Non-Surgical Periodontal Therapy II: Scaling and Root Planing

Presented by

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Reference

- *CARRANZA's Clinical Periodontology 11th Edition*

- *Part 6, Section III, Chapter (45)*

outline

CLASSIFICATION OF PERIODONTAL INSTRUMENTS

- Periodontal Probes , explorer
- - Scaling and Curettage Instruments
- - Cleansing and Polishing Instruments

GENERAL PRINCIPLES OF INSTRUMENTATION

- Accessibility: Positioning of Patient and Operator
- Visibility, Illumination, and Retraction
- Condition and Sharpness of Instrument
- Maintaining a Clean Field
  Instrument Stabilization
  Instrument Activation
  Instruments for Scaling and Root Planing

✓ PRINCIPLES OF SCALING AND ROOT PLANING

- Definitions and Rationale
- Detection Skills
- Supragingival Scaling Technique
- Subgingival Scaling and Root-Planing Technique

✓ INSTRUMENT SHARPENING

- Evaluation of Sharpness
- Objective of Sharpening
- Sharpening Stones
- Principles of Sharpening
- Sharpening Individual Instruments

GENERAL PRINCIPLES OF INSTRUMENTATION:

INSTRUMENT ACTIVATION

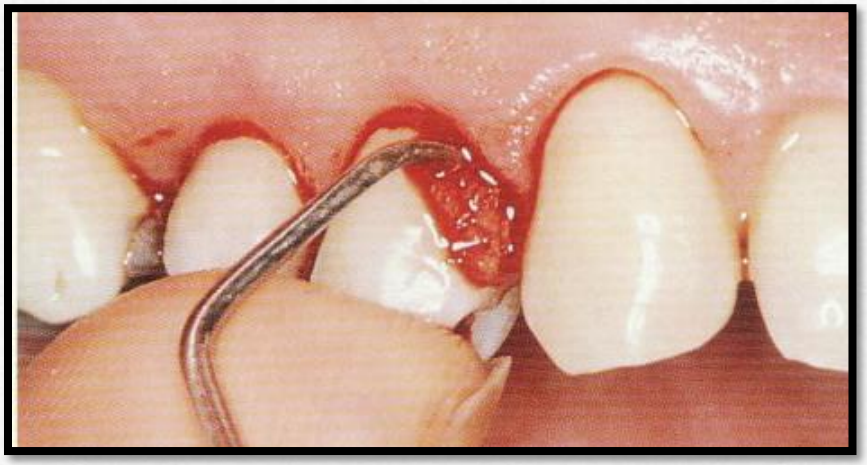
Instrument Activation

1. ADAPTATION
2. ANGULATION
3. LATERAL PRESSURE
4. STROKES

ADAPTATION

- **Def.:** The manner in which the working end of a periodontal instrument is placed against the surface of a tooth.

- **Objective:** is to make the working end of instrument conform to the contour of the tooth surface.



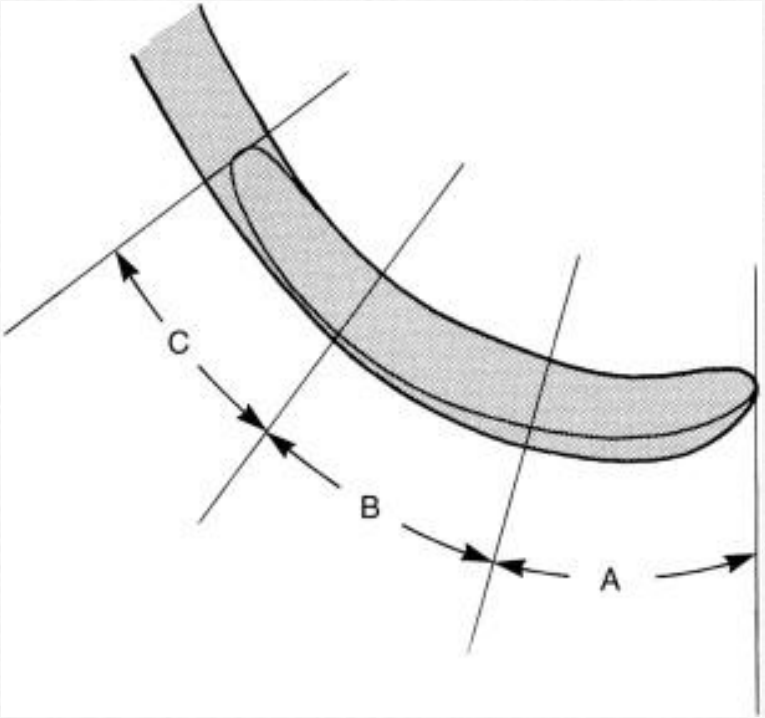
Adaptation technique

- The cutting edge has 3 sections:

A. Leading third- used more often during instrumentation

B. Middle third

C. Heel third



Adaptation technique

- Precise adaptation must be maintained with all instruments:

→ To avoid trauma to the soft tissues & root surfaces

→ To ensure maximum effectiveness of instrumentation.

Bladed instruments (such as curette) & sharp pointed instruments (explorers) are more difficult to adapt.

INSTRUMENT ANGULATION

It refers to the angle between the face of a bladed instrument & the tooth surface.

√ For insertion beneath the gingival margin → the face to tooth surface angulation should be an angle b/w 0° to 40°

√ For calculus removal → angulation should be b/w 45° to 90°

X If angulation less than 45° → cutting edge will slide over the calaulus smothening.

