



Peri-Implant Instrumentation

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Dental implants are here to stay and even if they are not placed or restored in your office, patients with implants will be part of your practice. Long-term studies have concluded that the use of titanium implants and abutments to support prostheses are a predictable treatment for partially edentulous and fully edentulous patients.¹ Routine implant maintenance is necessary to maintain peri-implant health and to ensure the long-term success of the implant; however, implants are susceptible to both peri-implantitis and implant failure. Peri-implantitis is an inflammatory reaction in the hard and soft tissues, with loss of surrounding supporting bone.² Implants fail when osseous integration doesn't occur or is destroyed by infection. Peri-implantitis can be prevented and controlled with routine care by the hygienist (see sidebar).

Proper dental hygiene includes removing microbial deposits without altering the implant surfaces or adversely affecting biocompatibility.³ Scratches and gouges may affect the titanium-oxide layer, reducing the corrosion-resistant nature of titanium.⁴ The implant surface can become contaminated with trace elements from the curette material that remains, which can compromise the long-term osseointegration of the implant.⁵ Plastic, graphite and titanium scalers are all within safe limits for instrumenting on implant surfaces. Studies using scanning electron microscopy showed these implant instruments produced no scratches or gouges on the implant surface. Recent studies have not evaluated the effectiveness of these instruments for calculus removal or the effects of instrument debris left on the implant surface.

According to a 1990 *Journal of Periodontology* study, authors Dmytryk, Fox and Moriarty state, "Although the use of a plastic curette did not significantly roughen the implant surface...⁶ there was concern that some of the plastic material may have been smeared or deposited on the implant surface, perhaps altering the biocompatibility of the titanium surface."⁷ Dr. Driver, in a current SEM study noted "Plastic instruments had no effect on the implant surfaces but they did leave plastic debris that was firmly attached to the surface as if melted or embedded to it." These research results would lead to the conclusion, more studies are needed to evaluate the effects of instrument debris left behind on the implant surface and the biocompatibility of this debris with the titanium implant surface. To prepare for peri-implant challenges, a basic understanding of the implants is important. The three implant designs you may see are: endosteal, transosteal and subperiosteal. Endosteal implants are the most frequently utilized implants today in partially and fully edentulous implant patient treatment to replace a missing tooth or teeth with a final restoration or abutment attached. Transosteal and subperiosteal are framework implants historically placed by a surgeon when there is not have enough bone for an endosteal implant. These patients have extensions that protrude about the gingiva in the form of abutments to attach to overdentures or fixed bridges. Overdentures are removable partial or complete dentures, often supported by both implants and tissue. The implant-supported overdenture provides improved stability, function, speech, comfort and self image. It is also important to understand that horizontal bone loss around an implant may appear similar to a pocket; this is to be expected. It measures only 0.5mm to 1mm and is reasonable in the first year, with an anticipated stable alveolar level following this initial healing period.⁸

Implant Maintenance Protocol

1. Review patient's medical history
2. Assess the implant
3. Instrument and polish safely
4. Provide home-care recommendations

Challenges

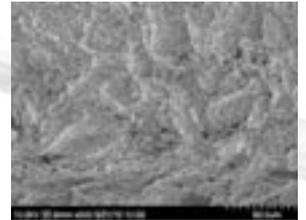
Calculus deposits are primarily supragingival, softer and easily removed with short vertical strokes. Care must be taken to avoid scratching or roughening the implant surface, as this may provide a niche for bacterial accumulation and subsequent inflammation. In the studies conducted to date, plastic, graphite and titanium scalers are the only recommended hygiene instruments that did not alter the implant surfaces. Power scalers and air powder abrasive systems can be used with specific tips, sleeves and powder formulated for implants.⁹ However, caution must be taken when using a plastic sleeve on a power scalers tip to prevent aspirate of the plastic tip, should it become dislodged. Stainless steel instruments and metallic power scaler tips have been shown to gouge or scratch the implant surface and are therefore contraindicated.¹⁰

Every dental office should have at least one go-to implant instrument set for each hygienist, consisting of the instruments needed to meet all implant maintenance challenges. These challenges include removing calculus from a variety of implants and restorative choices. Some are narrow base implants (narrow platform used for lower incisors, congeniality missing laterals, and area with limited available bone) while others have a wide base or wide platform. High water bridges as well as full-arch cement or screw retained implants are difficult to access. Also a small diameter instrument is needed to fit under a Hader clip bar or around O-ring ball or locator abutments that are used under overdentures.

