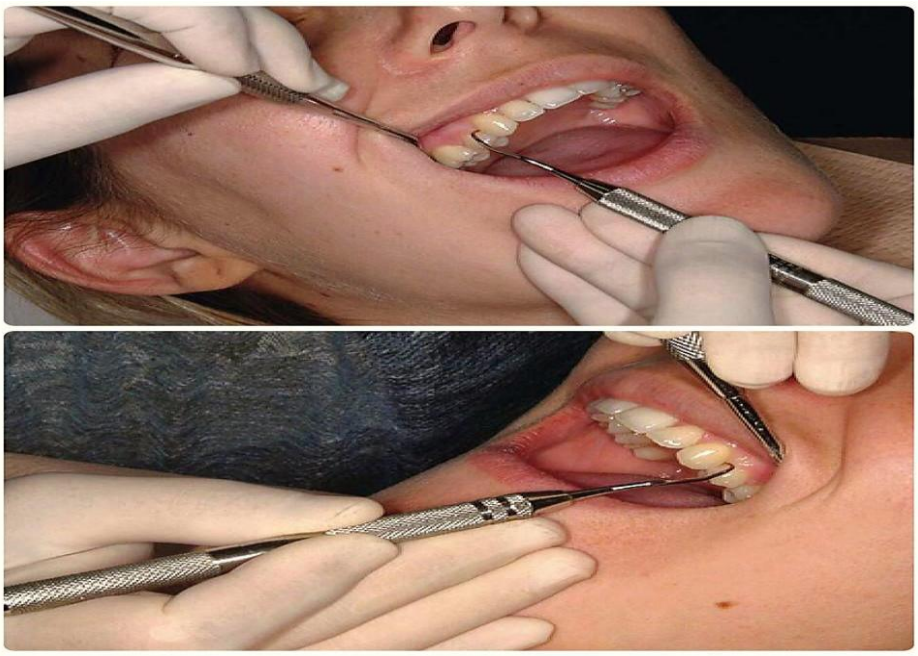


Fig.:- Extraoral fulcrums.

Instrument Activation

Adaptation:- refers to the manner in which the working end of a periodontal instrument is placed against the surface of a tooth. Precise adaptation must be maintained with all instruments to avoid trauma to the soft tissues and root surfaces and to ensure maximum effectiveness of instrumentation.

Angulation:- refers to the angle between the face of a bladed instrument and the tooth surface. It may also be called **the tooth-blade relationship**.

Correct angulation is essential for effective calculus removal. For subgingival **insertion** of a bladed instrument such as a curette, **angulation should be** as close to 0 degree as possible . During scaling and root planing, **optimal angulation** is between **45 and 90 degrees** .

With angulation of **less than 45 degrees**, the cutting edge will not bite into or engage the calculus properly. Instead, it will slide over the calculus, smoothing or "burnishing" it. If angulation is **more than 90 degrees**, the lateral surface of the blade, rather than the cutting edge, will be against the tooth, and the calculus will not be removed and may become burnished. Angulation greater than 90 degrees is used to engage and remove the pocket lining **(gingival curettage).**

