

Chapter 9: Instrument Sharpening

There have been a number of interesting developments in periodontal treatment in the past few years. However, the cornerstone of periodontal treatment remains the mechanical debridement of the crown and, more importantly, the root surfaces to remove all mineralized deposits and plaque from the tooth and inflamed soft tissue from the periodontal pockets. Though mechanical scalers can speed some of this work, fine coronal scaling, root planing and subgingival curettage must be done with hand instruments (dental scalers and curettes). As with any piece of equipment, these instruments will only work effectively if they are maintained properly and used as they were designed to be used.

The effectiveness and efficiency of instrumentation depends on the quality of your instruments.

Why sharpen?

Very simply, sharp instruments work, dull ones don't. Sharp instruments mean:

- greater instrument control,
- fewer, lighter strokes to remove deposits,
- increased tactile sensitivity,
- increased speed,
- reduced operator fatigue.

This all leads to increase in the quality of your dental work = better patient care!

Sharpening saves money too. A finely sharpened instrument, consistently maintained will last longer.

- Don't wait until you need to recontour,
- Sharpen at the first sign of dullness.

However

- More instruments are destroyed by poor sharpening than by clinical use.
- As with any procedure, it will only work if done properly.

Your goal when sharpening is to produce a sharp cutting edge while maintaining the original shape of the instrument.

A master set of instruments acts as a reference for maintaining the proper design and shape of the blade.

Basic design of dental scalers and curettes

There are two basic types of dental hand instruments for periodontal work – scalers and curettes.

The curved sickle scaler has a triangular cross-section, a pointed tip and cutting edges on both sides of the face (see Figure #8.5, page 44).

The straight sickle scaler is very similar but has straight, rather than a curved blade. Both instruments are designed for use on the visible portion of the tooth only.

Curettes have a semicircular cross section and a rounded toe. Universal curettes have a face that is perpendicular to the terminal shank with a cutting edge on both sides of the face (see Figure #8.7, page 44). Gracey curettes have their face tipped at an angle to the terminal shank and only the lower edge of the face is considered a cutting edge (see Figure #8.8, page 45). These instruments are designed for root planing and subgingival curettage below the gingiva.

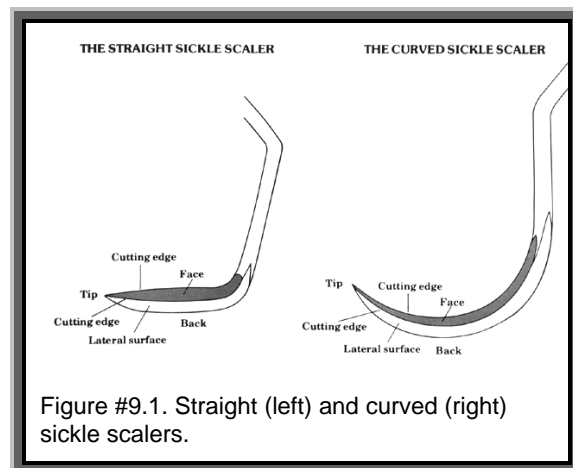


Figure #9.1. Straight (left) and curved (right) sickle scalers.

CURET COMPARISON CHART		
FEATURE	GRACEY	UNIVERSAL
CUTTING EDGES	Has only <i>one</i> cutting edge – the lower edge of the facial surface.	Has <i>two</i> cutting edges, one on each side of the facial surface.
USAGE	Available in <i>sets</i> of instruments, each designed for use in a <i>specific</i> area or on a <i>specific</i> tooth surface.	Designed so that <i>one</i> instrument can be used <i>universally</i> on <i>all</i> tooth surfaces and areas.
CUTTING ANGLE	Offset cutting edge. Facial surface is beveled at 60-70° to shank.	Non-offset cutting edge. Facial surface is beveled at 90° to shank.
FACIAL CURVATURE	The facial surface is curved in <i>two</i> planes, up and to the side.	The facial surface is curved in <i>one</i> plane, up only.

The terminal shank is an important landmark when sharpening instruments. It is that portion of the instrument between the blade and the first bend in the shank of the instrument. When sharpening, you will be looking for the terminal shank, as you must align this portion of the instrument with the sharpening guide to ensure a proper sharpening angle.