√ For gingival curratage → angulation greater than > 90°

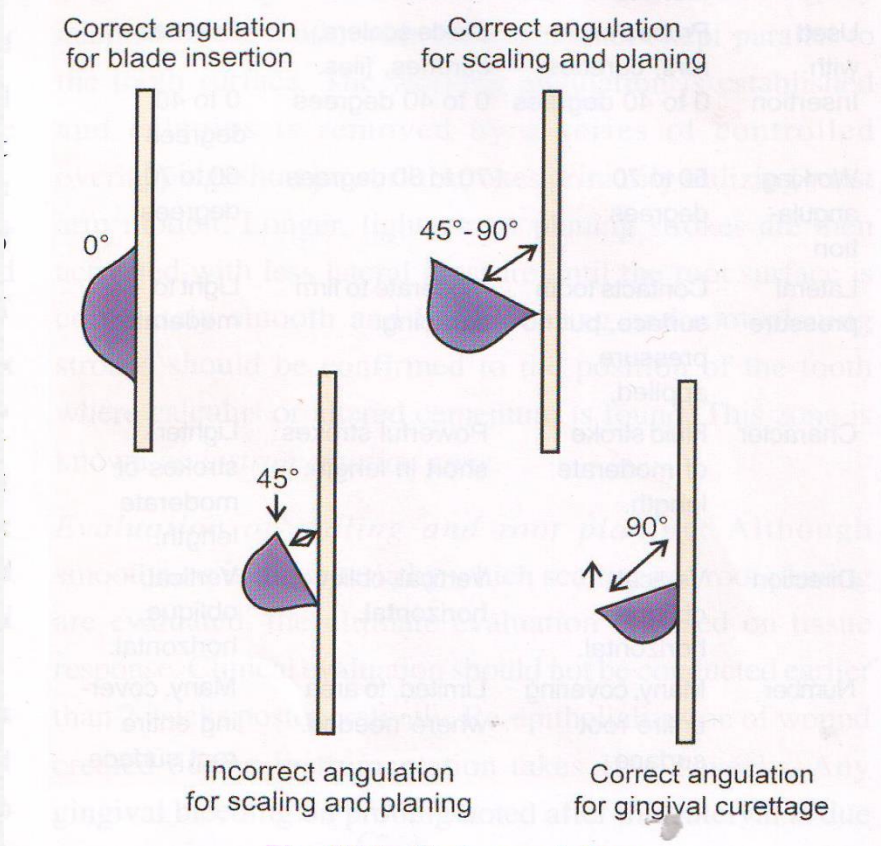


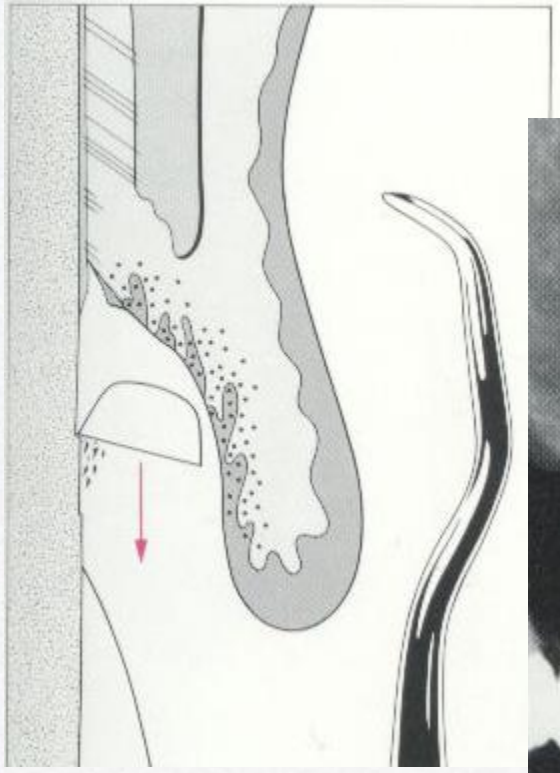
Fig. 36.5: Blade angulations

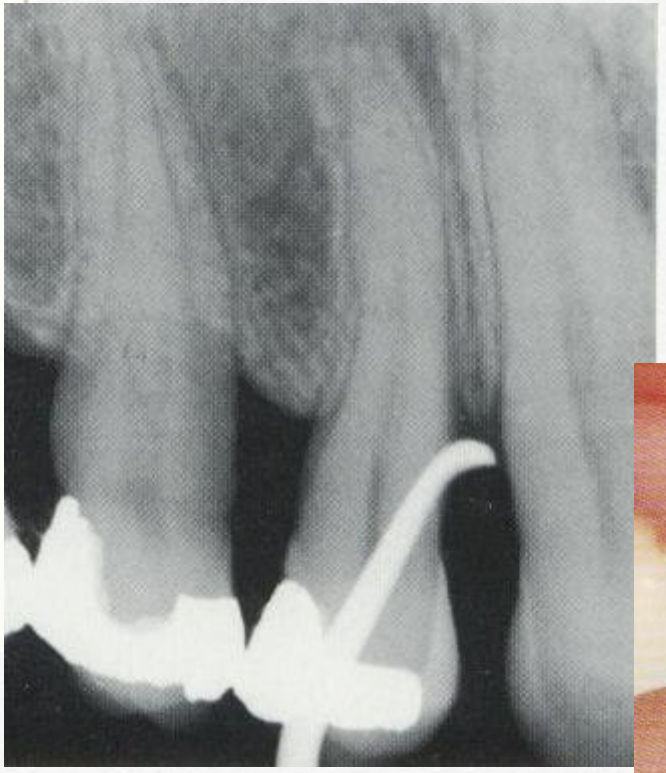
INSTRUMENT ANGULATION

The exact blade angulation depends on:

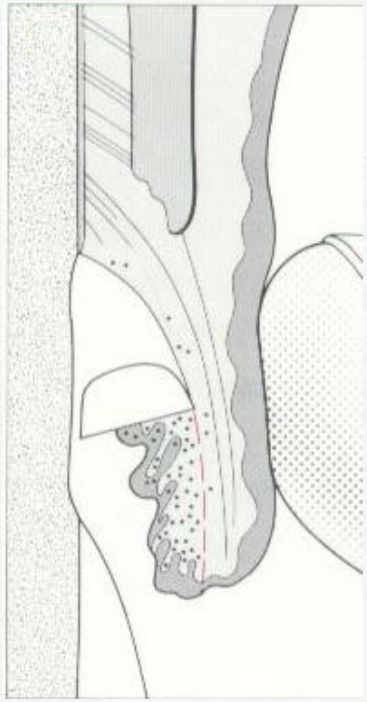
- The amount & nature of calculus.
- The procedure being performed.
- Condition of tissue during Sc & Rt planing.

