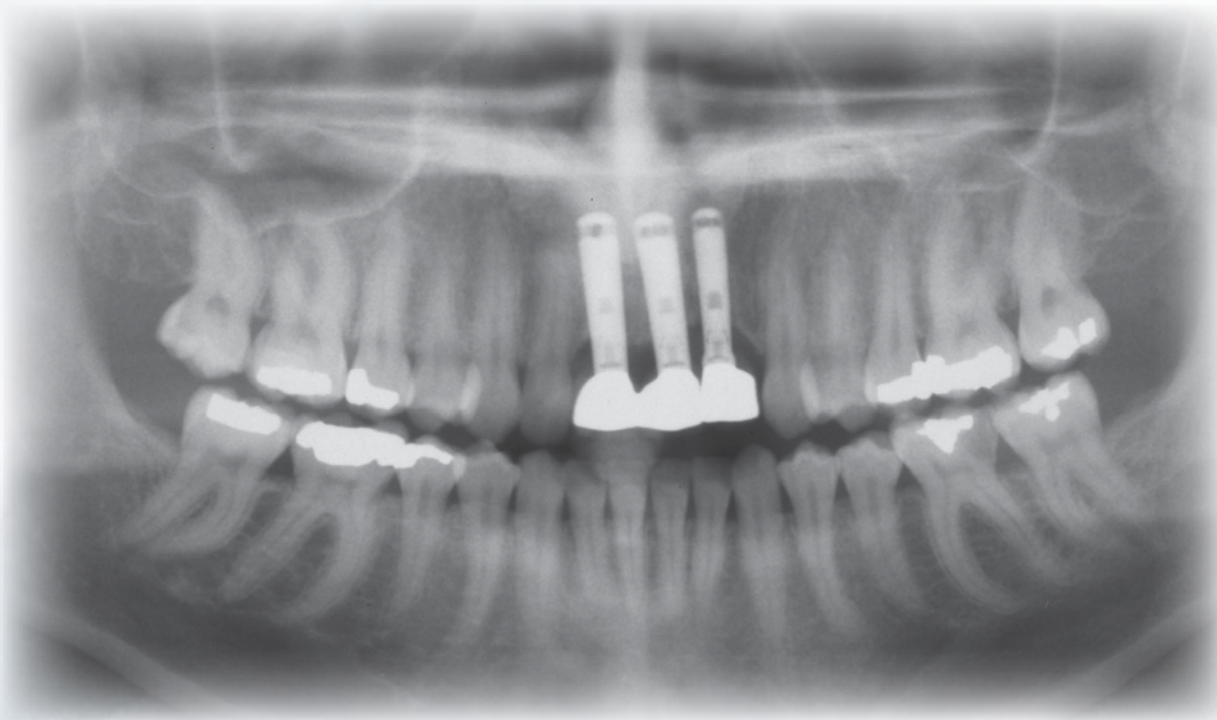


Peri-Implant Disease: Prevention, Diagnosis and Nonsurgical Treatment



by *Susan S. Wingrove, RDH and
Robert A. Horowitz, DDS*

Proper maintenance of the peri-implant soft tissue, including the evaluation and treatment of peri-implant inflammation and bone loss, plays a key role in ensuring the best possible long-term outcomes for implant therapy. With a clear understanding of peri-implant disease, how it develops, and the methods involved in preventing, diagnosing and treating the condition, its effects can be mitigated.

Peri-implant disease resembles periodontal disease in its structure, but has different criteria and treatment options. Peri-implant mucositis can advance to peri-implantitis around implants in a manner similar to the progression of gingivitis to periodontitis around natural teeth.¹ Collective-

ly, peri-implant mucositis and peri-implantitis are known as peri-implant disease.^{2,3} Early detection and treatment are essential for effective treatment of peri-implant inflammatory disease.

Peri-implant mucositis manifests itself in the soft tissue with signs of redness, swelling and generalized inflammation (*Fig. 1*). It mirrors the effects of gingivitis around natural teeth and is confined to the soft tissues only, with no evidence of radiographic bone loss. Mucositis is best treated when detected early, through elimination of the factors contributing to inflammation, regular in-office implant maintenance, and improved dental care at home.



