One of the most difficult tasks in periodontal instrumentation is the scaling of tenacious calculus in deep pockets and furcations. Initial ultrasonic and/or hand instrumentation usually results in only partial removal of calculus. Despite our best efforts, there are always residual areas of calculus and biofilm on the roots, especially in anatomic areas such as developmental depressions, line angles, and furcations. Recent improvements in commonly used curets and new types of instruments are improving our ability to scale these areas more effectively.

**Shank Design**

If a rigid Gracey curet does not feel strong or stiff enough during scaling, try using extra rigid shanks. Rigid shanked Gracey curets have been available for many years but extra rigid shanks are relatively new. These stronger, thicker Gracey curets provide the necessary extra rigidity to prevent flexing of the Shank when scaling very tenacious calculus. Manufacturers produce different Shank diameters and different types of metals to provide varying degrees of flexibility or rigidity. Although many manufacturers offer rigid Gracey curets, the Extra Rigid Gracey curets (Hu-Friedy Mnf Co, Chicago) are specially designed for initial preparation of periodontal patients with tenacious calculus (Figure 1). G. Hartzell & Son, Concord, Calif, produces exceptionally rigid shanked Gracey curets with very hard, sharp blades in both stainless steel and carbon steel (Figure 2). Miltex Inc also makes a line of rigid Gracey instruments. Premier Dental Products Co, Plymouth Meeting, Pa, offers both standard and rigid Gracey curets as well as InSite™ Pocket Scalers and Mini Pocket Scalers that have 5 mm and 10 mm markings on the Shank (Figure 3). The mini-bladed Hu-Friedy Vision™ Curvettes were the first curets to feature this type of raised 5 mm and 10 mm Shank marking.

**Sharpening**
American Eagle Instruments, Missoula, Mont, has introduced the new XP™ instruments with thin, sharp blades that require no sharpening (Figure 4, page 28). A special process of stainless steel surface engineering produces a very sharp blade that lasts for months. Although replacement is required when the instrument becomes dull, the instruments are guaranteed to last from 3 to 4 months depending on frequency of use. XP instruments are not made with rigid shanks. Their standard shanks and thin blades are specially designed for fine scaling and root planing and are not intended for initial scaling of large calculus deposits.

The new EverEdge™ technology from Hu-Friedy Mnf Co produces a hard, cryogenically treated steel that requires much less sharpening than traditional instruments (Figure 5). Standard, rigid, and mini-bladed Gracey curets; universal curets; and sickles are all available with the new EverEdge™ metal. Hu-Friedy’s EverEdge™ is available in standard and rigid shanked instruments and can be used either for fine scaling or for initial scaling of heavy, tenacious deposits.

Paradise Dental Technologies (PDT), Missoula, Mont, produces Gracey Curets, Extended Reach and Extended Reach Minis (Figure 6), universal curets, and sickles with very hard, sharp blades that are able to hold an edge even when scaling burnished calculus.

Quetin Furcation Curets

The Quetin (kee-tan) furcation curets from Hu-Friedy Mnf Co are actually very small hoes with a shallow half-moon radius that fits into the roof or floor of the furcation (Figure 6). The curvature of the tip also fits into developmental depressions on the inner aspects of the roots. The shanks are slightly curved for better access, and the tips are available in two widths. The BL1 (buccal-lingual) and MD1 (mesial-distal) instruments are small and fine with a .9 mm blade width. The BL2 (buccal-lingual) and MD2 (mesial-distal) instruments are larger and wider with a 1.3 mm blade width.

These instruments remove calculus from recessed areas of the furcation where other curets, even the mini-bladed Gracey curets, can be too large to gain access (Figure 7). Using mini-bladed Gracey curets and Gracey curvettes in the furca may also unintentionally create gouges and grooves. The Quetin instruments, however, are well suited for this area and lessen the likelihood of root damage.

Diamond Coated Instruments

Diamond coated instruments are used for final finishing of the root surface after other ultrasonic and/or hand instruments have been used to remove deposits. These instruments do not have cutting edges, instead they are coated with a very fine diamond grit. They are abrasive and should be used with light, even pressure against the root surface to avoid gouging or grooving.

When viewing the root surface with the dental endoscope after all tactiley detectable deposits are gone, clinicians have observed small, embedded remnants of calculus in the root surface. Diamond instruments are used like an emery board to remove these minute remnants of calculus from the root, creating a surface that is free of all visible accretions. Diamond files are the final finishing instruments in endoscopic instrumentation. They are capable of producing a smooth, clean, highly polished root surface. When used without endoscopy, diamond files should be used carefully because they have the potential to cause over-instrumentation of the root surface. They will remove too much root structure if used with excessive force, are poorly adapted to root morphology, or are used too long in one place.
Hu-Friedy diamond instruments are the Nabors and the MD (mesial-distal). The Brasseler diamond files F (fine) series includes the F1, F2 (buccal-lingual) instruments and the F3, F4 (mesial-distal) instruments (Figure 8). All of these instruments are used with light strokes that can be vertical, oblique, or horizontal. Controlled circular motions can be used on broader root surfaces and light in and out strokes are used in furcations (Figure 9).

The future development of diamond and other new hand instruments should include even smaller, different shaped working ends to facilitate precise adaptation to root contours. New developments in metallurgy will allow these smaller instrument tips to withstand more pressure without breakage. Although the challenges of root instrumentation are great, instrument manufacturers are constantly working toward new solutions to help make our work as clinicians less difficult and more effective.

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Anna M. Pattison, RDH, MS, is editor in chief of Dimensions of Dental Hygiene. She is associate professor and former chair of the Department of Dental Hygiene at University of Southern California, School of Dentistry, Los Angeles. She is the co-author with her husband Gordon L. Pattison, DDS, of the textbook Periodontal Instrumentation, which is used in dental and dental hygiene schools throughout the United States and the world. A 2005 recipient of the Pfizer/American Dental Hygienists’ Association Excellence in Dental Hygiene Award, she speaks on periodontal instrumentation throughout the United States and internationally.

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