Stress Related Peri-Implant Bone Loss

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Psychological stress has been reported to be associated with periodontal bone loss; however, this association has not been studied for peri-implant bone loss. Psychological stress may be a factor in peri-implant bone loss. Alone, stress may not be significant, but in tandem with other factors, certain types of psychological stress may aggravate or accelerate peri-implant bone loss. This association needs to be studied further.

Key Words: dental implant, osseous loss, recession, psychological stress

STRESS RELATED PERI-IMPLANT BONE LOSS

Psychological stress has been shown to be contributory to periodontal bone loss.[1] During World Wars I and II, a condition called trench mouth, also known as acute necrotizing ulcerative gingivitis, occurred that was caused by a combination of poor nutrition, poor oral hygiene, and the psychological stress of being in a war zone.[2] Trench warfare was common in World War I, and this oral condition was found in the soldiers who fought in these trenches. Additionally, the emotional stress of military service in wartime Viet Nam was found to be associated with severe periodontal bone loss.[3]

Psychological factors have been shown to be associated with the incidence and severity of periodontitis, but the mechanism of action is still unknown.[4]

One Swedish study of 298 dentate patients found that there was an association with those who exercised extreme exterior emotional psychological control and the risk for periodontitis. Additionally, investigators found an association between periodontitis risk and the loss of a spouse.[5] A stressful life event tests the ability of an individual to cope with and ameliorate the stressful situation. Those who can successfully cope may change the risk for progression or occurrence of periodontitis.

Financial strain and associated psychological stress may be expressed as psychological depression. Again, problem-solving and coping skills have been shown to be important in relieving the stress-associated risks for periodontitis in these patients.[6,7] Thus, inadequacy of these psychological coping skills may influence the onset and progression of periodontitis.

Although evidence from the past has been directed at periodontal conditions, stress-related bone loss around dental implants may also occur. Stress alone may not cause periodontal or peri-implant bone loss, but when other factors act in tandem, periodontal or peri-implant bone loss may occur. No reported research has been directed at the association between psychological stress and peri-implant bone loss.

CASE REPORT

A 67-year-old female patient sustained dental fractures and carious breakdown of multiple maxillary teeth. She had a medical history that included a diagnosis of and treatment for breast cancer and was in remission. She had never smoked. The

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patient desired a fixed restorative outcome. A treatment plan was developed that entailed extraction of unsalvageable teeth and construction of an implant-supported prosthesis. Implant-supported fixed complete denture treatment was instituted for the maxilla and the mandible.

Unrestorable teeth were extracted, and immediate implants placed. A healing period of 4 months was observed, and implant-supported porcelain-fused-to-metal fixed complete dentures were constructed. An anterior guidance occlusal scheme was instituted. The patient functioned well and was happy with the esthetic outcome. She returned routinely for hygiene maintenance.

Two years after treatment had been completed, the patient's husband died in an accident, and she inherited and received insurance settlements amounting to a very large sum of money. Her adult children began demanding that she distribute the money to them, but she resisted. She wanted financial independence in her old age. The patient became distraught from the family turmoil and was treated for depression by her physician with fluoxetine (Prozac, Eli Lilly, Indianapolis, Ind). Her family continued to demand distribution of the funds, and she continued to resist. Concomitantly, the patient began to have dramatic peri-implant bone loss. Efforts were made to minimize this through 3-month prophylaxes, improved personal oral hygiene, and topical oral chemotherapy in the form of chlorhexidine rinses (Peridex, 3M-ESPE, St Paul, Minn) and 1.1% neutral sodium fluoride toothpaste (Control RX, 3M-ESPE). Bone loss was rapid and uniform. Vertical reparative osseous augmentation grafting treatment would not be predictable, and the patient declined the procedure. The patient also developed xerostomia that may have been a result of the stress itself or a side effect of the psychopharmacologic therapy. Generally, 3–4 mm of bone was lost around the maxillary osseointegrated implants. No implants were lost, and the bone loss was finally arrested. The implant-supported prostheses functioned adequately, but the coronal threads of the implants were exposed. Fortunately, the maxillary fixture threads were covered by a low lip contour, and the porcelain-fused-to-metal fixed prosthesis was in a normal esthetic display. The patient was counseled on oral hygiene for the rough surface and exposed threads. The patient could function normally.

Discussion

Although this case is truly anecdotal and does not present any definitive evidence of any true association between psychological stress and peri-implant bone, it may open the discussion for further study. The psychological stress experienced by this patient may not be solely responsible for the observed bone loss, but it may be a contributing factor. Also, the xerostomia, induced by the antidepressant or the stress itself, has not been associated with peri-implant bone loss. However, saliva does contain antibodies that act against oral pathogens, which may be active in periodontal and peri-implant bone loss. The low salivary levels of xerostomia may have decreased this patient's ability to fend off pathogenic activity.

Psychological stress has been implicated in inducing or exacerbating diabetes, multiple sclerosis, and immune resistance to infection.[8–10] Thus, stress may attenuate immune function, reducing host resistance to peri-implant bone loss. However, no information is available regarding the effects of stress on periodontal collagenase activity.

Several factors have been previously associated with crestal bone loss, including genetics, smoking, oral hygiene, alcohol consumption, history of periodontitis, diabetes, biologic width, and abutment microgap

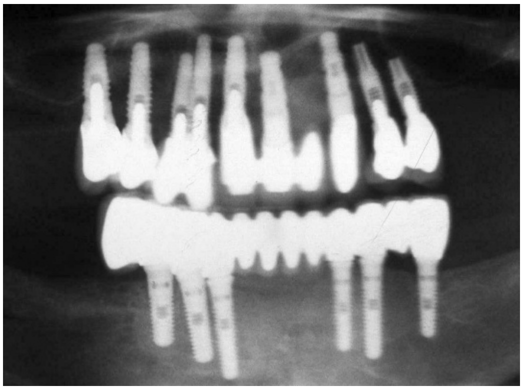

Figure 1. The panoramic radiograph of the bimaxillary treated patient.

factors.[11] Psychological factors have not been considered, even though an association with periodontal bone loss can be seen.

Conclusions

Psychological stress has been reported to be associated with periodontal bone loss; however, this association has not been studied for peri-implant bone loss. The case described here may point to the potential risk that psychological stress may be a factor in peri-implant bone loss. This possible association needs further study.

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