

Sharpening Periodontal Instruments

This course is no longer offered for Continuing Education credit.

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Intended Audience: Dentists, Dental Hygienists, Dental Assistants, Dental Students, Dental Hygiene Students, Dental Assistant Students

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Disclaimer: Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

Introduction

Periodontal scalers and curettes require frequent maintenance in the form of sharpening in order to keep them in optimal working order. It is axiomatic that clinicians recognize when an instrument requires sharpening in order to be effective. The clinician must differentiate between the various instrument designs, such as sickle scalers, universal curettes and Gracey curettes, as they all require different sharpening techniques. Similarly, an understanding of the various types of sharpening stones (with different characteristics) is essential for sharpening each instrument design in a specialized way. This continuing education course provides a review of this topic and takes a start to finish look at sharpening.

Conflict of Interest Disclosure Statement

- The author reports no conflicts of interest associated with this course.

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Overview

This is meant to be a self-directed course for any professional who uses or is part of a team that uses periodontal debridement instruments. It presents the purpose and importance of sharpening instruments specific to settings where periodontal scalers and curettes are used extensively and, how to recognize when the working edge becomes dull and less effective. Tests to determine instrument sharpness, including a comparison of new instruments to dull ones, are reviewed. Strategies to identify when to sharpen versus when to replace an instrument are presented. Various sharpening techniques are illustrated. In depth sharpening procedures for sickle scalers, and universal and Gracey curettes are reviewed.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Describe why sharpening is important.
- Differentiate between dull and sharp instrument blades.
- Identify the need to sharpen an instrument.
- Determine when the blade is sharp enough for use.
- Identify all types of sharpening armamentaria.
- Describe the sharpening procedure for sickle scalers, universal curettes and Gracey curettes.

Importance of Sharpening

Sharp dental instruments optimize their

effectiveness. Not only does this benefit the patient through improved deposit removal and increased patient comfort, it also benefits the clinician by reducing fatigue, saving time, and improving tactile sensation. A dull instrument also results in burnishing the calculus deposit rather than effectively removing it, making the calculus more difficult to detect.

When to Sharpen

When an instrument blade contacts the hard tooth surface, discreet metal particles are worn away from the blade. As a result, the cutting edge eventually becomes rounded. This rounded edge results in a dull and less effective blade. Although the dullness progresses with repeated use, wear is detectable after each use.¹ A dull blade will burnish the calculus, gliding over it passively, rather than “biting” into the deposit to effectively remove it. A clinician using a dull blade loses the tactile sensation associated with the blade’s ability to detect the calculus. This loss of sensation reduces operator effectiveness. Consequently, the sharpness of an instrument should be assessed after each use. Consistent, regular sharpening prevents the need for extensive sharpening that is likely to change the shape, angle and other characteristics of the original instrument.²

Diagnose the Need to Sharpen

Sharpness can be determined by visual inspection. The serrated surface of a sharp blade viewed under intense light (such as that from a dental unit- or head-light) has a matte finish. The sharp serrations diffuse light and result in a matte finish. Under a magnifying lens, this effect is more discernible. On the other hand, a dull edge, from which discreet metal particles have been worn away, has worn down serrations and appears shiny under these same conditions. Shiny light is reflected off the blade surface that has become dull from use (Figure 1).

A plastic test stick is designed specifically to differentiate a sharp instrument from a dull one. A sharp blade edge will “bite” into the plastic surface whereas a dull one will glide along the surface without engagement. Furthermore, a sharp blade edge produces a metallic clicking sound (Figure 2).

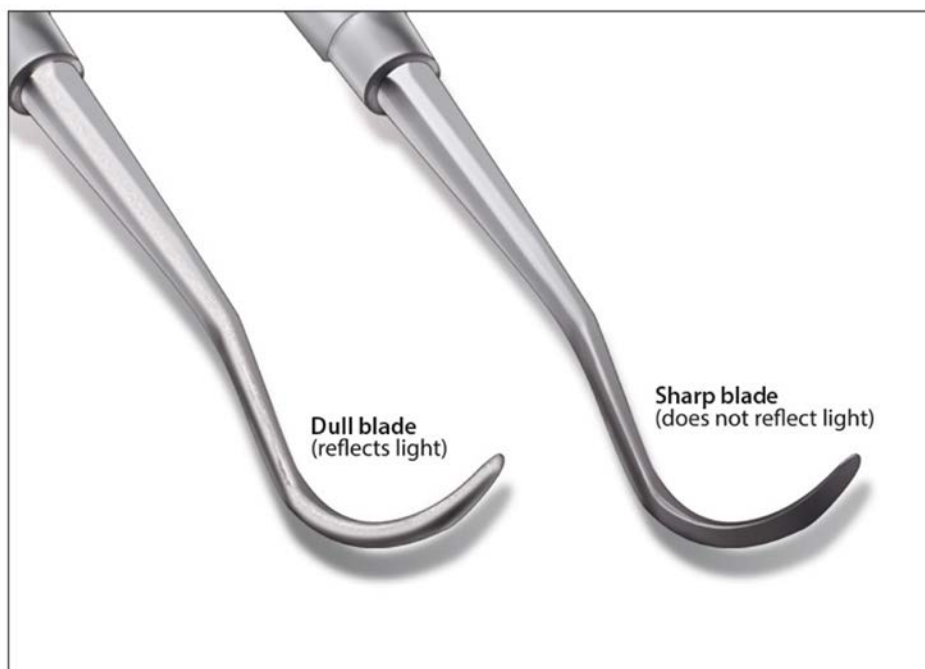


Figure 1. Sharp versus Dull Cutting Blade.

A dull blade produces a clear, shiny surface under bright light, a sharp blade (right) produces a matte reflection.