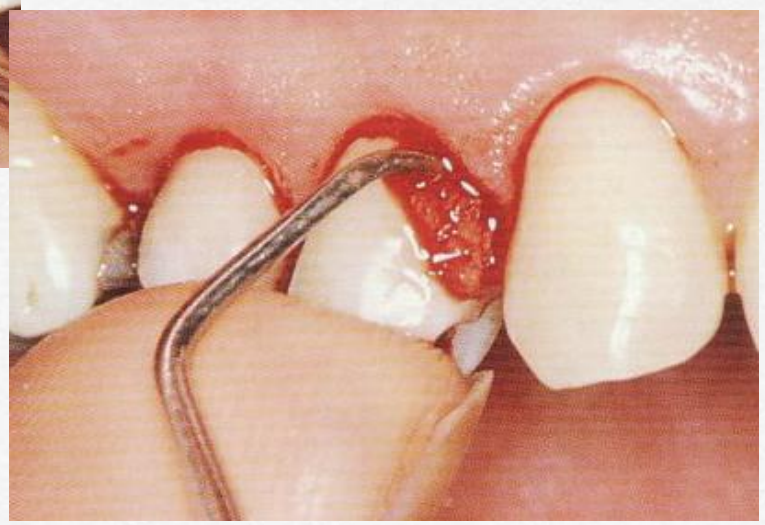
Root planing angulation





Soft tissue curettage



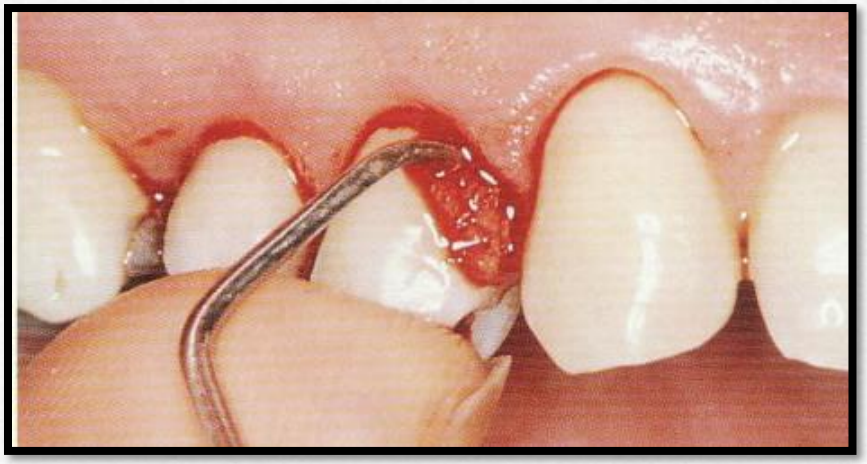


LATERAL PRESSURE

It means the pressure of the instrument against the tooth surface during activation.

It is described as :

1. **Light**
2. **Moderate**
3. **Heavy pressure**



LATERAL PRESSURE

- Repeated application of excessively heavy strokes will nick/gouge the root surface

- Careful application of varied & controlled amounts of lateral pressure during instrumentation is an integral part of effective scaling & root planing.

Strokes

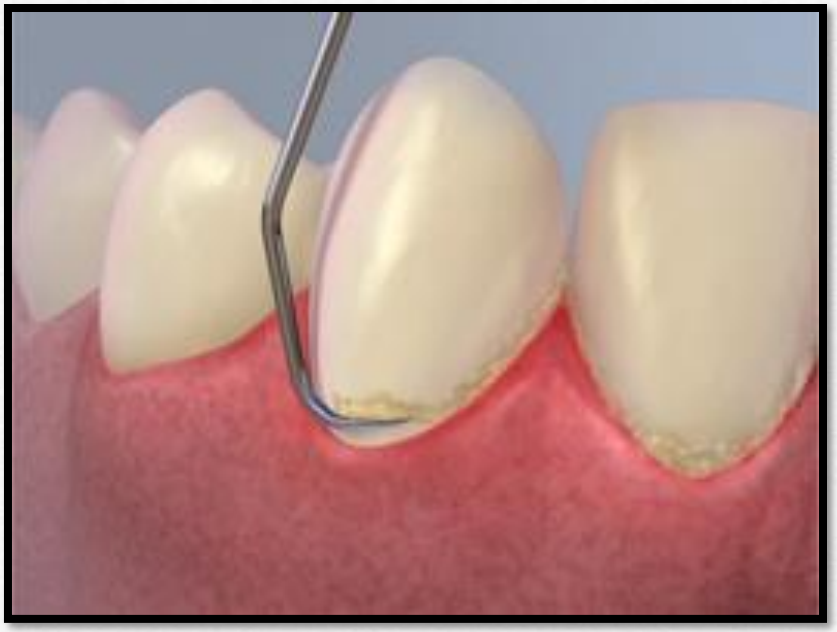
- There are 4 types of strokes:

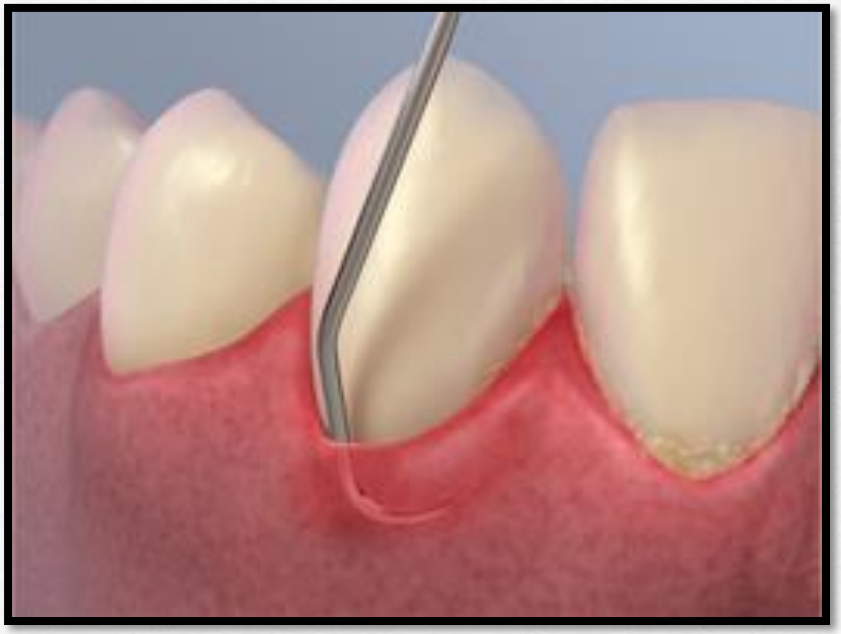
1. **Placement stroke.**
2. **Exploratory stroke / assessment stroke.**
3. **Scaling stroke.**
4. **Root planing stroke.**

Any of these basic strokes may be activated by a pull or a push motion in a vertical, oblique, or horizontal direction.