Determining the sharpness of your instruments

There are three ways of determining if an instrument requires sharpening.

1. Glare Test: a sharp cutting edge does not reflect light, but a dull one does. If you see light reflecting from the cutting edge, the instrument is quite dull.

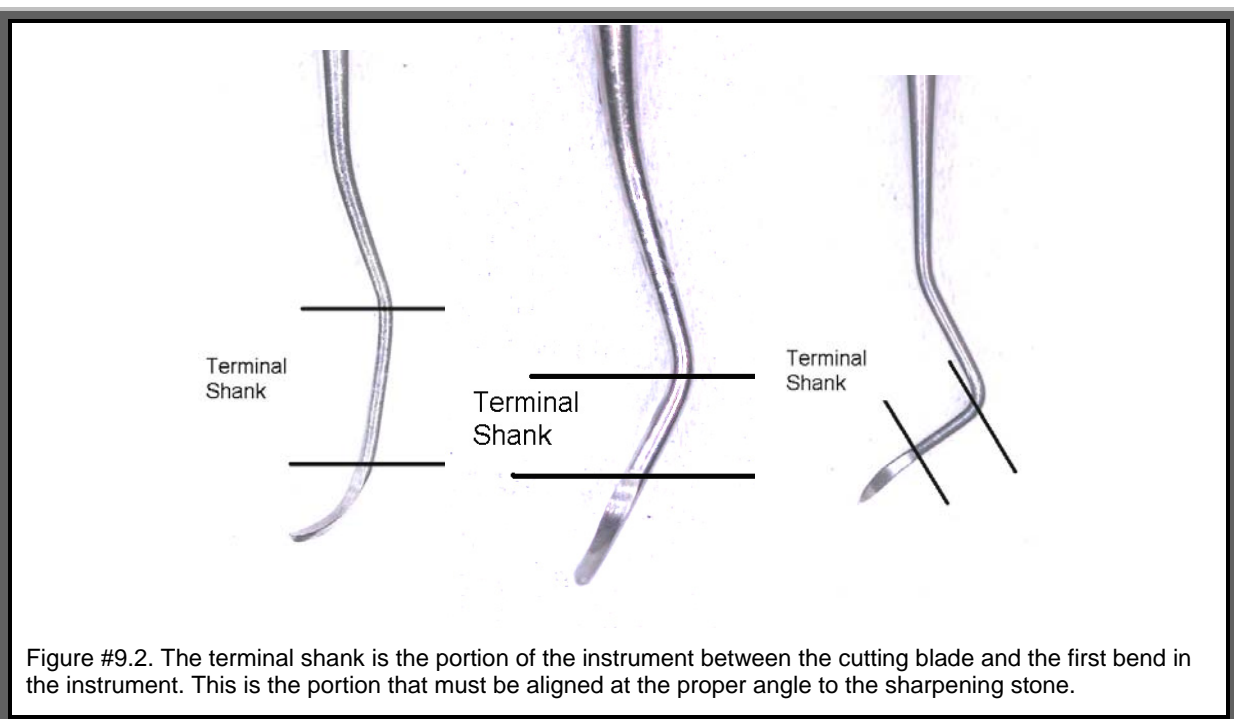
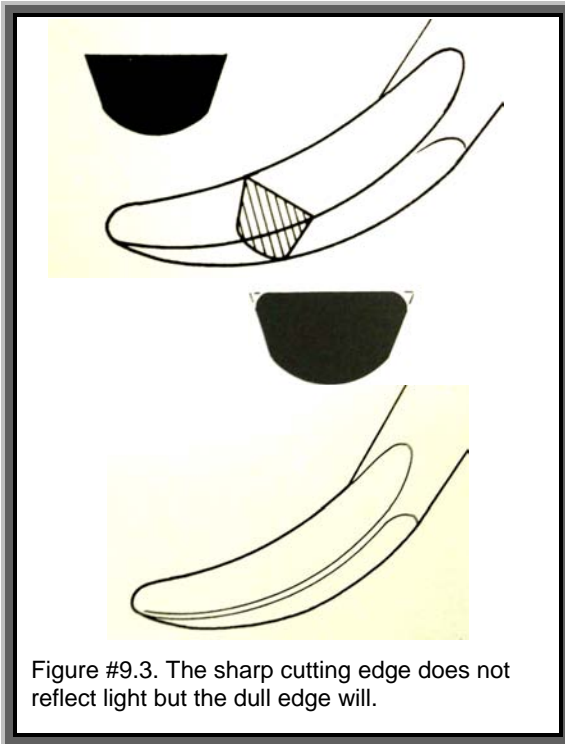
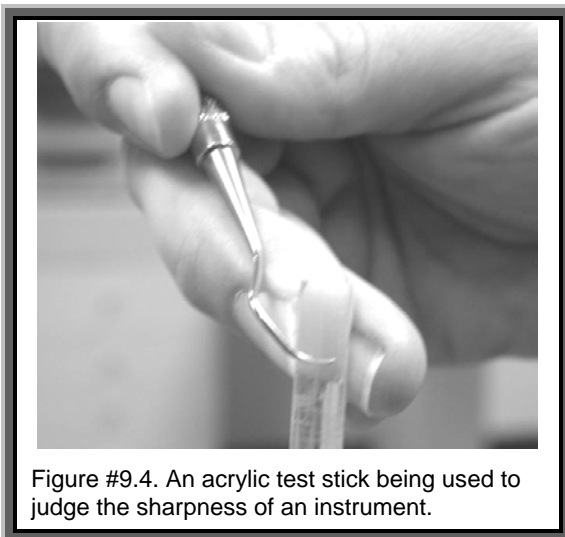


