



Non-Surgical Periodontal Therapy II: Scaling and Root Planning

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Reference

- **CARRANZA's Clinical Periodontology 12th Edition**

- **Part 2, Section IV Chapter (44)**

outline

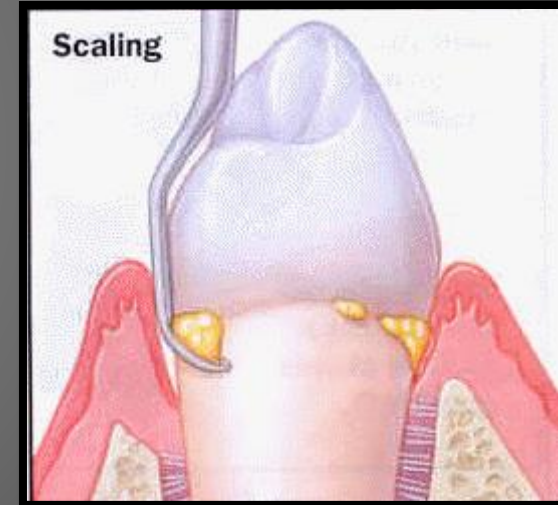
- **Principles of Scaling and Root Planing (*e-only*)**
- **Classification of Periodontal Instruments**
- **General Principles of Instrumentation (*e-only*)**
- **Instrument Sharpening (*e-only*)**



**PRINCIPLES OF
SCALING AND
ROOT PLANING**

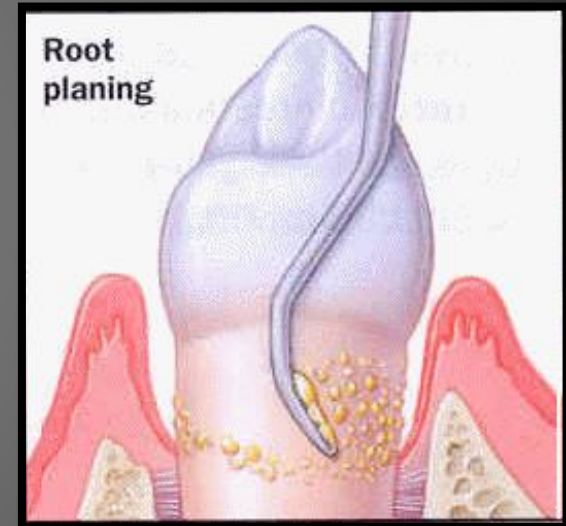
Definitions and Rationale

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



Definitions and Rationale

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 planning is to**
 - **Restore gingival health**
 - **Arrest the progression of periodontal disease.**

Rationale

- **This is achieved by completely removing elements that provoke gingival inflammation (i.e., biofilm, calculus, and endotoxin) from the tooth surface.**

- **Scaling alone is sufficient for the enamel, but not dentin or cementum**

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**,

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.**

Why scaling is insufficient in removing deposits in root surface?

- **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.**

Evidence based studies in periodontal instrumentation

- Instrumentation has been shown to
 - **Reduce** the numbers of subgingival microorganisms
 - Produce a shift in the composition of subgingival biofilm (from **gram-negative anaerobes** to **gram-positive facultative bacteria compatible with health**).

The critical probing depth for

- **Scaling and root planning is 2.9 mm ± 0.4**
- **Periodontal surgery is 4.2 mm ± 0.2.**

(Lindhe et al .1982)

- **Scaling and root planning did not result in total removal of subgingival calculus particularly in deep pockets (>5mm).**

(Rabbani et al .1981)



Instruments for Scaling and Root Planning

Periodontal instruments

Periodontal Instruments classification

Periodontal
probes

Explorers

Scaling, root-
planing,
& curettage
instruments

Periodontal
endoscope

Cleansing and
polishing
instruments

*Sickle
scalars*

Curettes

*Hoe, chisel,
and file
scalars*

*Ultrasonic
and sonic
instruments*

Scaling and Root Planning Instruments

- **Sickle scalers**
- **Curettes**
- **Hoe, chisel and file scalers**
- **Ultrasonic and sonic scalers**



Hand instruments

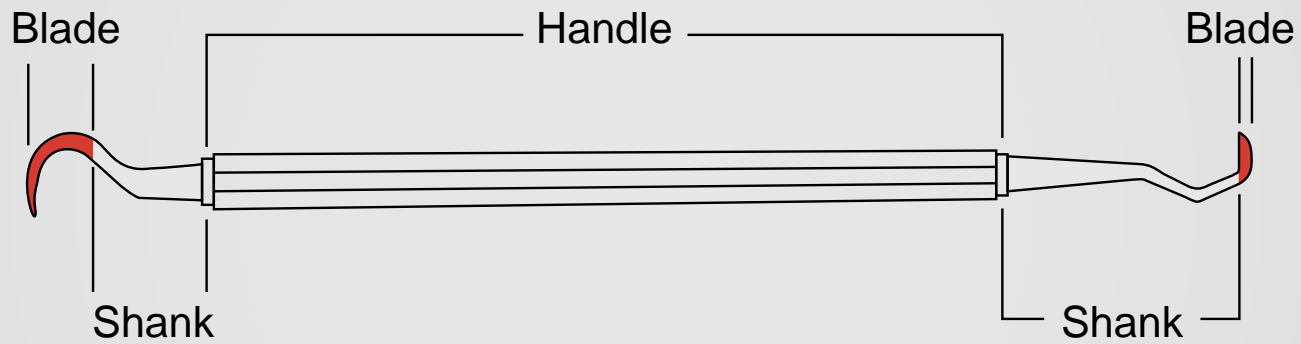


Figure 45-1 Parts of a typical periodontal instrument.

Adaptation technique

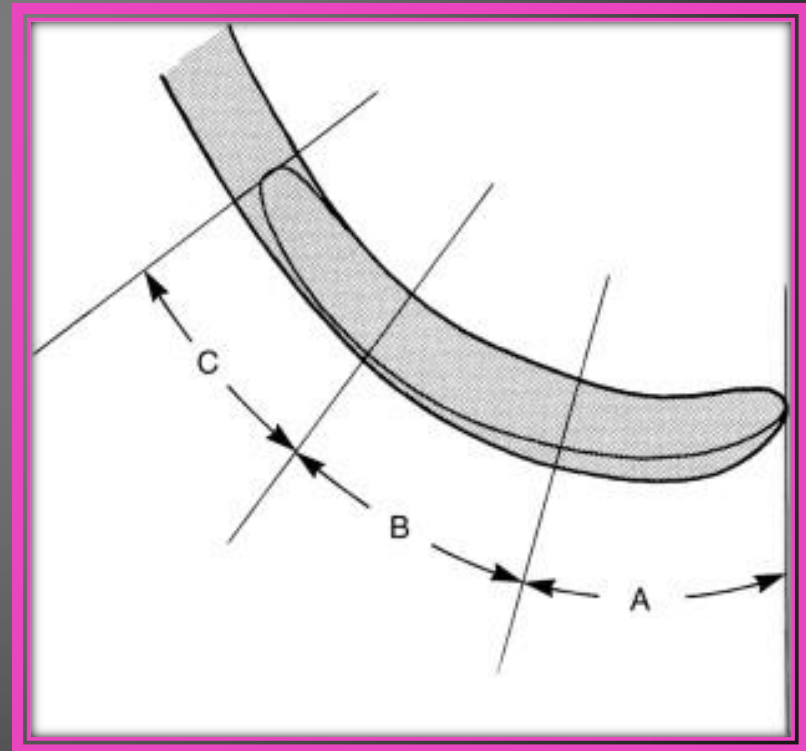
- The cutting edge has 3 sections:

