

Periodontal instruments

Periodontal instruments are designed for specific purposes, such as removing calculus, planing 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.

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.

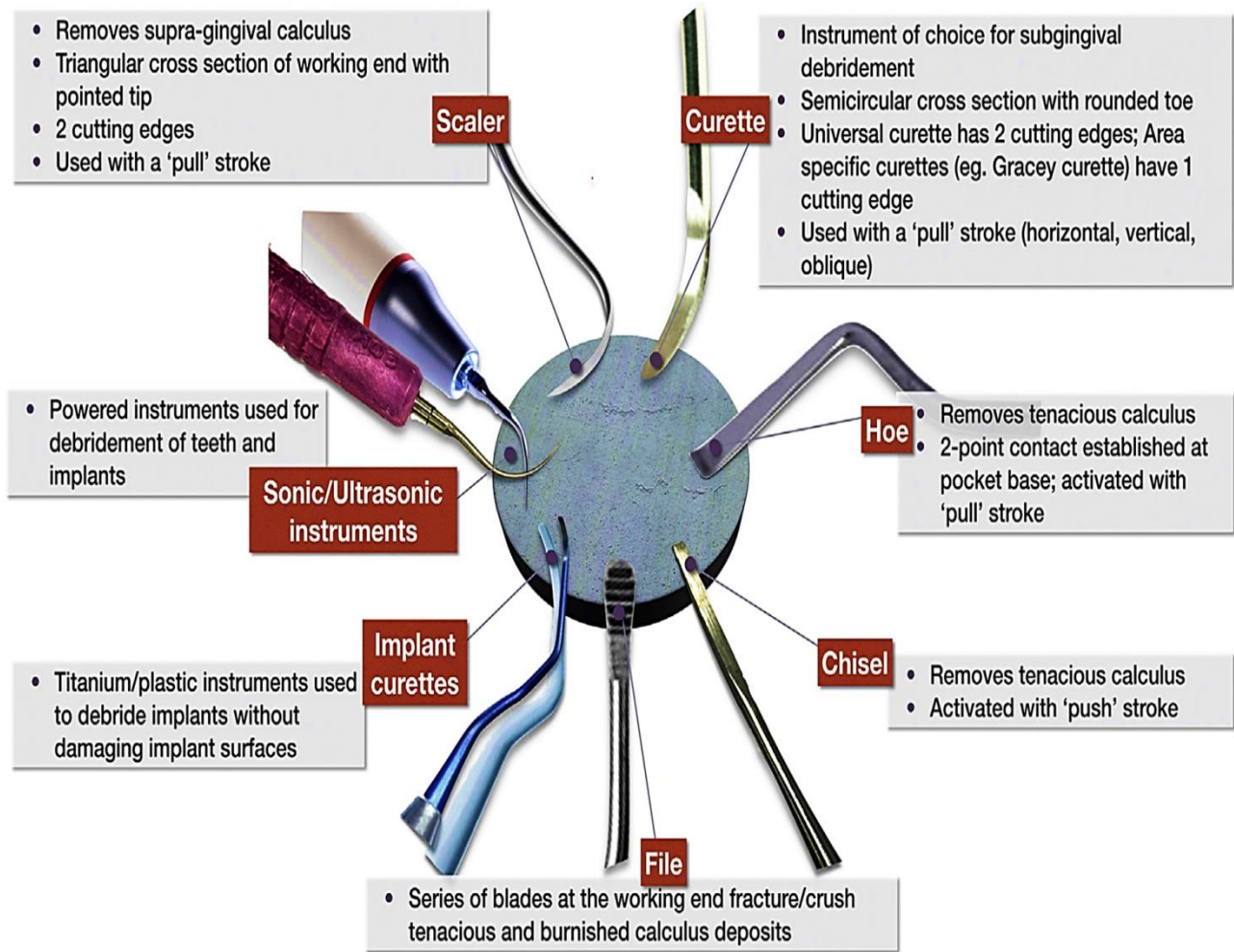


Fig.:- Debridement periodontal & implants instruments.

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.