Figure #9.2. The terminal shank is the portion of the instrument between the cutting blade and the first bend in the instrument. This is the portion that must be aligned at the proper angle to the sharpening stone.



2. Acrylic Test Stick: a more sensitive test is to use an acrylic test stick. The stick is held firmly in the non-dominant hand. The instrument is held in a modified pen grasp and placed against the acrylic with the face between 80 and 90 degrees to the long-axis of the stick. The cutting edge is first pulled gently in toward the stick and then an attempt is made to pull the instrument up the stick. If the cutting edge bites into the acrylic, the instrument is sharp. If the instrument does not bite in but slides along the acrylic, the instrument is dull.



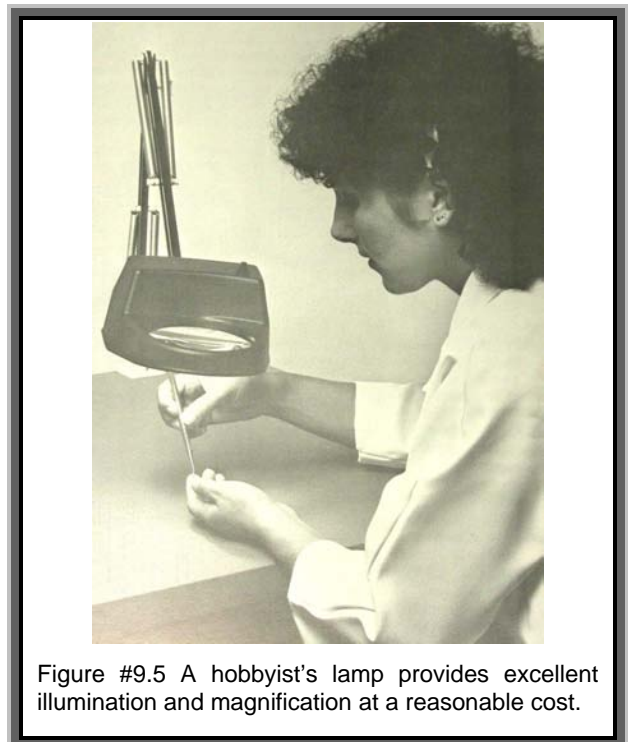
3. Clinical Performance: Once you have had the pleasure of working with sharp instruments, you will develop a tactile sense of when an instrument is losing its edge.

Tools for instrument sharpening

In order to do any job properly, you need the right tools. Fortunately, sharpening of dental instruments does not require very much.

The first things you will need are a tidy, smooth, firm work surface and a comfortable seat. You will also need a source of light and magnification. A head-mounted light source and magnifying head loupe work well if you have these. Otherwise, a hobbyists magnifying task lamp is an excellent choice.