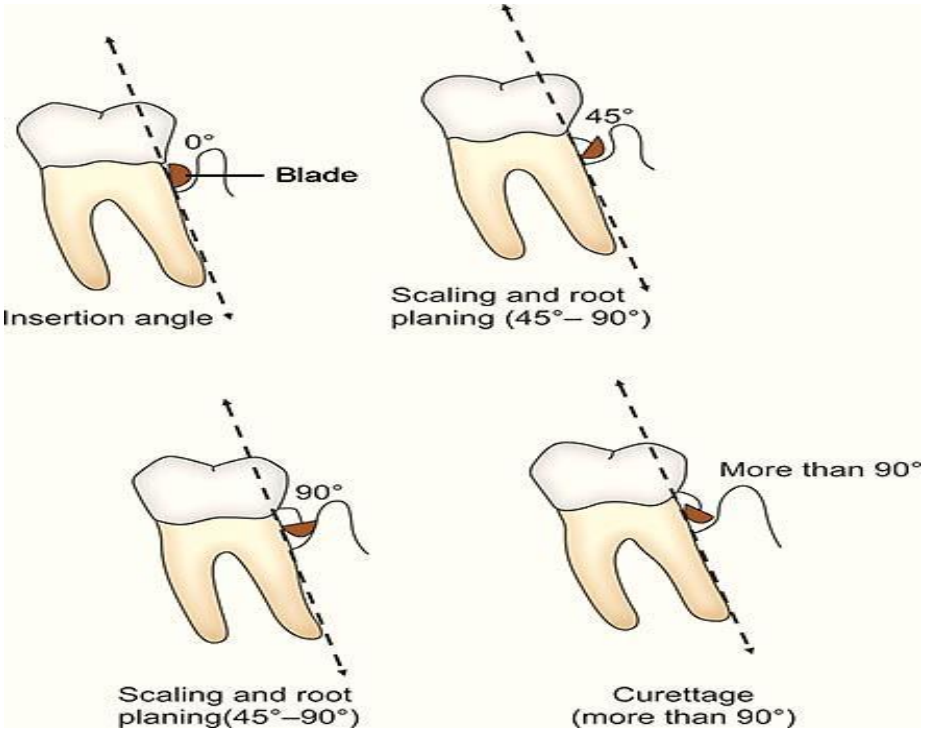


Fig.:- Tooth-blade relationship.

Lateral Pressure:- refers to the pressure created when force is applied against the surface of a tooth with the cutting edge of a bladed instrument.

Strokes:- Three basic types of strokes are used during instrumentation: the exploratory stroke, the scaling stroke, and the root planing stroke.

The direction, length, pressure, and number of strokes necessary for either scaling or root planing are determined by **four major factors**: (1) gingival position and tone, (2) pocket depth and shape, (3) tooth contour, and (4) the amount and nature of the calculus or roughness.

The **exploratory stroke** is a light, "feeling" stroke that is used with probes and explorers to evaluate the dimensions of the pocket and to detect calculus and irregularities of the tooth surface.

The **scaling stroke** is a short, powerful pull stroke that is used with bladed instruments for the removal of both supragingival and subgingival calculus. The cutting edge engages the apical border of the calculus and dislodges it with a firm movement in a coronal direction.

The **root-planing stroke** is a moderate to light long, overlapping pull stroke that is used for final smoothing and planing of the root surface. Although hoes, files, and ultrasonic instruments have been used for root planing, curettes are widely acknowledged to be the most effective and versatile instruments for this procedure.

Principles of Scaling and Root Planing

Definitions and Rationale

Scaling is the process by which biofilm and calculus are removed from both supragingival and subgingival tooth surfaces.

Root planing is the process by which residual embedded calculus and portions of cementum are removed from the roots to produce a smooth, hard, clean surface.

Scaling alone is sufficient to remove biofilm and calculus completely **from enamel**, leaving a smooth, clean surface.

Deposits of calculus on root surfaces are frequently embedded in cemental irregularities. Subgingival calculus is porous and harbors bacteria and endotoxin and therefore should be removed completely. When dentin is exposed, biofilm bacteria may invade dentinal tubules. Therefore, **scaling alone is insufficient** to

remove them, and a portion of the root surface must be removed to eliminate these deposits (root planing).

Scaling and root-planing strokes should be confined to the portion of the tooth where calculus or altered cementum is found; this area is known as the instrumentation zone.

Various approaches to instrumentation in different areas of the mouth are mentioned here. The examples shown provide maximal efficiency for the clinician and comfort for the patient. For most areas, more than one approach is presented.

Maxillary right posterior sextant: facial aspect.

- ☒ **Operator position: Side position.**
- ☒ **Finger rest: Extraoral, palm up.**

Maxillary right posterior sextant, premolar region only: Facial aspect .

- ☒ **Operator position: Side or back position.**
- ☒ **Finger rest: conventional Intraoral .**

Maxillary right posterior sextant: palatal aspect .

- ☒ **Operator position: Side or front position.**
- ☒ **Finger rest: Extraoral, palm up**.

Maxillary right posterior sextant palatal aspect .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Intraoral, finger on finger.**

Maxillary anterior sextant: Facial aspect, surfaces away from the operator .

