



PerioDontaLetter



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From Our Office to Yours....

Maintaining good oral hygiene is essential for the long-term health of implant-supported prostheses.

The preponderance of data indicates that the incidence of peri-implant disease is significantly increased in those patients who do not receive dental implant maintenance. Consequently, dental implant maintenance should be a critical component of all dental implant treatment plans.

In addition, identification of individuals with additional risk factors for the development of peri-implant diseases, and, if possible, the mitigation of such risk factors, are critical in reducing the incidence of peri-implant complications.

*This current issue of **The PerioDontaLetter** addresses the current protocols for proper and successful dental implant maintenance, along with the appropriate instruments available to execute those protocols.*

As always, we welcome your questions and comments.

The Dental Implant Maintenance Protocol

Peri-implantitis occurs in up to 47 percent of all implants placed, and peri-implant mucositis in up to 65 percent.

Current findings suggest that dental implant maintenance reduces the risk of the development of peri-implant disease, and is necessary for an implant's long-term success.

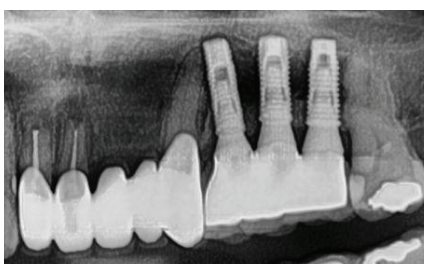
Thus, implant maintenance must be considered a critical part of dental implant therapy, and routine recall, evaluation, radiographs, and maintenance intervals should be

tailored to each patient's risk for the development of peri-implant disease.

The Implant Maintenance Protocol consists of two phases — the assessment phase and the hygiene phase.

Assessment Phase

In the assessment phase, the dentist should first **assess the patient's medical condition** and analyze the risk factors which may contribute to implant failure. These risk factors include a regimen of



Figures 1 and 2. Assessment of an implant's health includes evaluating the width of keratinized tissue around it. Bone and soft tissue loss on the facial surface of an implant can not be detected on radiographs. The tissue loss in this case is directly associated with the lack of buccal keratinized gingiva.

antidepressants such as tricyclic antidepressants like Elivil and serotonin-norepinephrine reuptake inhibitors like Cymbalta and Effexor. A recent study found implant failure in almost one-third of users. Other risk factors include neuropsychiatric disorders, which may make it difficult for the patient to maintain oral hygiene; recent myocardial infarction or cerebrovascular accident, in which implant placement may cause post-ischemia complications; valvular prosthesis placement, in which implant placement may result in prosthetic valve endocarditis; bleeding disorders and the use of anticoagulants, which may cause abnormal post-operative bleeding; cancer and chemotherapy, which may affect osseointegration of the implant; respiratory disease, which may perpetuate asthma or cause airway hyperresponsiveness; liver, endocrine and hormonal disorders, which may delay wound healing or increase the risk of implant failure due to abnormal bone metabolism; smoking; the use of bisphosphonates, which may increase the risk of osteoradionecrosis of the jaw; or anticancer drugs, which may cause bone marrow toxicity and immunosuppression.

Along with a medical history, the patient's dental history should also be evaluated as it should provide information about the patient's prior oral hygiene and peri-implant status. Studies show patients with high plaque scores and those treated for periodontal infections prior to implant placement are more likely to experience implant complications. Patients with a history of periodontitis must undergo Supportive Periodontal Therapy and diligently follow the regular maintenance phase and recall visits.

Secondly, the dentist should perform a diagnostic assessment of **the implant's health**. This should include:

- **Retained Cement.** The risk of peri-implant disease is significantly greater for patients with cemented restorations compared to patients with screw-retained restorations. Residual cement provides a favorable platform for plaque deposition, much like calculus on a tooth.

- **Restorative Design.** A cleansable contour on the implant restoration is important to prevent biofilm attachment and development of calculus.