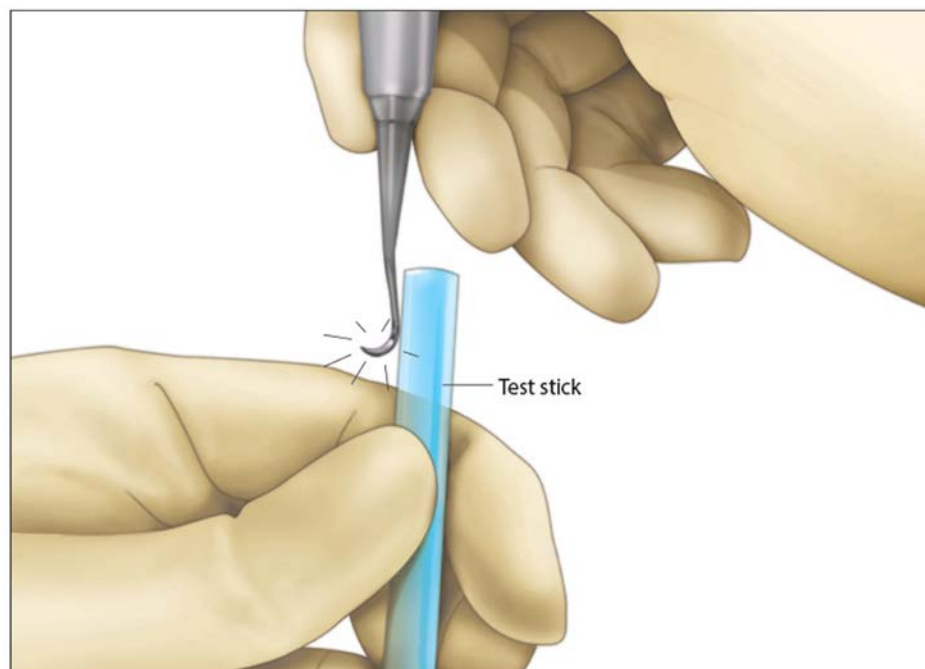


Figure 2. Test Stick.

A sharp instrument produces a click sound as it “bites” against a test stick.

Compare Sharp Instruments with Dull Ones, and Know When to Replace

New instruments serve as a gold standard when sharpening dull instruments. The gold standard serves as a reminder of the original instrument design, including proper

contour, angles and cutting edges. These ideal characteristics should be maintained during the life of the instrument, even with frequent sharpening. When the instrument being maintained starts to deviate from the gold standard, replacement should be considered.³

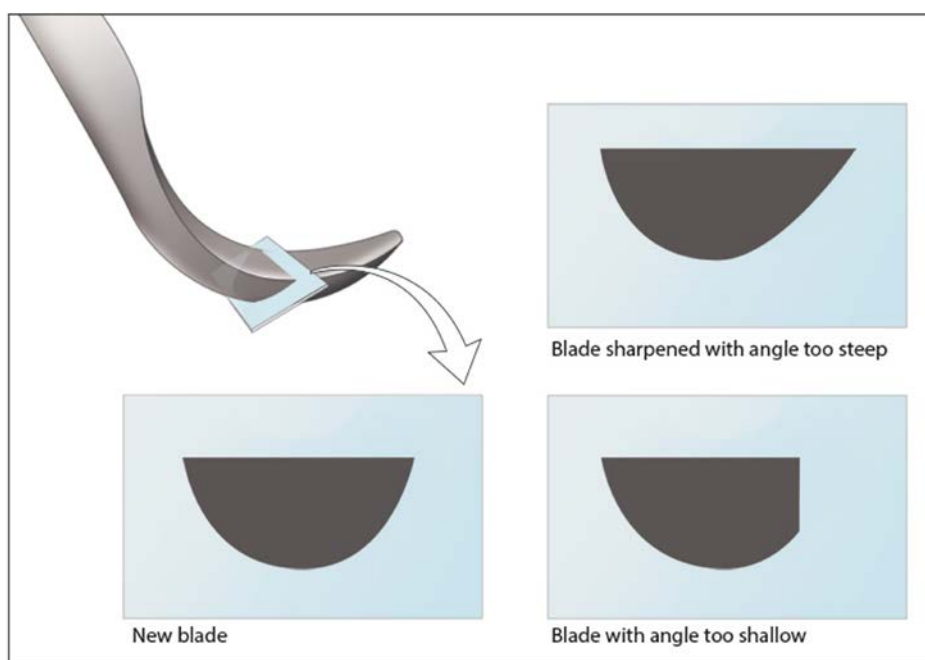


Figure 3. Decision to Replace an Instrument.
When an instrument loses its original characteristics, it should be replaced. A number of factors could cause the instrument to lose its original characteristics some are shown.

If the thickness of the terminal edge starts to be noticeably thinner than the gold standard and the instrument has lost strength, the tip could easily break off upon activation. Similarly, if the blade edge angulation starts to deviate from the original design, the integrity of the instrument blade has been compromised and the instrument should be replaced (Figure 3).⁴ In some cases, clinicians may choose to alter the original instrument design with the specific purpose of customizing the instrument for use in a particular location; for example, a specific cutting angle may be created to reach into a furcation entrance or root groove.⁵

Instrumentation

To safely and effectively sharpen instruments, appropriate armamentarium is required. Gloves and a mask must be worn during the sharpening procedure to protect against sludge; safety glasses are necessary as shavings often become airborne. Cotton tipped applicators are useful to spread the lubricant onto the stone. Gauze is needed to wipe the blade and stone surfaces. A magnifying glass or loupes are needed to examine the blade. Plastic test sticks are needed to test for sharpness (Figure 4).

The work area should provide adequate space and light for comfortable operation. The counter top or other work surface should be wide enough to support the elbows and it should be high enough so that the instrument can be held at eye level.

There are four types of sharpening stones, each with unique composition and grit. These combinations are shown in Table 1.

When using oil to lubricate, such as with the Arkansas, India, or Composition stones, spread oil completely over stone surface. Likewise, when using water to lubricate a Ceramic stone, cover the entire surface.

Sharpening Procedure

Sickle scalers, and universal and Gracey curettes share common components: handle, shank, working end and blade. The difference is at the very tip of the instrument (Figure 5). For all instruments, the instrument is held in the non-dominant hand using a palm grasp. The index finger and thumb should be near the junction of the functional shank and the top of the handle such that they will counter balance the force produced at the opposite end of the



Figure 4. Armamentarium. Safety glasses (side shielded), Mask, Gauze, Gloves, Lubricated Sharpening Stones, Cotton tipped applicator.

Table 1. Sharpening Stones.