- ☒ **Operator position: Back position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Maxillary anterior sextant: Facial aspect, surfaces toward the operator .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Intraoral conventional.**

Maxillary anterior sextant: palatal aspect, surfaces away from the operator (surfaces toward the operator are scaled from a front position) .

- ☒ **Operator position: Back position.**
- ☒ **Finger rest: Intraoral conventional.**

Maxillary left posterior sextant: Facial aspect .

- ☒ **Operator position: Side or back position.**
- ☒ **Finger rest: Extraoral, palm down.**

Maxillary left posterior sextant: Facial aspect .

- ☒ **Operator position: Back or side position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Maxillary left posterior sextant: palatal aspect .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Intraoral, opposite arch, reinforced with index finger of the nonoperating hand.**

Maxillary left posterior sextant: palatal aspect .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Extraoral, palm down.**

Maxillary left posterior sextant: palatal aspect.

- ☒ **Operator position: Side or front position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular left posterior sextant: Facial aspect .

- ☒ **Operator position: Side or back position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular left posterior sextant: Lingual aspect .

- ☒ **Operator position: Front or side position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular anterior sextant: Facial aspect, surfaces toward the operator .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular anterior sextant: Facial aspect, surfaces away from the operator.

- ☒ **Operator position: Back position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular anterior sextant: Lingual aspect, surfaces away from the operator.

- ☒ **Operator position: Back position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular anterior sextant: Lingual aspect, surfaces toward the operator .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular right posterior sextant: Facial aspect .

- ☒ **Operator position: Side or front position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Mandibular right posterior sextant: Lingual aspect .

- ☒ **Operator position: Front position.**
- ☒ **Finger rest: Intraoral. Conventional.**

Ultrasonic and Sonic Instrumentation

Sonic/ultrasonic instrumentation requires removal from the coronal to the apical portion of the deposit. The **aerosol produced by sonic and ultrasonic instrumentation** may contain potentially infectious blood-borne and airborne pathogens. ***Pneumococci, staphylococci, α-hemolytic streptococci,*** **and** ***Mycobacterium tuberculosis*** are among the bacteria that have been found in dental aerosols. Aerosols also subject dental personnel and patients to many viruses, including covid-19 , herpes simplex, hepatitis, influenza, common cold, Epstein-Barr, and cytomegalovirus.

The instrument is grasped with a light to moderate pen or modified pen grasp . Extraoral hand rests should be used for the maxillary teeth. For the mandibular teeth, either intraoral or extraoral fulcrums may be used. The purpose of the extraoral fulcrum is that it allows the operator to maintain a light grasp and easier access physically and visually to the oral cavity.

The working end should be kept in constant motion, and the tip should be kept **parallel to the tooth surface or at no more than a 15-degree angle** to avoid etching or grooving the tooth surface. Surface should be examined frequently with an explorer. Any remaining irregularities of the root surface may be removed with sharp curettes if necessary.

Instrument Sharpening

Evaluation of Sharpness

Sharpness can be evaluated by sight and touch in one of the following ways:

1. When a dull instrument is held under a light, the rounded surface of its cutting edge reflects light back to the observer. It appears as a bright line running the length of the cutting edge. The acutely angled cutting edge of a sharp instrument, conversely, has no surface area to reflect light. When a sharp instrument is held under a light, no bright line can be observed.

2. Tactile evaluation of sharpness is performed by drawing the instrument lightly across an acrylic rod known as a "sharpening test stick." A dull instrument will slide smoothly, without "biting" into the surface.

Sharpening Stones

India and Arkansas oil stones are examples of **natural** abrasive stones. **Carborundum, ruby, and ceramic stones** are **synthetically** produced.

Sharpening stones can also be categorized by their method of use.

Mounted Rotary Stones:- These stones are generally not recommended for routine use because they (1) are difficult to control precisely and can ruin the shape of the instrument, (2) tend to wear down the instrument quickly, and (3) can generate considerable frictional heat, which may affect the temper of the instrument.

Unmounted Stones:- come in a variety of sizes and shapes.