For sharpening the instruments, you also need stones of some sort. Many type are available. I recommend that you obtain two grits of synthetic water slip stones (available from Lee Valley Tools). A 1000-grit stone is a coarse stone for recontouring damaged and very dull instruments. A 4000-grit stone is much finer and is used to create and maintain a smooth surface and a fine cutting edge. These synthetic stones should be lubricated with water and rinsed periodically to remove sludge (stone grit, metal fillings and water) and keep the surface from becoming clogged. They can also be autoclaved at day's end.



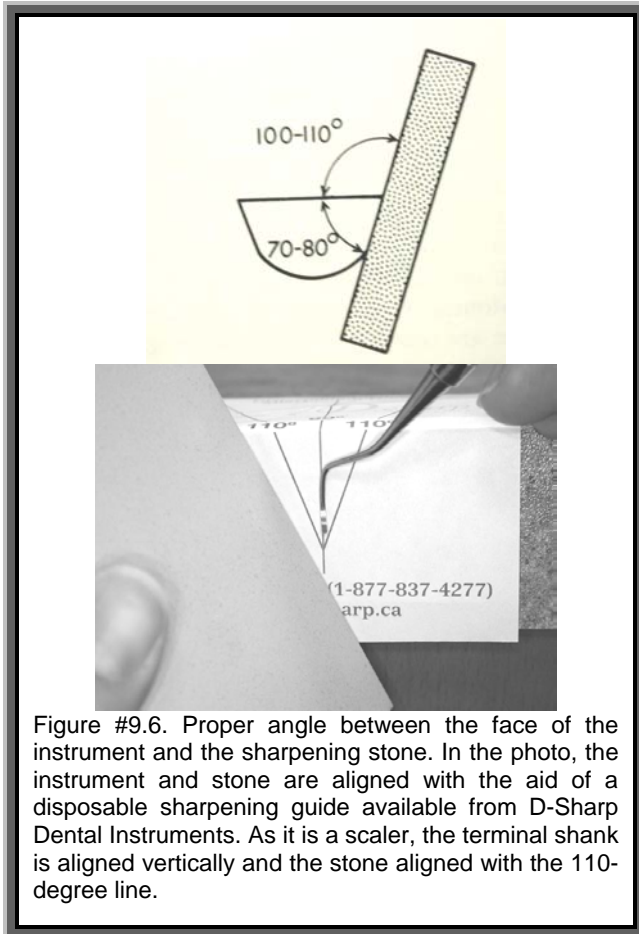


Figure #9.6. Proper angle between the face of the instrument and the sharpening stone. In the photo, the instrument and stone are aligned with the aid of a disposable sharpening guide available from D-Sharp Dental Instruments. As it is a scaler, the terminal shank is aligned vertically and the stone aligned with the 110-degree line.

The cutting edges of scalers and curettes are sharpened using the flat surface of the stones. The rounded sides of the stones can be used for sharpening the concave surface of dental and periosteal elevators.

Pads of disposable sharpening guides are available (D-Sharp Dental Instrument). Such a guide can easily be made with a math protractor and then laminated to the sharpening bench with clear packing tape. These guides allow you to easily maintain the desired angle between the sharpening stone and the instrument to maintain the proper angle between the face of the instrument and the lateral side.

Sharpening Technique

For all scalers and universal curettes, align the terminal shank of the instrument with the vertical central line and align the stone with either of the slanting 110-degree lines. For all Gracey curettes, align the terminal shank with one of the 110-degree lines and align the stone with the other (remember that with Gracey curettes, you only sharpen the lower edge of the face).