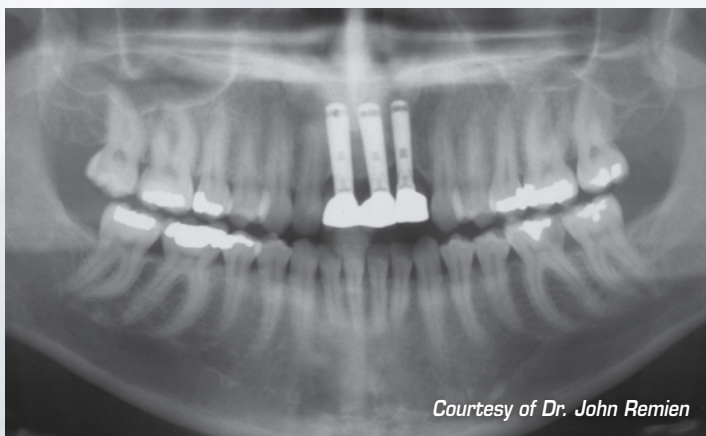
Courtesy of Dr. Lloyd Tucker

Figure 1: Gingiva above tooth #9 exhibiting symptoms of peri-implant mucositis.



Courtesy of Dr. John Remien

Figure 2: The inflammation and sulcular crevices forming around these maxillary implants are indicative of peri-implantitis.



Courtesy of Dr. John Remien

Figure 3: The onset of peri-implant disease is illustrated by the saucer-shaped voids surrounding the maxillary implants near the surface of the gingiva in this radiograph.

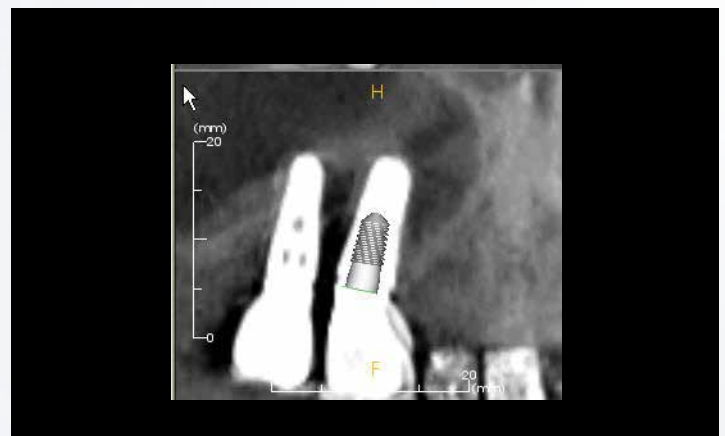


Figure 4: The three-dimensional imagery offered by CBCT scanning facilitates detection of bony lesions on the facial, lingual and proximal aspects that are often not visible through conventional radiography.

Peri-implantitis begins with the same symptoms as mucositis and can be induced by occlusal stress, bacteria, excess cement or a combination of factors. A sulcular crevice develops around the implant-bone interface as a result of inflammation in the supra-alveolar gingival tissues (Fig. 2). This allows bacteria to migrate apically and an infection to develop, ultimately leading to bone loss. Radiographically, this phenomenon appears as a radiolucent saucer shape surrounding the implant (Fig. 3).

Peri-implantitis is often compared to periodontal disease, but there is one important difference: Peri-implantitis can develop on the facial and lingual aspects of the implant in a manner that may be undetectable by traditional radiographs. Studies have shown that cone-beam computed tomography (CBCT) technology is effective in identifying facial, lingual and proximal bony lesions around implants (Fig. 4).⁴ Diagnosis of peri-implantitis can be aided by ob-

taining baseline bone-level scans 360 degrees around the implant. This involves taking a CBCT scan prior to placement of the implant, at the time of implant placement and when the implant restoration is loaded. Then, if peri-implant disease is suspected, subsequent CBCT scans can be compared with the baseline scans for definitive diagnosis of alveolar bone loss, including the location and severity.⁴

Prevention

According to a statement released in 2013 by the American Academy of Periodontology (AAP) on the “current diagnoses and clinical implications of peri-implant disease,” there are risk factors that can increase the potential for peri-implant disease.⁵ These factors include previous periodontal disease, poor oral hygiene, residual cement from cement-retained restorations, smoking, genetic factors, poorly controlled diabetes and occlusal overload.^{5,6}

Based on these risk factors, an updated medical and dental history is essential in determining the appropriate in-office maintenance schedule for each implant patient. The dental history should include the date of implant placement as well as the type, coronal design and manufacturer of the implant.

