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The Dental Hygienist's Role in Implant Evaluation & Assessment

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Implant therapy remains dynamic due to advancements in technology and research, as well as an improved understanding of biological and biomechanical relationships. As the utilization of dental implants increases, however, the potential for complications and long-term maintenance challenges also increases.

The role of the dental hygienist in implant maintenance and care has been well defined. Success comes from the interaction of many variables including:

- Bone quality/quantity;
- Systemic factors and healing;
- Infection and disease;
- Oral habits and nutrition;
- Patient compliance and maintenance;
- Implant design and surface;
- Surgical technique;
- Loading, occlusion, and prosthetic design.

Documentation is also imperative to monitor progress and identify potential complications (Table). All evaluations should be compared to a baseline assessment to monitor for changes. If an anomaly is detected, thorough investigation is required to uncover the reason for the change and how to intercede to avoid progression of any complications.

Evaluation & Assessment

Keratinized tissue is preferred at the perimucosal site. The absence of keratinized tissue can be associated with higher plaque accumulation and gingival inflammation.[1] The color, surface texture, size, bleeding, and inflammation of the soft tissue should be assessed. Bleeding alone is not an accurate indicator of disease, since impingement on well-adapted perimucosal tissue and excessive probing pressure can yield inaccurate results. The presence of plaque and/or ulcerated sulcular epithelium is, however, an indicator that future complications may arise. Bleeding at an implant site during oral hygiene could also be indicative of a potential complication or overly aggressive patient care. Systemic health complications and current medications should also be considered when assessing inflammation and bleeding. The presence of exudate indicates some type of infection that will require intervention and treatment. Excessive stress or strain on a dental implant and restoration can cause bone loss, prosthetic complications, and failure. Occlusion and parafunctional habits can overload implants; adjustments and/or occlusal splint therapy should be employed. If the bone loss is created by stress, there may be no bacteria present, but the pocket created can provide a nidus for anaerobic bacteria, which can be responsible for continued

Table. Dental Implant Assessment

- Tissue consistency and form
- Tissue color
- Inflammation
- Bleeding
- Exudate
- Bone level (radiographic)
- Occlusion, parafunctional habits
- Mobility
- Patient hygiene adequacy

> "Because the longevity of any implant therapy is dependant upon proper tissue maintenance and care, regular hygienic evaluations remain imperative."

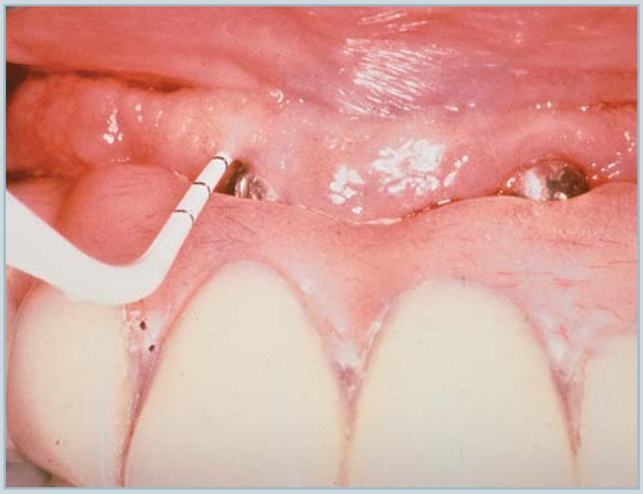

Figure 1. Prosthetic design may hinder probe access to the long axis of a dental implant, especially in a parallel direction.

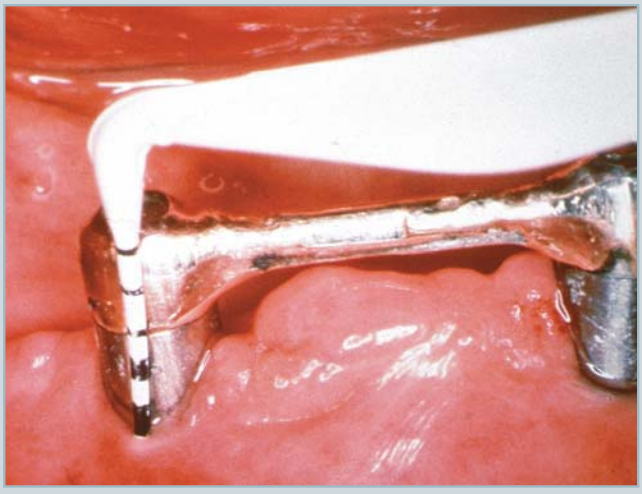

Figure 2. Establishment of a fixed probing point, in order to ensure accurate probing-depth information is obtained.

bone loss even if the stress is removed. Implants do not have a periodontal ligament and consequently act like an ankylosed tooth; absence of clinical mobility under load is an important criterion for success, and mobile implants should not be restored.

Probing Depth

Care should be taken when probing the dental implant, since probing force can penetrate the junctional epithelium. Plastic probes used with gentle pressure are the best tool to avoid altering the implant surface. Prosthetic design can make it difficult—if not impossible—to place the probe parallel to the long axis of the implant (Figure 1). Because gingival hyperplasia and hypertrophy can yield false probing-depth information, establishment of a fixed reference point on the restoration is important to eliminate confusion (Figure 2). Dipping the probe in chlorhexidine prior to usage in an implant sulcus can help avoid bacterial infiltration. To avoid overstressing the gentle tissue cuff, radiographs can be used to monitor mesial and distal bone levels following one year of stable probing depths, and probing can be limited to facial and lingual surfaces.