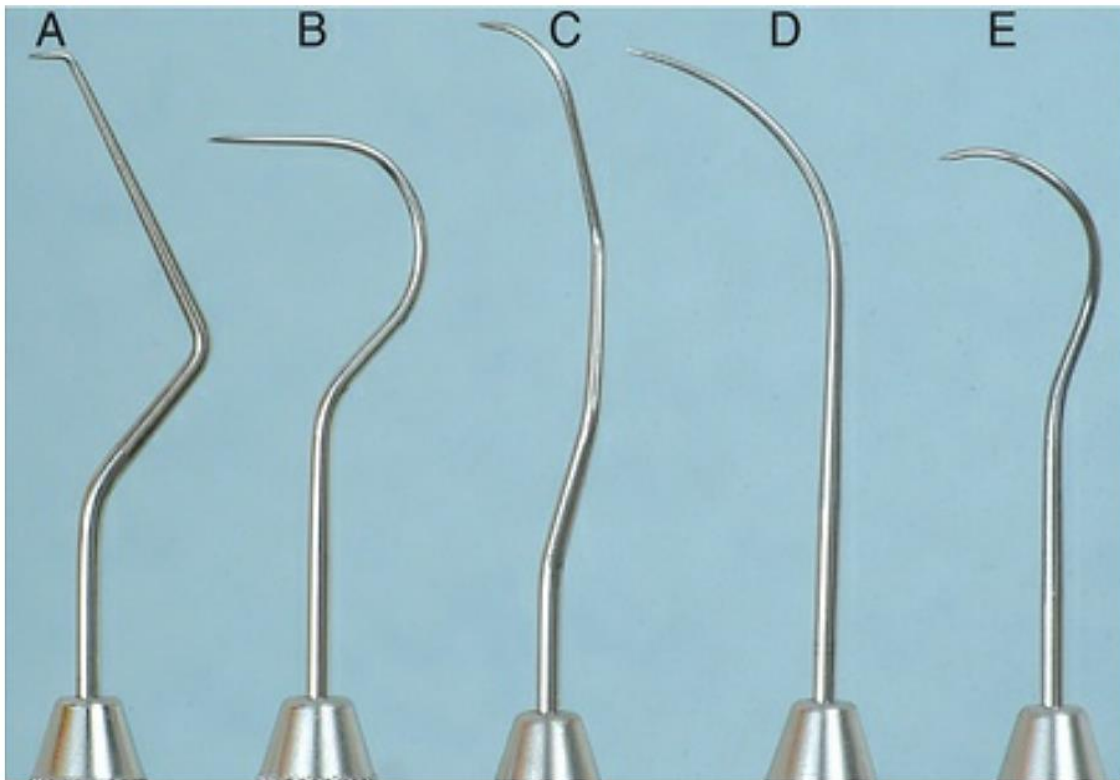


Fig.:- Five typical explorers. A, #17; B, #23; C, EXD 11-12; D, #3; E, #3CH pigtail.

C. Periodontal Probes

Periodontal probes are **used to** measure the depth of pockets and to determine their configuration. 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:

