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Periodontal Restabilisation of An Ailing Dental Implant- A Case Report

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Brief Report

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ABSTRACT

Dental implants are widely used now-a-days for rehabilitation of partial and complete edentulism. Although literature regarding dental implants have reported long term success rate, failure of dental implants are not uncommon. Peri-implant disease is characterized by an inflammatory reaction in the tissues surrounding an implant. Peri-implant disease should be diagnosed and treated as soon as possible to prevent implant failure. Periodic review with evaluation and elimination of risk factors (e.g. smoking, systemic diseases and periodontitis) are effective precautions. In addition to aspects of osseointegration, type and structure of the implant surface are of importance. Various conservative and surgical approaches are available for the treatment of peri-implant disease. Mucositis and moderate forms of peri-implantitis can obviously be treated effectively using conservative methods. We present a case report of conservative non-surgical treatment approach for an ailing dental implant in a senior citizen with systemic complications.

INTRODUCTION

The use of dental implants for supporting prosthetic rehabilitation has shown highly satisfactory long term results regarding restoration of the patient's function and esthetics. However, dental implants can lose supportive bone, even in cases of successful osseointegration [1]. These diseases are defined as inflammatory lesions of the surrounding peri-implant tissues and include two different entities: peri implant mucositis and peri-implantitis [2]. The main cause of this loss of crestal bone surrounding an implant is local inflammation during the course of peri-implant diseases. Peri implant mucositis is defined as an inflammatory lesion limited to the surrounding mucosa of an implant, whereas peri-implantitis is an inflammatory lesion of the mucosa that affects the supporting bone with loss of osseointegration [3] Periodontal pathogens, such as Aggregatibacteractinomycetemcomitans, Porphyromonasgingivalis, Prevotella intermedia, Tannerella forsythia, and Treponema denticola, were highly elevated in peri-implantitis. Therefore, it has been proposed that the treatment of peri-implantitis should ultimately involve anti-bacterial approach.

Terminology of dental implant as ailing, failing, or failed is referring to the status of the peri-implant supporting tissues. A failed implant is one that is fractured, has been totally refractory to all methods of treatment, or demonstrates clinical mobility or circumferential peri implant radiolucency. These implants must be removed immediately, because progressive destruction of surrounding osseous tissues may occur [4]. Ailing implant refers to clinically stable implant affected by bone loss with pocketing. A failing implant displays features similar to the ailing implant, but is refractory to therapy and continues to become worse. This implant also is immobile [5].

The major difference between an ailing and a failing implant is the outcome of the therapy. In fact, if an ailing implant is resistant to therapy it becomes failing. In other words, the term ailing implies a somewhat more favorable prognosis than failing [6]. Treatment options for ailing and failing implants are varied from conservative to more aggressive therapy depending upon the situation. The overall goal of therapy is to arrest further loss of bone support, re-establish a healthy peri-implant mucosal seal and to regenerate hard and soft tissue to implant and abutment. Treatment option varies according to aetiology.

Treatment strategies are broadly divided in to nonsurgical and surgical treatment strategies. Mechanical debridement alone cannot effectively eradicate these key pathogens due to the surface characteristics and topography of implant fixtures [7]. Thus, it may be necessary to devise adjunctive therapies such as the local delivery or systemic administration of antibiotics.

CASE REPORT

A 70-year-old male reported to the Outpatient Department of Prosthodontics complaining of broken prosthesis in mandibular arch (**Figure 1**).

Figure 1. Broken Prosthesis with abutment

On detailed history examination patient is recently diagnosed with diabetes mellitus and under Siddha medication for the same. No other relevant medical history was provided. Patient gave a history of implant placement 1 and half years back. On intra oral examination metal ceramic bridge prostheses were present in relation to 14, 15, 16, 17, 23, 24, 25, 26, and 27 in maxillary arch with remaining natural teeth. Root stump in 48, metal ceramic bridge in 31, 41, and 12. Implant in relation to 33 and 36 region and 46 and 44 region, with broken abutment in relation to 46 region (**Figure 2**) and there was no mobility of all four implants. Gingival inflammation and Pus discharge were evident around 36 and 46 implant region.

Figure 2. Mandibular arch showing broken pro

An OPG was suggested for radiographic examination. OPG reveals radiolucency around the implants in 46 and 36 region. Infected root stumps in relation to 48 (**Figure 3**).

Figure 3. Orthopantomogram showing radiolucency around the implants in 46 and 36 region, infected root stumps in relation to 48

Patient referred to the department of periodontics for further opinion and management of 36 and 46. Pre-operative probing depth was measured and recorded and tabulated (**Table 1**) around all the implants using a plastic probe (Hu-FriedyCOLORVUE™ probe).

