Nonsurgical management of inflammatory periimplant disease caused by food impaction: A clinical report

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The incidence, etiology, diagnosis, and management of infections and inflammatory disease around dental implants continue to be controversial. Although various researchers have described different etiologies and their ensuing treatments, none have proven to be definitive. Terms such as perimplant mucositis and periimplantitis have gained popularity. Food impaction into the perimplant sulcus and its role in inflammatory periimplant disease has not been previously reported in the literature. This article describes the nonsurgical management of a patient with a maxillary implant-supported overdenture, a recent history of pain, and suppurative around one of the implants. A detailed analysis of the patient’s history and clinical findings indicated a differential diagnosis of impaction of husks of masticated sunflower seeds into the perimplant sulcus. The situation was successfully resolved in 1 week by local irrigation with 0.12% chlorhexidine gluconate and the use of systemic antibiotics. (J Prosthet Dent 2014;111:96-100)

The incidence, etiology, diagnosis, and management of infections and inflammatory disease associated with dental implants are controversial. Inflammatory periimplant disease can be broadly grouped into plaque-induced inflammatory diseases and nonplaque-induced inflammatory diseases (Table I). Historically, the terms ‘perimplant mucositis’ and ‘periimplantitis’ have been used to describe plaque-induced inflammatory diseases around dental implants. Little reliable evidence is available regarding the most effective interventions for treating periimplantitis. Perimplant mucositis has been defined as “the presence of inflammation in the mucosa at an implant, with no signs of loss of supporting bone.” However, the definition of periimplantitis is controversial and has been defined variously by different sources. In the Glossary of Periodontal Terms, it is defined as “inflammation around a dental implant and/or its abutment.” An alternative, more-specific definition is “plaque-induced progressive marginal bone loss observed on radiographs with clinical signs of infection of the perimplant soft tissues.” A definition from a recent consensus group has described periimplantitis as “infection with suppuration associated with clinically significant progressing crestal bone loss after the adaptive phase.”

Although these definitions appear similar, and state that periimplantitis is an infection with progressive bone loss, the key difference is one definition’s emphasis on dental plaque and the other’s emphasis on the presence of suppuration. Although the implication that plaque and its associated pathogenic microorganisms cause dental-implant infection is controversial, a recent consensus group noted that many other etiologic factors may cause infection, with progressive bone loss, and argued that periimplantitis is an inappropriate term to describe all the varieties of progressive bone loss around dental implants.

Food impaction around natural or artificial teeth is a well-recognized problem in dentistry. The Glossary of Periodontal Terms defines food impaction as “the forceful wedging of food into the interproximal space by masticatory pressure (vertical impaction) or the forcing of food interproximally by tongue or cheek pressure (horizontal impaction).” For implant restorations, this can also include the wedging of food into the perimplant sulcus. Common foods that are empirically associated with food impaction include popcorn, seeds, legumes, and nuts. The hull (husk) found in most seeds, including sunflower seeds, is primarily composed of cellulose, a polysaccharide that cannot be broken down by human enzymes. The difference in the orientation of supracrestal connective tissue between natural teeth and dental implants is well understood. The fibers around the implants run parallel to the abutment surface and only adhere to the abutment surface as opposed to being attached. As a result, the perimplant sulcus may be predisposed to food and foreign body impactions.

Although evidence-based dentistry has grown, clinical reports are still considered important. As in medicine, they are able to detect novelty and form the basis for detecting new concepts, etiologic clues, adverse effects, and new treatments. In addition, clinical reports provide a foundation for progress in clinical science, independent of basic subjects or epidemiologic insights. The purpose of this clinical report is to describe the nonsurgical management of a patient with a maxillary implant-supported overdenture and a recent history of dental implant infection caused by food impaction.

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A 55-year-old white man presented to the prosthodontist with pain, suppuration, swelling, and a foul odor and taste in his mouth. The patient did not report any systemic discomfort or fever and malaise. He had a medical history of angina, arthritis, and hypertension. The patient’s dental history included maxillary complete edentulism treated with a 4-implant-supported overdenture with unsplinted abutments (Locator; Zest Anchors). All 4 implants (RN Standard Plus; Straumann) had been placed 4 years earlier by his previous dentist. The patient had been seen for a periodic recall examination 8 months earlier, and all the implants on the maxilla and the opposing teeth in the mandible were unremarkable.