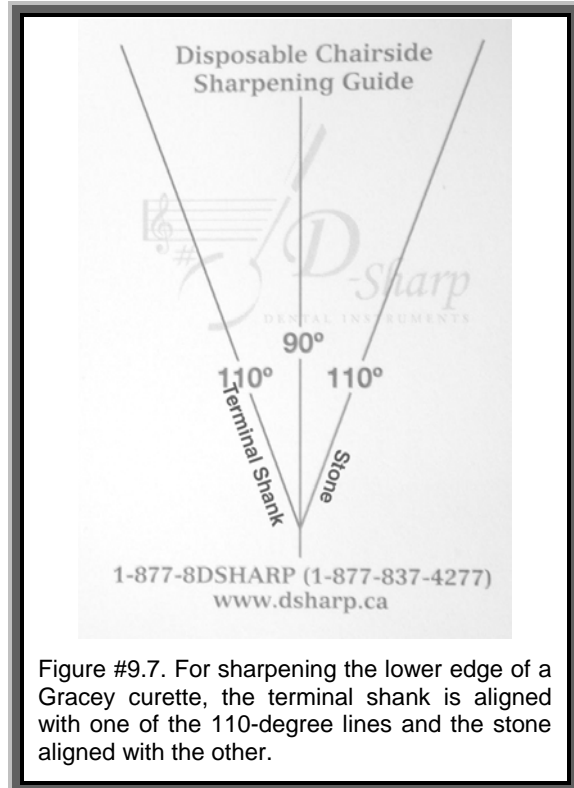


Figure #9.7. For sharpening the lower edge of a Gracey curette, the terminal shank is aligned with one of the 110-degree lines and the stone aligned with the other.

Divide the instrument blade into three sections: heel, middle, toe/tip.

- Stabilize the instrument at proper angle on sharpening guide.
- Place the stone against the instrument at the heel while maintaining the proper angle between instrument and stone.
- Using short, rhythmic strokes and light pressure, move the stone up and down along the guide line.

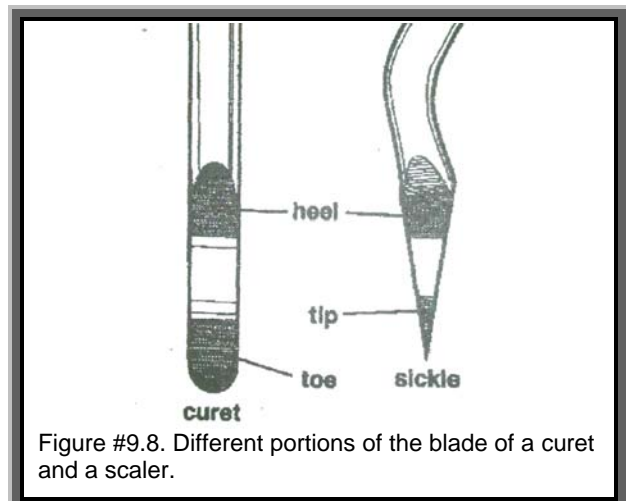


Figure #9.8. Different portions of the blade of a curet and a scaler.

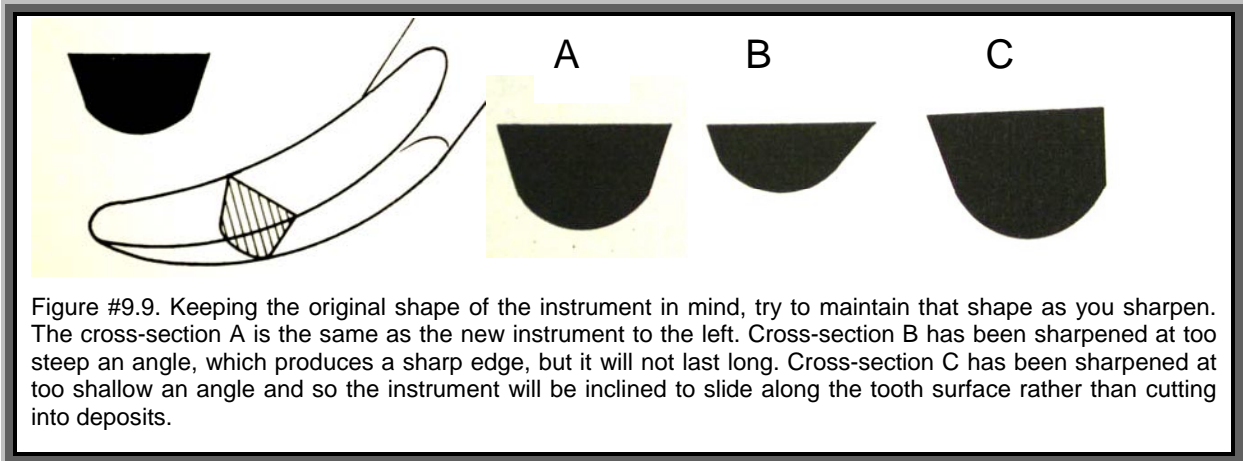


Figure #9.9. Keeping the original shape of the instrument in mind, try to maintain that shape as you sharpen. The cross-section A is the same as the new instrument to the left. Cross-section B has been sharpened at too steep an angle, which produces a sharp edge, but it will not last long. Cross-section C has been sharpened at too shallow an angle and so the instrument will be inclined to slide along the tooth surface rather than cutting into deposits.