Vertical and *oblique* strokes are used most frequently.

The placement stroke is used to position the working end of an instrument apical to a calculus deposit or at base of sulcus/pocket.





CHARACTERISTICS OF STROKES

	EXPLORATRY STROKE	Scaling stroke	Root planing stroke
Purpose	- Assess tooth anatomy. - level of attachment - Detect calculus & other plaque retentive factors.	- Remove calculus deposits.	-Remove residual calculus bacterial plaque & by-products.
Used with insertion	- Probes/explorers, curettes. - 0˚ to 40˚	- Sickle scalers, curettes, files. - 0˚ to 40˚	- Curettes - 0˚ to 40˚
Working angulation	50˚ to 70˚	70˚ to 80˚	60˚ to 70˚
Lateral pressure	Contacts tooth surface, but no pressure applied.	Moderate to firm scraping.	Light to moderate.
Character	Fluid stroke of moderate length.	Powerful strokes short in length.	Lighter strokes of moderate length.
Direction	Vertical, oblique, horizontal.		
Number	Many, covering entire root surface.	Limited, to area where needed.	Many , covering entire root surface.

- **The direction, length, pressure, and number of strokes necessary for scaling or root planing are determined by 4 major factors:**

(1) Gingival position and tone

(2) Pocket depth and shape

(3) Tooth contour

(4) The amount & nature of the calculus or roughness.

Stroke Directions

Instrument strokes are initiated using a pull stroke in a coronal direction away from the junctional epithelium.

Pull strokes:

1. **Oblique**
2. **Vertical**
3. **Horizontal**

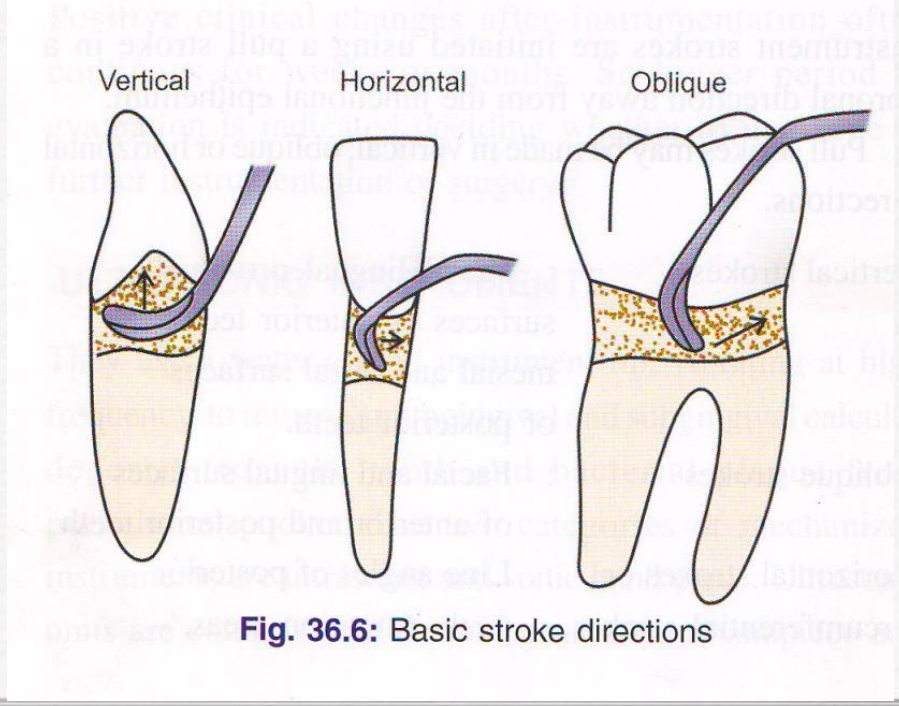


Fig. 36.6: Basic stroke directions

Stroke Directions

Vertical strokes	Facial , lingual, proximal surfaces of anterior teeth. Mesial & distal surfaces of posterior teeth.
Oblique strokes	Facial & lingual surfaces of anterior teeth.
Horizontal / circumferential strokes	Line angles of posterior teeth Furcation areas

