Peri-implant diseases: prevention and management

Drs. Richard Horwitz, Eddie Scher, and Nikos Donos look at the appearance, prevention, and management of peri-implant diseases

Nowadays, peri-implant diseases are an increasing reality that we are confronted with in our profession. If they are not prevented, recognized early, or managed appropriately, they may lead to failure of the implant.

This article aims to provide an update into the nature of peri-implant disease, the diagnosis, and appropriate prevention and management.

What are peri-implant diseases?

In general, peri-implant diseases are characterized by a host inflammatory response to opportunistic oral microbiota and are classified into peri-implant mucositis and peri-implantitis.

Peri-implant mucositis can be defined as a reversible inflammatory process residing in the soft tissues surrounding a functioning dental implant, whereas peri-implantitis is defined as an inflammatory process characterized by loss of surrounding bone in addition to the symptoms of the soft tissues (Lang, et al., 2011a).

How big a problem is this?

Dental implants present with very high survival rates (Albrektsson, et al., 1987; Pjetursson, et al., 2008). These, however, only report whether the implant is present at a certain moment in time, without evaluating whether it presents with biologic or technical complications.

At the same time, implant success includes various clinical and radiographic criteria (Ong, et al., 2008), which may often be reported using different terms (Needelman, et al., 2012).

The prevalence of peri-implantitis in the UK is still relatively unknown. Other reports have suggested that prevalence of peri-implantitis affects between 28% and 56% of severe chronic periodontitis patients and 12% and 43% of implant sites (Zitzmann and Berglundh, 2008). Another systematic review suggested prevalence at a patient level of 20% (Mombelli, et al., 2012).

How do we know if an implant is affected?

To diagnose peri-implant disease, the following steps need to take place during clinical examination:

- Probing around the implant
- Radiographical examination

The European Federation of Periodontology (EFP) consensus paper supports the use of a standard periodontal (UNC15) probe (Lang and Berglundh, 2011a). There is no conclusive evidence to demonstrate any detrimental effect that probing per se could pose around the implant (plastic or metal).

Probing needs to take place after loading of the implant, as a baseline, and at every maintenance visit.

If possible, removing the prosthesis can provide a more reliable probing depth reading (Serino and Ström, 2009).

Radiographical examination

Periapical radiographs should be taken at the time of loading the implant fixture so that a comparison can be made with future radiographs taken at assessment visits.

Following clinical change such as increased probing pocket depths, bleeding on probing or suppuration around an implant, an additional radiograph should also be taken, in order to evaluate the bone levels around this implant.

Bleeding on probing (BOP)

BOP has been shown to be a high negative predictor for implant disease (Jepsen, et al., 1996; Fransson, Wennström and Berglundh, 2008). This means if there is no bleeding, there is a low probability of disease.

At the same time suppuration is associated with active forms of disease, according to Fransson, Wennström and Berglundh, especially in smokers (2008).

Peri-implantitis can be classified as an incidence of probing pocket depth (PPD) ≥5 mm with bleeding on probing and/or suppuration and radiographic signs of bone loss.

Educational aims and objectives

This article aims to discuss the growing issue of peri-implantitis and present some suggestions for its prevention and management.

Expected outcomes

Implant Practice US subscribers can answer the CE questions on page XX to earn 2 hours of CE from reading this article. Correctly answering the questions will demonstrate the reader can:

- Identify the etiology of peri-implant diseases.
- Identify the steps needed to be taken during the clinical examination for diagnosis of peri-implant disease.
- Recognize the risk factors and indicators of peri-implant disease.
- Realize the current thinking regarding management of peri-implant disease in patients.
- Realize the predictability of various treatment of peri-implant mucositis and peri-implantitis.

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Implantitis is 3.1 to 4.7 (Heitz-Mayfield and Huynh-Ba, 2009). For 3 weeks (Pontoriero, et al., 1994). There is a statistically significant risk of peri-implantitis if left untreated, as shown by Lang and colleagues (2011b). Adequate oral hygiene measures and a cleansable prosthesis are very important in order to prevent peri-implant infection (Serino and Ström, 2009). Over-contoured restorations, poor pontic design or loose approximation of implants can provide obstacles for patients in the maintenance of their implants. An observational study conducted in 2009 showed that approximately 50% of implants with peri-implantitis had a lack of accessibility for oral hygiene practices (Serino and Ström, 2009).

It has also been found that with poor oral hygiene, the patient presents with an odds ratio of approximately 14 times and is more likely to develop peri-implantitis (Ferreira, et al., 2006). There is a statistically significant risk of developing peri-implantitis in patients with periodontitis, even in those patients who are treated previously and declared as “periodontally stable.”

History of periodontal disease

There is a statistically significant risk of developing peri-implantitis in patients with periodontitis, even in those patients who are treated previously and declared as “periodontally stable.”

It has been calculated that the patient with previously treated periodontitis, the reported odds ratio of their developing peri-implantitis is 3.1 to 4.7 (Heitz-Mayfield and Huynh-Ba, 2009).

While this is significant, the reported implant survival rate for this cohort was still above 90%. Despite this, the success rates that indicate incidence of biological complications vary between studies from 58% to 100%. However, this is based on 5-year data, and different groups have suggested that the real long-term damage of peri-implantitis may present itself in survival data after 5 years (Heitz-Mayfield and Huynh-Ba, 2009).