Table 1. Probing depth for implants i.r.t. 36 and 46 regions at Baseline (in mm)

Implant i.r.t. 36 region			Implant i.r.t. 46 region		
Mesiobuccal	Midbuccal	Distobuccal	Mesiobuccal	Midbuccal	Distobuccal
6	8	5	6	8	6
5	6	5	6	6	6
Mesiolingual	Midlingual	Distolingual	Mesiolingual	Midlingual	Distolingual

Suggested Treatment Plan

Phase 1:- Extraction of root stumps in relation to 48

Phase 2:- Curettage around the implants i.r.t. 46 and 36 regions with local drug delivery

Phase 3:- Recall visit after 6 weeks

Phase 4:- Replacement of prosthesis/ missing tooth

Phase 5:- Review

Patient was explained about the periodontal approach prior to the procedure; patient was willing to undergo treatment hence a written informed consent was obtained from the patient prior to the procedure. Local anaesthesia infiltration was given and peri-implant curettage was done in relation to 36 and 46 regions using plastic curettes (Hu-FriedyImplacare 4R/4L curettes). Granulation tissue around the implants were completely removed and irrigation was done using 0.2% Chlorhexidine. Tetracycline medicated resorbable fibres were placed within the peri implant pocket to aid in local drug delivery at the infected sites.
The tetracycline impregnated resorbable collagen fibres are soaked in saline and packed into the periodontal pockets with a cotton forceps or curette until the pocket is filled up to or slightly below the gingival margin. To avoid dislodging of the fibre patient was instructed not to brush or floss the treated areas and was advised 0.2% chlorhexidine rinses twice daily to maintain oral hygiene. Patient was advised to report after one week for a review. On visual examination soft tissues seems to be healing surrounding the implants in relation to 36 and 46. After 6 weeks, the probing depth was measured on all surface in relation to 36 (**Figure 4**) and 46 (**Figure 5**).

Figure 4. Distobuccal probing in 36 region after 6 weeks

Figure 5. Disto buccal probing in 46 region after 6 weeks

Treatment Done

Phase 1:- extraction of root stumps in relation to 48.

Phase 2:- curettage around the implants 46 and 36 with local drug delivery.

Phase 3:- Recall visit after 6 week.

Probing depth was re-examined by the same operator after 6 weeks.

Probing depth for implants i.r.t. 36 and 46 (in mm) was recorded which is presented in Table 2.

Table 2. Probing depth measurement after 6 weeks of curettage (in mm)

Implant i.r.t. 36 region			Implant i.r.t. 46 region		
Mesiobuccal	Midbuccal	Distobuccal	Mesiobuccal	Midbuccal	Distobuccal
4	5	4	4	5	5
4	4	3	4	4	3
Mesiolingual	Midlingual	Distolingual	Mesiolingual	Midlingual	Distolingual

DISCUSSION

Dental implants have become an indispensable established therapy in dentistry in order to replace missing teeth in different clinical situations. In analogy to gingivitis and periodontitis affecting the periodontium of natural teeth, an inflammation and destruction of soft and hard tissues surrounding dental implants is termed as peri-implant mucositis and peri-implantitis [8].

Peri-implant tissues are more susceptible for inflammatory disease than periodontal tissues due to the reduced vascularization and parallel orientation of the collagen fibres.
Mucositis describes a bacteria-induced, reversible inflammatory process of the peri-implant soft tissue with reddening, swelling and bleeding on periodontal probing. These are typical signs, but they are sometimes not clearly visible [9]. peri-implantitis is a progressive and irreversible disease of implant-surrounding hard and soft tissues and is accompanied with bone resorption, decreased osseointegration, increased pocket formation and purulence [10]. Bleeding on probing, bone loss and deep probing depths may have other reasons than inflammation such as excessive sub-crestal insertion of the implant. Moreover, type and shape of the implant, connection type, abutment and supra structure material and the type of prosthetic supra structure affect the peri-implant soft and hard tissues.

DIAGNOSIS OF PERI-IMPLANT PATHOLOGY

Peri-implant Probing

Periodontal probing using a light probing force (0.2–0.3 N) is a reliable tool for diagnosing peri-implant health and disease. In healthy the probe tip identified the apical extent of the barrier epithelium. Even mild inflammation around implants was associated with an increased probe penetration. Penetration of the probe up to 1.6 mm into the connective tissue occurred in the peri-implantitis lesion. Presence of bleeding on gentle probing (0.25 N) is a useful parameter for diagnosis of mucosal inflammation. Absence of bleeding on probing was an indicator for stable peri implant conditions [11].

Mobility

Mobility is not a good diagnostic as mobile implant is hopeless and should be removed. However, perceived implant mobility may be related to the loosened restoration and/or abutment, which may or may not lead to crestal bone loss without loss of integration. A loose implant-supported prosthesis may contribute to the accumulation of plaque, which may lead to the development of peri-implant diseases [12].

Radiographs

Periapical radiographs perpendicular to the implant body to show a clear demarcation between the threads of the implant. Other advanced diagnostic aids such as CBCT may be considered depending on the location of progressive attachment loss [13].