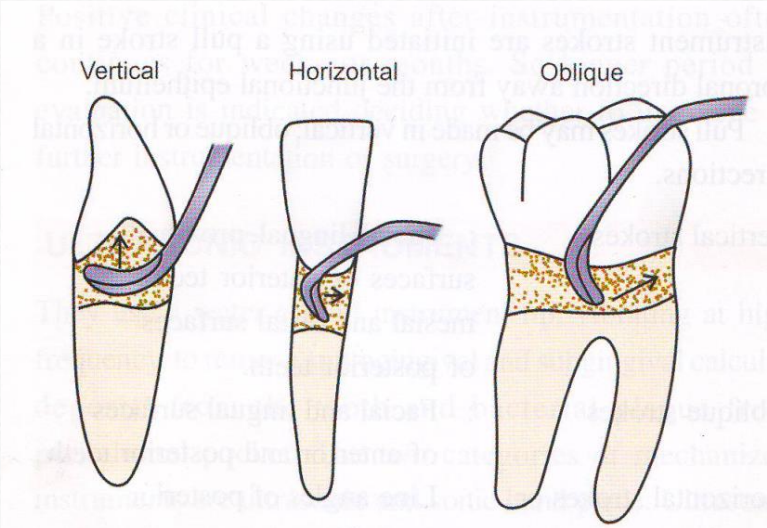


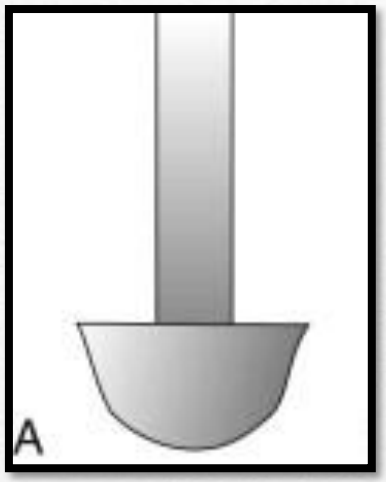
Fig. 36.6: Basic stroke directions

GENERAL PRINCIPLES OF INSTRUMENTATION:

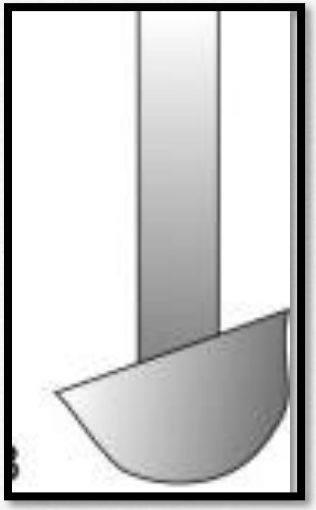
INSTRUMENTS FOR SCALING AND ROOT PLANING

Instruments for Scaling and Root Planing

- Universal Curettes

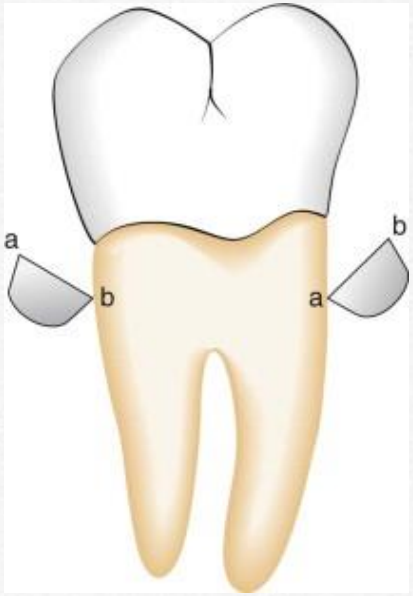


- Gracey Curettes



Universal Curettes

- The working ends of the universal curette are designed in pairs so that all surfaces of the teeth can be treated with one double-ended instrument or a matched pair of single-ended instruments.



Universal Curettes

- The primary advantage of these curettes is that they are designed to be used universally on all tooth surfaces, in all regions of the mouth.

LIMITATIONS:

- limited adaptability for the treatment of deep pockets in which apical migration of the attachment has exposed furcations, root convexities, and developmental depressions.
- For this reason, many clinicians prefer the Gracey curettes and new modifications of Gracey curettes,

Gracey Curettes

- Designed by *Dr. Clayton H. Gracey* of Michigan in the mid-1930s.

- **4 design features make Gracey curettes unique:**

(1) Area specific,

(2) only one cutting edge on each blade is used,

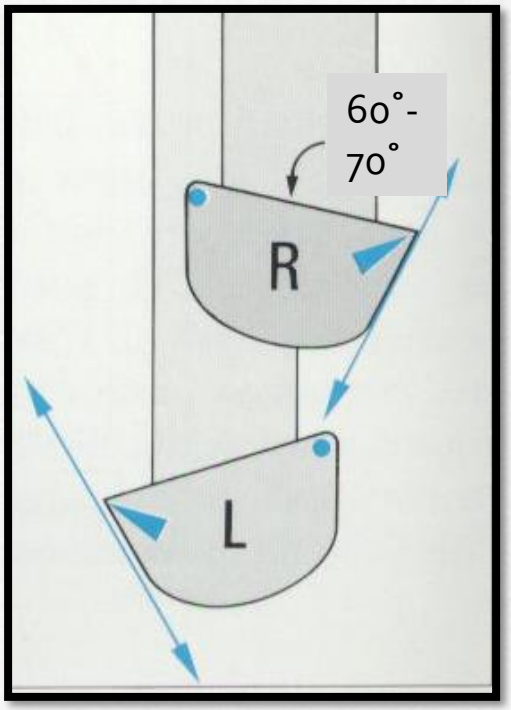
(3) Blade is curved in two planes,

(4) Blade is "offset"

Offset Blade

- It means that face of the blade is not perpendicular to the lower shank as it is on a universal curette.

- The tooth-blade working angulation is 60 to 70 degrees when the lower shank is held parallel to the tooth surface



Gracey Curettes

- **Push designed strokes** → old original design + not recommended → if used with pull strokes instead, they are likely to burnish calculus rather than completely remove it.

- **Pull designed strokes** → new current modified design → used with pull strokes → for calculus removal.

8 PRINCIPLES APPLY ONLY TO GRACEY CURETTES:

1. ***Determine the correct cutting edge*** → visually inspecting the blade & confirmed by lightly adapting the chosen cutting edge to the tooth with the lower shank parallel to the surface of the tooth.

PRINCIPLES APPLY ONLY TO GRACEY CURETTES:

2. **Make sure the *lower shank* is parallel to the surface to be instrumented.**

- (The lower shank of a Gracey curette is that portion of the shank between the blade and the first bend in the shank).

- WHY?
- Because the Parallelism of *the handle or upper shank* is not an acceptable guide with Gracey curettes because the angulations of the shanks vary.

On anterior teeth the lower shank of the **Gracey #1-2, 3-4, or 5-6** should be parallel to mesial, distal, facial, or lingual surfaces of the teeth.

On posterior teeth the lower shank of **the #7-8 or 9-10** should be parallel to the facial or lingual surfaces of the teeth.

The lower shank of the **#11-12** should be parallel to the mesial surfaces of the teeth

The lower shank of the **#13-14** should be parallel to the distal surfaces of the teeth.

