Periodontal instruments

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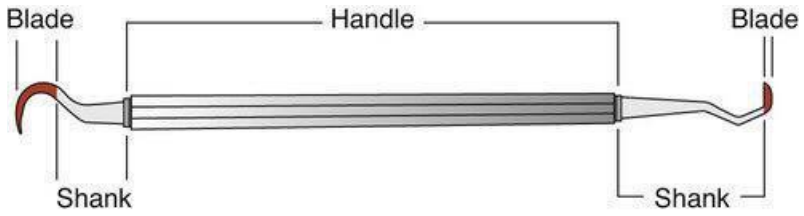
Periodontal instruments

- 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

A. Diagnostic instruments

1. A dental mirror that is used for ***specific purposes*** (Indirect vision, Indirect illumination, Transillumination, Retraction) and ***Nonspecific purposes*** (Handles can be used for checking mobility, percussion).

2. Explorers: are used to locate calculus deposits and caries. They are 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.

3. Periodontal probes used to locate measure and mark pockets as well as determine their course on individual tooth surfaces.

A typical probe is a tapered rod-like instrument calibrated in millimeters with a blunt, rounded tip. Periodontal probes are used to measure the depth of the pocket and to determine their configuration.

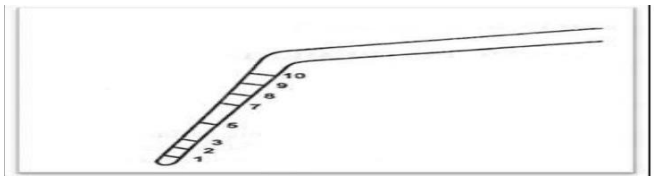
Types of periodontal probes are color – coded or non-color coded probes.

a.The Marquis color-coded probe: The calibrations are in 3 millimeter sections.



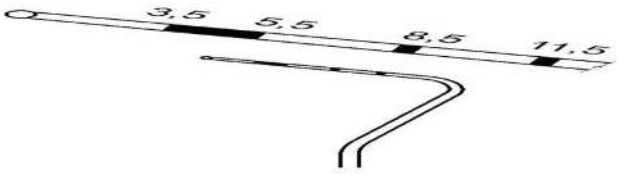
b.UNC-probe: marking from 1 to 15 with three color coding (4-5mm,9-10mm,14-15mm).

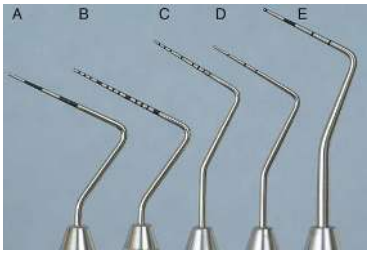
c. Williams probe: Has both color and non-color coding with markings at 1,2,3,5,7,8,9 and 10 mm.



d.The Michigan "O" probe with markings: At 3, 6,and 8 mm.

e. The WHO probe: It has a 0.5 mm ball at the tip and millimeter marking at 3.5, 8.5 and 11.5 mm and color coding from 3.5 to 5.5 mm.





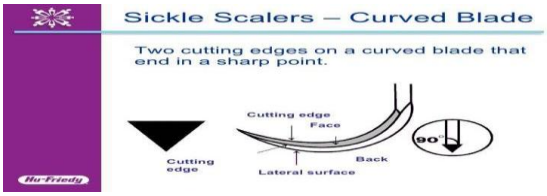
B. Scaling, root planning, and curettage instrument

They are classified as follows:

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

1.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. They appear triangular in cross-section. 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.





straight and curve sickle scaler

2.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.

Cumine 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 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.



Cumine

3.Pushing 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.



Push scaler

b. For subgingival scaling

a. Hoe scaler: are 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

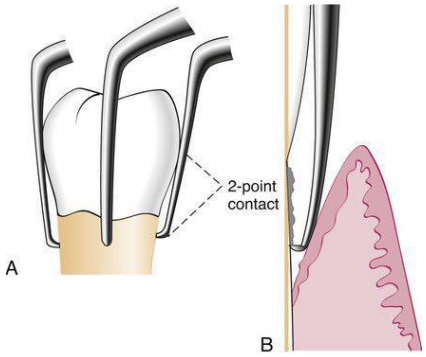
by the junction of the flattened terminal surface with the inner aspect of the blade. **The blade has been reduced to minimal thickness to permit access to the roots without interference from the adjacent tissues.**

Hoe scalers are used in the following manner:

1.The blade is inserted to the base of the periodontal pocket so that it makes twopoint 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. Must be fully engaged with every effort being made to preserve the two-point contact with the tooth.