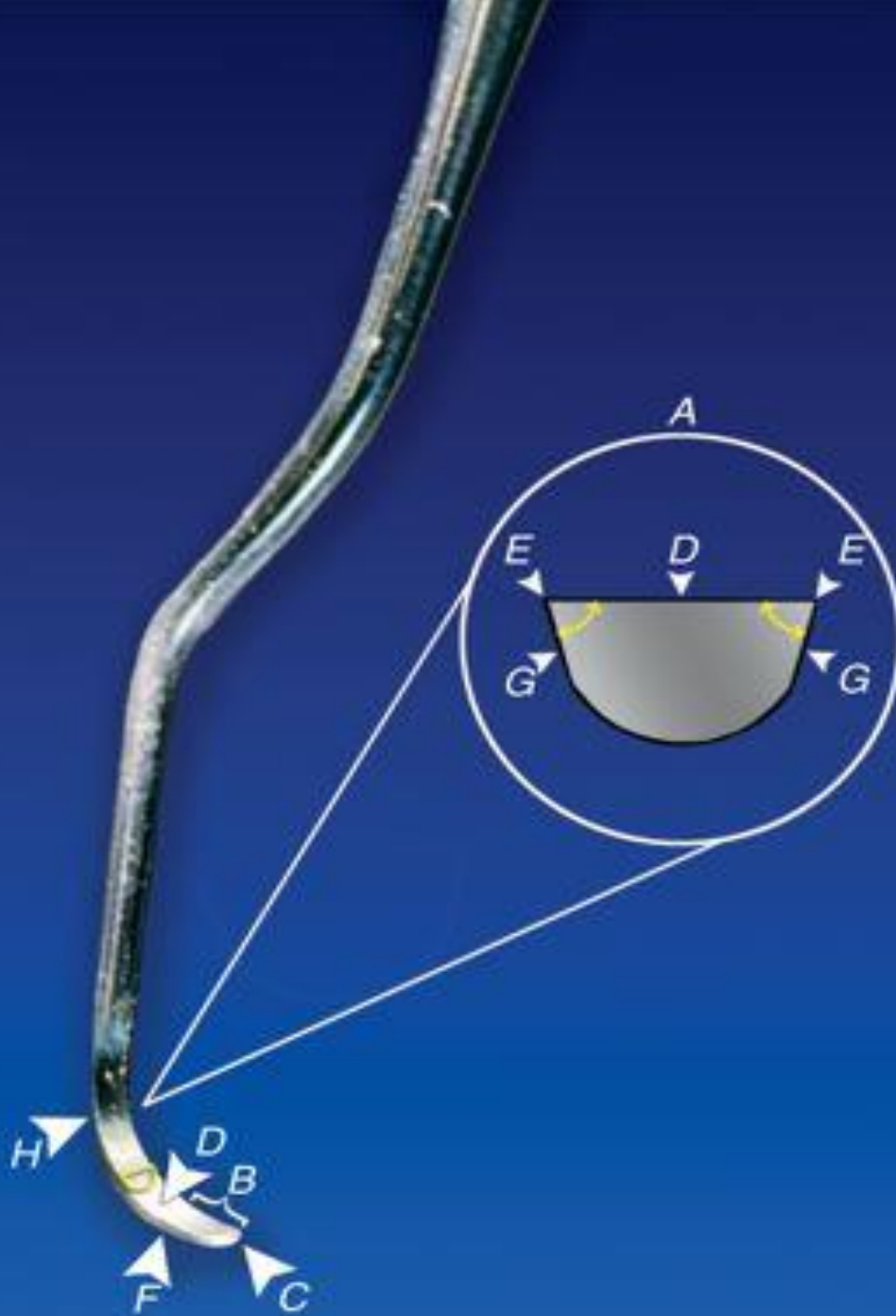
- **Leading third – (toe)**

(used more often during instrumentation)

- **Middle third**

- **Heel third**







Scalers



Figure 45-11 Both ends of a U15/30 scaler.

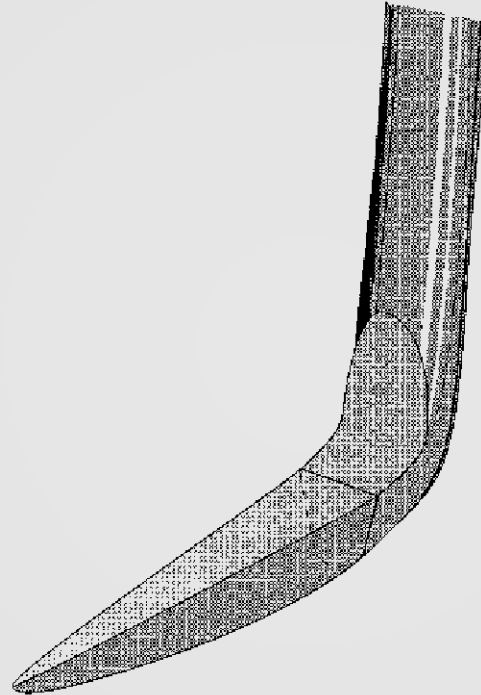
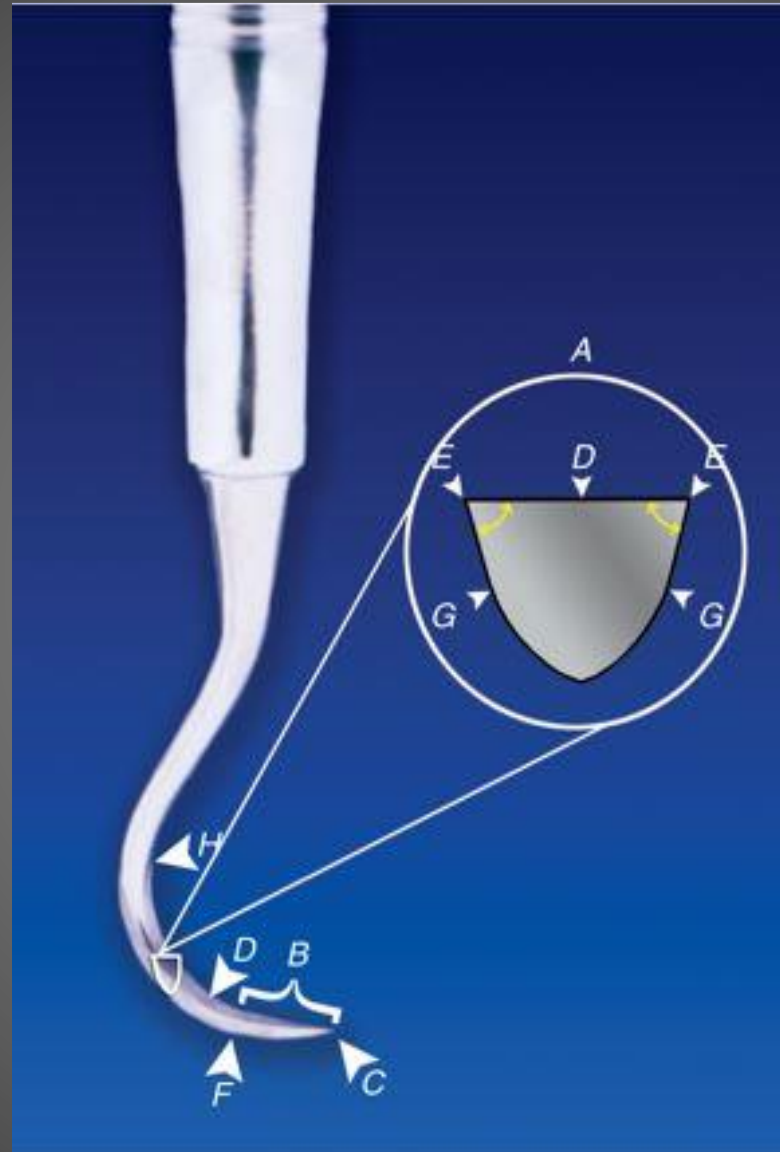
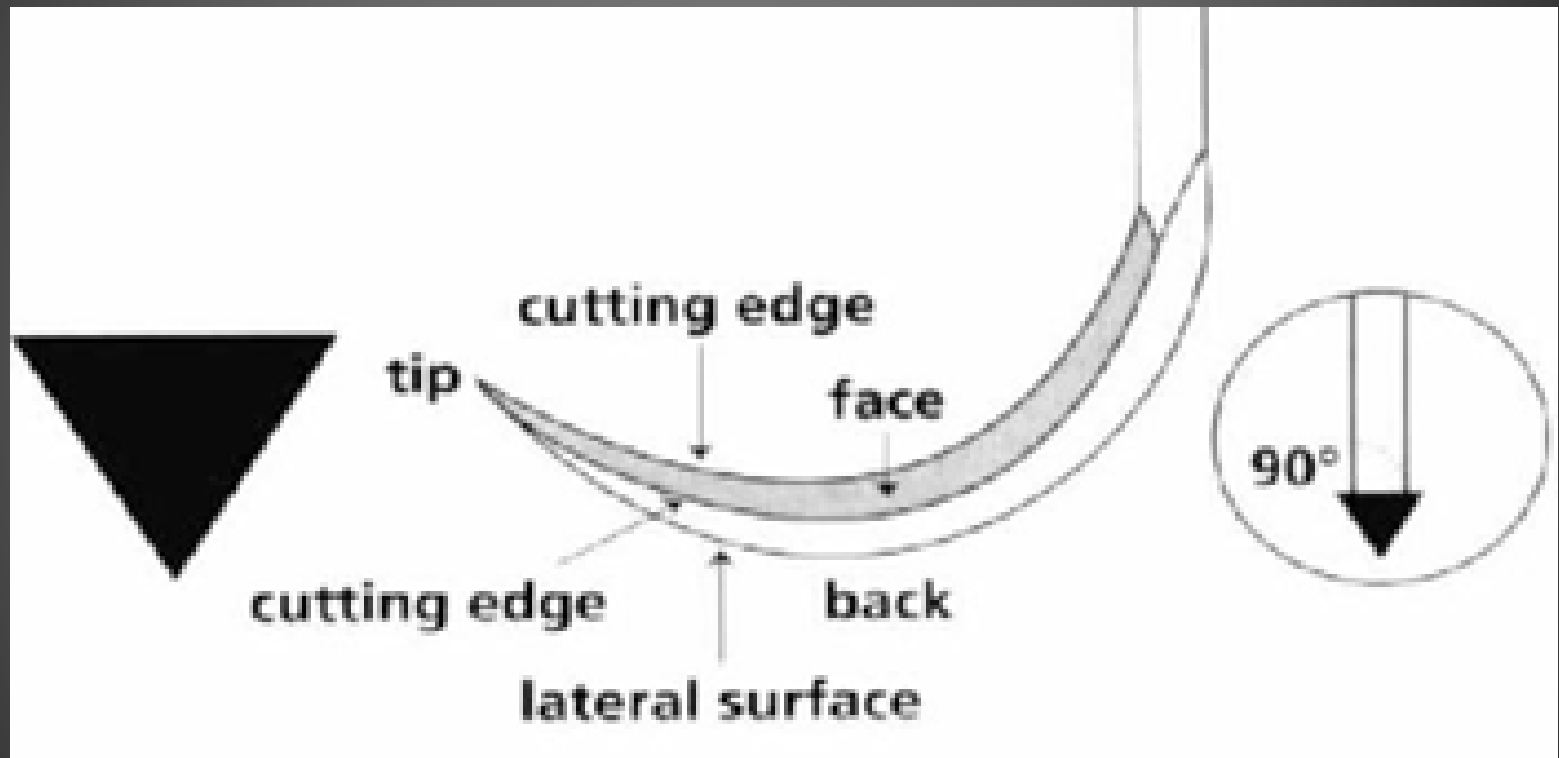



Figure 45-8 Basic characteristics of a sickle scaler: triangular shape, double-cutting edge, and pointed tip.