PRINCIPLES APPLY ONLY TO GRACEY CURETTES:

3. When using intraoral finger rests, keep the fourth and middle fingers together in a built-up fulcrum for maximum control and wrist-arm action.

4. Use extraoral fulcrums or mandibular finger rests for optimal angulation when working on the maxillary posterior teeth.

PRINCIPLES APPLY ONLY TO GRACEY CURETTES:

5. Concentrate on using the lower third of the cutting edge for calculus removal, especially on line angles or when attempting to remove a calculus ledge by breaking it away in sections, beginning at the lateral edge.

6. Allow the wrist and forearm to carry the burden of the stroke, rather than flexing the fingers.

PRINCIPLES APPLY ONLY TO GRACEY CURETTES:

7. Roll the handle slightly between the thumb and fingers to keep the blade adapted as the working end is advanced around line angles and into concavities.

8. Modulate lateral pressure from firm to moderate to light depending on the nature of the calculus, and reduce pressure as the transition is made from scaling to root-planing strokes.

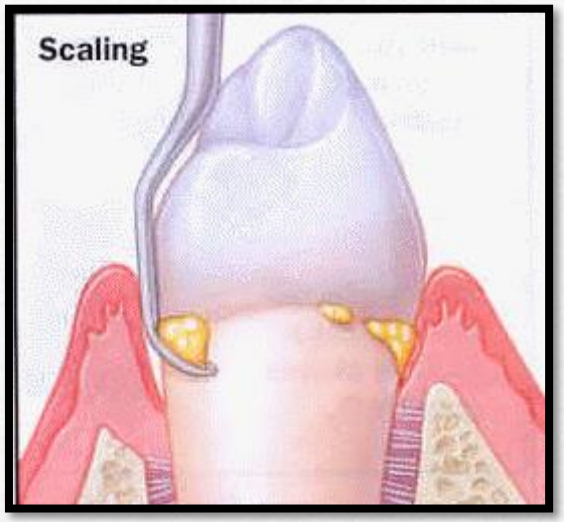
PRINCIPLES OF SCALING AND ROOT PLANING

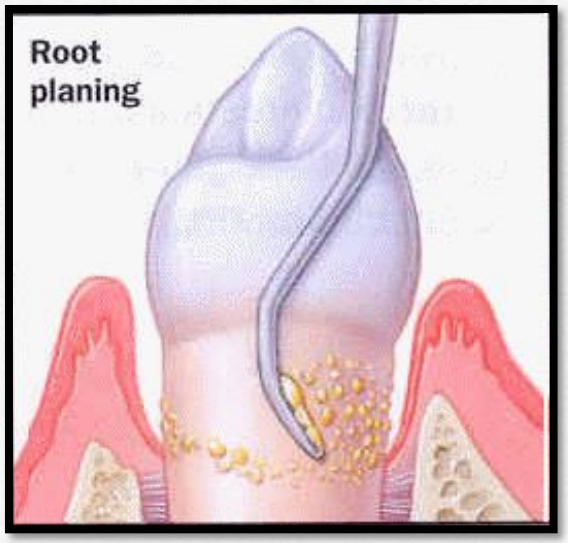
- DEFINITIONS AND RATIONALE
- DETECTION SKILLS
- SUPRAGINGIVAL SCALING TECHNIQUE
- SUBGINGIVAL SCALING AND ROOT-PLANING TECHNIQUE
- EVALUATION

Definitions and Rationale

SCALING: The process by which biofilm and calculus are removed from both supragingival and subgingival tooth surfaces.

ROOT PLANING: the process by which residual embedded calculus and portions of diseased cementum are removed from the roots to produce a smooth, hard, clean surface.





Rationale

- The primary objectives of scaling and root planing is to restore gingival health by completely removing elements that provoke gingival inflammation (i.e., biofilm, calculus, and endotoxin) from the tooth surface.

- Also arrest the progression of further periodontal disease destruction.

Evidance based studies in periodontal instrumentation

- Instrumentation has been shown to reduce dramatically the numbers of subgingival microorganisms and produce a shift in the composition of subgingival biofilm from one with high numbers of gram-negative anaerobes to one dominated by gram-positive facultative bacteria compatible with health.

- The critical probing depth for scaling and root planing is **2.9 mm ± 0.4** and for periodontal surgery is 4.2 mm ± 0.2.

(Lindhe et al .1982)

- Scaling and root planing did not result in total removal of subgingival calculus particularly in deep pockets.

(Rabbani et al .1981)

- Scaling and Root planning are not separate procedure, however they are different .

- All principles of scaling apply equally to Root planning, the difference between scaling and Root planning is only a matter of degree .

Why scaling is sufficient in supragingival deposits (enamel)?

- When biofilm and calculus form on enamel, the deposits are usually superficially attached to the surface and are not locked into irregularities.

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

Why scaling is insufficient in removing deposits in root 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.

Scaling & root planing Detection Skills

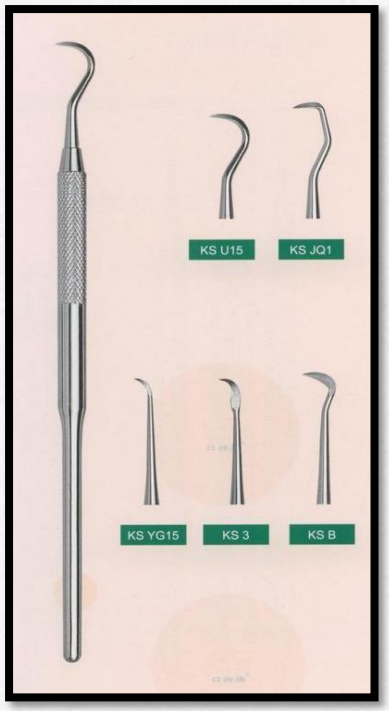
- **1- visual examination**

2- **tactile exploration fine.**
pointed explorer or probe +
Light exploratory strokes

Supragingival Scaling Technique

- *Supragingival calculus* is generally less tenacious and less calcified than subgingival calculus. scaling strokes are not confined by the surrounding tissues.

