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Review Article

Peri-Implantitis: A Systemic Review

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ABSTRACT:
Peri-implantitis is a common problem encountered these days in patients undergoing prosthetic rehabilitation by dental implants. The probing depth, the presence of bleeding on probing, suppuration and radiographs should be assessed regularly for the diagnosis of peri-implant diseases. Poor oral hygiene, smoking and previous history of periodontitis are known risk factors for the disease. Hence; we planned the present review to highlight important aspects of peri-implantitis.
Key words: Peri-implantitis, Probing depth.

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INTRODUCTION

"Peri-implantitis" (or "Periimplantitis") has been introduced as a term for infectious pathological conditions of peri-implant tissues more than two decades ago. At the 1st European Workshop on Periodontology in 1993 it was agreed that this term should be used specifically for destructive inflammatory processes around osseointegrated implants in function that lead to peri-implant pocket formation and loss of supporting bone. The definition implied that initial healing had been uneventful and osseointegration was achieved as anticipated. Hence, bone loss following implant installation due to remodeling had to be distinguished from bone loss due to a subsequent infection.[1, 2]

DIAGNOSIS

Probing

Periodontal probing is essential for the diagnosis of periimplant disease. A conventional periodontal probe under a light pressure of 0.25 N will not damage the peri-implant tissues. An increase in probing depth overtime is associated with loss of attachment and supporting bone. The use of a periodontal probe helps to identify bleeding, or suppuration, or both, in the peri-implant mucosa when it and the alveolar bone are being monitored. It has been previously advocated that the baseline probing depths (baseline landmark) should be taken shortly after the prosthesis has been completed. The baseline should be measured at six points (mesiobuccal, midbuccal, distobuccal, mesiopalatal, midpalatal, and distopalatal).[3, 4]

Bleeding on probing

Bleeding on probing is a simple indicator of the health of the peri-implant tissues. The severity of peri-implant mucositis can be classified by the degree of bleeding on probing, and the progress of treatment of peri-implantitis is monitored by examining the degree of bleeding. The absence of bleeding on probing (non-smokers)is an indicator of stable peri-implant conditions. Studies have shown that the presence of bleeding on probing increased the risk of loss of peri-implant attachments, so bleeding on probing can be used as a predictor for potential loss of supporting tissue.[5]

Radiographic evaluation

Radiographs are key in the assessment of marginal bony loss. Intraoral long-cone parallel radiographs have been used to record marginal levels of bone at implants and to diagnose interproximal loss of bone. One should use fixed reference points, such as the shoulder of the implant or the implant abutment junction. Panoramic radiographs tend to be more distorted and result in more exposure to

radiation, and are probably of limited use. Intraoral radiographs are more accurate. The general limitations are the inability to assess and monitor buccal/labial and lingual/palatal bone levels. This therefore highlights the essential need to use clinical probing to assess these sites.[6]

MICROBIOLOGY

When bone loss is due to infection, Gram-negative bacteria, rods and mobile microorganisms, suppuration, increased depth and bleeding on probing, higher gingival and plaque indices, pain on chewing and the presence of granulation tissue surrounding the implant are all detected. However, when bone loss is due to excessive biomechanical forces, initially Gram-negative, nonmobile microorganisms are absent and on x-ray, the periimplant space appears widened and a loss of bone height is observed without signs of suppuration or remarkable signs of inflammation and the implant is encapsulated within fibrous tissue, with little granulation tissue.[7] Analysis of the fluid in the periimplant sulcus reveals certain early changes that demonstrate the existence of bone resorption, for instance, increased levels of chondroitin sulfate, as seen in non-treated chronic gum diseases or in patients undergoing orthodontic treatment. Elastase, β-glucuronidase, aminotransferase and prostaglandin E2 levels are also high. DNA probes that are capable of identifying sequences of specific nucleotides in certain bacterial species can be used in the identification of the microorganisms that colonise the pocket (Actinobacilus actinomycetemcomitans, Prevotella intermedia and Porphyromonas gingivalis); traditional culture methods are also capable of identifying the colonising germs. Increased probing depth and positive culture findings are correlated.[8]Another useful method is BANA (benzoyl-arginine-naphthylamide) hydrolysis, which shows the presence of the enzyme trypsin that is produced by pathogens such as Treponema denticola, Bacterioides Forsythus and Porphyromonas gingivalis. Recording of gingival temperature and peri-implant fluid volume are other testing procedures that have been acknowledge to be valid for the early detection of periimplantitis; both parameters are elevated in the presence of periimplantitis.[9]