Sharpening Stone	Composition	Grit	Lubrication	Shapes Available for Finishing
Arkansas	Natural	Fine	Oil/Dry	Conical, Cylindrical, Flat, Wedge
Ceramic	Synthetic	Fine or Medium	Water/Dry	Cylindrical, Flat
India	Synthetic	Fine or Medium	Oil	Flat, Wedge
Composition Stone	Aluminum Oxide	Course Grit	Oil/Water	Range of shapes and sizes for advanced sharpening needs

instrument once the stone is activated. For all stones, the lower half is held in the dominant hand with the thumb on the edge closer to the operator and the fingers on the edge farther. The entire arm will work in one fluid motion so the grasp is intended to stabilize the stone and make such a motion comfortable to accomplish. The difference between the instruments is found at the working end. These differences make sharpening technique a little different for each instrument type.

Sickle Scaler

There are two cutting edges to a sickle scaler formed where the lateral surfaces meet the facial surface. These two cutting edges meet at the pointed tip. There are two types of sickle scalers. One is straight, which results in a triangular cross section. The other is curved, which results in a cone-shaped cross section. This integrity of form must be maintained during sharpening.

These cutting edges are sharpened by activating a flat stone against the lateral surface of the blade, starting at the heel of the blade, progressing through the middle third and finally to the facial third of the blade using a light fluid up and down motion. After testing for sharpness produces an acceptable result as determined against the test strip, the instrument is ready for finishing to maintain the structural integrity of the facial surface; the facial surface is not sharpened vigorously, only honed to remove any metal fragments.

In the case of the curved sickle scaler, holding the instrument handle perpendicular to the work surface with the tip toward the operator, place the conical stone horizontally on the instrument face and gently rotate the stone from heel-to-middle-to-tip. Use a similar grasp for the straight sickle scaler; perpendicular to the work surface with the tip toward the operator, use the flat stone on the instrument face and gently

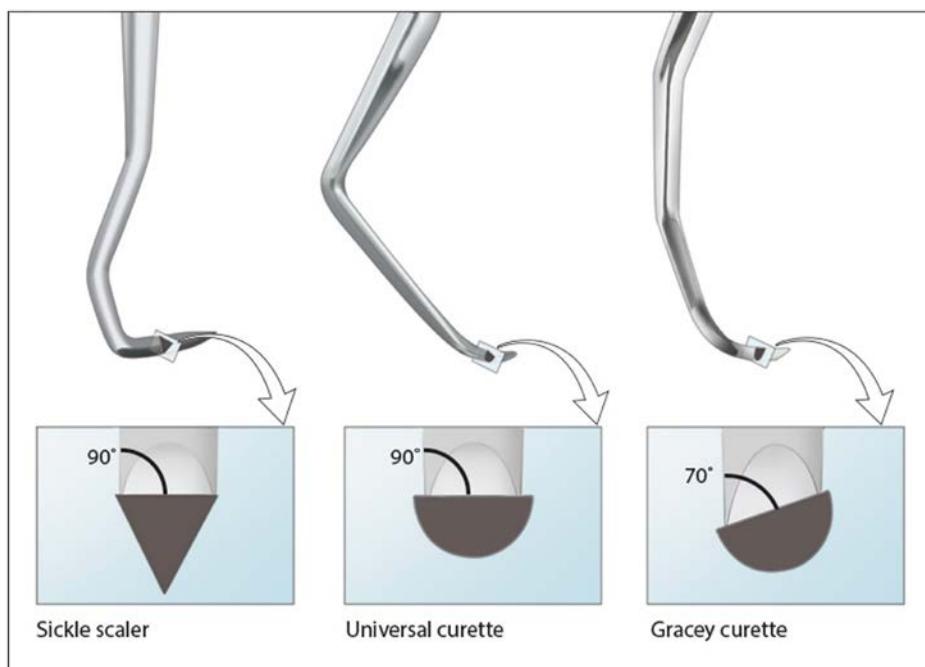


Figure 5. Instrument Anatomy.

- A.** Sickie scaler has two straight cutting edges which join to form the sharp back of the instrument. These cutting edges of the face meet to form the pointed end of the tip. This makes a triangular cross-section. Sickie scaler also comes in a variety where the sharp back is rounded or squared off.
- B.** Universal curette has two cutting edges with the blade at a 90 degree angulation. The blade is curved in only one plane such that it is not specialized to a particular area of the mouth.
- C.** Gracey curette blade is curved in two planes. The blade is "offset" such that there is only one cutting edge on each blade. In this example it is offset by 70 degrees.

moving the stone horizontally across the face (Figures 6a-6c). The intent is to remove debris and wire edges, not to sharpen the face.

After sharpness testing produces an acceptable result, the instrument is ready for finishing (Figure 7).

Universal Curette

Universal curettes are designed such that each of two parallel, 90 degree, cutting surfaces are formed by the junction of the lateral and facial surfaces that meet at a rounded toe (Figure 8). Close attention to maintain this original shape should be kept in mind during sharpening (Figures 9a-9d).

To sharpen the other cutting edge, rotate the instrument between the finger and thumb

of the non-dominant hand so that the toe is pointed away from the operator.

Gracey Curettes

Unlike the sickle scaler and the universal curette, the Gracey curette is designed specifically to be site specific. The facial surface has only one working blade which is angled downward at 70 degrees (Figure 11). Blades are paired on either side of the instrument, and identified by a number imprinted on the handle. Each instrument has an odd and an even number to identify each blade on either end such that the right facing blade is identified by an odd number and the left facing blade is identified by an even number. This can be remembered using the mnemonic "you have the right to be odd."



Figure 6a. Holding the Scaler.
Holding the instrument in the non-dominant hand, perpendicular to the bench top, at eye level with elbows on the bench, position the blade to be sharpened at the bottom such that the tip is easily visualized. This bottom tip should line up with the wrist, while the top shank is braced between the index finger and thumb.