Sickle Scalers(Supragingival Scalers)

- **2 cutting edges**
- **Straight flat surface**
- **Sharply pointed tip**
- **Blades may damage the tissue subgingivally**
- ➔ **Used: To remove supra-gingival calculus**



Curettes

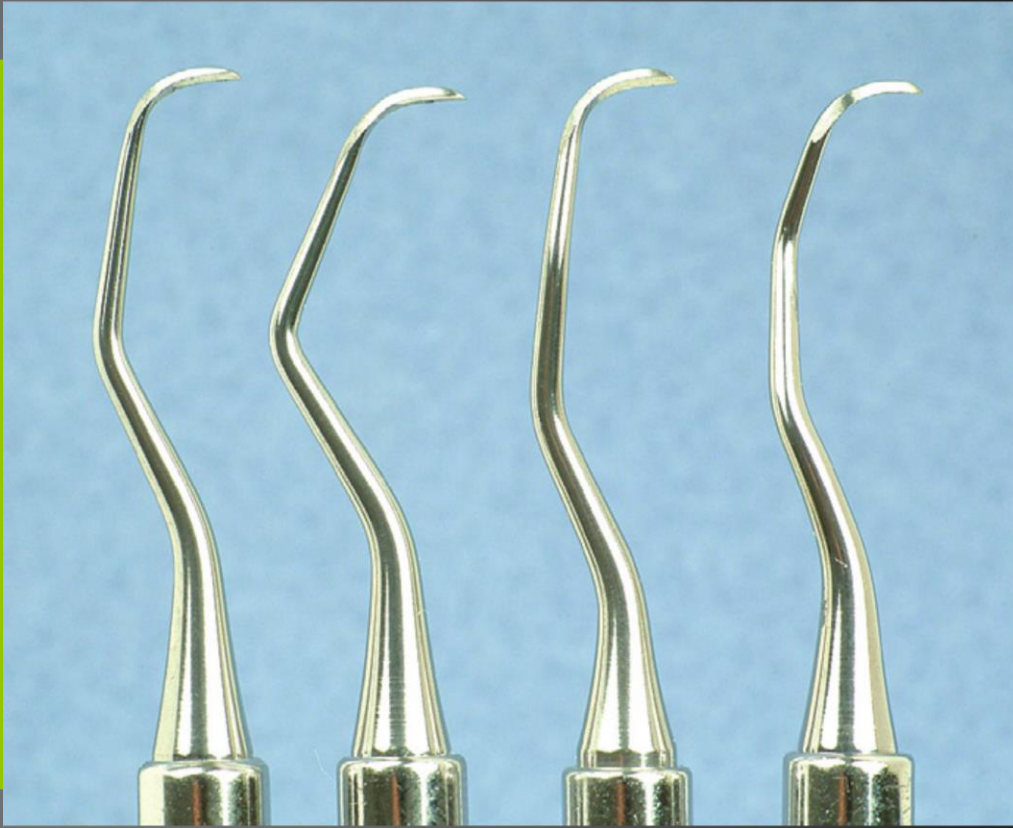


Figure 45-18 Reduced set of Gracey curettes. *Left to right, #5-6, #7-8, #9-10, #11-12, and #13-14.*

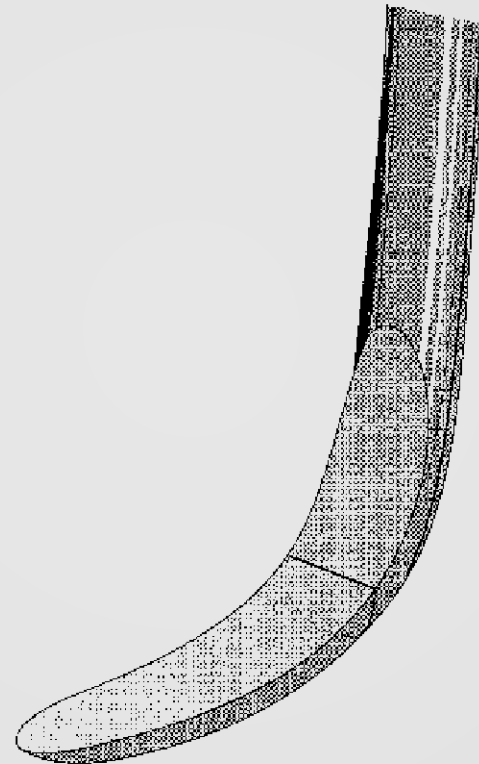
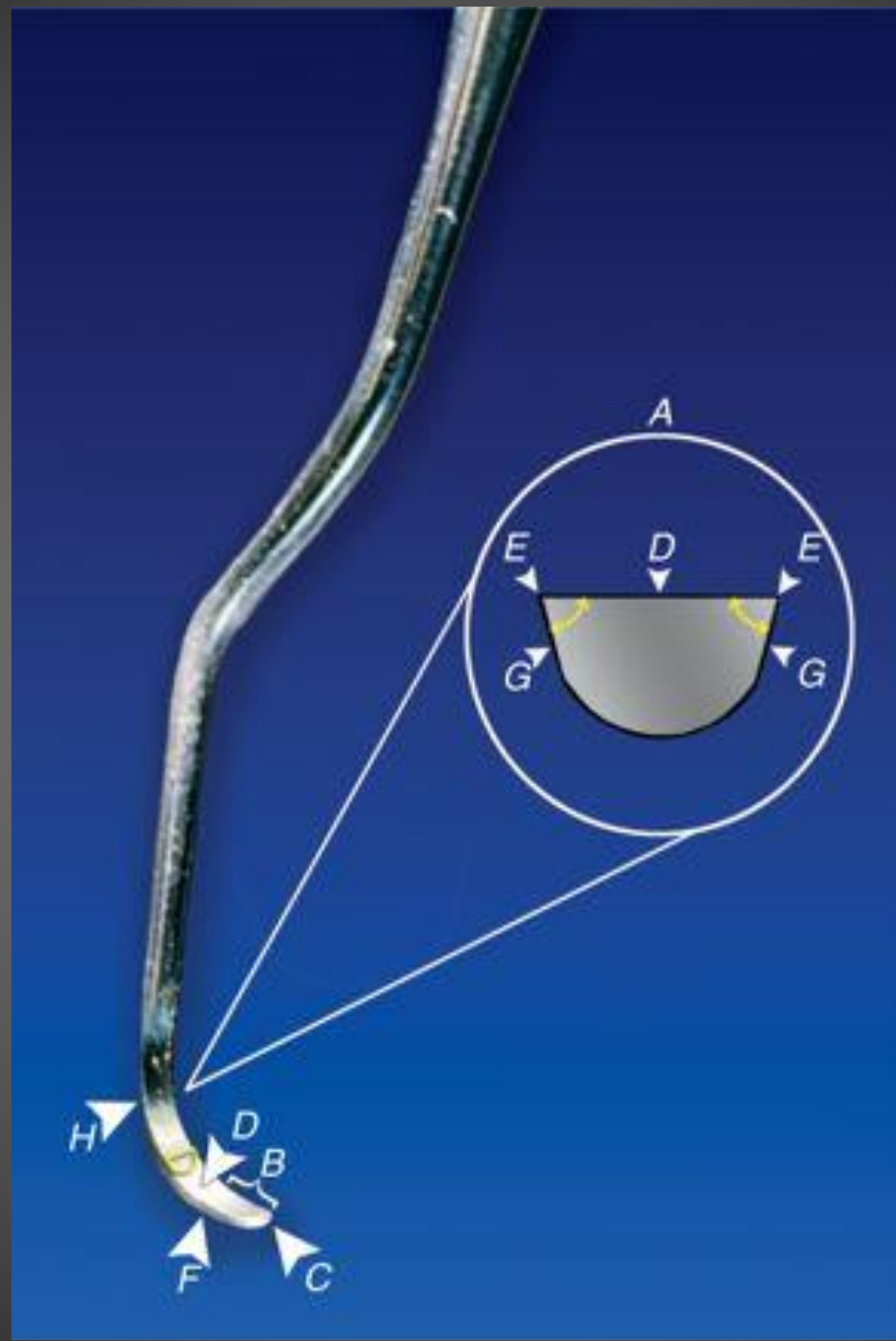
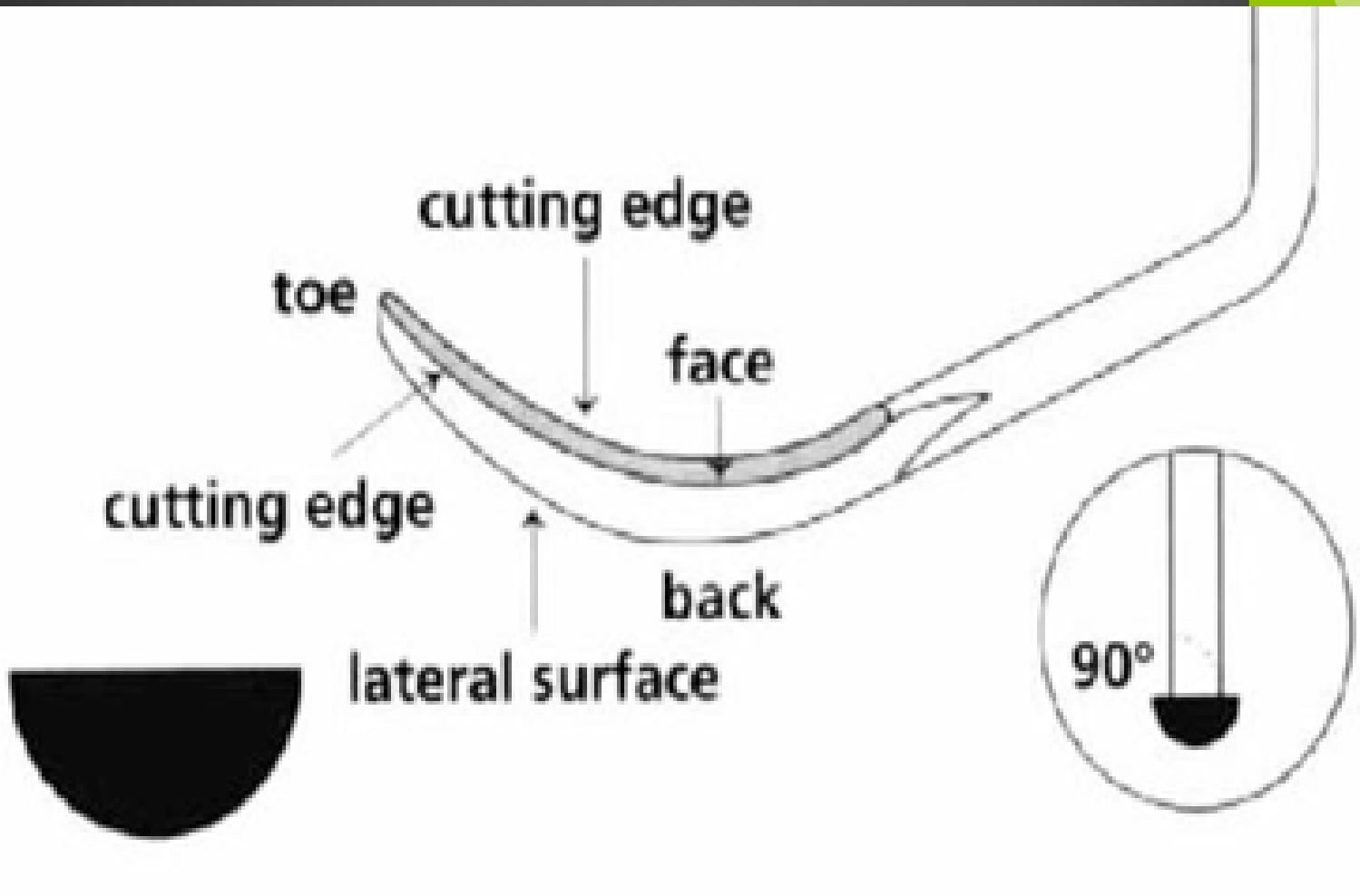