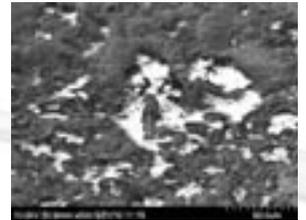
Currently, implant instruments are plastic-, graphite- or titanium-coated or are solid titanium. Implant Prophy+ from TESS are manufactured from polycarbonate plastic and include Gracey and Columbia designs which can be sharpened. Implacare scalers from Hu-Friedy feature a sturdy handle and plastic disposable tips in several designs. Premier Dental Facial implant scalers are made of nonmetallic, autoclavable graphite and can be sharpened. Titanium-coated Suvan-O'Hehir implant scoop curettes are available from G. Hartzell and Son.

Solid titanium instruments are the most recent addition to the market and are available from many companies. They are thinner than plastic or graphite instruments and can also be sharpened. Titanium instruments can be used on like-metal, thus titanium on titanium.¹¹ This advantage provides more strength to dislodge calculus. ImplantPro from Brasseler is available in the Langer series with replaceable titanium tips. Implamate is made by Nordent, also in the Langer series, Barnhart and Universal scalers. The newest in the market are the Wingrove Series, made by Paradise Dental Technologies (PDT). These instruments are available in Nebraska, Langer and Barnhart designs. All are finely adjusted designs to adapt specifically for peri-implant therapy. Instrumentation of an implant is different than scaling on a natural tooth. Natural teeth are anchored in the bone by the periodontal ligament and sulcular epithelium, while implants are osseointegrated, with direct contact between bone and the dental implant with no sulcus or ligament attachment between bone and implant. When instrumenting a natural tooth, the instrument blade is adapted to the tooth surface and gently inserted between the sulcular epithelium and the side of the tooth or root. Then it is moved to the bottom of the pocket. Vertical, horizontal and oblique strokes are used to remove calculus deposits.

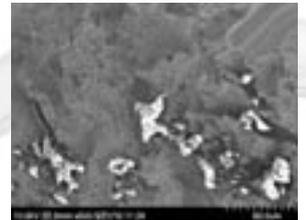
Based on experience, the ideal implant instrument kit should include a plastic periodontal probe, an anterior scaler with a short blade length, a posterior scaler with longer blade



Control implant surface SEM photo



Plastic debris on implant surface



Plastic debris on implant surface after air blast

Photos courtesy of Dr. J Driver UM Division of Biological Sciences 2010.

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Anterior scaler



Wide base implant

length and a universal posterior scaler. Selecting the proper instrument to remove calculus deposits and not harm the implant surface is critical. An anterior implant scaler needs to be small enough to adapt under a Hader clip bar, around a ball or locator abutment, and to scale calculus on exposed implant threads. A side-to-side motion should be used to scale under a Hader clip bar and a short vertical stroke around any anterior ball or locator abutments. To remove calculus from any exposed threads of an implant (anterior or posterior), use the side of a shorter radius blade tip and carefully scale in a side-to-side motion, one thread at a time. For narrow base posterior implants or implants that replace two adjacent teeth, select a longer bladed instrument to stretch under the more bulbous-shaped crowns and under framework of a high water bridge or full arch implant retained prosthesis. Short scaling strokes should be used to dislodge the calculus present on these implants, crowns or frameworks. For wide-base posterior implants, a universal posterior implant scaler should be used with short vertical strokes to dislodge the calculus.

For overdenture implant abutment patients, remove the denture and assess the O-rings or clips inside the denture for loss or wear. Replace O-rings or plastic retention clips if worn out or replace at least once a year.¹² Scale the ball or bar-retained implant abutments with an anterior scaler in a side-to-side motion under the bar and with short vertical strokes around the ball abutments. For hygiene maintenance on overdentures, follow routine directions for proper ultrasonic cleaning and be careful of O-rings or clips.

Understanding various implant designs and having the right instruments for the job will allow you to provide your patients ideal implant care to ensure the long-term success of their implants. ■

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Implant high water bridge Salvin model of overdenture



Implant full arch cemented Salvin model of overdenture

Author's Bio

Susan Wingrove has interwoven health, fitness and dentistry into all aspects of her life. She served as a National Director, writer, trainer and administration for the YMCA. Wingrove is a practicing private practice hygienist, as well as a clinical advisor, writer, and educator for The Implant Consortium. Wingrove is also a National and International speaker on Regeneration, Peri-Implant Therapy, and Advanced Instrumentation, as well as a Fellow & Certified educator for the ADIA.