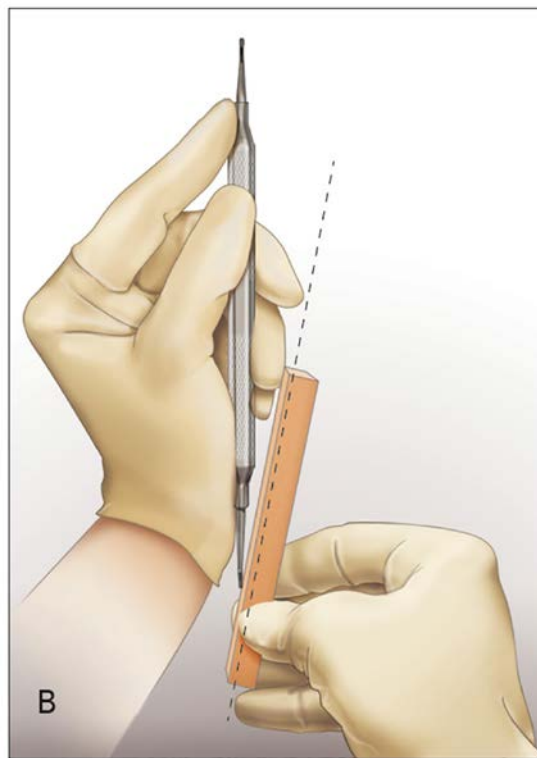


Figure 6b. Holding the Stone.
With the lubricated surface of the stone against the lateral blade surface, tilt the top of the stone to a 30 degree angle.

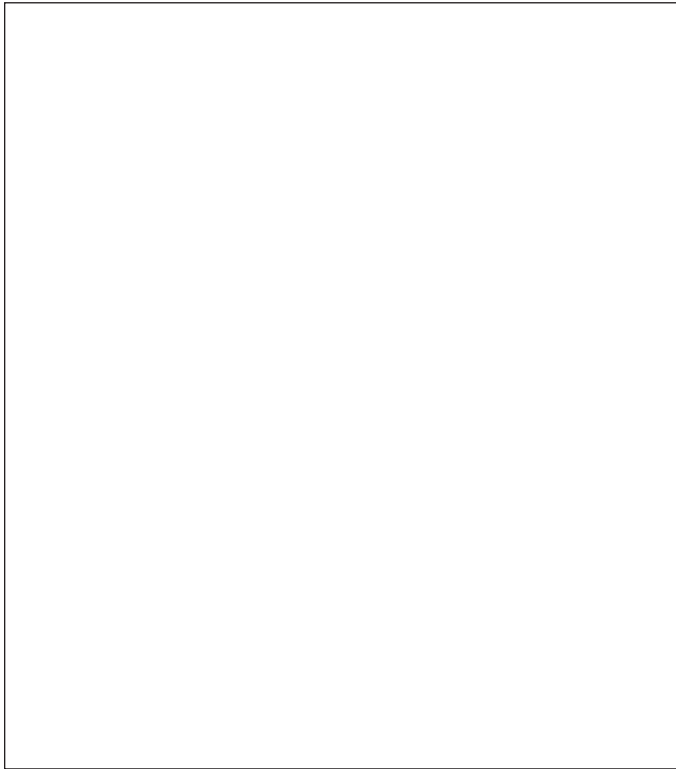


Figure 6c. Sharpening Motion.
In a consistent up and down motion, starting with the heel and moving through the middle and tip third, grind the stone over the surface. Metal filings and or sludge will become visible on the blade surface and stone. These can be removed with gauze.

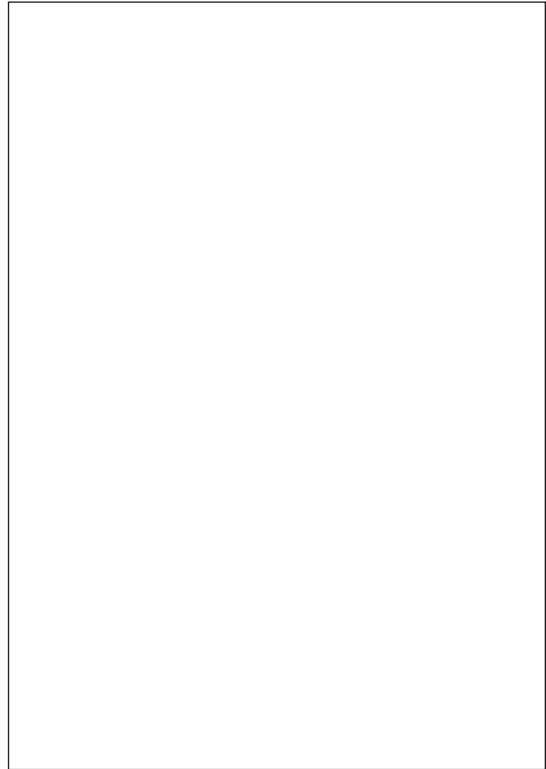


Figure 7. Finishing Sickle Scaler.
Place a conical or cylindrical stone on the facial surface and lightly spin along face to remove sludge.

Table 2. Sickle Scaler Step-by-Step Summary.

1. Sit with elbows on a work surface. Position instrument perpendicular to the work surface.
2. Firmly grasp instrument with non-dominant hand using index finger and thumb.
3. Compare blade and shank of instrument to be sharpened to a new instrument, decide whether it can endure sharpening and still maintain original design, integrity and strength. Will the terminal shank be so thin that it may snap off during use? Decide to keep or replace instrument.
4. Point blade tip away from operator to sharpen right cutting edge (point blade tip toward operator to sharpen left cutting edge.)
5. Place sharpening stone against lateral surface so the top of the stone is angled 30 degrees away from the blade.
6. Glide stone up and down in a smooth motion beginning with the heel third, progressing to the middle and anterior third of the blade.
7. Wipe away metal filings and sludge.
8. Do not activate the instrument tip against the stone.
9. Test sharpness against test strip for "gripping" and sound.
10. Finish with finishing stone.

