

Natural Teeth Versus Dental Implants- The Periodontal Perspective!

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Abstract

Recent advances in dental implants make it a reliable form of therapy in patients suffering from periodontitis. Clinical decision making in periodontitis patients is often a dilemma for the clinician whether to save or extract the natural teeth and place dental implants. Prosthetic rehabilitation is often utilized for the treatment of periodontal patients to improve the function and aesthetics of the oral cavity after periodontal treatment. Past history of periodontitis is often considered a risk factor for dental implant placement. Irrespective of whether implants are to be placed or not in patients suffering from periodontitis, the cause related management and supportive care of periodontitis infection is of utmost importance to prevent further periodontal breakdown and its recurrence and improve the survival of dental implants by preventing peri-implant infections. The purpose of this article is to discuss the factors to be taken into consideration while deciding the treatment modality in periodontitis patients with respect to survival of natural teeth versus dental implants.

Keywords: Implants, Survival, Natural, Periodontitis, Extraction

Introduction

Periodontal infection, which is considered as the sixth most prevalent disease worldwide, results due to the host microbial interactions between the individual and pathogenic microorganisms present in dental plaque.¹It is a multifactorial disease including local, systemic, genetic and environmental factors.² The resultant bone loss, attachment loss can compromise the prognosis of teeth and markedly affect the quality of life of the patient. Loss of natural teeth has a negative impact on the mental health of the individual adding to the financial burden for the prosthetic rehabilitation of lost teeth.³

If the periodontal disease is completely eradicated with cause related therapy and the regular supportive periodontal therapy for elimination of infection, the remaining natural teeth can act as an abutment for prosthetic treatment for a long span of time without any compromise. This has been supported by scientific studies in the literature.⁴⁻⁷ Dental implants although reliable, are often over utilized in the today's scenario in periodontal patients due to business based promotion of dental implants and assumptions that implants have a better prognosis as compared to natural teeth that are periodontal affected. The 3-5 year prognosis of implants in periodontally compromised patients is

similar to the prognosis of implants in non-compromised patients. The data for long term survival and success of dental implant placement in periodontally compromised and susceptible individuals is lacking in the periodontal literature.⁸

This article summarizes the evaluation and treatment options that can be done for periodontally compromised patients and factors to be taken into consideration for clinical decision making in for retaining the natural teeth or place dental implants. The benefit to risk ratio of the alternative treatments is also discussed.

Teeth versus Implants Biology

The attachment of a tooth to the surrounding periodontal structures is via cementum, bone and periodontal ligament (PDL). The periodontal ligament is however absent around dental implants and the connection with periodontium is by osseointegration also known as functional ankylosis. Due to absence of PDL, there is resiliency, adaptive capacity or movement of implant possible as it is in a natural tooth which has PDL. The arrangement of connective tissue fibres around a tooth is perpendicular and around an implant the fibres are arranged in a parallel direction. The vascularity is less around implants as compared to around a tooth. The connective tissue has high collagen and low fibroblast content around implants. The junctional epithelium around a tooth originates from reduced enamel epithelium and junctional epithelium around implant originated from the surrounding oral epithelium.

The normal probing depth of a gingival sulcus around a tooth is ≤ 3 mm in health, whereas it ranges from 2.5 to 4 mm around implants. Bleeding on probing is less reliable sign of inflammation around implants as it is unrelated to the amount of inflammation in peri-implant tissue. Biologic width which describes the dimensions of dentogingival junction is subcrestal around implants. The connective tissue has high collagen and low fibroblast content around implants.⁹

Prevalence of Periodontitis in India

As per the National Oral health survey of India (2002) conducted by Dental Council of India (DCI), the prevalence of periodontal disease was 55.4% in children aged 12 years and it peaked to 89.2% in the age group of 35-44 year age group.¹⁰ A systematic review and meta-analysis on prevalence of periodontitis among adults in India in the year 2020 suggested the overall prevalence of periodontal disease to be 51% (CI: 41.9-60.1) and gingivitis to be 46.6% (CI: 37.8-55.5).¹¹ A prevalence of 42.3% of periodontal disease in South Indian population was reported in the year 2018 suggesting higher prevalence even in areas with oral healthcare facilities. This suggests a rising burden of periodontal disease in Indian population warranting the need for awareness of oral health and periodontal treatment.¹² Since periodontal disease is a pandemic and a key public health concern, the oral health policy makers and public health workers must draft methods to lessen the load of periodontal infection in India.

Who has a Better Survival- Teeth or Implants?

When it comes to reasons of extraction of teeth, the most common and rationale causes include periodontal disease and caries amongst other reasons like trauma and aplsia. However, another most common cause of tooth extraction is lack of knowledge of the clinician concerning criteria of hopeless prognosis which should be addressed and standardized.¹³

The 50 year survival rate of natural teeth with a gingival index score of 2 with bleeding on probing present at all sites was reported to 63.4% which was significantly lower than teeth without bleeding on probing.¹⁴ The 13 year survival rate of teeth that have undergone endodontic, periodontal and prosthodontic multidisciplinary treatment was in the range of 83-89%.¹⁵ The 10 year survival rate of structurally compromised teeth preserved by crown lengthening and restorative treatments was close to 80%.¹⁶ A study by McGuire and Nunn evaluating the prognosis of furcation involved (FI) teeth suggested a poorer prognosis in FI involved teeth with degree II and III involvement as compared to non-FI teeth. There were no significant differences in the survival rate between non-FI teeth and degree I and II FI teeth up to 5 years with supportive periodontal therapy. After 5 years, the prognosis becomes poorer for degree II FI teeth.¹⁷

The survival rate of implant supported fixed partial dentures is reported to be around 87% after 10 years.¹⁸ The survival rate of single unit restorations ranges from 96.7% to 97.5% and for fixed partial restorations is from 92.5% to 93.6% over 6 to 7 years. The outcome rates reported by the literature of implant survival exceed 95%.¹⁹ The 5 year survival rate of dental implants as reported by systematic review and meta-analysis is 92% for implant supporting overdentures and 95% for implant supported fixed reconstructions.²⁰ The factors taken into consideration for implant success by various studies include absence of progressive loss of alveolar bone, absence of peri-implant infection, implant mobility and implant fracture.

