Initial Therapy of Peri-implantitis by Anti-microbial Photodynamic Therapy

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Introduction

The microbiological infection of the peri-implant tissue is still one of the most difficult implant complications today. Due to scar formation of the soft-tissue the infection defence mechanism are reduced in comparison to periodontal tissue. The implant surface with a rough structure, once exposed to oral cavity offers an ideal environment for bacterial growth. The microbiological load and the clinical symptoms are comparable to periodontal disease. The anti-microbial photodynamic treatment shows high levels of antimicrobial reduction for all relevant bacterial strains.

Material and Methods

From 2003 till 2006, during regular implant recall, 25 patients showed clinical signs of peri-implantitis including bleeding on probing. The initial treatment concept included hygienic instruction, supragingival cleaning and determination of mechanical reasons. 5 patients received the implant treatment after cancer rehabilitation with skin graft and suffered on super infection with Candida albicans. After the mechanical cleaning for all patients a thiazin based photosensitizer (HELBO®*Blue*, HELBO, Grieskirchen, Austria) was applied into the pocket and at the skin graft left for one minute. Then the dye was rinsed with water and activation of the photosensitizer was performed with non-thermal laser light of 660 nm for one minute for each area following the recommended protocol. The photodynamic reaction leads to a singlet oxidation at the membrane of the bacteria and performs a selective cell death. In the osseoseparation group vertical bone defects were augmented after 3 to 5 days with additional local photodynamic treatment of the surgical site.

Initial findings	Mucositis bleeding on probing +	Mucositis with Candida infection	Osseoseparation with bone loss > 4 mm	Total
Patients	14	5	6	25
Implants	26	12	14	52
Results				
Non infected implants after 6 months	25 / 96.2%	8 / 66%	9 / 64.3%	42 / 80.8%
Progression of bone loss	1 / 3.8%	None	2 / 14.3%	3 / 5.8%
Implant failure	None	None	3 / 21.4%	4 / 7.7%
Number of treatments	1.2	6.2	3.2	

Results

The anti-microbial photodynamic treatment offers a bacteria reduction without administering local anaesthesia and can be repeated without any side effects. This non-invasive method allows an early treatment of peri-implantitis prior to radiological signs of bone loss. In severe cases like superinfection by candida albicans multiple appointments are necessary. The initial treatment allow a nearly complete regression at an early stage. In late cases of peri-implantitis a recovery is possible for over 80% of the infected implants.

Implant Treatment With Retro-molar Block Graft

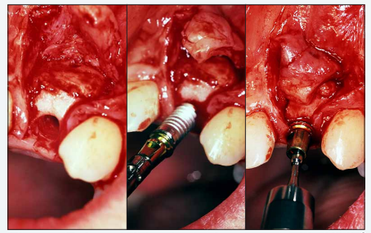

Fig. 1: Epicrestal implant placement with XiVE® implants after retro-molar block graft

Fig. 2: Uneventful healing after 3 months prior to second stage surgery

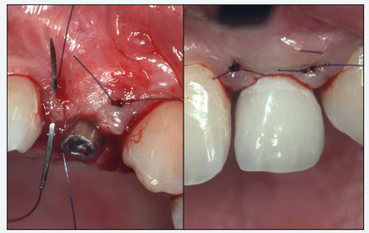

Fig. 3: Second stage surgery with reconstruction of peri-implant soft tissue by W-incision

Fig. 4: Contouring of papilla to neighbouring teeth with temporary reconstruction

Fig. 5: Healthy situation one year after prosthetic delivery and instruction for oral hygiene

Mucositis Treatment by aPDT

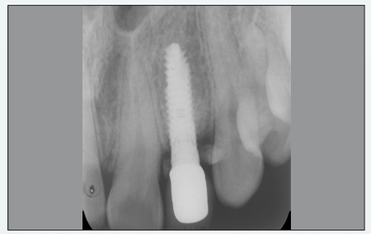

Fig. 6: Recall after three years with separated radio-opaque structure at crestal bone level

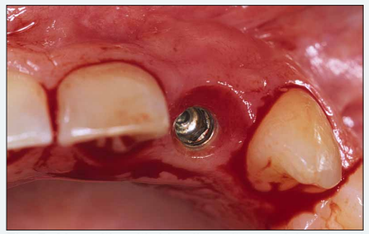

Fig. 7: Mucositis with bleeding after applying dental floss twice a day no foreign material within sulcus

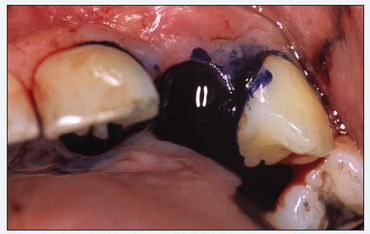

Fig. 8: Administering HELBO Photosensitizer after cleaning peri-implant tissue

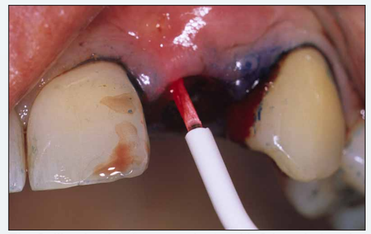

Fig. 9: Illumination for one minute with 3d-pocket probe and HELBO®*TheraLite Laser*

Fig. 10: Final situation with stained tissue and re-cemented implant crown after therapy

Healing and Recall

Fig. 11: Recall after six weeks without symptoms of infection but mobile bone sequester visible

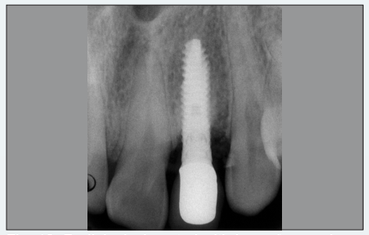

Fig. 12: Radiological control with loss of upper bone graft part

Fig. 13: Healthy soft tissue after six months without further signs of infection or bone loss

HELBO-System with Photosensitizer and probes for HELBO®*TheraLite Laser*

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