- Sickles ,curettes ,and ultrasonic and sonic instrument are most commonly used for removal of supragingival calculus .



Supragingival Scaling Technique

- Sickle or curette is held with a modified pen grasp, and a firm finger rest is established on the teeth adjacent to the working area.
- The blade is adapted with an angulation of slightly less than 90˚ to the surface being scaled.
- The cutting edge should engage the apical margin of the supragingival calculus while short, powerful, overlapping scaling strokes are activated coronally in a vertical or an oblique direction.

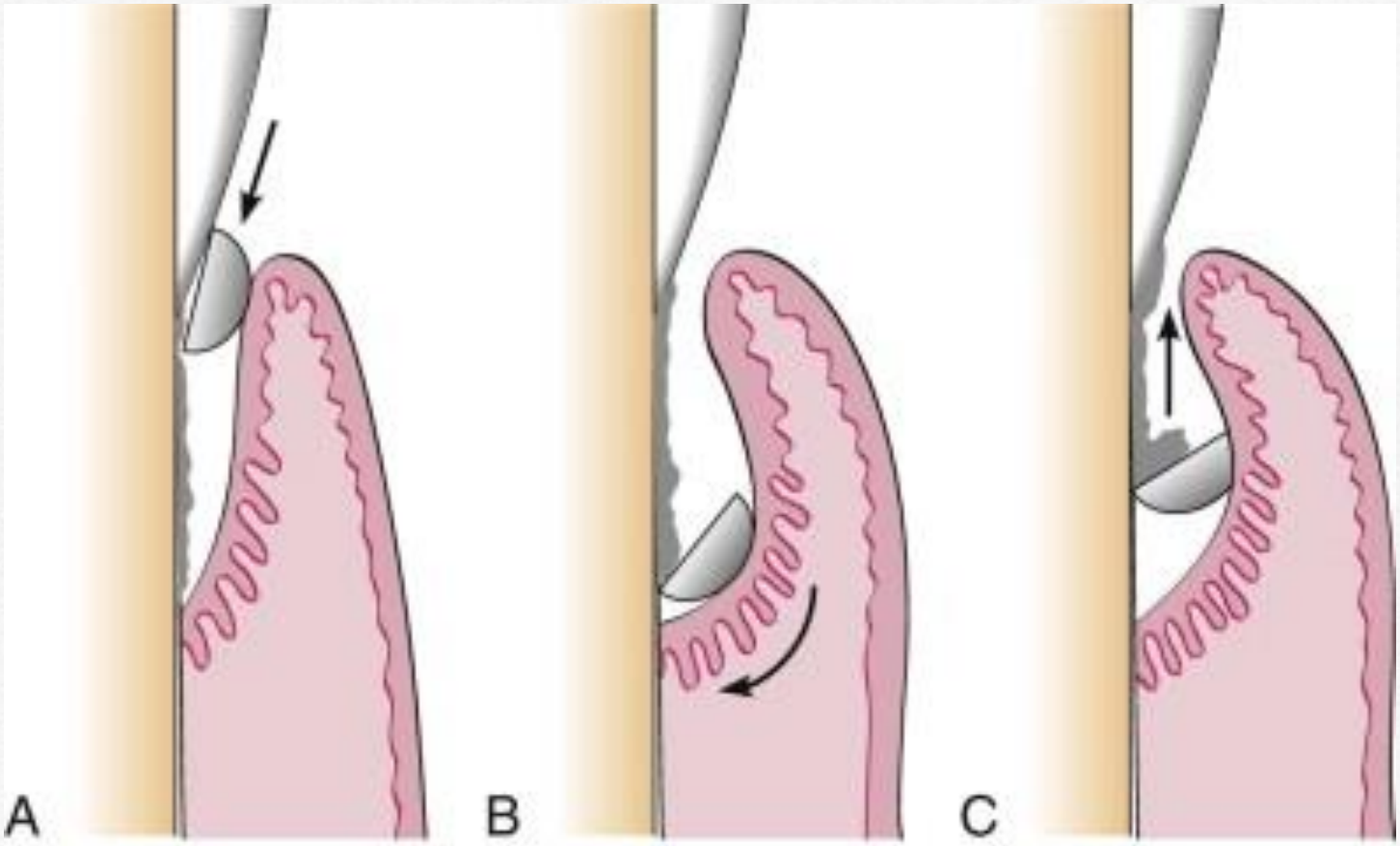
Subgingival Scaling and Root-Planing Technique

- *Subgingival calculus* is usually harder than supragingival calculus and is often locked into root irregularities, making it more tenacious
- The curette is preferred by most clinicians because of the advantages afforded by its design.
- The direction & length of the strokes are limited by adjacent pocket wall.
- Hoes, files, and standard large ultrasonic tips are all more hazardous than the curette in terms of trauma to the root surface and surrounding tissues.

Subgingival Scaling and Root-Planing Technique

- The curette is held with a modified pen grasp, and a stable finger rest is established.
- The correct cutting edge is slightly adapted to the tooth, with the lower shank kept parallel to the tooth surface.
- The lower shank is moved toward the tooth so that the face of the blade is nearly flush with the tooth surface.
- The blade is then inserted under the gingiva and advanced to the base of the pocket by a light exploratory stroke.
- When the cutting edge reaches the base of the pocket, a working angulation of between 45 and 90 degrees is established, and pressure is applied laterally against the tooth surface.
- Calculus is removed by a series of controlled, overlapping, short, powerful strokes primarily using wrist-arm motion

Root planing technique



- Longer, lighter root-planing strokes are then activated with less lateral pressure until the root surface is completely smooth and hard.

- 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.***

- Sweeping the instrument over the crown where it is not needed wastes operating time, dulls the instrument, and causes loss of control.

Go back to your manual for Various approaches to instrumentation in different areas of the mouth

(each sextant)

Evaluation of scaling & root planing

- Although smoothness is the criterion by which scaling and root planing are immediately evaluated, the ultimate evaluation is based on ***tissue response.***

- Clinical evaluation of the soft tissue response to scaling and root planing, including probing, should not be conducted earlier than 2 weeks postoperatively.