Figure 45-14 Basic characteristics of a curette: spoon-shaped blade and rounded tip.





Curettes

- **Semicircular cross section with a convex base**
- **Rounded tip**

Curettes

- **Used to remove subgingival calculus, root planning altered cementum, and removing soft tissue lining pockets**

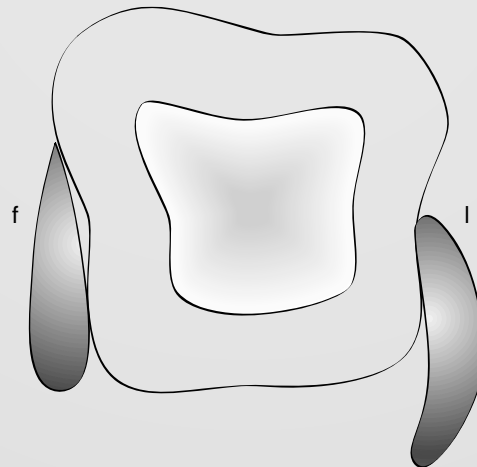
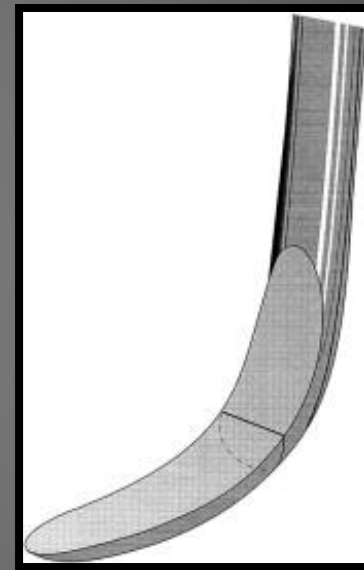
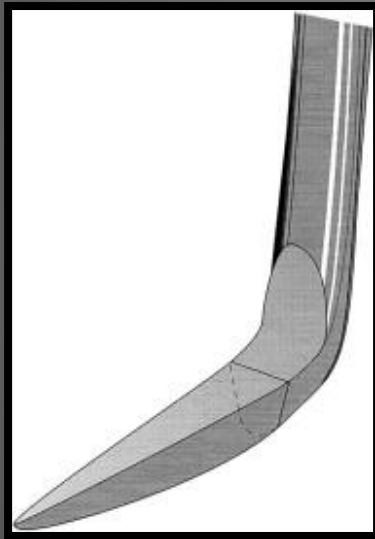


Figure 45-10 Subgingival adaptation around the root is better with the curette than with the sickle; f, facial; l, lingual.

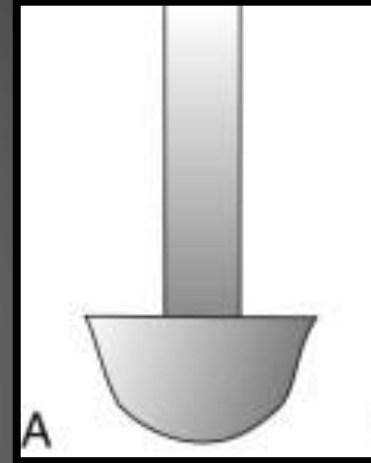
Difference b/w Sickle scalers & Curettes



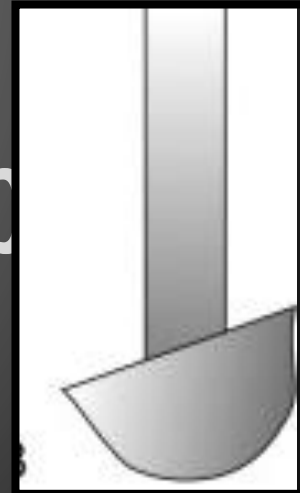
curved blade and rounded toe of the curette allow the blade to adapt better to the root surface, unlike the straight design and pointed end of a sickle scaler, which can cause tissue laceration and trauma

Instruments for Scaling and Root Planning

- **Universal Curettes**



- **Area specific (Gracey Curettes)**



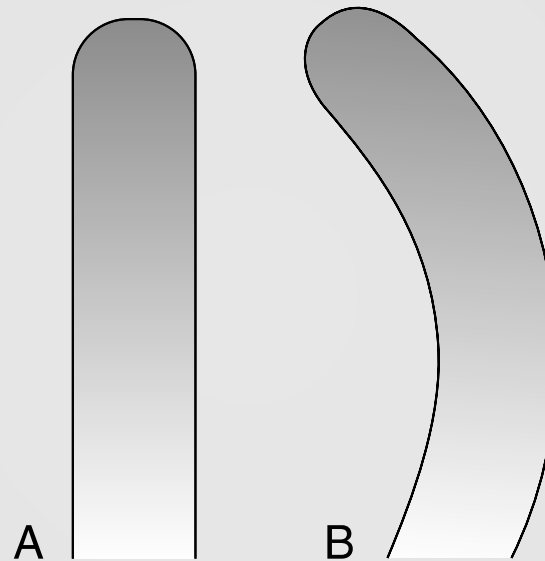
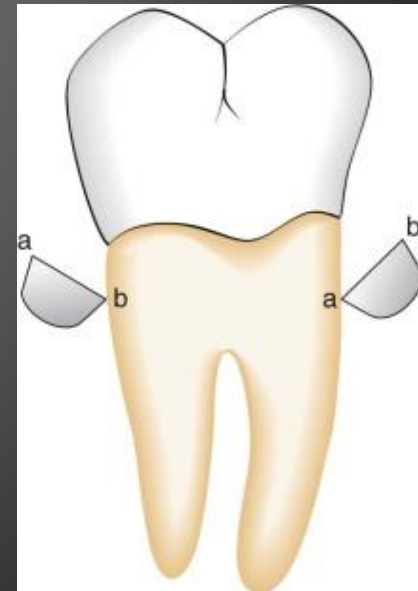


Figure 45-21 **A**, Universal curette as seen from the blade. Note that the blade is straight. **B**, Gracey curette as seen from the blade. The blade is curved; only the convex cutting edge is used.