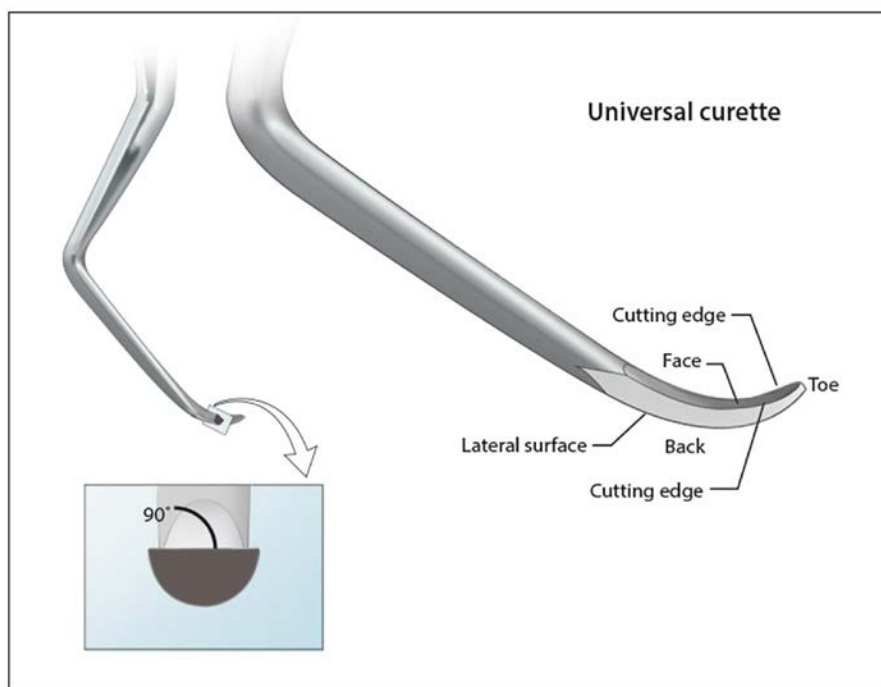


Figure 8. Cross Section of Universal Curette.



Figure 9a. Holding the Curette.
With elbows on the work surface, hold the instrument perpendicular to the work surface in the non-dominant hand, braced between the index finger and thumb. The blade to be sharpened will line up with the wrist and the toe of the instrument should point to the operator such that it can be easily visualized at eye level.

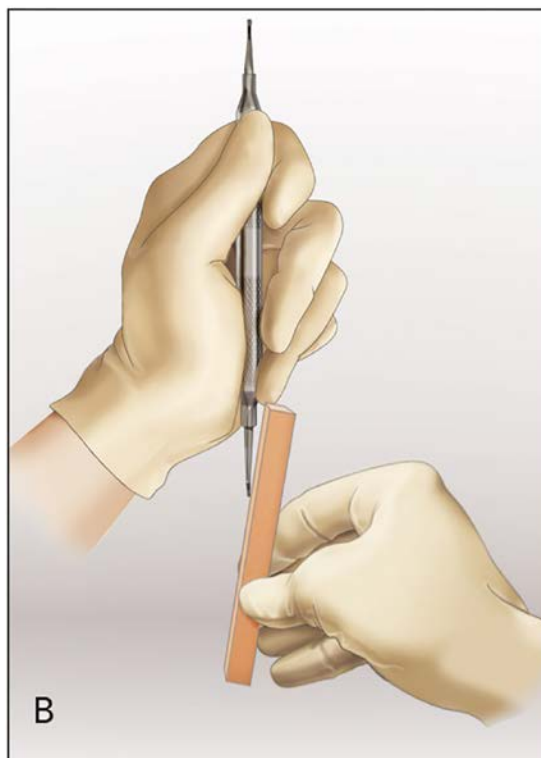


Figure 9b. Holding the Sharpening Stone.
Hold the lubricated side of the sharpening stone in the dominant hand, against the lateral surface of the blade at slightly less than a 30 degree angle to the instrument shank.

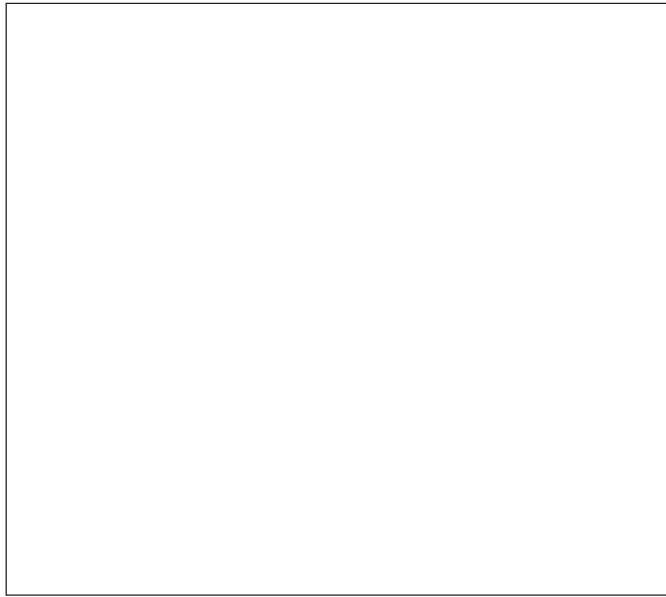


Figure 9c. Sharpening Motion.

Move the stone up and down fluidly starting at the heel third working in a continuous motion through the middle and toe third of the instrument. Sludge and metal filings will begin to form and build up on the stone, and should be wiped away with gauze.



Figure 9d. Sharpening the Toe.

Rotate the instrument so that the back side of the toe is parallel to the work surface at eye level and the toe is in the direction of the operator's thumb. Place stone against the toe at a 60 degree angle to the blade and move it up and down in a consistent motion. Rotate it around the tip to keep the original rounded shape of the tip.