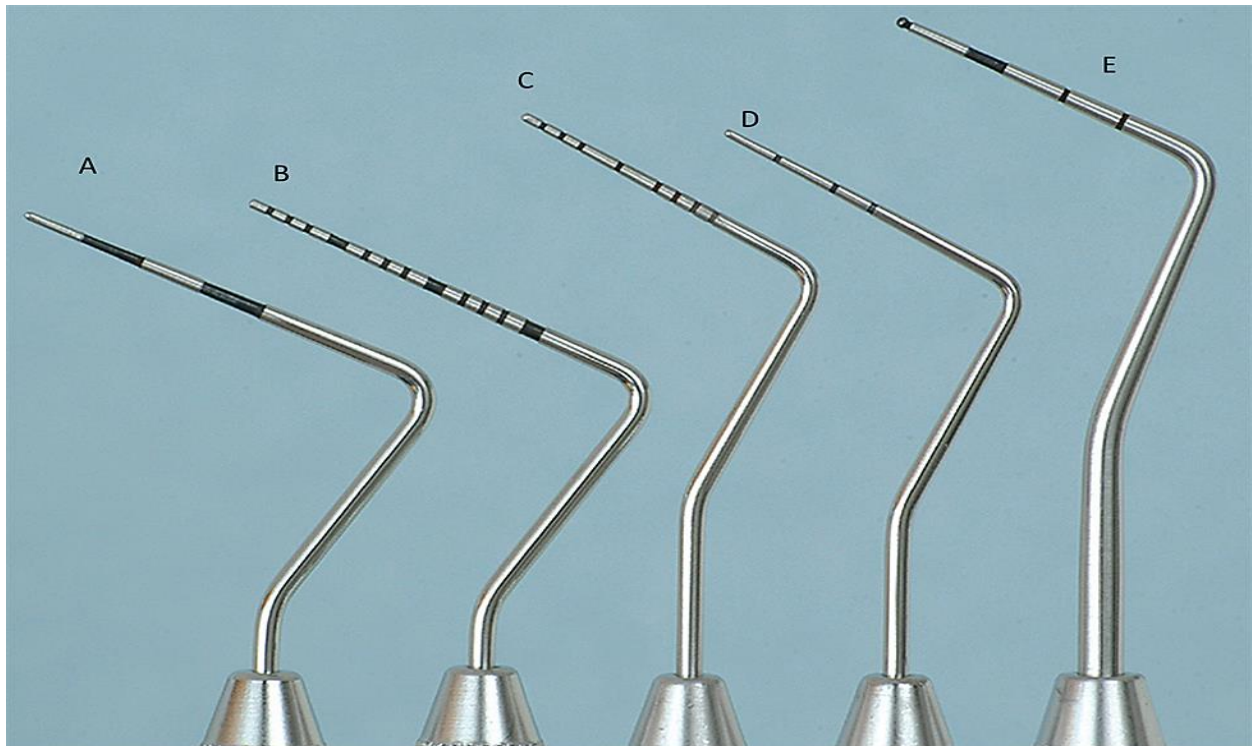


Fig. : Types of periodontal probe : A, Marquis color-coded probe. Calibrations are in 3-mm sections. B, University of North Carolina-15 probe, a 15-mm long probe with millimeter markings at each millimeter and color coding at the fifth, tenth, and fifteenth millimeters. C, University of Michigan “O” 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.