- Reepithelialization of the wounds created during instrumentation takes **1 to 2 weeks**.

Before

Gingivitis

After

- Any gingival bleeding on probing noted after this interval is more likely the result of persistent inflammation produced by residual deposits not removed during the initial procedure or inadequate plaque control.

- Positive clinical changes after instrumentation often continue for weeks or months.

- So longer period of evaluation may be indicated before deciding whether to intervene with further instrumentation or surgery

Limitation of scaling & root planing

- Meticulous and requires more experienced operator .
- Time consuming(×2the time needed fo surgery)
- Less predictable in deep pockets ,furcations and interproximal groove.
- Ineffective as mono therapy in the treatment of aggressive periodontitis .

Limitation of scaling & root planing

- Might cause dentine hypersensitivity .
- Increased the risk of disease transmission (aerosol of the powered instruments).
- Powered may interfere with pacemakers .
- Patient discomfort .
- Cost effectiveness .

INSTRUMENT SHARPENING

- EVALUATION OF SHARPNESS
  - OBJECTIVE OF SHARPENING
  - SHARPENING STONES
- PRINCIPLES OF SHARPENING
- SHARPENING INDIVIDUAL INSTRUMENTS

Instrument Sharpening

- Prior to any instrumentation, all instruments should be inspected to make sure that they are clean, sterile & in good condition.

- The working end of pointed or bladed instruments must be sharp to be effective.

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, has no surface area to reflect 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 and raising a light shaving as a sharp instrument would.

Objective of Sharpening

- To restore the fine, thin, linear cutting edge of the instrument
- without distorting the original angles of the instrument → ineffective

Advantages of Sharpness

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

Sharpening Stones

- A flat India stone
- a flat Arkansas stone
- a cone-shaped Arkansas stone
- a ceramic stone

Principles of Sharpening

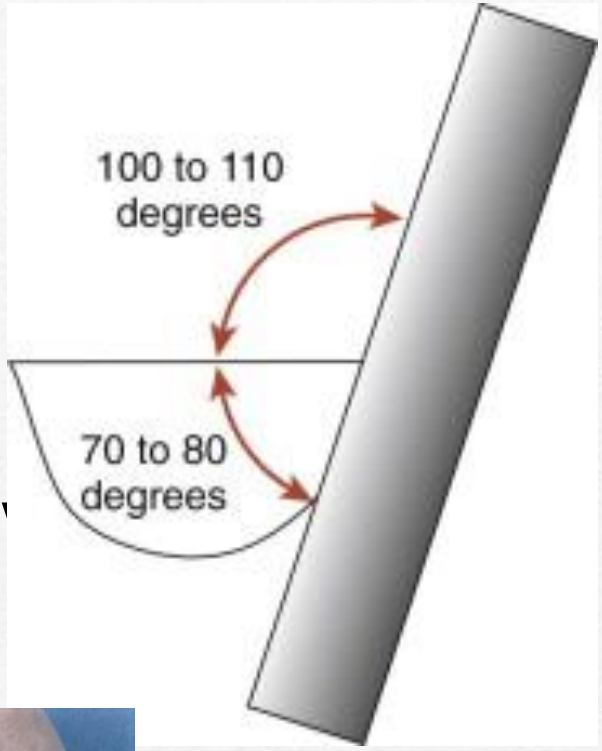
- Choose a stone suitable for the instrument to be sharpened—one that is of an appropriate shape and abrasiveness.
- Use a sterilized sharpening stone if the instrument to be sharpened will not be resterilized before it is used on a patient.
- Establish the proper angle between the sharpening stone and the surface of the instrument on the basis of an understanding of its design
- Maintain a stable, firm grasp of both the instrument and the sharpening stone. This ensures that the proper angulation is maintained throughout the controlled sharpening stroke.

Principles of Sharpening

- Avoid excessive pressure. Heavy pressure causes the stone to grind the surface of the instrument more quickly and may shorten the instrument's life unnecessarily.
- Avoid the formation of a "wire edge," characterized by minute filamentous projections of metal extending as a roughened ledge from the sharpened cutting edge.
- Lubricate the stone during sharpening.
- Sharpen instruments at the first sign of dullness.

Sharpening Individual Instruments

- **Universal Curettes**



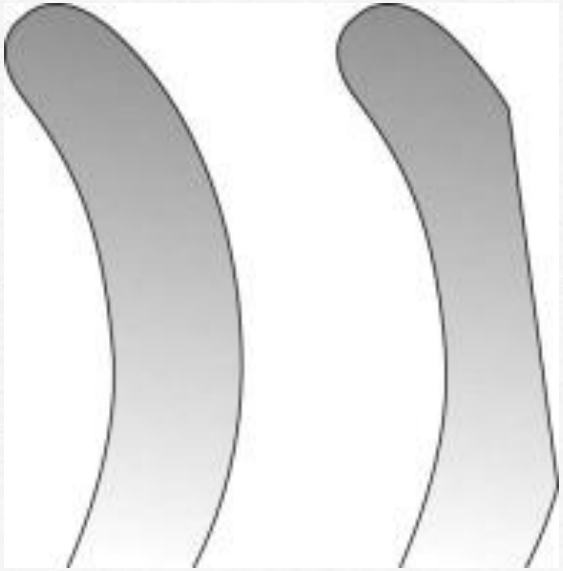
- the angle between the face of the blade and the surface of the stone be 100 to 110 degrees

- **One plane only**

Area-Specific (Gracey) Curettes sharpening

- Hold the curette so that the face of the blade is parallel with the floor.
- Identify the edge to be sharpened. Apply the stone to the lateral surface so that the angle between the face of the blade and the stone is 100 to 110 degrees.
- Activate short, up-and-down strokes, working from the shank end of the blade to the curved toe. Finish with a down stroke.
- Remember that the cutting edge is curved. Preserve the curve by turning the stone while sharpening from shank to toe. If the stone is kept in one place for too many strokes, the blade will be flattened

Two planes



Read it from the chapter online

THANK YOU

ANY QUESTIONS?