On clinical examination, the left maxillary implant at the left lateral incisor region showed obvious suppuration around the abutment, and the surrounding tissue appeared inflamed and erythematous (Fig. 1). The implant and abutment were immobile, and a sharp sound was heard on tapping the abutment. No tenderness to percussion of the abutment was noted, but the soft tissues around the implant were tender on palpation. The remaining 3 implants appeared healthy (Fig. 2). A new periapical radiograph of the implant was made and did not reveal the presence of any foreign body (Fig. 3). The radiographic bone levels noted on this radiograph were not significantly different from those on the panoramic radiograph made 8 months earlier (Fig. 4). The radiographs revealed some

**CLINICAL REPORT**

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**TABLE I.** Comparison of 2 different types of inflammatory periimplant disease

<table>
<thead>
<tr>
<th>Comparison Element</th>
<th>Plaque-induced Inflammatory Periimplant Disease</th>
<th>Nonplaque-induced Inflammatory Periimplant Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of presentation</td>
<td>Chronic</td>
<td>Acute or chronic</td>
</tr>
<tr>
<td>Incidence</td>
<td>Controversial and not well documented</td>
<td>Not well documented</td>
</tr>
<tr>
<td>Description and etiology</td>
<td>(1) Periimplant mucositis (restricted to soft tissues around implant)(^9); (2) periimplantitis (includes soft tissues and surrounding bone)(^2,5,6); primarily implicated microorganisms for etiology include anaerobic gram-negative bacteria(^15)</td>
<td>Multifactorial etiology including following(^5): (1) patient factors such as systemic disease and medication, oral disease and local infections, noncompliance, smoking; (2) site-specific factors such as hard- and soft-tissue quality and quantity; presence of foreign body in periimplant sulcus (dental materials such as dental cement, displacement cord, impression materials, broken bristles of toothbrush and/or oral hygiene aids, food impaction); (3) implant factors such as osteogenicity, material, design, and susceptibility to fracture; (4) clinician factors such as experience, knowledge, skills, and ethics</td>
</tr>
<tr>
<td>Cause-effect relationship</td>
<td>Difficult to prove causation and more controversial(^7)</td>
<td>Easier-to-isolate causing variable for site-specific and implant-related factors</td>
</tr>
<tr>
<td>Primary treatment</td>
<td>Antibacterial and antiplaque measures(^2)</td>
<td>Antibacterial and elimination of causing variable</td>
</tr>
<tr>
<td>Treatment mechanism</td>
<td>Involves host response and mandates biologic cascades for favorable regenerative outcomes</td>
<td>Does not mandate biologic cascades and may involve mechanical cascades to eradicate source of infection</td>
</tr>
<tr>
<td>Treatment outcome</td>
<td>Variable and may involve repetitive treatment for resolution of infection(^2,3)</td>
<td>Definitive resolution of infection is possible if etiology is isolated and eradicated</td>
</tr>
</tbody>
</table>

1. Patient’s initial presentation, showing suppuration around abutment, with inflammation and erythema of surrounding tissue.
bone loss, primarily attributable to the depth of placement of the tissue level implant with a submerged polished collar at the time of placement. This bone level was consistent with the remaining 3 implants in his maxilla (Fig. 4).

Before making a diagnosis and determining subsequent treatment options, the patient’s recent dental history was scrutinized. The patient admitted that he often did not use his overdenture for eating because of a gagging problem. He also admitted to dehulling and masticating sunflower seeds 1 week earlier when he was not wearing his overdenture; he experienced pain around his implant shortly thereafter. As a result of his history, clinical examination, and radiographic findings, a differential diagnosis was made for dental implant infection induced by food impaction, possibly related to the dehulling of sunflower seeds. The first treatment approach was nonsurgical, and the plan included the removal of the abutment, local irrigation, and systemic antibiotics.

As a result, the abutment was removed. The purulent exudate was cleaned with a cotton-tip applicator and then the periimplant sulcus was copiously irrigated with 0.12% chlorhexidine gluconate rinse (Periogard; Colgate Oral Pharmaceuticals) by using a plastic disposable syringe (Monoject Curved Tip Syringe; Patterson Dental) (Fig. 5). No obvious food debris was noticed from the soft tissues during the process of irrigation. The abutment was then replaced intraorally and hand tightened. The patient was prescribed 300 mg clindamycin tablets to be taken orally, 3 times a day for 1 week. He was prescribed the 0.12% chlorhexidine gluconate rinse and also was provided a plastic disposable syringe for self-irrigation around the implants twice daily for 1 week. He was advised to take nonprescription analgesics for any further discomfort and return in 1 week to determine a subsequent course of action. He also was advised not to masticate without wearing his overdenture prosthesis.