For the restoration, the record should indicate the date the implant was first loaded into occlusion and whether a screw- or cement-retained restoration was used. The detection and removal of residual cement from subgingival areas is helpful in preventing inflammation and peri-implantitis.

A key preventive measure is to place previous periodontal disease patients on a shorter implant maintenance interval — generally three to four months — to ward off peri-implant disease.

Diagnosis

According to Dr. Stuart Froum, “The diagnosis of peri-implantitis includes periodontal probe depths (PPD) of 5–6 mm or greater, bleeding on probing (BOP), exudate, and bone loss greater than 2–3 mm around the implant.”¹ Treatment protocol depends on the extent of the probe depths and whether any radiographic bone loss is evident, making it essential for every implant maintenance appointment to begin with the hygienist or dentist gently probing around the implant with 0.15–0.20 N of threshold pressure.^{7, 8} The guidelines below should be followed in the preliminary diagnosis of peri-implant disease.³

Clinical Signs of Peri-Implant Disease

| Assessment | Periodontal Probing Depth (PPD) | Bleeding on Probing (BOP) | Exudate | Radiographic Bone Loss |
|------------------|---------------------------------|---------------------------|----------|------------------------|
| Healthy | < 4 mm | None | None | None |
| Mucositis | > 4 mm at one site | Possible | Possible | None |
| Peri-Implantitis | > 5–6 mm | Bleeding present | Present | > 2–3 mm |



Courtesy of Dr. Marco Padilla and Heather Rogers, RDH

Treatment

The primary method for the nonsurgical treatment of peri-implantitis involves the mechanical debridement of plaque from the surface of the implant using titanium implant scalers or ultrasonic magnetostrictive implant inserts to improve the health of the peri-implant soft tissue, alleviate inflammation and mitigate bleeding (*Fig. 5*).⁹ Note that submucosal debridement alone may not be adequate for the removal of the bacterial load from the surfaces of implants with a peri-implant pocket depth greater than 5 mm or more than 50 percent of the implant length.¹⁰ Early detection and treatment is critical for successful peri-implant disease outcomes.

Figure 5: Debriding plaque from the surface of the implant with a titanium implant scaler helps to alleviate subgingival bleeding, inflammation and the presence of bacteria.

Conclusion

Peri-implant disease is generally not painful, and patients may not be aware that they have inflammation or an infection surrounding their implant. Early detection involves leveraging a combination of diagnostic data to properly identify peri-implantitis, including BOP, presence of suppuration and radiographic changes in bone levels. The identification of bony lesions can be aided by CBCT scanning. For cement-retained implant restorations, cement residue is sometimes found around the circumference of the coronal portion of the abutment or implant. This makes early detection and removal of all cement residue crucial.¹⁰ Effective treatment of peri-implant disease begins with regular in-office comprehensive diagnostic exams and implant maintenance visits to protect the patient's investment and ensure a healthy and successful implant restoration.

Prevention of peri-implant disease should begin prior to implant placement and continue on through the restorative phase of treatment. Placing the implant in its proper location and in vital bone sets up a successful restorative outcome. An ideal custom abutment should be fabricated that includes a properly located abutment-crown junction.¹¹ The custom abutment should establish an esthetic emergence profile that facilitates optimal patient and professional cleaning. Utilizing a dental laboratory that will deliver the appropriate restorative components helps to meet these goals. By properly planning the restorative phase before the implant is placed, the biologic and cosmetic outcomes are maximized, and the risk of peri-implantitis is reduced.

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