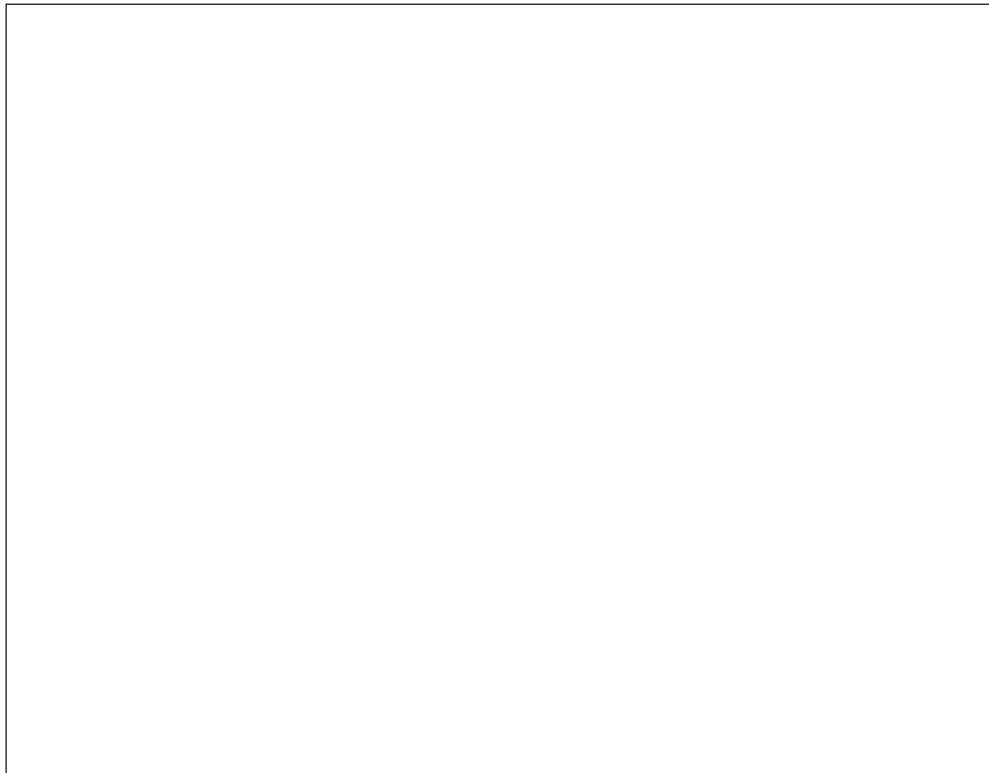


Figure 10. Finishing the Instrument.
Hold the instrument perpendicular to the work surface such that the tip is pointed to the operator. Use the cylindrical or conical stone parallel to the work surface lightly spinning along the face to remove sludge, metal particles and debris.

Table 3. Universal Curette Step-by-Step Summary.

1. Position the instrument perpendicular to the work surface and rotate the instrument handle left of the vertical plane to align the **terminal shank** with the **vertical plane**.
2. Firmly grasp instrument with non-dominant hand using index finger and thumb.
3. Compare blade and shank of instrument to be sharpened to a new instrument, decide whether it can endure sharpening and still maintain original design, integrity and strength. Will the terminal shank be so thin that it may snap off during use? Decide to keep or replace instrument.
4. Point blade tip away from operator to sharpen right cutting edge (point blade tip toward operator to sharpen left cutting edge).
5. Place stone against lateral surface so the top of the stone is angled 30 degrees right of the **terminal shank** of the instrument.
6. Glide stone up and down in a smooth motion beginning with the heel third, progressing to the middle and anterior thirds of the blade.
7. Wipe away metal filings and sludge.
8. Do not activate the instrument tip against the stone.
9. Test sharpness against test strip for “gripping” and sound.
10. Finish with finishing stone. Using fluid motions to round the toe.

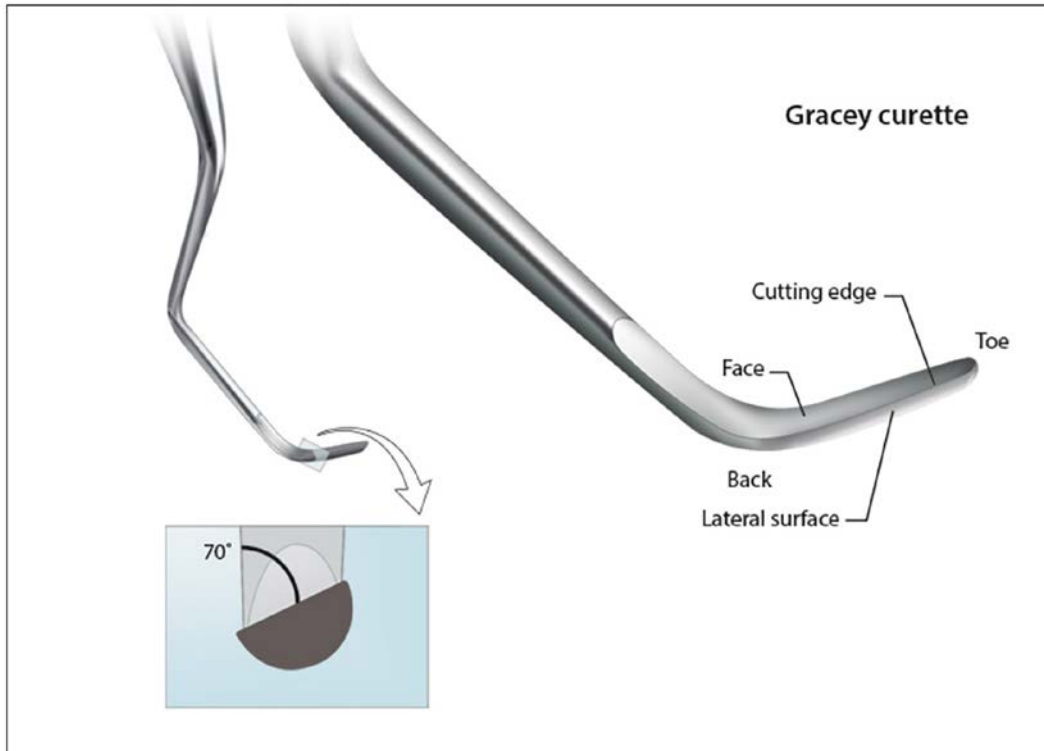


Figure 11. Gracey Curette Cross Section.
The edge of a Gracey curette is not curved, it is straight as it projects from the shank. This original shape should be maintained when sharpening.



Figure 12a. Holding the Gracey Curette. With elbows on the work surface, hold the instrument in the non-dominant hand *perpendicular* to the work surface, such that the odd number on the handle is pointing downward (closer to the lab bench). The blade should be at eye level, at the level of the wrist, pointing toward the operator. The handle should be secured between the thumb and index finger at the top shank of the instrument. With this positioning, the terminal shank should be a little less than 30 degrees to the left from the vertical plane for right handed operators and to the right for left handed operators.