Therapy

The treatment of peri-implant infections comprises conservative (non-surgical) and surgical approach. Depending on the severity of the peri-implant disease (mucositis, moderate or severe peri-implantitis), nonsurgical therapy alone might be sufficient or a step-wise approach with a non-surgical therapy followed by a surgical treatment may be necessary.
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 inflammatio [14]. For the treatment of peri-implantitis, both conservative (nonsurgical) as well as surgical therapies can be applied. Non-surgical treatment approach includes mechanical implant cleaning with titanium or plastic curettes, ultrasonic or air

polishing. Moreover, local antiseptic medication (chlorhexidine gluconate, hydrogen peroxide, sodium percarbonate, povidone-iodine) may support the antimicrobial therapy.
This case report highlights the use of non-surgical treatment approach by means of curettage to stabilise ailing dental implants in a systemically compromised senior citizen.
Even though the implant sites i.r.t. 36, 46 showed all signs of inflammation with purulent exudate on initial examination, the lack of mobility indicated a better prognosis. Hence a nonsurgical approach was planned taking into consideration all systemic factors, age of the patient and local factors presents.
Adjunctive therapy comprising of subgingival irrigation with 0.2% chlorhexidine and local drug delivery of Tetracycline was also administered following curettage to have a profound anti-microbial effect in the infected sites and to promote reattachment.
Tetracyclines are primarily bacteriostatic agents that are effective against many Gram-negative species such as Aggregatibacter actinomycetemcomitans. The proven efficacy of this group of drugs in the management of periodontal diseases may be related not only to their antimicrobial actions but to a number of additional properties that have been recently identified. These include collagenase inhibition, anti-inflammatory actions, inhibition of bone resorption and their ability to promote the attachment of fibroblasts to root surfaces [15].
Goodson et al. [16], observed that tetracycline filled hollow fibers placed in the gingival sulcus have dramatic effect both on the periodontal flora and clinical manifestation of disease. Of theoretical importance was the observation that virtual elimination of spirochetes from the gingival sulcus is possible by a single placement of tetracycline filled hollow fibers and spirochetes once eliminated from a site do not recolonize despite the persistence of viable organisms elsewhere in the mouth.
Rodrigues et al. [17] compared antibiotic resistance profile with local and systemic tetracycline and observed that there are less chances of bacterial resistance with locally delivered tetracyclines. Local drug delivery with tetracycline fibers has also a role to play in the treatment of peri-implantitis sites as observed in microbiological studies.
Re-evaluation of the implant sites i.r.t. 36, 46 at 6 weeks post-op showed a resolution of all signs of inflammation and lack of exudate from the peri implant mucosal margins. There was also marked reduction in probing depth at all sites following treatment indicating initiation of reattachment following non-surgical treatment.
Persson et al. and Renvert et al. [18] experienced significantly lower numbers of bacteria with partial reduction of plaque and bleeding scores after mechanical curettage.
The prevalence of periodontitis and the severity increases with greater age.
The presence of periodontal disease in the elderly can have a major impact on their quality of life through swollen gums, sore gums, receding gums, loose teeth, teeth that have drifted and bad breath

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. Antiseptic rinses and application of systemic and locally delivered antibiotics in relation to pocket depth or different parameters have been recommended.
Javed et al. [19] concluded that systemic and local antibiotic applications (e.g. tetracycline, doxycycline, amoxicillin, metronidazole, minoxicycline, hydrochloride, ciprofloxacin, sulfonamides + trimethoprim) led to significant reductions of pocket depths in a period between one and six years.
Leonhardt et al. [20] noticed an overall success rate of 58% when treating peri-implantitis with surgical debridement and the use of various antibiotics and combinations of them (including clindamycin, amoxicillin + metronidazole, tetracycline, ciprofloxacin).
Astasov-Frauenhoffer et al. [21] were able to prove complete growth-inhibiting effects of amoxicillin and metronidazole on Streptococcus sanguinis, Porphyromonasgingivalis and Fusobacterumnucleatum apart from each other, but combinations were found to be more efficient than metronidazole alone. Comparing local antibiotic therapy with photodynamic therapy,
Application of chlorhexidine resulted in the reduction of peri implant pocket depths, a higher implant adhesion and general weakening of inflammation measured by the level of the inflammatory markers IL-1 beta, VEGF and PGE-2 in various studies. Local or systemic antibiotics are an additional therapy option. In combination with other conservative or surgical treatments it results in more efficient reductions of clinical peri-implantitis symptoms.

PERI-IMPLANT MAINTENANCE

Maintenance principles should include regular evaluation of implants and their surrounding tissues and prostheses; occlusal examination; review and reinforcement of oral hygiene; removal of plaque and calculus; treatment of disease or repair of prostheses, as required; and institution of customized preventive measures. Recent study showed the absence of preventive maintenance in individuals with pre-existing peri-implant mucositis was associated with a high incidence of peri-implantitis. Clinical parameters, such as bleeding on peri-implant probing, periodontal probing depth and the presence of periodontitis in adjacent natural teeth were associated with a higher risk of developing peri-implantitis.

CONCLUSION

Peri-implantitis is inflammatory disease of peri-implant tissue affecting osteo-integrated implant resulting eventually in implant failure. Treatment of peri-implant disease ranges from conventional nonsurgical therapy to aggressive surgical therapy. As treatment of peri-implantitis show variable rates of success, proper maintenance of peri-implant tissue is required for long term success of dental implants. Hence prevention is the most important instrument based on appropriate treatment planning, atraumatic approach for implant insertion, consistent check-up intervals and periodic maintenance protocols.

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