Hoe scalers

b.Curettes: The curette is the instrument of choice for removing deep subgingival calculus, root instrumentation (root planing) of altered cementum, and removal of the soft tissue lining the periodontal pocket. Each working end has a cutting edge on both sides of the blade and a rounded toe. Curettes are finer than sickle scalers and do not have any sharp points or corners other than the cutting edges of the blade. Therefore, curettes can be adapted for and provide good access to deep pockets, with minimal soft tissue trauma.

Types of curates

- Universal curettes have cutting edges that may be inserted in most areas of the dentition by altering and adapting the finger rest, fulcrum, and hand position of the operator
- 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:

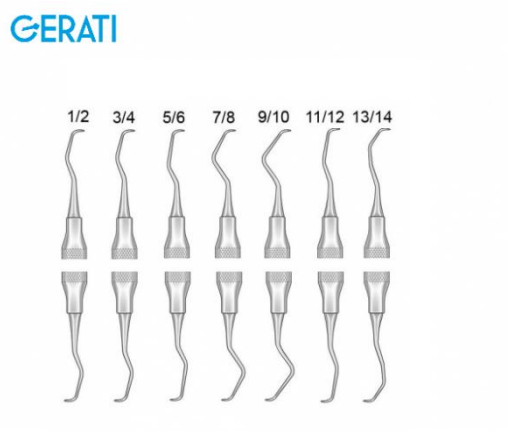
Gracey #1-2 and #3-4: Anterior teeth

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



Extended-Shank Curettes. 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

Mini-Bladed Curettes. 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. In any area where root morphology or tight tissue prevents full insertion of the standard Gracey or After Five blade, Mini Five curettes can be used with vertical strokes, with reduced tissue distention and no tissue trauma.

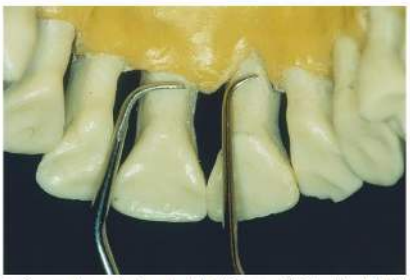


Fig. 51.26 Comparison of standard rigid Gracey #5-6 with rigid Mini Five #5-6 on the palatal surfaces of the maxillary central incisors. Mini Five curette can be inserted into the base of these tight anterior pockets and used with a straight vertical stroke. The standard Gracey or After Five curette usually cannot be inserted vertically in this area because the blade is too long. (Copyright A. Pattison.)



Fig. 51.28 Comparison of Gracey curette designs. *Left to right,* Standard #1-2, After Five #1-2, Mini Five #1-2, Micro Mini Five #1-2. (Courtesy Hu-Friedy, Chicago, IL.)

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

Dental Endoscope The dental endoscope is used subgingivally in the diagnosis and treatment of periodontal disease. 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. Using this device, operators can achieve levels of root debridement and cleanliness that are much more difficult or impossible to produce without it. The dental endoscope can also be used to evaluate subgingival areas for caries, defective restorations, root fractures, and resorption.

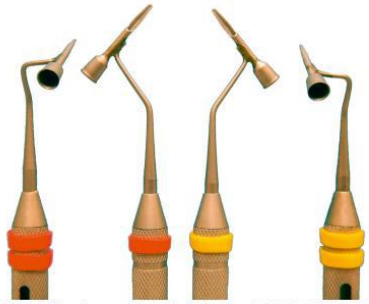


Fig. 51.43 Viewing periodontal explorers (left/right/full viewing) for the perioscopy system. (Courtesy Perioscopy, Inc., Zest Dental Solutions, Carlsbad, CA.)

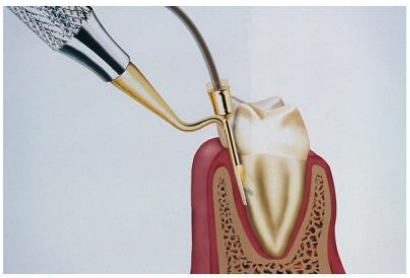


Fig. 51.44 Perioscopic instrumentation permits deep subgingival visualization in pockets and furcations. (Courtesy Perioscopy, Inc., Zest Dental Solutions, Carlsbad, CA.)