Sharpening Universal Curettes. The angle between the face of the blade and the lateral surface of any curette is **70 to 80** degrees . This is the most effective design for removing calculus and root planing. To maintain the 70- to 80-degree angle , a flat, handheld stone should be correctly applied to the lateral surface of a curette, the angle between the face of the blade and the surface of the stone will be **100 to 110 degrees .**

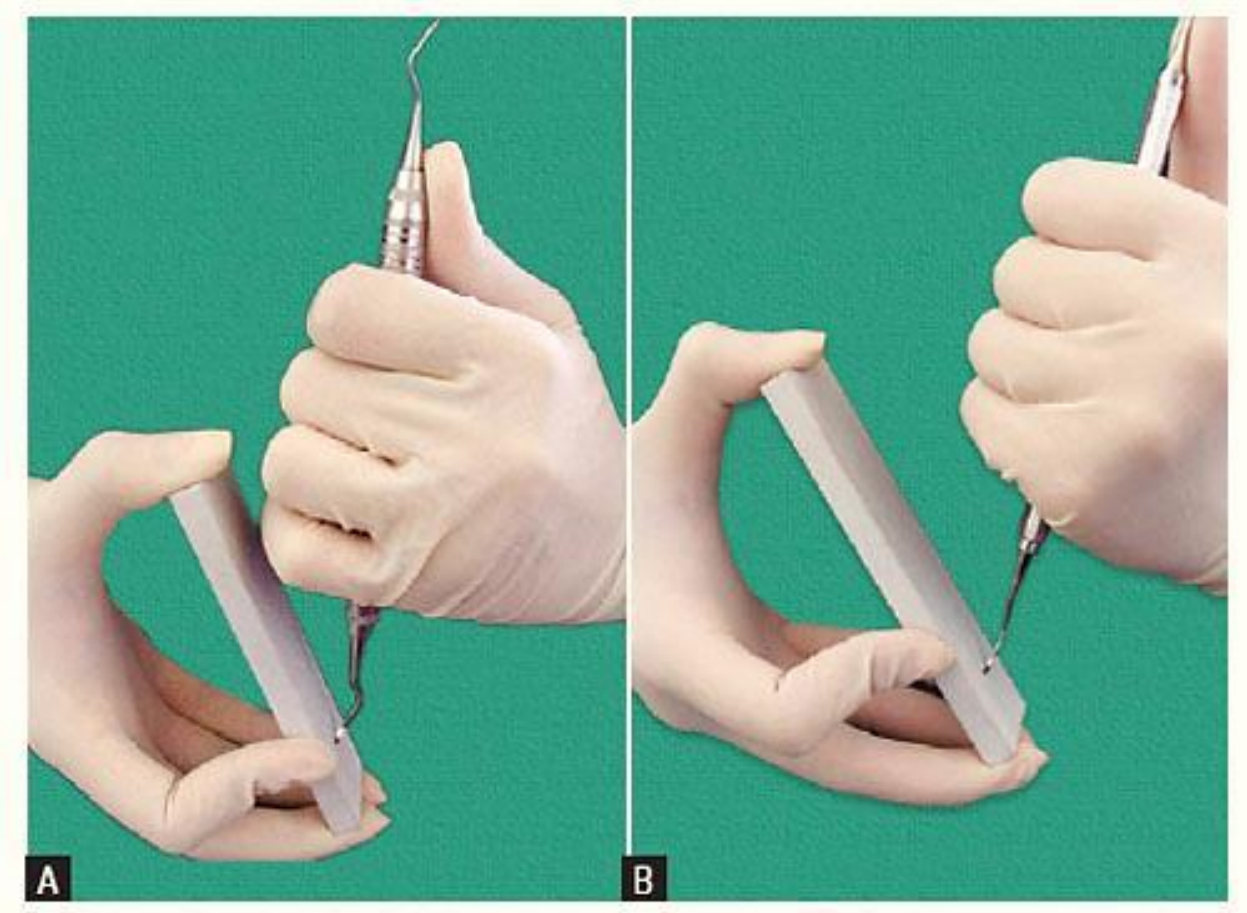


Fig.:- Instrument sharpening.