At the 1-week evaluation (6 days after initial examination), the patient reported the absence of all clinical symptoms and indicated that he had complied with all instructions previously provided. On clinical examination, no signs of purulence were evident, and the soft tissues around the implant appeared pink, firm, and healthy; no tenderness to palpation was noted (Fig. 6). The abutment was removed and the periimplant sulcus was examined and appeared healthy (Fig. 7). All of these signs indicated the successful resolution of the infection around the implant. The patient was educated about the periimplant biology, and the consequences of mastication without wearing his overdenture prosthesis were reinforced. He was advised to return if symptoms recurred. The patient remained free of
symptoms 1 year after the treatment and was pleased with the outcome of the nonsurgical intervention.

**DISCUSSION**

In medicine, a diagnosis primarily depends on the history obtained from the patient, the signs noticed on physical examination, and the results of laboratory investigations. Of these 3 elements, the history obtained from the patient along with clinical examination has been shown to be more valuable than laboratory results. In this clinical report, a careful and detailed history obtained from the patient identified that he did not routinely use his overdenture for eating because of his gagging problem. The patient had masticated on sunflower seeds without wearing his overdenture and had experienced pain around his implant shortly thereafter. In this situation, food impaction contributed to a foreign body reaction. Therefore, a diagnosis of inflammatory periimplant disease due to food impaction into the periimplant sulcus appeared to be sound. The differential diagnoses for this patient included the presence of another foreign body in the periimplant sulcus (such as broken bristles of toothbrush and/or oral hygiene aid), a fractured implant, and idiopathic late failure of an implant. These differential diagnoses were ruled out based on history, lack of mobility of the implant, and absence of other relevant clinical and radiographic signs. A diagnosis of 'peri-implantis' was ruled out because of the absence of dental plaque, the patient's history, and the absence of any progressive radiographic bone loss. This conforms to the recent Estepona consensus group, which argued that the term 'peri-implantitis' is inappropriate for all inflammatory and infectious conditions around dental implants.

Because of the established diagnosis, a nonsurgical approach was chosen for the management of this patient because it allowed for a simple, conservative, inexpensive, and painless treatment. In addition, it allowed the patient to wear his overdenture prosthesis while the

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4. Panoramic radiograph made 8 months before patient's presentation does not reveal progressive bone loss in comparison with Figure 3; also note, bone levels appear similar around all implants.

3. Erythema and inflammation of periimplant soft tissues after removal of abutment and irrigation with 0.12% chlorhexidine rinse.

6. After 6 days, healthy soft tissues around abutment and no signs of infection or inflammation.
infection was being resolved. Clindamycin was the antibiotic of choice in this patient because of its broad spectrum of activity against aerobic and anaerobic pathogens and significant tissue penetration, including bone, its high oral absorption, and its stimulatory effects on the host immune system. Similarly, a 0.12% chlorhexidine gluconate rinse was chosen because of its antimicrobial efficacy, substantivity, and good history of management of periimplant infections. Currently, insufficient evidence is available in the scientific literature for the use of systemic antibiotics for the management of periimplant infections. Therefore, the use of systemic clindamycin in this patient was dictated primarily by empiricism and the assessment of the risk:benefit ratio by the author. The rationale for using a systemic antibiotic along with a topical antimicrobial agent was to ensure broad-spectrum antimicrobial coverage to prevent the progression of infection. A lack of response to this first-line treatment at the 1-week evaluation would have necessitated surgical anti-infective management with an open-flap debridement and possible guided bone regeneration procedures. To prevent a similar condition in the future, the patient was reminded of the importance of wearing his prosthesis during mastication and of maintaining good oral hygiene.

**SUMMARY**

This clinical report described the successful management of a patient with a maxillary overdenture with inflammatory periimplant disease caused by food impaction into the periimplant sulcus. The diagnosis was based on careful analysis of the patient’s history and clinical signs. The infection was resolved in 1 week by local irrigation with 0.12% chlorhexidine gluconate rinses and the use of systemic clindamycin. A nonsurgical intervention in this patient allowed for the simple, conservative, inexpensive, and painless management of the inflammatory periimplant disease. A patient’s food intake history and the possibility of food impaction into the periimplant sulcus should be considered for differential diagnosis of inflammatory periimplant disease.

**REFERENCES**


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