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 face of the blade is at a **90-degree angle** to the lower shank (perpendicular)
- The blade is curved in **one direction** from the head to the toe
- Used in **most areas** by altering finger rest, fulcrum, and operators hand position

Universal Curettes

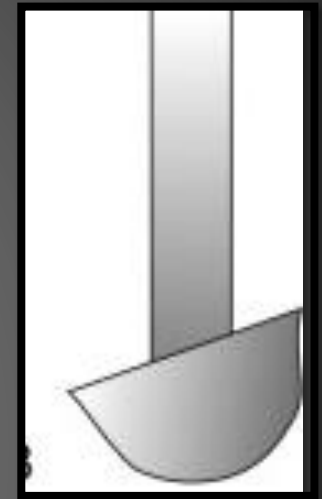
- **The primary advantage of these curettes is that they are designed to be used universally on all tooth surfaces, in all regions of the mouth.**

LIMITATIONS:

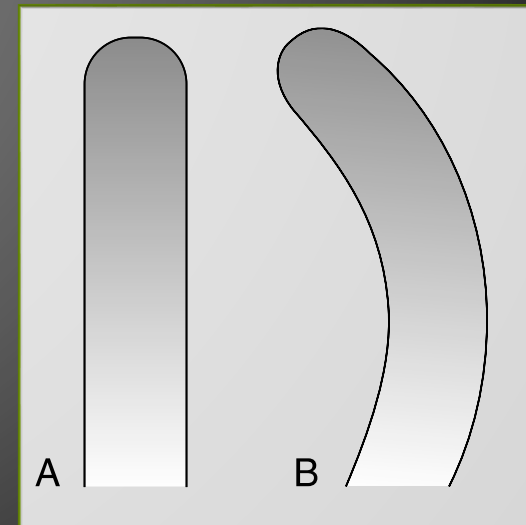
- **limited adaptability for the treatment of deep pockets in which apical migration of the attachment has exposed furcations, root convexities, and developmental depressions.**
- **For this reason, many clinicians prefer the Gracey curettes and new modifications of Gracey curettes**

Area Specific (Gracey) Curettes

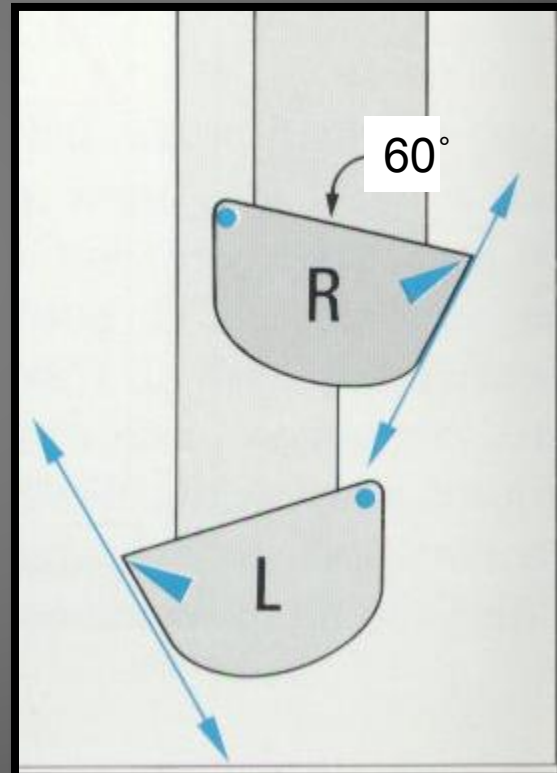
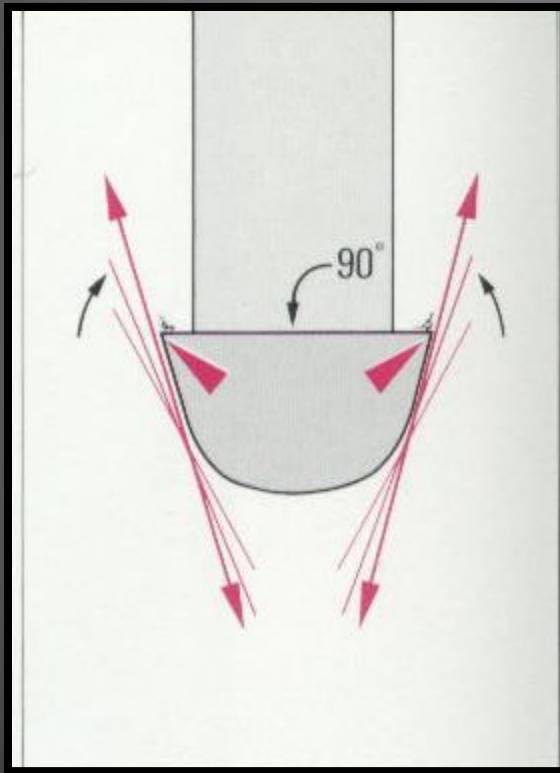
- The blade is **60 to 70 degrees** to the lower shank (offset blade)



- Curved from the head to the toe and also along the side of the cutting edge



Offset blade



Area Specific (Gracey) Curettes

- **Designed to adapt specific anatomic areas of the dentition**
- **Gracey #1-2 : Anterior teeth**
- **Gracy #3-4 : Anterior teeth**
- **Gracey #5-6: Anterior teeth and premolars**
- **Gracey #7-8 and Posterior teeth facial and lingual**
- **Gracy 9-10: Posterior teeth facial and lingual**
- **Gracey #11-12: Posterior teeth :mesial**
- **Gracey #13-14: Posterior teeth :distal**
- **Gracey #15-16: Posterior teeth :mesial**
- **Gracey #17-18: Posterior teeth :distal**

Double-ended Gracey curettes are paired in the following manner.

Gracey Curettes



Posterior teeth (Mesial)

Posterior teeth (Distal)

1 / 2
3 / 4
5 / 6
7 / 8
9 / 10
11 / 12
13 / 14

Anterior teeth

Anterior & PM teeth

Posterior teeth (F&L)

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.

A decorative graphic on the left side of the slide. It features a large, light green rounded rectangle. Overlapping the top-left corner of this rectangle is a large, light gray oval. Inside the green rectangle, there are three smaller, overlapping circles: a light yellow one at the top, a light green one in the middle, and a light gray one at the bottom. The word "Summary" is written in a bold, black, serif font to the right of these elements.

Summary

Comparison between Scalers and Curettes

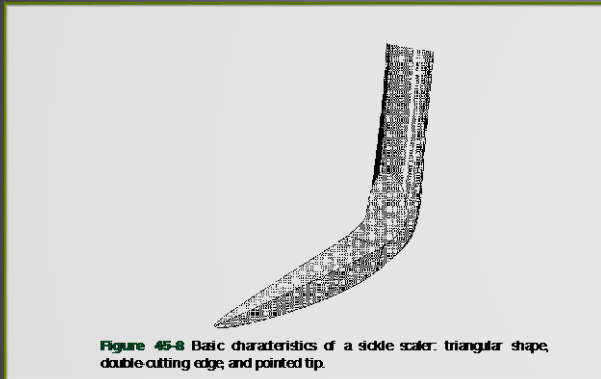


Figure 45-8 Basic characteristics of a side scaler: triangular shape, double-cutting edge, and pointed tip.

Cutting Edges

Cross section

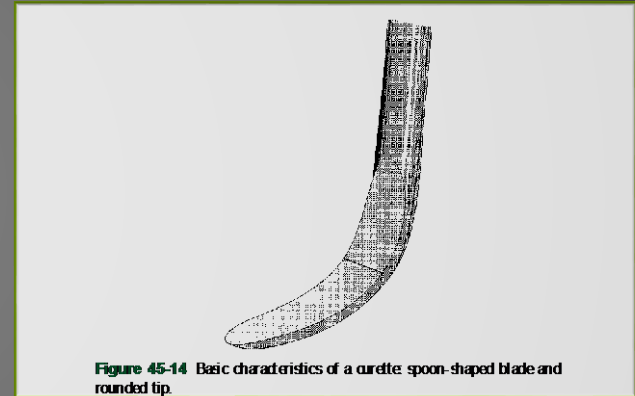


Figure 45-14 Basic characteristics of a curette: spoon-shaped blade and rounded tip.

tip

Uses

Universal Curettes vs Gracey Curettes

	Universal	Gracey
Area of use	All	Specific
No. of cutting edges	2	1
Curvature	1	2
Blade angle	90	60-70



Using Gracy Instruments

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 .**

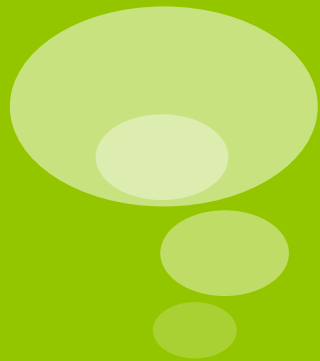
PRINCIPLES APPLY ONLY TO GRACEY CURETTES:

