Acta Scientific Dental Sciences
Volume 2 Issue 4 April 2018
Editorial

Antimicrobial Photodynamic Therapy: A Reliable Treatment Option for Peri-Implantitis

Abdul Ahad*

Department of Periodontics and Community Dentistry, Faculty of Medicine, Aligarh Muslim University, Aligarh, India

***Corresponding Author:** Abdul Ahad, Department of Periodontics and Community Dentistry, Faculty of Medicine, Aligarh Muslim University, Aligarh, India.

Received: January 12, 2018; **Published:** March 01, 2018

Current trends in the research, innovation and practice of oral implantology suggest a rapid growth in last two decades. Earlier, osseointegration was considered as the single most critical factor in the success of dental implants. However, with the continuously advancing front of research and development in implant designs, surface treatment and better armamentarium, osseointegration is invariably achieved in more than 90% of cases.

The focus of implant practice has now shifted from the functional stability of the implant to the long term esthetic concerns, suggesting that clinicians need to think beyond the initial osseointegration. Regular maintenance for long term success of implant supported prostheses cannot be ignored. Apart from the curriculum of dental schools, most clinicians will agree that maintenance of implants and management of peri-implant disease has not been given its rightful place in the short term courses, workshops and continuing education programs on oral implantology, particularly in the third world countries.

In order to ensure the long term usefulness of implant based prostheses, one has to clearly understand the difference between a successful and a surviving implant. Implant survival refers to whether the implant is still physically present in the oral cavity or has been removed. However, a successful implant requires to fulfil a myriad of criteria that include immobility, absence of radiolucency, vertical bone loss less than 0.2 mm per year after the first year of loading, absence of persistent or irreversible signs and symptoms such as pain, infections, neuropathies, paraesthesia or violation of the mandibular canal [1]. A well osseointegrated and apparently successful implant at the time of loading may deteriorate to just survive in the oral cavity, if regular maintenance and early intervention of inflammatory disease are ignored. While the 10 year survival rate of implants is more than 90% in longitudinal studies performed in developed countries, the success rate for the same time period is considerably low in developing countries where implantology has rapidly emerged in the recent past.

Peri-implantitis is the inflammation of supporting tissues of dental implants in association with bone loss, which eventually results in progressive destruction of bone around the implant, if left untreated [2]. Studies regarding the prevalence of peri-implantitis have reported highly variable data, depending on the diagnostic criteria used to define peri-implantitis. The prevalence ranges from 4.7 to 43% at implant level, and from 8.9 to > 56% at patient level [3]. Treatment of peri-implantitis involves, but not limited to the complete eradication of the causative bacteria, disinfection and detoxification of the implant surface and obviously the debridement of peri-implant pockets. These steps can be performed by surgical as well as non-surgical approaches [2]. A recent meta-analysis has concluded that surgical procedures result in more pocket depth reduction and clinical attachment gain than non-surgical procedures in the management of peri-implantitis [4]. Mechanical debridement can easily be achieved by curettes specially designed for dental implants, and other surgical instruments, similar to the surgical management of periodontal pockets. However, disinfection of contaminated microstructured implant surface is not an easy task. It does require an adjunctive modality like concentrated citric acid, antiseptics, local application of high-level lasers and the newer approach of antimicrobial photodynamic therapy (aPDT) [5]. Clinical studies involving the use of local antibiotics and antiseptics have shown contradictory results in terms of implant surface disinfection and re-osseointegration when used as an adjunct to open flap debridement or guided tissue regeneration (GTR). High level lasers have shown considerable bactericidal and detoxification effects on contaminated dental implant surfaces. However, many incidences of surface alterations (melting and carbonization) have been reported [6].

aPDT involves the application of a non-toxic chemical agent (photosensitizer) and its activation with a low level laser. Unlike high level-lasers, aPDT selectively targets the bacteria without potentially damaging the host tissues or implant surface. After its successful application in the treatment of periodontal infections, aPDT is being widely considered as an adjunct in the treatment of peri-implantitis. Its positive effects have already been demonstrated in *in-vitro* and animal studies, where it has effectively reduced *A. actinomycetemcomitans, P. gingivalis, P. intermedia, P. nigrescens* and *Fusobacterium* spp. Few *in-vitro* studies with scanning electron microscope (SEM) analysis have also confirmed that aPDT leads to bacterial cell destruction, without any damage to the titanium surface. Animal studies have confirmed that combination of aPDT and GTR results in greater bone fill and re-osseointegration than conventional GTR alone. Although controlled clinical studies started much later, most of them have confirmed the findings of previous *in-vitro* and animal studies [5]. Another recent meta-analysis has suggested that the use of photodynamic therapy with mechanical debridement will definitely bring about significant improvement in patients with peri-implantitis [7].

Being highly effective, easy to use, and minimal or no side effects when performed carefully, aPDT definitely has an edge over

conventional decontamination of implant surfaces. With such encouraging results, it should be suggested as the indispensable part of peri-implantitis treatment protocol. We need to remember that it plays an adjunctive role while effective mechanical instrumentation is still the most important aspect. A combination of good surgical skills and application of new technologies will deliver the best results. Nevertheless, after treatment, regular maintenance and good oral hygiene are essential for a predictable outcome and long-term stability.

Bibliography

1. Alberktsson T., *et al*. "The long-term efficacy of currently used dental implants: a review and proposed criteria of success". *International Journal of Oral and Maxillofacial Implants* 1.1 (1986): 11-25.

2. Renvert S and Polyzois I. "Treatment of pathologic peri-implant pockets". *Periodontology 2000* 76.1 (2018): 180-190.

3. Marcantonio C., *et al*. "Prevalence and possible risk factors of peri-implantitis: a concept review". *Journal of Contemporary Dental Practice* 16.9 (2015): 750-757.

4. Faggion CM., *et al*. "Network meta-analysis for evaluating interventions in implant dentistry: The case of peri-implantitis treatment". *Clinical Implant Dentistry and Related Research* 15.4 (2013): 576-588.

5. Takasaki AA., *et al*. "Application of antimicrobial photodynamic therapy in periodontal and peri-implant diseases". *Periodontology 2000* 51 (2009): 109-140.

6. Kreisler M., *et al*. "Effect of Nd: YAG, Ho: YAG, Er: YAG, CO_2 and GaAlAs laser irradiation on surface properties of endosseous dental implants". *International Journal of Oral and Maxillofacial Implants* 17.2 (2002): 202-211.

7. Sivaramakrishnan G and Sridharan K. "Photodynamic therapy for the treatment of peri-implant diseases: A network meta-analysis of randomized controlled trials". *Photodiagnosis and Photodynamic Therapy* 21 (2018): 1-9.

Volume 2 Issue 4 April 2018