Residual probing pocket depths ≥5 mm can serve as an even greater risk for peri-implant disease. Prevalence of peri-implantitis was found to be 11.8% to 13.3% in patients with a history of periodontitis (with no residual probing depths >5mm), compared to 30.1% of patients with active peri-implantitis (with periodontal probing depths >5mm) (Cho-Yan Lee, et al., 2012).

Smoking

Smoking not only has a negative impact on the periodontal tissues, it has also been shown to influence the prevalence and progression of peri-implant diseases (Roos-Jansåker, et al., 2006). Smokers have been shown to have a higher incidence of peri-implant bone loss in periodontal patients under maintenance (Fransson, Wennström, and Berglundh, 2008).

Diabetes

Patients with poorly controlled diabetes and periodontitis have been shown to present with an increase level of systemic “inflammation, relative stress, and apoptosis” (Retzepi, Lewis and Donos, 2010; Genco and Borgnakke 2013). This can contribute to destruction of periodontal tissues and impair wound healing, as shown by Genco and Borgnakke (2013).

Studies of patients with diabetes also reflect an increase in prevalence for peri-implantitis (Ferreira, et al., 2006).

The degree of glycemic control may also have a role, as early investigations seem to suggest that there may be limited clinical and microbiological differences in patients with diabetes and those with good glycemic control (Tatarakis, et al., 2014). Other risk indicators, which we need to be aware of in our patients with implant fixtures, include but are not limited to: genetic factors, alcohol consumption, systemic disease and stress (Heitz-Mayfield, 2008; Dereka, 2012).

How do we manage the patient with peri-implantitis?

Following diagnosis of peri-implant diseases, an appropriate management is vital in order to prevent deterioration of the peri-implant tissues. The goal of any treatment should be elimination/reduction of the pockets around the implants, with absence of suppurration, BOP, bone loss, and maintenance of healthy re-established peri-implant tissues (Heitz-Mayfield and Mombelli, 2014). The Cumulative Interceptive Supportive Therapy (CIST) protocol has been suggested as a step-by-step guideline for the treatment of peri-implant diseases (Lang, et al., 2004).

The protocol, which is adapted in a flow diagram in Figure 1, provides guidance as to the stage/type of intervention that may be indicated at different clinical conditions. As probing depths increase along with BOP and bone loss, cumulative interventions are displayed in Figure 1 (A to D).

It also reinforces the need to take peri-apical radiographs when there are probing depths ≥5 mm with bleeding on probing. Other protocols have been written, including the Association of Dental Implantology (ADI) guidelines on treatment of peri-implant diseases (2012).

As peri-implant disease is bacterial in origin with contamination of the surface of the implant, mechanical debridement is the first line to any approach to therapy. Many treatment modalities have been suggested for mechanical debridement and decontamination of the implant surfaces, including titanium curettes, plastic-coated ultrasonic inserts, air abrasion units, titanium brushes, and the use of chemical or photodynamic therapies — just some of the approaches that have been attempted.

How predictable is treatment?

Non-surgical therapy has been shown to be effective in the treatment of peri-implant mucositis. However, treatment of peri-implantitis has shown a limited response ( Klinge, et al., 2012).
The adjunctive uses of local or systemic antibiotics have been shown to reduce bleeding on probing and pocket depth, but with modest outcomes (Renvert, et al., 2008).

Due to the different implant surface characteristics and therefore limited access to the biofilm, surgical treatment may be indicated at an earlier stage and more frequently compared to conventional periodontal therapy (Heitz-Mayfield and Lang, 2010).

Summary
Preventive approach should start in the implant planning stages and case selection. It is important to assess the patient risk profile so that maintenance can be targeted appropriately.

Figure 2 (Donos, Laurell and Mardas, 2012) demonstrates these risk profiles in a simple way for us to start this preventive process and case selection from the early stages in treatment planning. The majority of patients would fit into this lower risk category.

It is of utmost importance to continually monitor the health of our patients and their implants. Regular maintenance visits are essential depending on the risk profile of the patient. Supportive periodontal therapy is vital in the prevention of peri-implant disease, as reported by Donos, Laurell and Mardas (2012).

A summary of what can be included in the visit is shown as follows:

- Parallel periapical radiographs taken immediately post-implant fixture placement at the time of loading and at the 1-year review appointment (Lang and Berglundh, 2011a)
- Detailed oral hygiene advice, demonstrating how to perform efficient plaque removal
- Depending on the severity of periodontal disease and presence of risk factors for disease progression, examination should take place every 3, 6, or 12 months. This should include PPD, BOP, and plaque scores (Donos, Laurell and Mardas, 2012)
- Further radiographic examination should take place in the presence of a peri-implant site with BOP and PPD ≤5 mm (Lang, et al., 2004)
- Professional hygiene treatments including supra- and subgingival debridement should be performed every 3 to 6 months with appropriate instruments (Donos, Laurell and Mardas, 2012)
- Following a management protocol is vital in preventing peri-implant disease. This empowers the clinician to recognize this condition and manage appropriately.

REFERENCES