- 5. Concentrate on using the lower third of the cutting edge for calculus removal.**
- 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.**
- 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.**





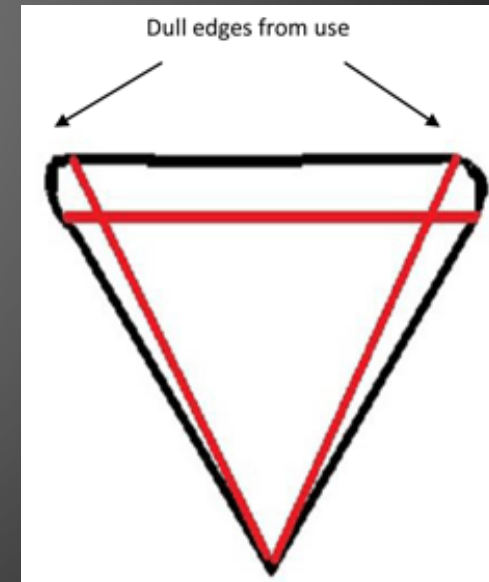
INSTRUMENT SHARPENING

Instrument Sharpening

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

Instrument Sharpening

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

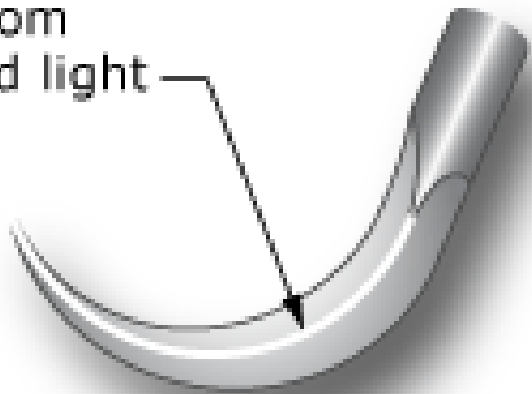


Evaluation of Sharpness

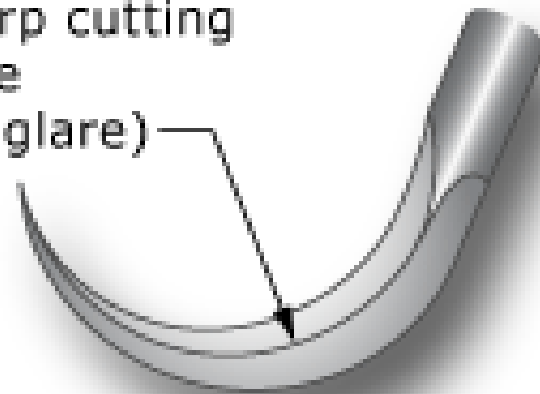
- **Sharpness can be evaluated through:**
 - 1. Light reflection:** cutting edge of a dull instrument appears bright unlike the sharp one
 - 2. Tactile evaluation:** Drawing the instrument across an acrylic rod (test stick), dull instrument will slide smoothly unlike a sharp one



Glare from reflected light



Sharp cutting edge (no glare)



Dull cutting edges



Cross section

Sharp cutting edges



Cross section

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

- **Select a suitable stone (shape and abrasiveness)**
- **Use sterile stone**
- **Establish the proper instrument-stone angle**
- **Maintain a firm grasp and avoid excessive pressure**

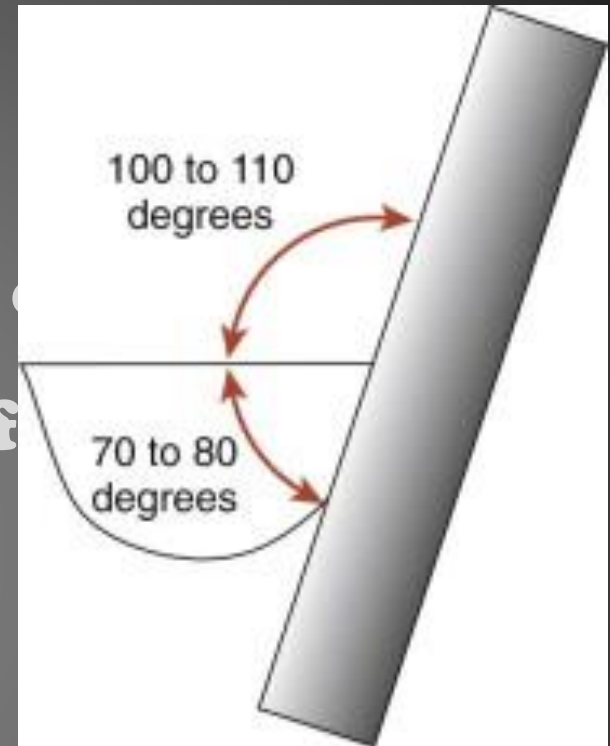
Principles of Sharpening

- **Lubricate the stone during sharpening**
- **Sharpen instruments at the first sign of dullness**

Sharpening Individual Instruments

I- Universal curettes

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



- One plane only

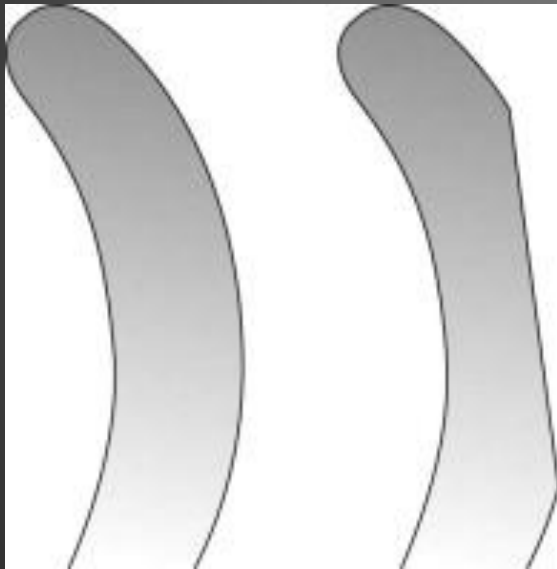


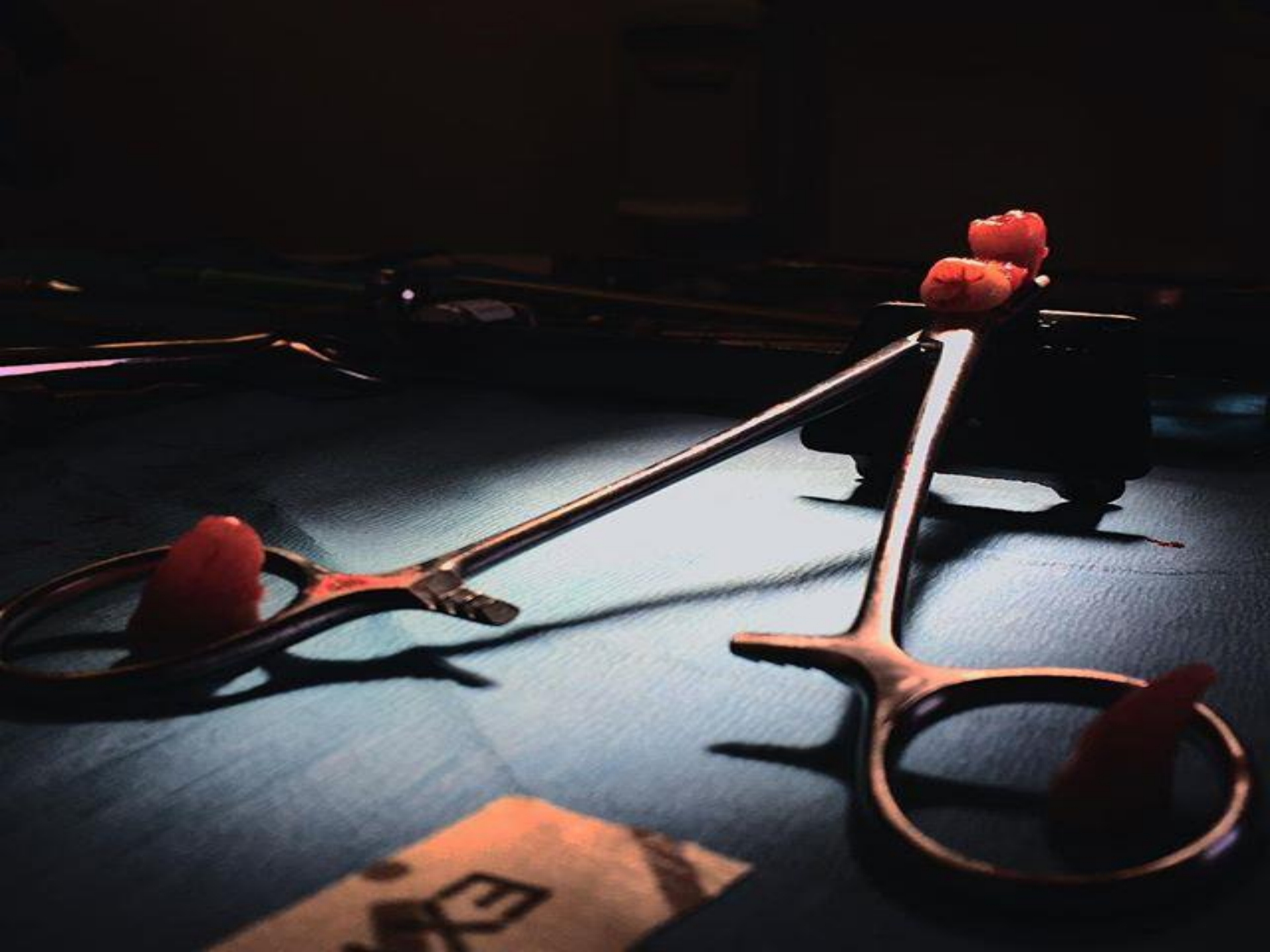
Sharpening Individual Instruments

II-Area-Specific (Gracey) Curettes

- Hold the curette with the face of the blade parallel to the floor
- Identify the edge to be sharpened
- Hold the stone with an angle of 100-110 between face of the blade and the stone
- Preserve the curve by turning the stone while sharpening from shank to toe

Two planes





How to detect calculus?