- Gradually move from the heel to the middle to the toe/tip of the instrument.
- Apply slightly more pressure on the down-stroke and finish each section with a down-stroke.
- Maintain the proper angle and keep stone in contact with the instrument at all times.

Always keep the original shape of the instrument in mind and try to maintain that shape throughout sharpening.

When sharpening a scaler, try to maintain a sharp point at the tip, but when sharpening a curette, maintain a rounded toe.

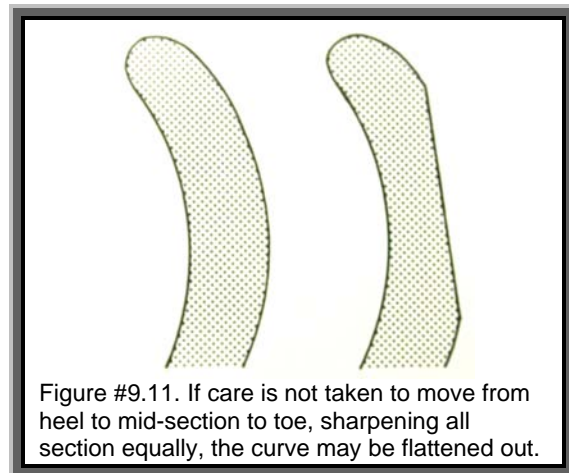


Figure #9.11. If care is not taken to move from heel to mid-section to toe, sharpening all section equally, the curve may be flattened out.

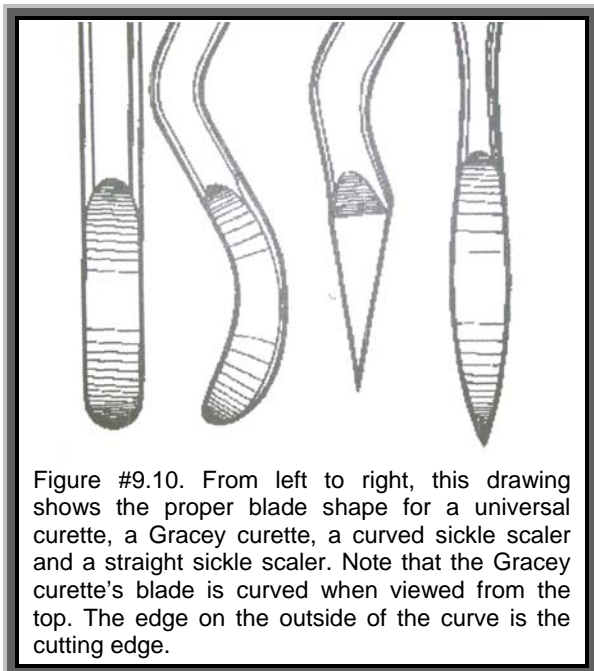


Figure #9.10. From left to right, this drawing shows the proper blade shape for a universal curette, a Gracey curette, a curved sickle scaler and a straight sickle scaler. Note that the Gracey curette's blade is curved when viewed from the top. The edge on the outside of the curve is the cutting edge.