TREATEMNT

The treatment protocol differs depending upon whether it is peri-implant mucositis or peri-implantitis. Until now, no particular treatment protocol has been shown effective. There are number of treatment protocol for the resolution of diseases. But this study highlighted that diseases resolution is satisfactory by surgical treatment. Peri-implant mucositis can be treated by non-surgical treatment. If the peri-implantitis is diagnosed then the treatment protocol depends on the intraosseous defect. If the bony defect is minimum then implantoplasty can improve the bony defect.[10]

Most of the published strategies for peri-implantitis therapy are mainly based on the treatments used for teeth with periodontitis. The reason is that the way of bacterial colonization of dental and implant surfaces follow similar principles, and it is commonly accepted that the microbial biofilm plays an analogous role in the development of peri-implant inflammation. For the treatment of peri-implantitis, both conservative (non-surgival) as well as surgical therapies can be applied. Thereby, the surgical treatments can be done using resective or regenerative approaches.[10]

Conservative therapy

In addition to medication and manual treatment (e.g. with curettes, ultrasonic and air polishing systems) innovative techniques such as laser-supported and photodynamic therapy methods are recently described as conservative therapy options.

Manual treatment

Basic manual treatment can be provided by teflon-, carbon-, plastic- and titanium curettes.[9]

Drug therapy

There are numerous in vitro and in vivo studies on the application of medicaments as part of the treatment of mucositis and peri-implantitis. However, due to differences in the design of all studies, comparison of these studies is difficult. The following therapies can be distinguished:

• Antiseptic rinses in relation to different parameters.

• Application of systemic and locally delivered antibiotics in relation to pocket depth or different parameters.[10]

Laser therapy

By means of a bactericide mode of action, CO2, Diode-, Er:YAG- (erbium-doped: yttrium-aluminum-garnet) and Er,Cr:YSGG- (erbium, chromium-doped: yttrium-scandium-gallium-garnet) lasers are used in the treatment of peri-implant diseases with increasing frequency. Minimal absorption and reverberations must be ensured with the purpose to protect implant and tissue. Er:YAG and Er,Cr :YAG with a wavelength of 3 microns can reduce biofilms up to 90% but in contrast to most mechanical therapies any biological compatibilities and cell stimulatory properties can't be re-induced. Treatment with a CO2 308 nm excimer laser, however, led mainly and efficiently to satisfactory results in an anaerobic bacteria spectrum. Patients suffering from localized peri-implant problems in the absence of other infections may be candidates for treatment by local drug-delivery devices. Local application of antibiotics by the insertion of tetracycline fibers for 10 days can provide a sustained high dose of the antimicrobial agent precisely into the affected site for several days. The use of minoccline microspheres as an adjunct to mechanical therapy is beneficial in the treatment of peri-implant lesions, but the treatment may have to be repeated.[11]

Explantation

If there is advanced bone loss and the implant cannot be saved, it has to be removed. If a decision has been made to remove the implant, explantation trephines are

available to suit the implant system concerned. It should be noted that these trephines have an external diameter of up to 1.5 mm greater than the diameter of the implant to be removed. Thus, explantation may be associated with significant bone removal including buccal or lingual bone cortices, and damage to adjacent natural teeth where the inter-radicular space is limited. An alternative approach is to allow progressive bone loss from peri-implantitis to occur, resulting in sufficient bone loss to allow for the removal of the implant with extraction forceps. Implants may be removed by forceps when there is less than 3 to 4 mm of residual bone support.[12]

CONCLUSION

Owing to the fact that the frequency of late implants failures is relatively low, the number of longitudinal studies evaluating different treatment protocols for peri-implantitis is limited. Hence; various epidemiological studies are recommended.

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