Sonic and ultrasonic instruments: Used for removing plaque, scaling, curetting and removing stains. Two types of ultrasonic units are:

-Magnetostrictive: Vibration of the tip is elliptical; hence all the sides can be used.

-Piezo-electric: 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.

•Acoustic streaming.

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

Advantage of ultrasonic over hand Instrument

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

Plastic and Titanium Instruments for Implants

Several 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.

C. 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 with a special prophylaxis angle. The hand piece, prophylaxis angle must be sterilized after each patient use, or a disposable plastic prophylaxis angle and rubber cup 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 and are packaged in small, convenient, single-use containers. Aggressive use of the rubber cup with any abrasive may remove the layer of cementum, which is thin in the cervical area.



-**Bristles brush**: are available in wheel and cup shapes. The brush is used in the prophylaxis angle 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, effectively removes 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.



Fig. 51.48 Hu-Friedy EMS Air Flow Master air polishing device with perio and standard handpieces and tips for both supragingival and subgingival air polishing. (Courtesy Hu-Friedy, Chicago, IL.)

D. Surgical instruments

Excisional and incisional instruments, surgical curettes and periodontal elevators scissors.

1. Knives are basic instruments and can be obtained with both fixed and replaceable blades.

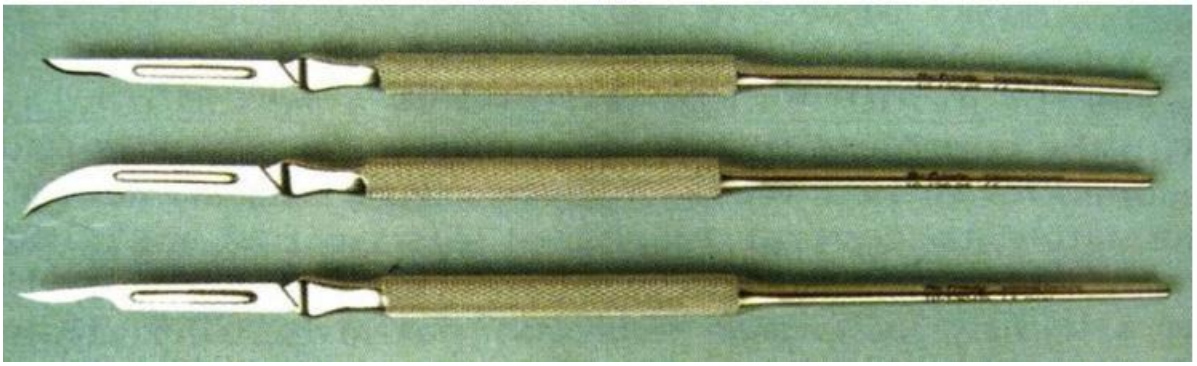
a. Kirkland knives are typically used for gingivectomy.These knives are kidney shaped and can be obtained as either double- ended or single-ended instruments.



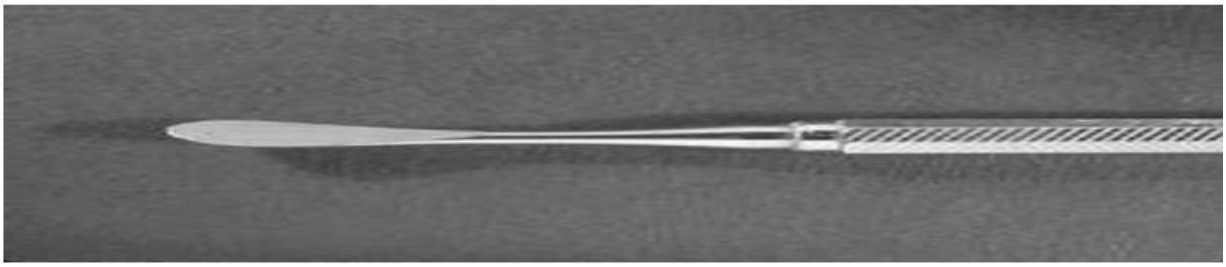
b. Interdental knives, Orban knife: These spear-shaped knives having cutting edges on both sides and are designed with either double-ended or single-ended blade. useful for excising interproximal tissue.