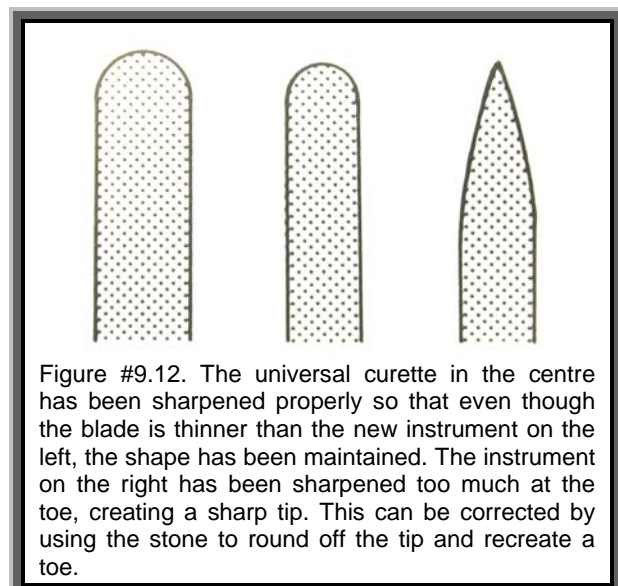


Figure #9.12. The universal curette in the centre has been sharpened properly so that even though the blade is thinner than the new instrument on the left, the shape has been maintained. The instrument on the right has been sharpened too much at the toe, creating a sharp tip. This can be corrected by using the stone to round off the tip and recreate a toe.

Alternate method for aligning stone and blade

Another method for maintaining the proper angles between the stone and the lateral surface of the instrument uses the face of a clock as a guide. In this system, the terminal shank of a scaler or universal curette is aligned vertically (the 12:00 position) and the stone is aligned to point to either 4 minutes to 12:00 or four minutes after 12:00 depending on which side of the blade is being sharpened.

For Gracey curettes, the terminal shank is aligned to point at 4 minutes to 12:00 and the stone at 4 minutes after 12:00 or vice versa depending on which side of the instrument is being sharpened.

An instructional video and workbook on this subject, entitled *Its About Time*, is produced by Hu-Friedy and available from distributors that carry this line of instruments.



Figure #9.13. The face of a clock can be used as a visual guide for aligning stone to instrument. For universal curettes and scalers, the terminal shank lies along the second hand and the stone lies along the minute or hour hand depending on which side is to be sharpened. For Gracey curettes, the terminal shank is aligned along the hour hand and the stone along the minute hand or vice-versa depending on which side of the blade is to be sharpened.

Sharpening other dental/surgical instruments

Dental and periosteal elevators and bone chisels/osteotomes need to be kept sharp for effective use. Given the variety of shapes and sizes, it is not possible to provide detailed notes on this subject.

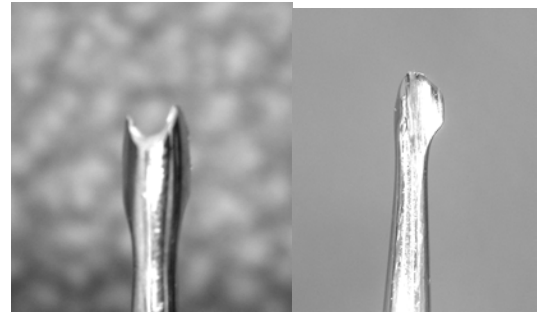


Figure #9.14. This badly damaged elevator was ready for the trash, but was rehabilitated and made ready for use with a mechanical sharpening device seen in Figure #9.15.



Figure #9.15. The Rx Honing Machine. It comes with a diamond wheel for rapid grinding, a carbide composite wheel for fine sharpening and a leather strop wheel for a polished finish. There are also a variety of reciprocating stones that attach to the far side of the machine for a variety other sharpening functions. The sharpening guide hovering over the wheel on the right is used to align scaler, curettes and scissors at the proper angle for sharpening.

Final Thoughts

- Scalers and curettes may need to be sharpened every 10 to 15 working strokes.
- Damaged elevators can often be rehabilitated through sharpening/grinding.
- Instruments and stones should be autoclaved after each use.
- Retipping services are available to replace the blades of worn-out or broken scalers and curettes at a price far below replacement costs.
- Mechanical sharpening aids such as the Rx Honing machine can dramatically speed the process of instrument sharpening. However, if not used properly, they can also dramatically increase the risk of ruining instruments.

Acknowledgements

Some photographs and illustrations and concepts used in these notes were taken from the sources listed below:

Smarten Up, Sharpen Up, published by Hu-Freidy of Chicago, IL.

Clinical Periodontology, published by W. B. Saunders of Philadelphia, PA.

Maintaining the Edge by Rose Hartmann formerly of D-Sharp Dental Instruments, Burlington, ON.