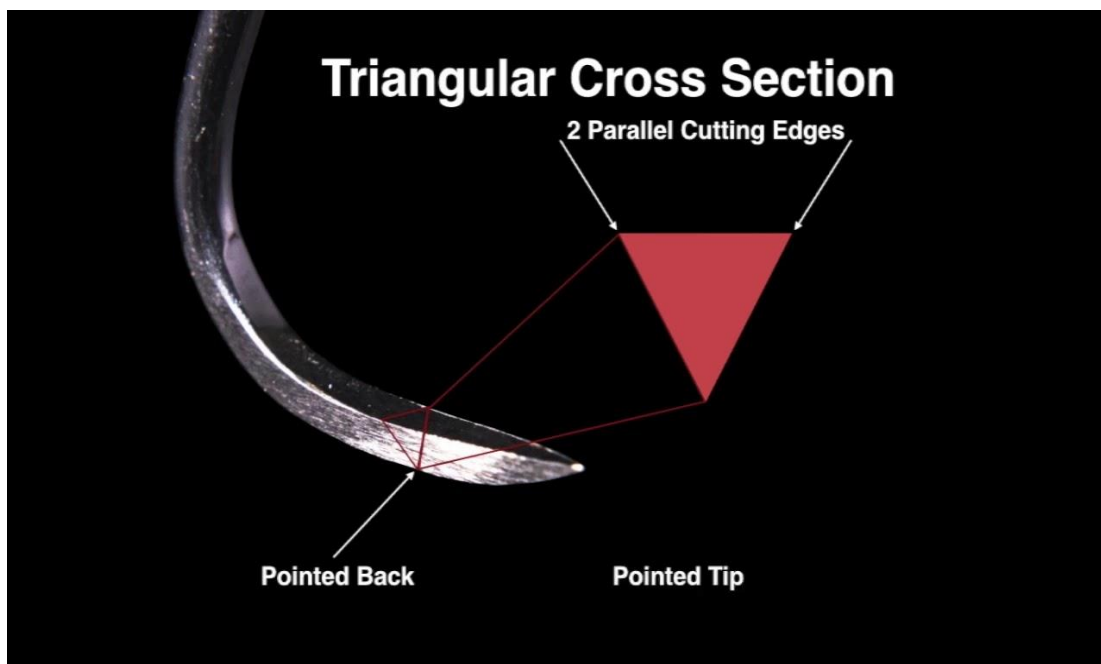


Fig. :- Sickle scaler.



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.

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.

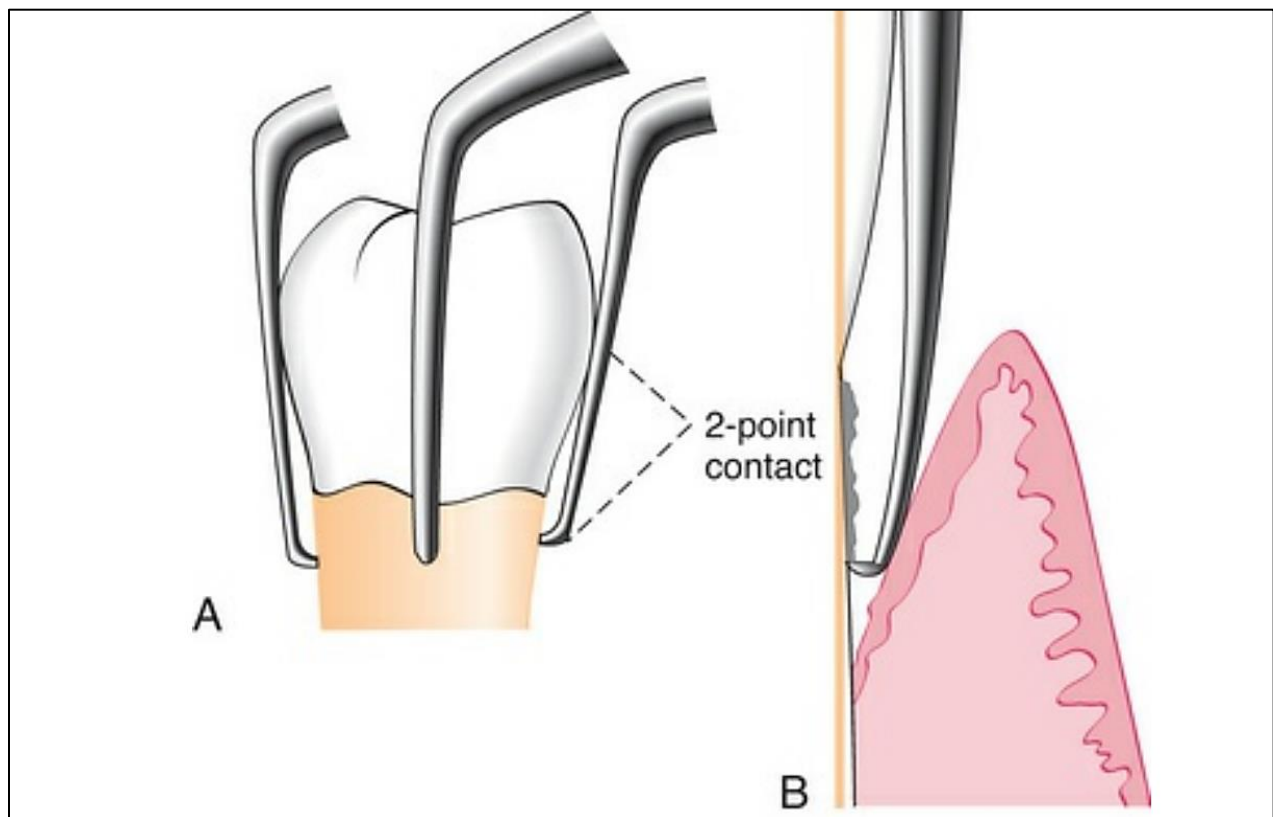


Fig.:- Hoe scaler application.