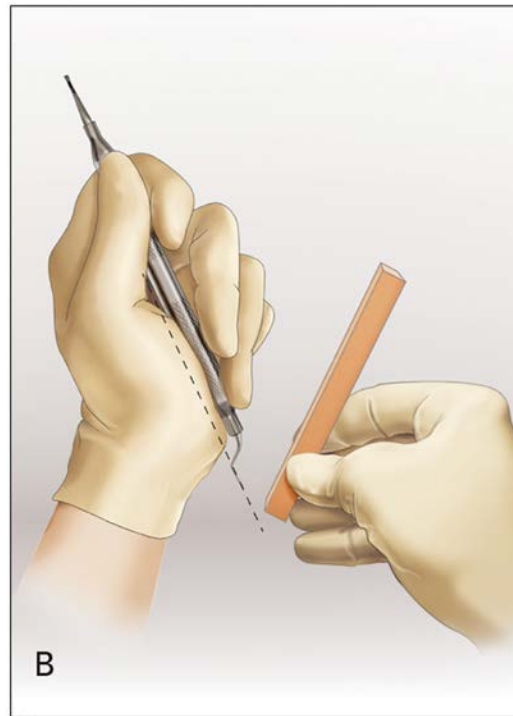


Figure 12b. Holding the Sharpening Stone. Position the stone against the right cutting blade surface at 30 degrees right of the vertical plane and to the left for left handed operators.

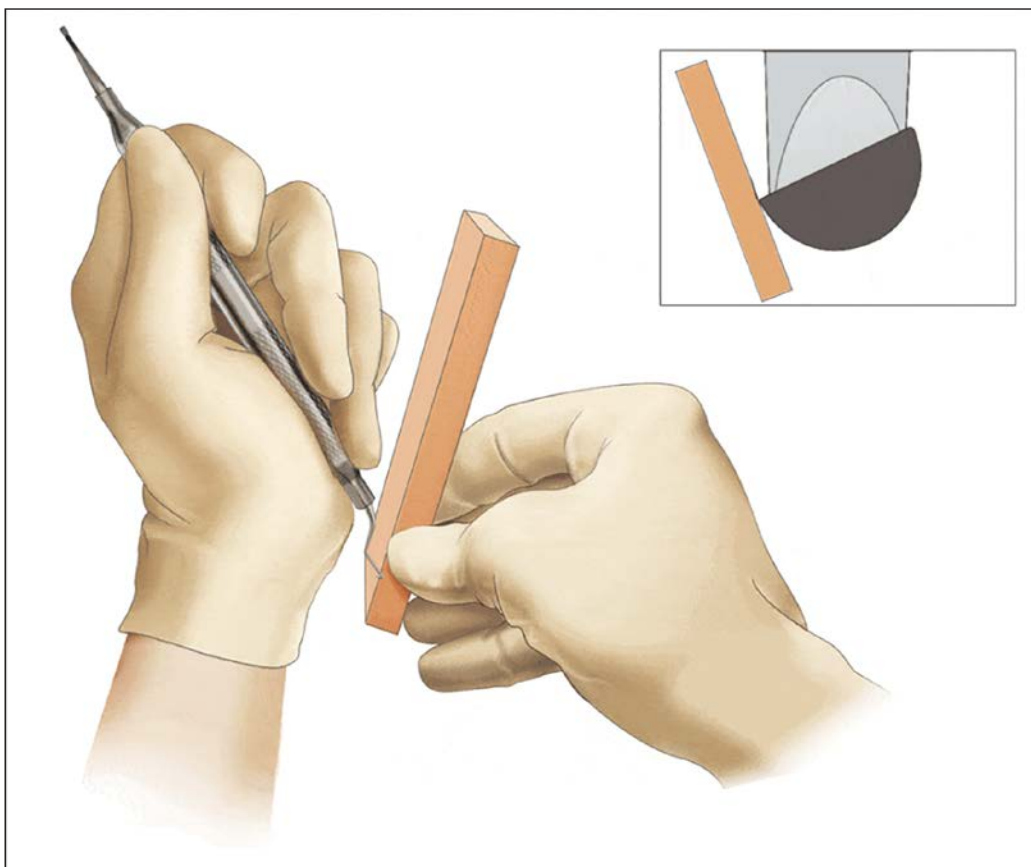


Figure 12c. Sharpening Motion.

In a fluid, continuous up and down motion lightly move the stone against the blade starting at the heel third, working through the middle and the toe third. As sludge, metal shavings and debris build up along the blade and stone, wipe it away with gauze.

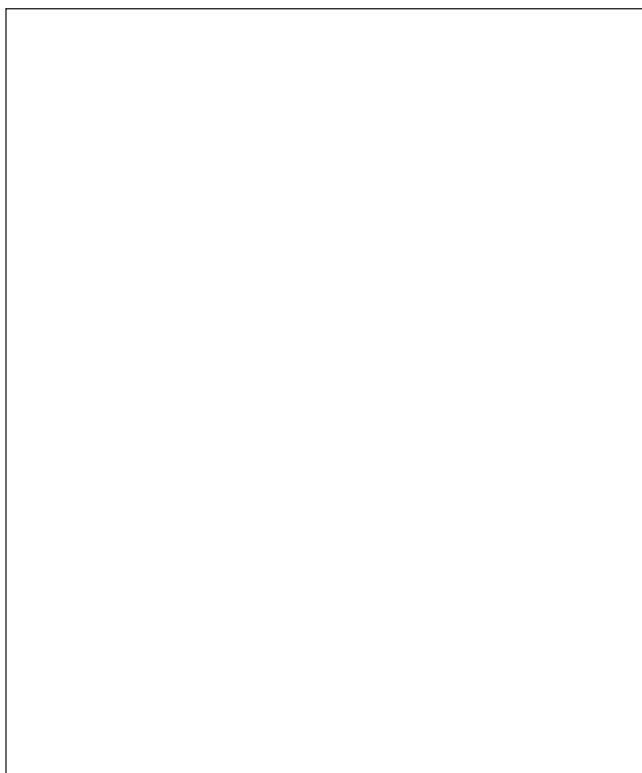


Figure 12d. Rounding the Toe.
Hold the instrument perpendicular to the work surface such that the terminal shank is 30 degrees to the left of the vertical. Rotate the instrument between the index finger and thumb so that the blade is now pointing to the right instead of toward the operator eyes. The instrument face should be parallel to the work surface. Hold the stone such that it is positioned 60 degrees to the right of the vertical plane. Move the stone in a continuous motion using overlapping strokes around the toe such that the rounded integrity of the toe is maintained.

