

PERIIMPLANTITIS AND ITS MANAGEMENT USING PHOTODYNAMICTHERAPY: A REVIEW

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ABSTRACT

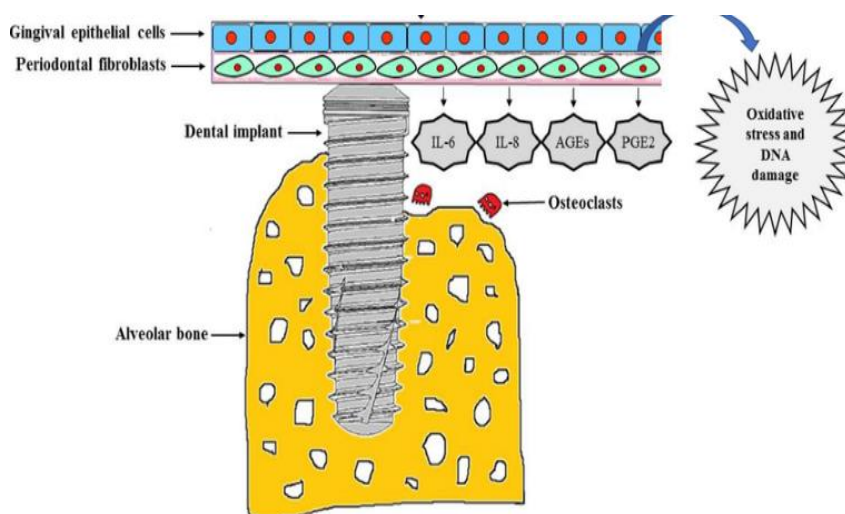
Periimplantitis is a pathological condition occurring in tissues around dental implants. Antimicrobial photodynamic therapy (aPDT) has been considered as an adjunct treatment approach to the bacterial decontamination of teeth and implants affected by periodontal and peri-implant disease. aPDT involves exposure to a combination of a photosensitizer and an appropriate wavelength of laser light.

KEYWORDS: Periimplantitis, photodynamic therapy, Photosensitizer.

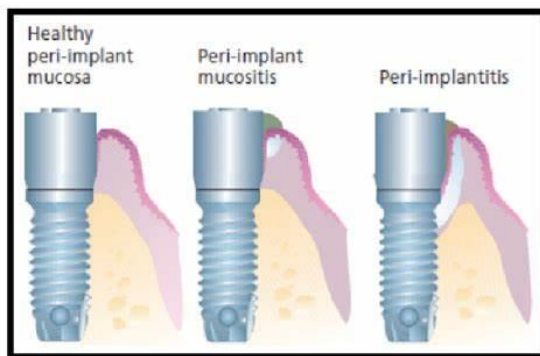
INTRODUCTION

Peri-implantitis is a pathological condition occurring in tissues around dental implants, characterized by inflammation in the peri-implant connective tissue and progressive loss of supporting bone. The onset of peri-implantitis may occur early during follow-up and the disease progresses in a non-linear and accelerating pattern. Surgical entry at peri-implantitis sites often reveals a circumferential pattern of bone loss. There is strong evidence that there is an increased risk of developing peri-implantitis in patients who have a history of chronic periodontitis, poor plaque control

skills, and no regular maintenance care after implant therapy. "smoking" and "diabetes" are potential risk factors/indicators for peri-implantitis Evidence suggests that progressive crestal bone loss around implants in the absence of clinical signs of soft tissue inflammation is a rare event. The peri-implant tissue morphology is a contributory factor to the pronounced inflammatory process going faster and deeper around the dental implant. The healthy peri-implant tissue plays an important role as a biological barrier to some of the agents that cause periimplantitis



Inflammation in the periodontium around the implant can be broken down into either mucositis or peri-implantitis:



- Mucositis: a clinical manifestation characterized by the appearance of inflammatory changes restricted to the peri-implant mucosa. If treated properly, it is a reversible process.
- Peri-implantitis: a clinical manifestation where clinically and radiographically evident loss of the bony support for the implant occurs, together with an inflammatory reaction of the periimplant mucosa.

Table 1: Diagnostic comparison of peri-implantitis versus peri-implant mucositis.