Radiographic Evaluation

To monitor crestal bone, vertical bitewings are an ideal choice. If a periapical radiograph is taken, the apical region may be omitted. Any sign of blurry threads indicates angulation inaccuracy. The implant-abutment connection should appear as a clear line on a diagnostically-acceptable radiograph (Figure 3). Baseline radiographs should be taken the day of prosthesis delivery, six months following prosthesis delivery, and one year following delivery. In a mouth with only implants—if there are no radiographic changes—evaluation can be made every three years. In a mouth with teeth and implants, radiographs will generally be required yearly. If there are signs of pathology, clinical symptoms, mobility, or advanced bone loss, diagnosis and treatment should be initiated, and an x-ray should be taken every six months for one year after cessation.

Peri-implantitis

Bone loss around an implant generally has a common cause of stress and/or bacteria. Bone can also be lost due to improper occlusion or parafuctional habits. Indications include 0.5 mm of connective tissue forming apical to the abutment/implant junction; the neck of the implant may also affect bone remodeling (eg, below smooth metal). Bone loss to the first thread of the implant within the first year of function is deemed acceptable; bone loss in increments greater than 0.5 mm per year indicates a need for diagnosis, documentation, and possible treatment.

Oral Hygiene

The biologic differences between teeth and implants make implants more susceptible to inflammation and bone loss from bacterial plaque.[2] The lack of a connective tissue barrier around implants creates a unique situation—lack of these fibers means bacteria have an easier path of entry to destroy bone (Figure 4). Plaque control with the use of toothbrushes (ie, manual or automatic), floss (and threader, if necessary), oral irrigator, tufted brushes, interdental brushes (ie, with coated wires), and antimicrobials are all acceptable. Antimicrobials such as cetylpyridium chloride (ie, Crest Pro-Health, Proctor and Gamble, Cincinnati, OH) and chlohexadine gluconate (ie, Peridex, OMNII, 3M ESPE, West Palm Beach, FL; Perioguard, Colgate, New York, NY) inactivate bacteria and are substantive.[3]

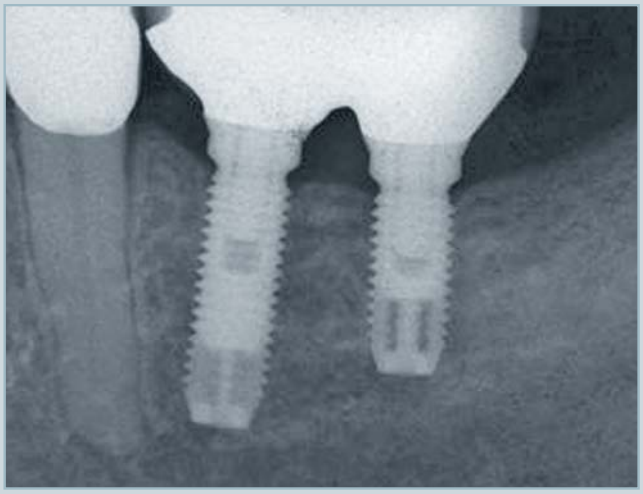

Figure 3. Radiograph demonstrates implant placement. Note the sharp thread lines and clear implant-abutment connection.

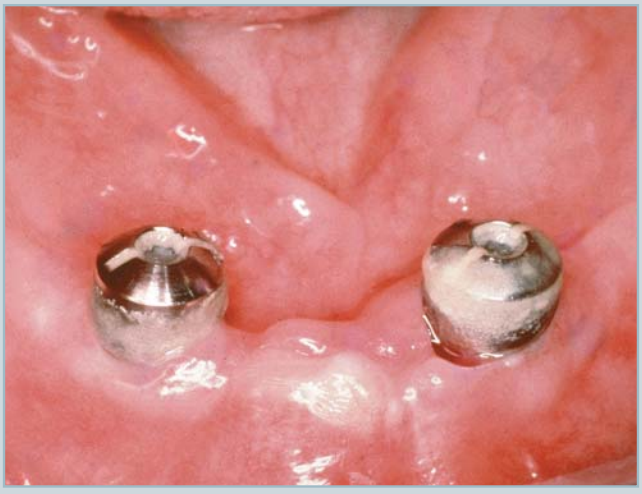

Figure 4. Incisal view of bone destruction at the implant site, resulting from bacterial incursion.

Maintenance Procedures

During all maintenance procedures, care must be taken to avoid scratching or pitting the smooth titanium surface, as this could provide a nidus for bacteria.[4] Additionally, care should be taken to avoid excessive manipulation of the tissue cuff or traumatizing tissue around the implant abutment during instrumentation. Stainless steel tipped instruments and metallic sonic and ultrasonic scalers have been found to gouge titanium.[5,6] Plastic-, nonmetallic-, graphite-, nylon- and Teflon-coated instruments have proven to be safe and effective for removal of deposits on titanium.[7-14] Ultrasonic scalers with a nonmetal tip or plastic sleeve are also advantageous.[15] Polishing with toothpaste, fine, APF-free prophy paste, tin oxide, flour of pumice, and a rubber cup are all safe for titanium.[15]

Conclusion

Because the longevity of any implant therapy is dependant upon proper tissue maintenance and care, regular hygienic evaluations remain imperative. While thorough patient education on proper methods for home care remains vital, continued evaluation via probing, radiographic assessment, and oral examination will allow the clinician to ensure long- term maintenance and overall treatment success. □

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