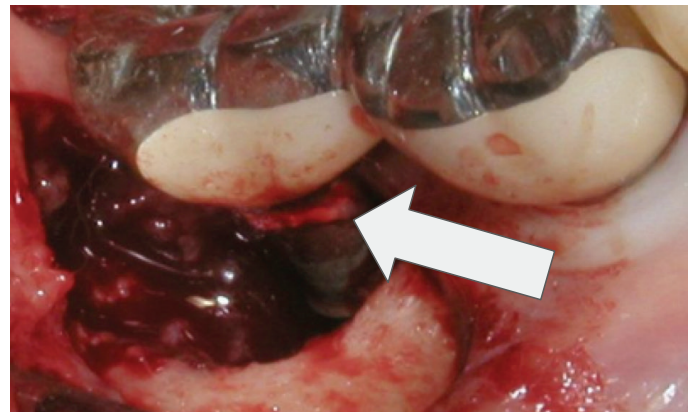
- **Plaque on the Implant and Mucosa** using the following score: 0 meaning no plaque detected, 1 meaning plaque detected only when a

probe is run through the smooth marginal surface of the implant, 2 meaning plaque visible to the naked eye, and 3 meaning an abundance of plaque detected.

- **Peri-implant Bleeding on Probing.** Healthy peri-implant sites are characterized by an absence of bleeding on probing, whereas patients with peri-implant mucositis manifested 67% bleeding on probing, and patients with peri-implantitis manifested 91% bleeding on probing.

- **The Width of Peri-implant Keratinized Mucosa.** Numerous studies indicate a relationship between lack of keratinized tissue and plaque accumulation, bone loss, increase in soft-tissue recession, bleeding on probing, and greater gingival inflammation

- **Peri-implant Probing Depth.** Probing depth on an implant having a supraosseous platform with healthy mucosa is around 2–4mm. For implants placed below the bone crest, particularly in the esthetic zone, the probing depth may be 4-5mm. An increase in clinical probing depth associated with bleeding on probing is an indication of peri-implant disease. Probing measurements should be taken circumferentially around the diameter of the implant.



Figures 3 and 4. Retained cement is another factor to be assessed in determining an implant's health. In this case, severe bone loss is attributed to excess cement which was not removed when the crown was placed.

• **Suppuration.** Suppuration is a significant indicator of disease activity and immediate anti-infective therapy is recommended.

• **Food Impaction Around Implants.** Open contacts often develop on teeth adjacent to implants. This is because teeth naturally have a mesial drift and implants are locked in position through osseointegration. A centric stop on the tooth adjacent to the implant can help prevent mesial drift. Clinicians should monitor the embrasures routinely. Food impaction around implants is one of the most common risk factors for developing peri-implant diseases. It can cause bleeding, edema, inflammation, halitosis, bone loss, pocket formation, implant mobility, and finally implant failure.

• **Stability of the Soft Tissue Margins.** It is important to evaluate and take note of any apical migration of the tissue. Recession can expose rough implant structures, which accumulate more plaque and could lead to inflammation and possible peri-implant mucositis.

• **Implant Mobility.** Implant mobility is a primary factor for identifying a failing implant. Implant mobility can be tested either by the conventional method or with automated devices. The conventional

method uses two rigid instruments which apply a labiolingual force of 500g around the implant fixture to test its rigidity. The automated device currently available is Periotest, a non-invasive device based on the principles of Resonance Frequency Analysis (RFA). A mobile implant almost always needs to be removed

• **Occlusion.** Studies indicate there is a direct correlation between occlusal overload and peri-implant bone loss. Occlusion must be evaluated at regular intervals. A poor implant-abutment interface plays an important role in the mechanical stability of the prosthesis and transfer of occlusal forces. Any deflective or premature contacts that may cause loosening or fracture of abutment screws, implant, or prosthetic failure must be evaluated and corrected. Parafunctional habits if present must be documented and treated accordingly as they may cause rapid bone loss.

• **Crestal Bone Loss.** Loss of crestal bone is a significant indicator of peri-implant disease and the need for initial preventive therapy. Marginal bone loss of 0 to 0.2mm after the first year of function is common and acceptable. However, bone loss of 0.5 to 1mm after the abutment is connected, and during the first few years following implant placement, is

an indicator of excessive stress at the crestal implant-bone interface. The clinician should evaluate and reduce the cause of stress at the implant-bone interface, which could be due to deflective occlusal contacts, cantilever length, or parafunction.