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)

- ❖ 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

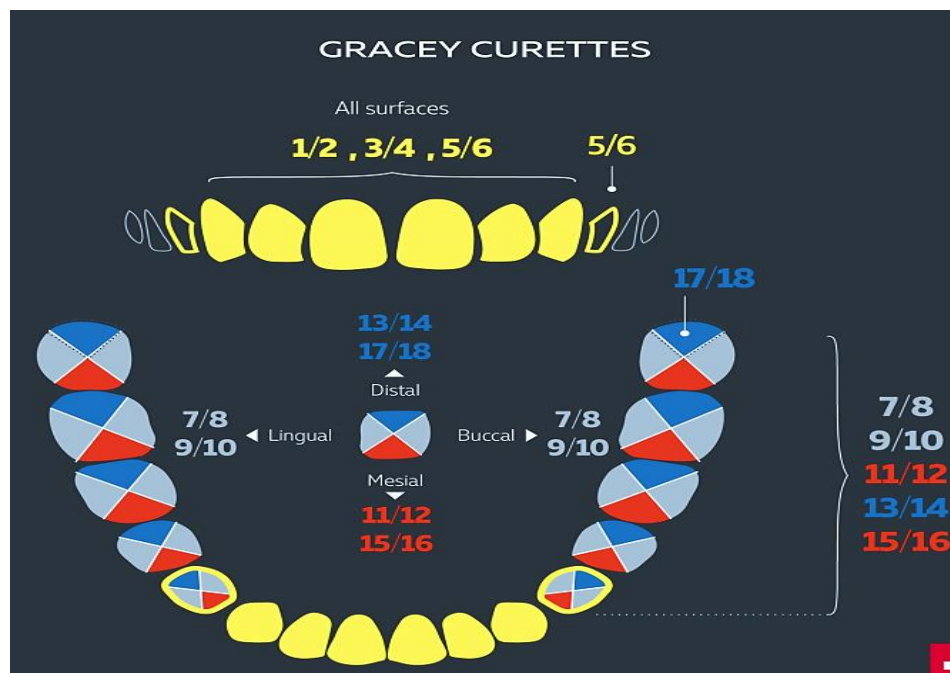


Fig. :- Gracey curettes numbers & uses.

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

Schwartz Periotriever :- 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 Periotriever 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.

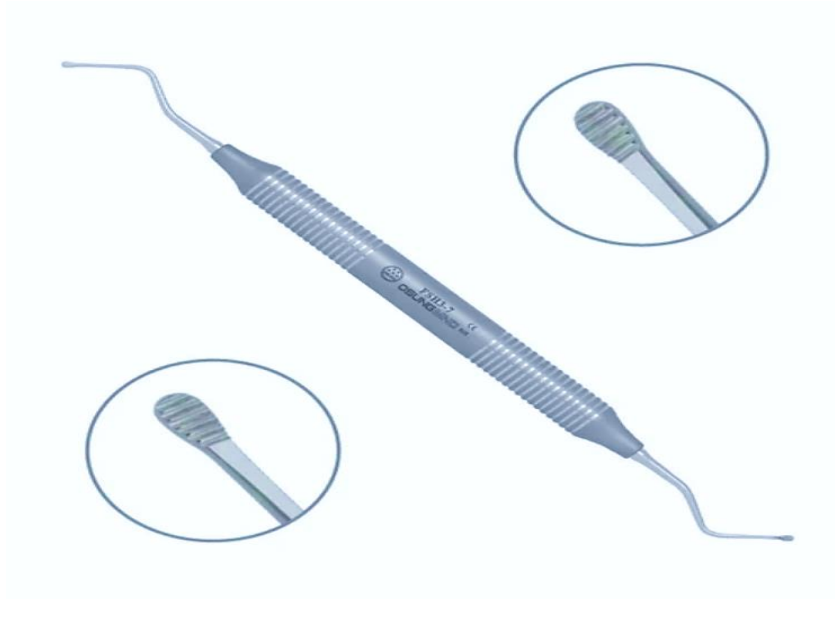


Fig.:- File.