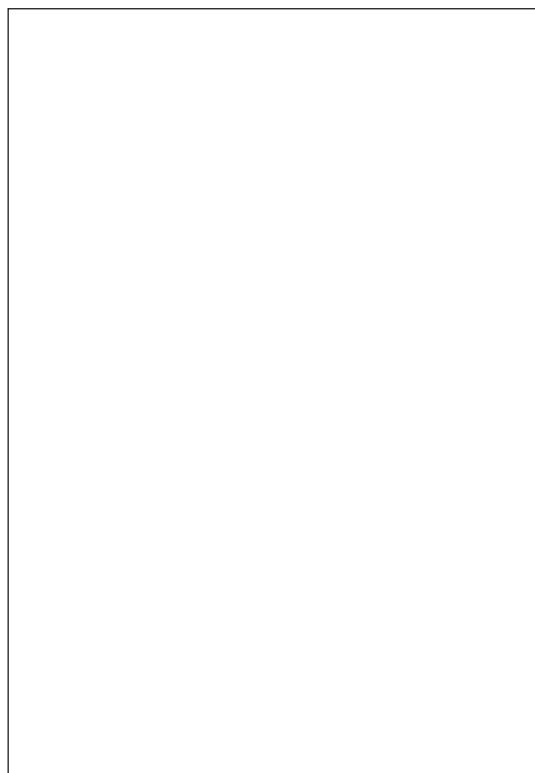


Figure 13. Finishing the Instrument.
Holding the instrument perpendicular to the work surface such that the toe is pointed toward the eyes, position the stone (conical or cylindrical) vertically against the instrument face. Gently rotate the stone from the heel to the middle and then to the toe third.

Table 4. Gracey Curette Sharpening Step-by-Step Summary.

1. Check the blade identification number on the handle. Aim the even numbered instrument toward the operator; aim the odd numbered one away.
2. Position the instrument perpendicular to the work surface so the blade to be sharpened is pointing toward the operator. Hold firmly in the non-dominant hand.
3. Hold firmly in the non-dominant hand, stabilizing the instrument between the thumb and forefinger at the top shank.
4. Tilt the terminal shank 30 degrees (to the left for right handed operators, or to the right for left handed).
5. Hold the stone in the dominate hand against the lateral instrument blade surface at 30 degrees (to the right for right handed operators, or to the left for left handed operators).
6. Move the stone up and down from the heel to the middle to the anterior third.
7. Round the toe by rotating the instrument such that it is now parallel to the work surface and the blade is pointing straight.
8. Aim the stone 60 degrees to the left of the vertical plane.
9. Use fluid overlapping up and down movement to round the toe.

Summary

Sharp periodontal instruments such as sickle scalers, universal curettes and Gracey curettes are important for effectiveness. Sharp instruments reduce operator fatigue, improve mechanical outcomes, and increase patient comfort. Differentiating dull from sharp instruments involves visual inspection. When the instrument blade has a visual matte finish under light and “grabs” the test stick, it is sharp

enough to conclude sharpening. Sharpening instrumentation includes personal protective equipment, sharpening stones, gauze and cotton swabs. Based on their specific characteristics, sickle scalers, and universal and Gracey curettes each have unique sharpening procedures. The goal is to maintain fidelity to the design characteristics of each instrument as determined by the manufacturer.

Course Test Preview

1. **When an instrument blade contacts hard surface, discreet metal particles are worn away from the blade. As a result, the cutting edge becomes _____. This results in a _____ effective blade.**
 - a. sharpened, more
 - b. rounded, less
 - c. sharpened, less
 - d. rounded, more
2. **A dull blade is likely to _____ the calculus, passing over it passively, rather than “biting” into it and cleanly removing it.**
 - a. burnish
 - b. sharpen
 - c. provoke
 - d. smooth
3. **The serrated surface of a sharp blade viewed under intense light has a _____ finish.**
 - a. bright
 - b. shiny
 - c. matte
 - d. rigid
4. **A dull edge, from which discreet metal particles have been worn away, has worn down its serrations. Under intense light, dull surface appears _____.**
 - a. matte
 - b. rigid
 - c. shiny
 - d. bright
5. **A _____ is designed specifically to differentiate a sharp instrument from a dull one.**
 - a. India stone
 - b. plastic test stick
 - c. ceramic stick
 - d. bright light
6. **Personal protective equipment must be worn during sharpening _____.**
 - a. to protect against sludge
 - b. because shavings are often airborne
 - c. None of the above.
 - d. More than one of the above.
7. **All of the following are common components of sickle scalers, and gracey and universal curettes EXCEPT the _____.**
 - a. handle
 - b. shank
 - c. blade
 - d. offset blade

8. **Universal curettes are designed such that each of the two parallel _____, cutting surfaces are formed by the junction of the lateral and facial surfaces that meet at a rounded toe.**
a. 70 degree
b. 20 degree
c. 90 degree
d. 110 degree
9. **There are two cutting edges to a sickle scaler formed where the lateral surfaces meet the facial surface. These two cutting edges meet at the pointed tip.**
a. The first statement is true, the second statement is false.
b. Both statements are true.
c. Both statements are false.
d. The first statement is false, the second statement is true.
10. **The difference between the instruments is found at the handle. These differences make each sharpening technique a little different.**
a. The first statement is true, the second statement is false.
b. Both statements are true.
c. Both statements are false.
d. The first statement is false, the second statement is true.
11. **When sharpening the toe of the universal curette, the stone should be at a ____ degree angle to the vertical plane and moved up and down in a consistent motion.**
a. 30
b. 60
c. 90
d. 45
12. **When sharpening a gracey curette, use fluid overlapping up and down movement to _____ the toe.**
a. point
b. round
c. square off
d. None of the above.
13. **When sharpening a gracey curette, position the stone against the right cutting blade surface at _____ degrees right of the vertical plane and to the left for left handed operators.**
a. 30
b. 45
c. 60
d. 90
14. **All of the following are sharpening stones EXCEPT the _____.**
a. Arkansas stone
b. India stone
c. Ceramic stone
d. Lime stone

- 15. What is the purpose of gauze as part of the sharpening armamentarium?**
- a. Clean work surface
 - b. Finger protection
 - c. Maintain a sterile surface
 - d. Wipe away metal filings and sludge as they build up

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