Due to limited evidence on long term survival rates of dental implants, it can be said that natural teeth without gingival inflammation have higher survival rates that surpass the survival rates of dental implants. However, it is a controversial issue as the factors considered by each author for implant success and survival vary from study to study and the reported survival rates are medium term and the long term success of dental implants is still not known at population and global levels.

What is the Outcome of Implant Treatment in Patients with a History of Periodontitis?

Prior history of periodontitis is considered to be a risk factor for implant placement due to the higher risk of implant failure resulting from peri-implant infections in periodontally compromised patients. Literature suggests that the 3 to 5 year prognosis of dental implants placed in periodontally compromised patients is similar to implants placed in non-compromised patients. The 5 year survival rates ranged from 90% to 98% and 10 year survival rates ranged from 89% to 95%.⁸

The factors which may affect the prognosis of implants in patients with prior history of periodontitis include reduced quantity and quality of alveolar support, the need to place shorter implants in such cases and the possibility of periodontal pathogens being transmitted from a

periodontally affected tooth to the implant site. Periodontally compromised patients who are treated have a similar outcome of dental implants as compared to a periodontally healthy patient. Thus the lower limit of implant survival in periodontally compromised patients does not contraindicate implant placement in such patients.

Which Teeth are Considered as Hopeless Prognosis Teeth?

Teeth with restricted possibilities of successful treatment and long term preservation of tooth are categorized as teeth with hopeless prognosis. Less than 25% of alveolar support remaining, Grade III tooth mobility that cannot be provisionally stabilized, root resorption, large carious lesion that cannot be treated or where successful endodontic treatment is not possible, vertical root fracture, clinical signs of active infection that cannot be controlled are features of teeth with hopeless prognosis that need to be extracted.²¹

What are the Factors taken into Consideration while Deciding the Treatment?

Factors which should be taken into consideration while deciding the whether to save the natural tooth or extract and place implants include:

- Prognosis of periodontally affected teeth after treatment- This depends on clinical parameters such as bleeding on probing, presence of residual pocket ≥ 5 mm, number of lost teeth, clinical attachment loss, bone loss, systemic diseases, genetic factors, plaque control, patient compliance and environmental factors such as smoking.¹³
- Better long term cost benefit and economic point of view- Saving a natural tooth by early identification of patients at increased risk for periodontal disease and preventive periodontal treatment is more cost effective than the expensive implant therapy. For those patients who cannot afford implant therapy but are the candidate for implant placement can get insured from dental insurance plans for covering the treatment. The charges required before implant placement such tooth extraction, ridge preservation or augmentation, sinus lift, the charges required for implant placement surgery, the charges for the supportive periodontal therapy and any biological/technical implant complications comprise the total cost to be bared by the patient and needs to be explained in detail prior to procedure and treatment planning.²²
- Esthetics- Esthetics is a major concern for periodontal patients particularly if they belong to a younger age group. Periodontal disease as well periodontal therapy can result in compromised esthetics. Recession of the gingival margin, elongation of the clinical crown, appearance of black triangles due to loss of interdental papillae, spacing and change in the position of the tooth are some of the esthetic challenges in a periodontitis patient. The soft and hard tissue deficiencies also challenge implant therapy for multiple missing teeth due to errors in emergence profiles, loss of papillae and exposure of metallic component of the implant. Therefore extraction of periodontally compromised teeth needs to be considered in patients in a young age group and those with a thin periodontal biotype.²³

- Patient satisfaction- It is a major factor nowadays governing the outcome of dental therapy. Patient perceptions, expectations and satisfaction are the factors to be considered during treatment planning. Patient satisfaction with implant therapy is more when compared to conventional prosthodontic treatment modalities such as removable partial dentures but when compared to resin bonded fixed dentures the satisfaction was somewhat less. Only 80% of patients are satisfied with single tooth implants. Periodontal surgery involves certain amount of patient discomfort and post-operative complications like esthetically unfavourable gingival recession, tooth sensitivity and transient tooth mobility. Since no RCT's are available evaluating patient satisfaction and effects on quality of life after implant therapy, no conclusions can be drawn as to which treatment modality gives maximum patient satisfaction.²⁴

Conclusion

The decision to extract a periodontally compromised tooth and place implant supported prosthesis or to save the natural tooth depends on several factors as discussed in the article. The literature lacks long term evidence of implants more than 10 years unlike natural teeth and those implant systems are not currently in use. Studies also show that natural teeth that are periodontal involved can be saved and provide long term function in the oral cavity if complete eradication of periodontal disease is carried out. The decision should be purely based in the clinical findings and patient related factors and should not be driven by the cost of treatment or any particular implant system which may lead to premature extraction of tooth that could have been saved.

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