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. It permits operators to detect the presence and location of subgingival deposits and guides them in the thorough removal of these deposits. Magnification ranges from **24 to 48 times**, enabling visualization of even minute deposits of plaque and calculus. The Perioscopy system can also be used to evaluate subgingival areas for caries, defective restorations, root fractures, and resorption.

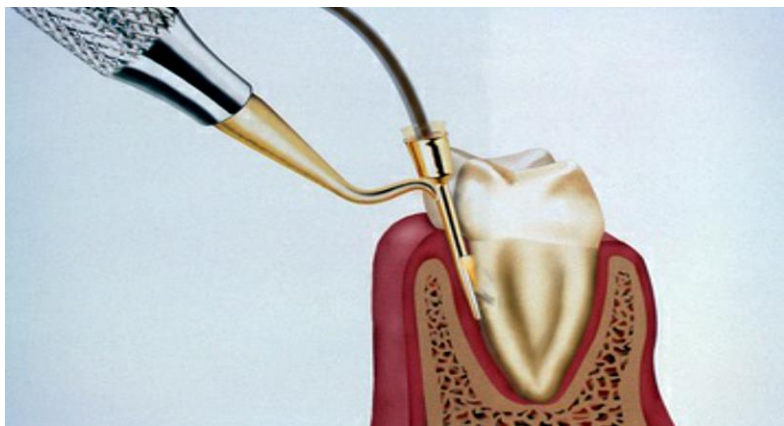


Fig. :- Perioscopic instrumentation permits deep subgingival visualization in pockets and furcations.

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.

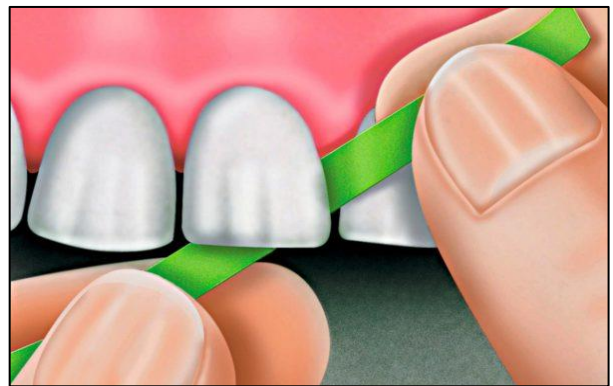


Fig.:- Dental tape.

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.**



Fig. :- Air-powder polishing device.

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.

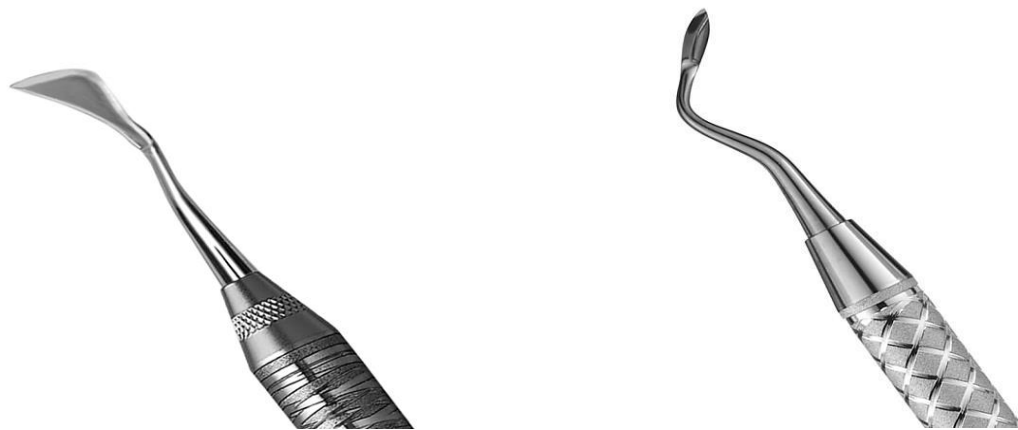


Fig:- Kirkland knife & Orban knife.

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.