2. Surgical blades eg: #12D,15,11



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



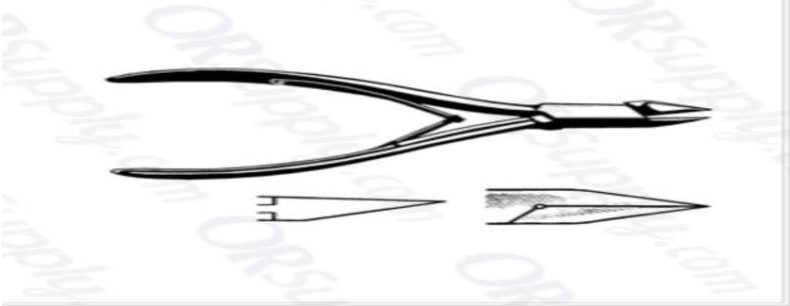
4. Tissues forceps: used to hold the flap during suturing and used to position and displace the flap after reflection.



Figure 60-12 DeBakey tissue forceps.

5. 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.

6. Surgical nippers: Serve same purpose as Scissors and they are also used for contouring the architectural form and for forming interdental sluiceways



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



Effective instrumentation is governed by a few general principles that are common to all periodontal instruments. Proper position of the patient and the operator, illumination and retraction for optimal visibility, instrument stability and sharp instruments are the fundamental pre-requisites.

INSTRUMENT STABILIZATION

Stability of the instrument and the hand is the primary requisite for controlled-instrumentation, stability and control is essential for effective instrumentation and to avoid injury to the patient or clinician.

The two factors that provide stability are, instrument grasp and finger rest.

Instrument Grasp: grasping can be divided into:

1. pen grasp: Index finger and thumb hold instrument, middle finger under instrument.usually provide less tactile sensitivity & flexibility of movement so it is not recommended during periodontal instrumentation.

2. modified pen grasp: Index finger and thumb hold instrument. Middle finger guides instrument,as it rest on the pad of middle finger so this will provide tactile sensitivity. The ring-finger acts as fulcrum/finger rest while the little finger relaxed beside ring finger.

so it is recommended for all periodontal instruments. This grasp allows precise control of the working end, permits a wide range of movements and facilitates good tactile conduction.

3. palm and thumb grasp: Fingers wrapped around handle; thumb used to stabilize instrument. The palm and thumb grasp are useful for stabilizing instruments during sharpening and for manipulating air and water syringes.

Correct grasp provides:

-Maximized stability during instrumentation.

-Minimized patient trauma and operator fatigue.

-Improved tactile sensitivity.

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 gingival and surrounding tissues. The ring finger is preferred by most clinicians for finger rest. Maximal control is achieved. When the middle finger is kept between the instrument shank and the ring finger, This built-up fulcrum is an integral part of the wrist-forearm action that activates the powerful working stroke for calculus removal. Finger rests may be generally classified as intraoral finger rests or extraoral fulcrums.



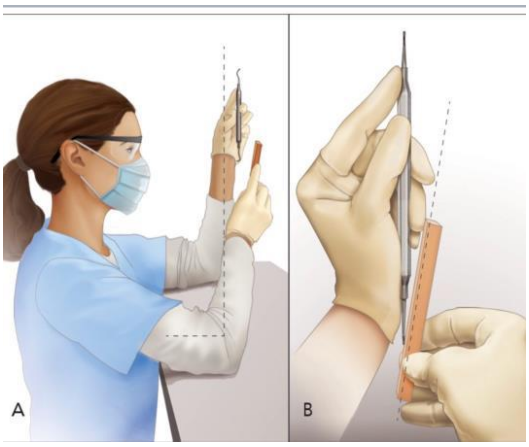
Modified pen grasp

INSTRUMENTS SHARPENING

Prior to any instrumentation, all instruments should be inspected to make sure that they are clean, sterile and in good condition. The working ends of pointed or bladed instruments must be sharp to be effective. Advantages of Sharpness:

- • Easier calculus removal
- • Improved stroke control
- • Reduced number of strokes
- • Increased patient comfort
- • Reduced clinician fatigue

Ideally, it is best to sharpen your instruments after autoclaving and then re-autoclave them prior to patient treatment. Dull instruments may lead to incomplete calculus removal and unnecessary trauma because of excess force applied. For all instruments, the instrument is held in the non-dominant hand using a palm grasp and the stone held in the dominant one.



instrument sharpening