Scaling & root planning Calculus Detection Skills

1- visual examination



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





**Instrument
Activation**

**GENERAL
PRINCIPLES OF
INSTRUMENTATION**

:

Instrument Activation

1. ADAPTATION

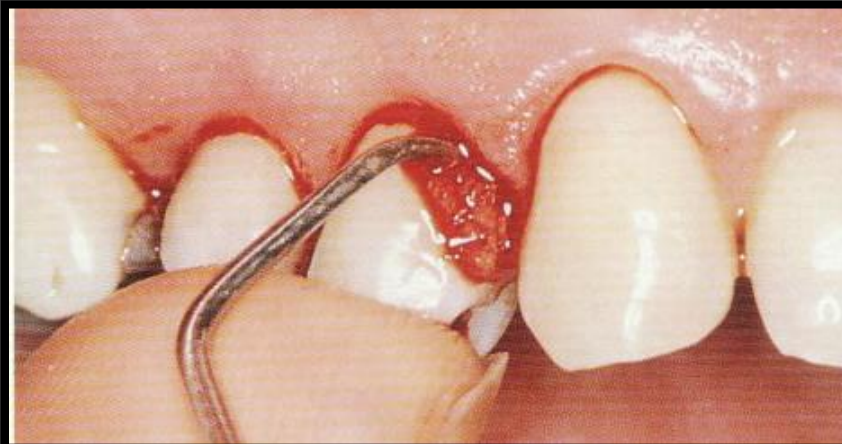
2. ANGULATION

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

- **Precise adaptation must be maintained with all instruments:**

→ **To ensure maximum effectiveness of instrumentation.**

→ **To avoid trauma to the soft tissues & root surfaces**

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

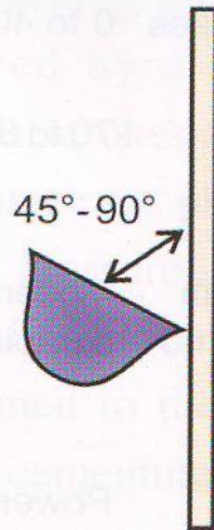
INSTRUMENT ANGULATION

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

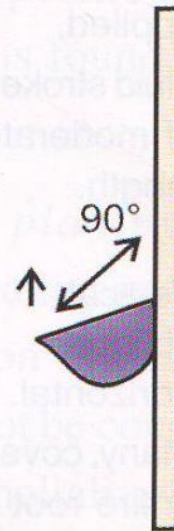
Correct angulation
for blade insertion



Correct angulation
for scaling and planing



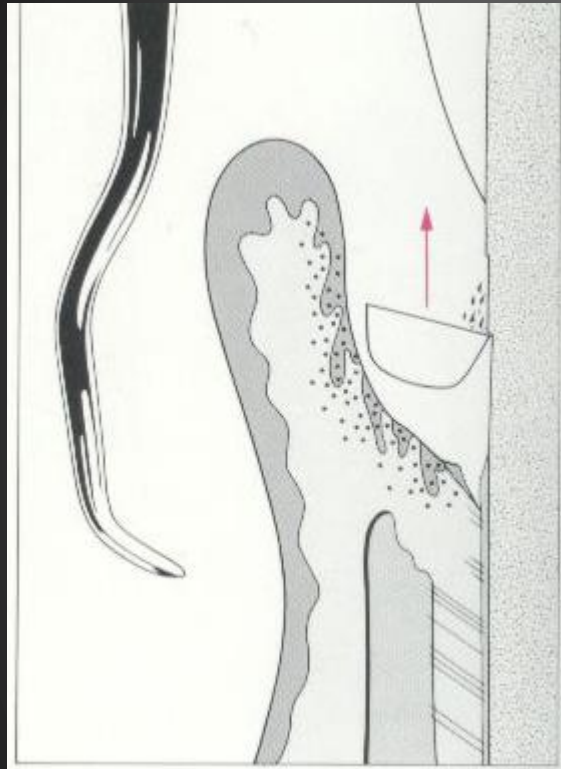
Incorrect angulation
for scaling and planing



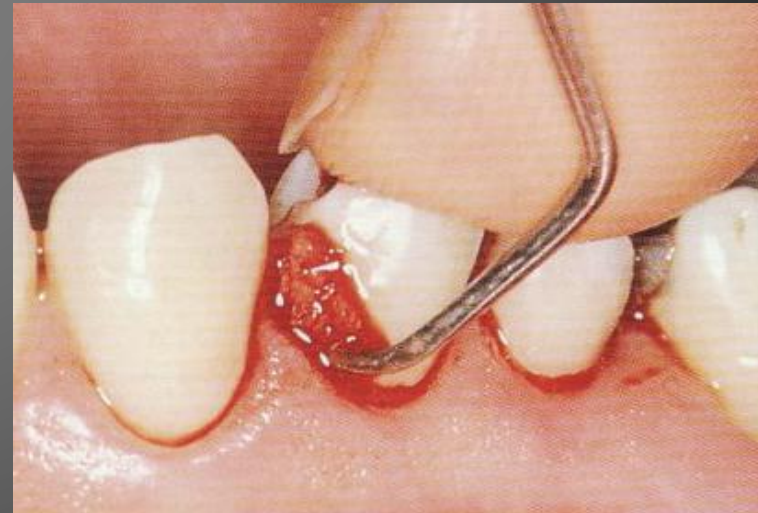
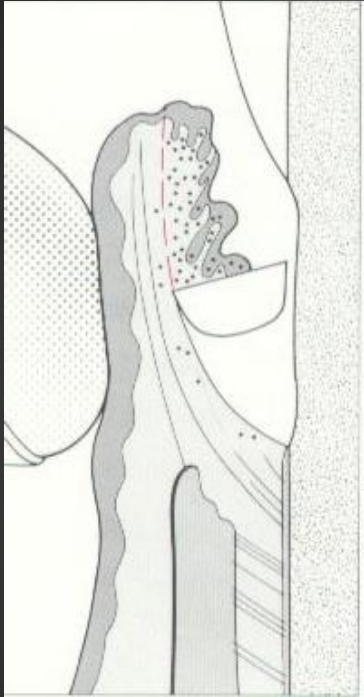
Correct angulation
for gingival curettage

Fig. 36.5: Blade angulations

Root planning angulation



Soft tissue curettage

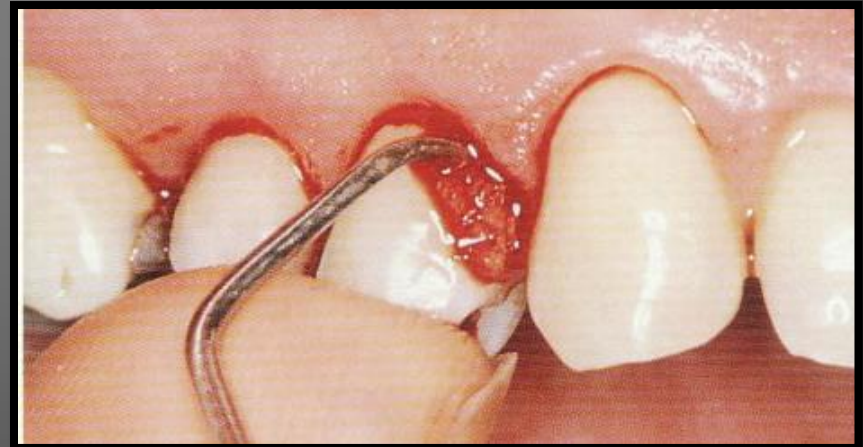


LATERAL PRESSURE

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 recommended.