A preventive maintenance visit should last for one hour and should be scheduled every three to four months.

A periapical/bitewing radiograph should be taken annually. These radiographs must be compared with the baseline radiographs to evaluate the crestal bone changes which have or have not occurred in the early stages of loading. In the absence of changes, a radiographic examination should be scheduled every three years. If there are unfavorable changes or crestal bone loss, a radiographic evaluation should be made every six to eight months, along with a stress reduction and hygiene maintenance protocol.

Hygiene Phase

Following the assessment phase, it is the responsibility of the patient to follow the oral hygiene protocol for the implant prescribed by the clinician. Patients often do not follow proper oral hygiene practices from fear of damaging the implant or from overzealous cleaning habits.



Figures 5 and 6. Suppuration is a significant indicator of disease. In this case, a deep periodontal pocket with suppuration was directly related to the presence of subgingival cement.



Figure 7. A curved oral irrigation tip can assist patients in their implant maintenance, especially in All on 4-6 cases

Noncompliance rates have been shown to increase over time after implant placement. Consequently, it is important to remind patients of the importance of maintaining the health of their implants. Reminders can achieve 60 percent compliance with three-month implant maintenance.

The hygiene phase should include:

- Showing the patient how to control underlying medical conditions which may cause peri-implant diseases and ultimately implant failure.
- Educating the patient on the importance of maintaining the health of their implants.
- Training the patient in the use of the appropriate hygiene products to ensure the success of their implants.

Oral implant hygiene methods fall into two categories: At-Home Implant Care and In-office Implant Care.

At Home Implant Care includes:

- **Brushing** with manual, automated/sonic, motorized power, end tufted and tapered rotary brushes. Patients should be instructed to follow the BASS technique of brushing. To access the interdental region, or below the implant bar or connector, a tapered rotary brush can be used. Automated Sonic brushes are superior to manual brushes in effectively removing plaque, providing improved interproximal cleaning

without damaging the peri-implant tissue, and they can be used by patients with limited dexterity. In difficult to access regions, especially the posterior area, end tufted brushes or tapered rotary brushes are recommended.

• **Interproximal Cleaning** using interproximal cleansers, including foam tips, interproximal brushes and disposable wooden picks; floss; water irrigation; and chemotherapeutic agents, including iodine and chlorhexidine. Patients should be instructed to place floss sub-gingivally until resistance is met. Floss can also be used to deliver antiseptic agents to implants daily. When using an interproximal brush with an exposed metal tip, care should be taken not to damage the peri-implant soft tissue and abutment surface. Water irrigators using antiseptic agents can be especially useful.

• **Chemotherapeutic agents** can be delivered to the implant surface using the proxy and foam tip interdental brushes. Water stream from irrigators should be directed inter-proximally and horizontally between implants to avoid damage to the peri-implant tissues. Rinses may be effective for patients with recurrent tissue inflammation.

In Office Implant Care includes scaling, polishing and the application of chemotherapeutic agents. An intraoral camera can document oral care.

• **Scaling:** If implants are showing signs of infection, more damage will occur from not instrumenting the threads than from cleaning them, even if it results in a scratched implant surface. They are already corroded! Short working strokes with light pressure should be used to prevent damage to the peri-implant tissues.

• **Chemotherapeutic agents** such as Arestin, PerioChip, and Atridox, may be applied subgingivally at the base of the implant sulcus using a plastic irrigation tip. Neutral sodium fluoride may be used instead of other fluorides, which may have an acidic pH and thereby alter the implant surface.

Conclusion

Establishing an adequate hygiene protocol is indispensable to the success of implant-supported restorations.

While much implant success is dependent upon patient compliance, we dental professionals are responsible for providing our patients the guidance and tools to properly maintain their implants.

It is also our responsibility to examine and record any changes or concerns we find during their regular maintenance appointments.

The more we know about implant maintenance and care, the better we can serve our implant patients.



Figures 8 and 9. Interproximal brushes (TePe) and wedge-shaped gingival cuff/embrasure area cleaning devices (Proxi-Tip) are very useful in cleaning hard-to-reach areas on a daily basis by the patient.