	BOP ± Suppuration	Probing Depth ≥4 mm	Radiographic Bone Loss
Peri-implant mucositis	+	+	-
Peri-implantitis	+	+	+

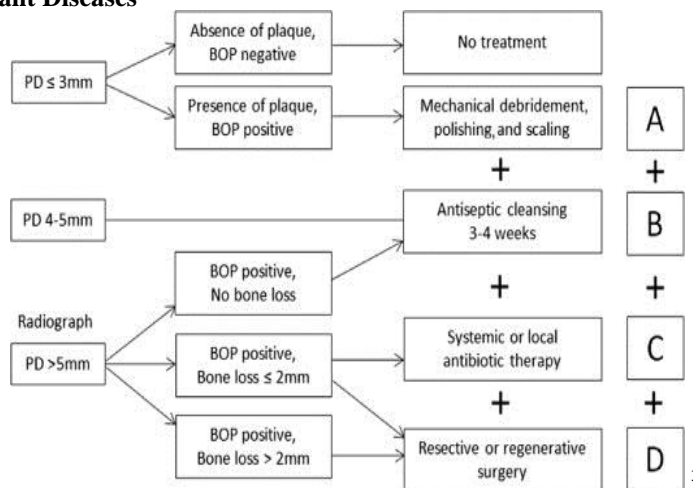
In addition to the presence of these periodontal disease-causing germs, other local, systemic and genetic factors must coexist in order for prolonged, active infection to take place.

- Bleeding on probing
- Suppuration
- Radiographic bone loss
- Mobility^[2]

Symptoms

- Swelling and redness of the periimplant marginal tissues

Management of Periimplant Diseases



Treatment options are

- Lasers
- mechanical instrumentation
- chemical detoxification
- Antimicrobial agents for nonsurgical approaches.

On the other hand, removal of failing implants, resective surgery, guided bone regeneration, and soft-tissue grafting are presented as valid options for the surgical treatment of periimplantitis

Photodynamic Therapy

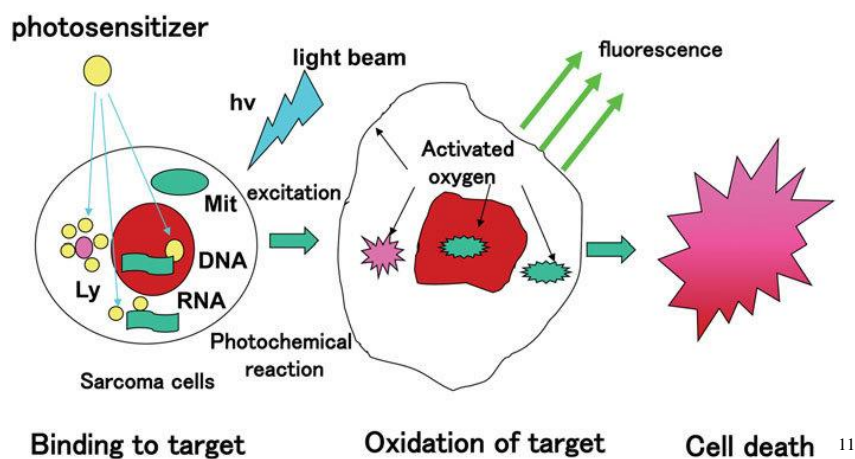
The therapeutic use of light, as we know it, begins in 1900 when Raab reported that the combination of acridine orange and light could destroy living organisms. The photochemical reaction that generates singlet oxygen, the predominant cytotoxic agent produced during PDT is a highly reactive form of oxygen that is produced by inverting the spin of one of the outermost electrons.^[10]

Photo physics of Photosensitizers

Porphyrins, chlorins, and bacteriochlorins are among the most useful photosensitizers for *in vivo* PDT, although other classes of porphyrinoids such as phthalocyanines and texaphyrins are also used. Porphyrins, chlorins, and bacteriochlorins have absorption maxima in the red portion of the electromagnetic spectrum and are efficient singlet oxygen generators. The most commonly used and studied photosensitizer to date is Photofrin, the only commercially available photosensitizer.^[10]

Recently, antimicrobial photodynamic therapy (aPDT) has been considered as an adjunct treatment approach to the bacterial decontamination of teeth and implants affected by periodontal and peri-implant disease.

aPDT involves exposure to a combination of a photosensitizer and an appropriate wavelength of laser light, resulting in the destruction of different oral pathogens in planktonic and biofilm forms.



The depth of light penetration in human tissue is wavelength-dependent. Up to date, a variety of light sources have been employed for aPDT protocols, especially by means of nonlaser light generators (halogen or light-emitting diode [LED] lamps).

CONCLUSION

Although, antimicrobial photodynamic therapy and photobiomodulation show different mechanisms, aPDT under proper parameters could also promote healing and bone formation.

Although the effects of aPDT on peri-implant disease have previously been investigated, the exact mechanism of action of aPDT against peri-implantitis remains largely unknown. The insufficient results found in the scientific literature with regard to using aPDT against pathogenic biofilms have not discouraged new investigations due to the advantage of this therapy in avoiding antibiotic resistance.

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