Strokes

- There are 4 types of strokes:

1. Placement stroke.

2. Exploratory stroke / assessment stroke.

3. Scaling stroke.

4. Root planning 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.

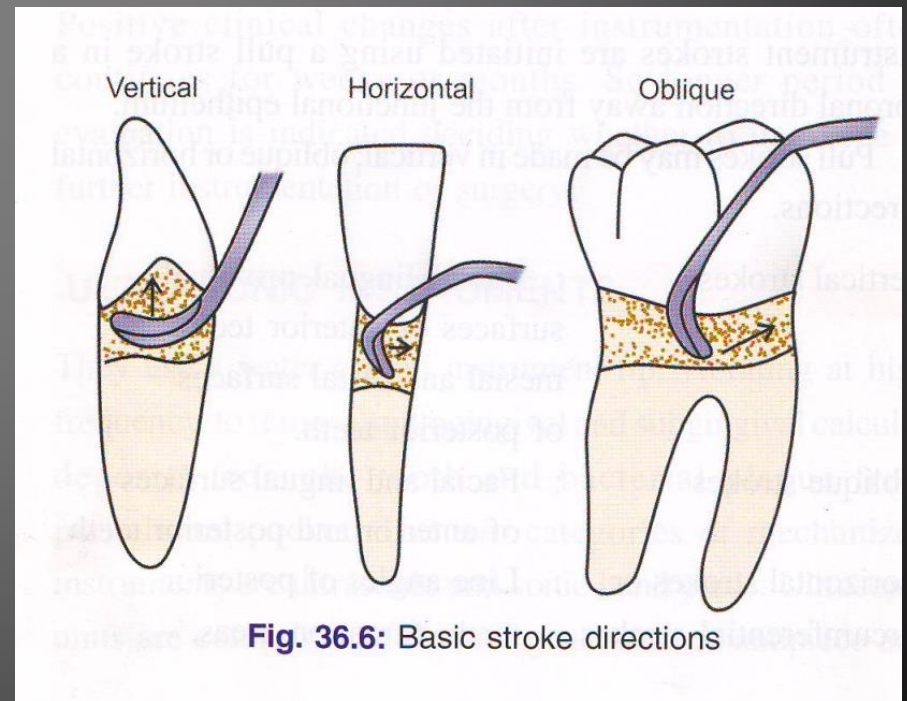


Stroke Directions

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**



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

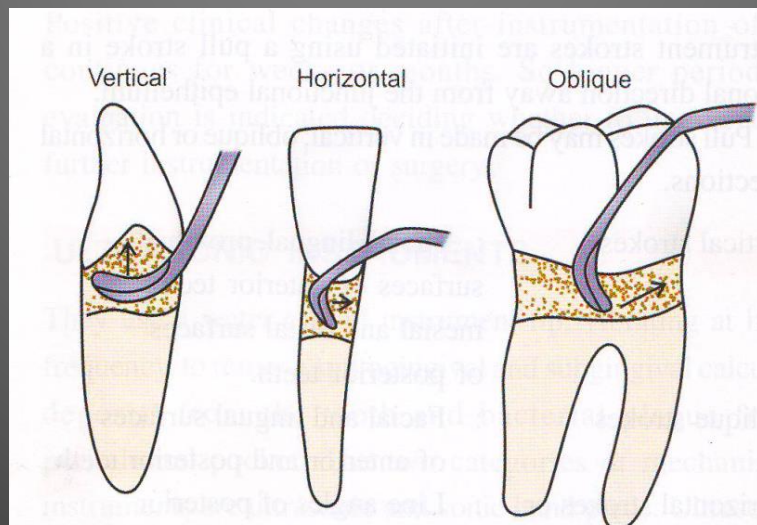
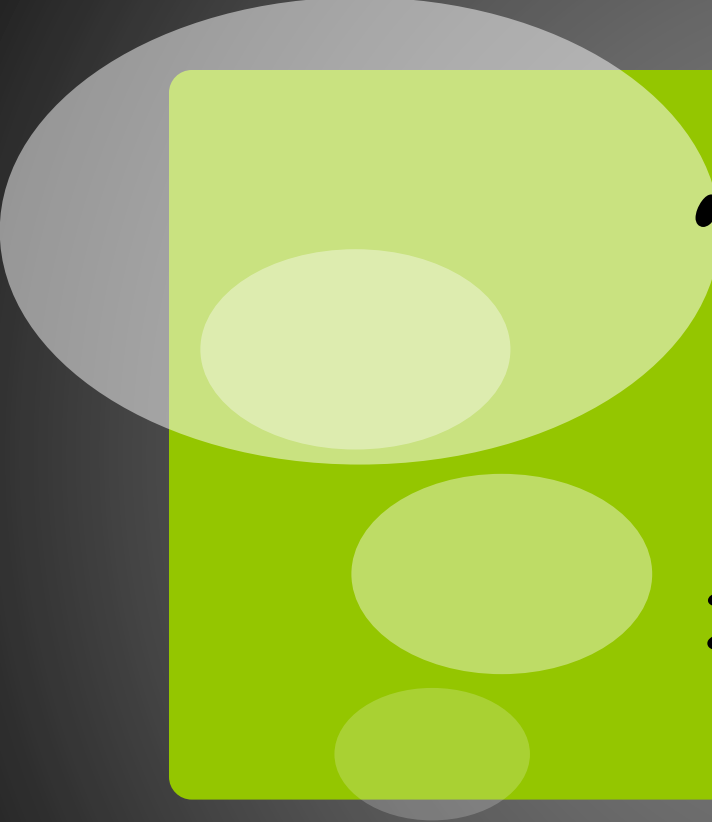
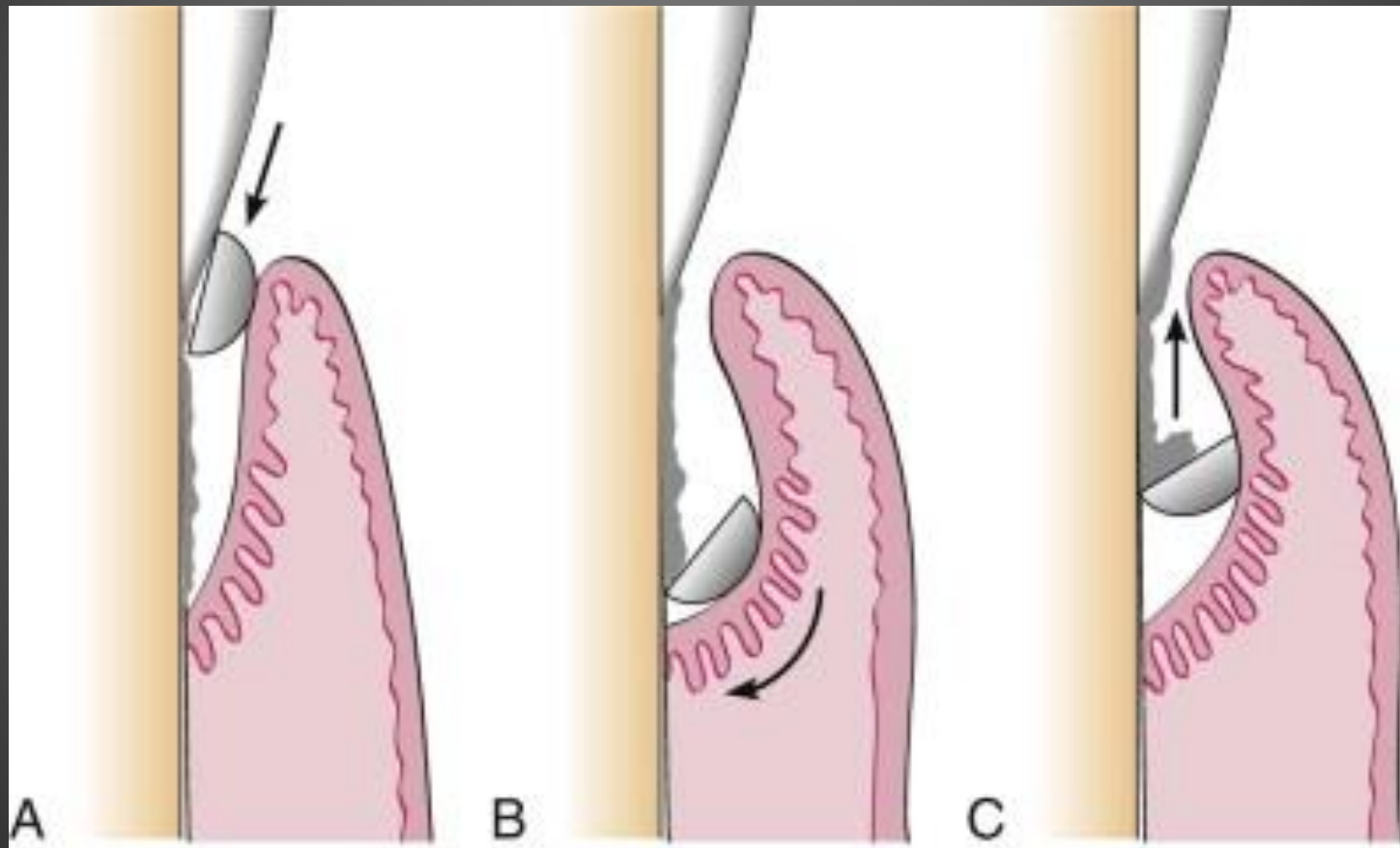


Fig. 36.6: Basic stroke directions



**Technique for
scaling and
root planning**

Root planning technique



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Evaluation

**of scaling
and root
planning**

Evaluation of scaling & root planning

- **Smoothness**
- ***Tissue response.***

Evaluation of scaling & root planning

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



Gingivitis

Before



After

Limitation of scaling & root planning

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



Limitation of scaling & root planning

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

The graphic features a split background: the left side is a vibrant lime green, and the right side is a muted brown. Overlaid on the green side is a light green thought bubble with three smaller circles trailing downwards. The text "THANK YOU ANY QUESTIONS?" is centered across the split background in a purple, sans-serif font.

THANK YOU
ANY QUESTIONS?

E-mail: hharbi1@ksu.edu.sa