Abstracts of articles published in important journals of Implantology, Prosthodontics and Periodontics from around the world

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On implant surfaces: a review of current knowledge and opinions

Wennerberg A, Albrektsson T. Int J Oral Maxillofac Implants 2010;25:63–74.

The objectives of this review are: (1) To identify the essential surface parameters, (2) provide an overview of characteristics of the surface at micrometer and nanometer resolution level relevant to the four most popular oral implant systems, (3) discuss the potential advantages of nano-roughness, hydrophilicity, biochemical binding, and (4) suggest a common hypothetical mechanism behind the intense bone responses to the new implant surfaces of different commercial companies. Oral implants from four large companies varied in mean surface roughness (S_a) 0.3-1.78 mM and in proportion of the developed surface (S_{dr}) of 24 to 143%, with the smoothest from the Biomet 3i and roughest implants from Straumann Institute. The original Brånemark implant with a machined surface had a Sa of 0.9 μm and an S_{dr} of 34%, showing clearly rougher than smoother implants examined. When evaluated for nanometric roughness, there was a substantial variation in Sa in different implants from four large companies. Biomet 3i, AstraTech and Straumann implants differed from their predecessors in the microroughness, physico-chemical proprieties, and nanoroughness. When examined with high magnification scanning electron microscopy, it was observed that all new implant surfaces has particularly nanorough structures which were not present in their respective predecessors; this finding was considered as a possible common mechanism behind bone responses to these implants and more intense compared to controls.

Comparative biology of chronic and aggressive periodontitis vs. peri-implantitis

Heitz-Mayfield LJA, Lang NP. Periodontology 2000 2010;53:167–181.

This revision was made to address the similarities and differences between two approaches of the periodontitis and peri-implantitis disease. Comprehensive analysis of the literature on the etiology and pathogenesis for periodontitis and peri-implantitis brought the impression that these both diseases have more similarities than differences. First, the onset of both diseases is dependent on the presence of a biofilm containing pathogens. While the

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microflora associated with periodontitis is rich in gram-negative bacteria, a similar composition was identified in peri-implant diseases. However, evidence increasingly suggests that S. aureus may be an important pathogen in the initiation of some cases of peri-implantitis. It is indicated to perform a further investigation on the role of facultative Gram-Positive Cocci, and other putative pathogens in peri-implantitis development. While the initial response to bacterial challenge in peri-implant mucositis appears to be identical to that found in gingivitis, the persistent accumulation of biofilm can cause a more pronounced inflammatory response in peri-implant tissue of mucosa than in the dentogingival unit. This may be a result due to structural differences, as the vascularization and proportion of fibroblasts and collagen. When periodontitis and peri-implantitis were experimentally produced by applying plaque retention ligatures, the progression of mucositis for peri-implantitis was followed by a very similar sequence of events, such as the gingivitis development followed by periodontitis. However, some of peri-implantitis lesions appeared to have periods of quick progression, in which the infectious lesion reached the alveolar bone marrow. Therefore, it is reasonable to assume that the peri-implantitis in humans can also exhibit accelerated destruction periods that are more pronounced than those observed in cases of chronic periodontitis. From a clinical point of view, the risk factors identified and confirmed for periodontitis can be considered as similar to those of peri-implantitis. In addition, patients susceptible to periodontitis seem to be more susceptible to peri-implantitis than patients without a history of periodontitis. Both periodontitis and peri-implantitis are opportunistic infections, and therefore therapy should be such from anti-infective nature. The same clinical principles apply to the debridement of lesions and maintenance of an oral infection-free cavity. However, in daily practice, such principles may occasionally be difficult to apply in the treatment of peri-implantitis. Due to the characteristics of the implant surface and the limited access to the microbial habitat, there may be need for most frequent surgical access and, in an earlier stage, in the treatment of peri-implantitis than in periodontal therapy. In conclusion, it is evident that periodontitis and peri-implantitis are not fundamentally different from the perspective of etiology, pathogenesis, risk assessment, diagnosis and therapy.

Understanding the concept "All-on-4" of the immediate function for completely edentulous mandibles: a clinical report over the medium (three years) and long term (five years).

Paulo Maló, Miguel de Araújo Nobre; Armando Lopes, Carlos Francischone, Mauricio Rigolizzo. Clin Implant Dent Relat Res. 2011 Oct.

The implant with immediate function has been an accepted treatment modality for fixed prostheses in completely edentulous mandibles, taking into account the experience of immediate function in the edentulous maxilla is limited. Objective of this study was submit a report on the results of medium and long term of a protocol on immediate function of four implants (All-on-4™, Nobel Biocare AB, Gothenburg, Sweden) supporting a fixed prosthesis in the edentulous maxilla. This retrospective clinical study included 242 patients with 968 implants with immediate load (Brånemark System®, TiUnite™, Nobelspeedy™, Nobel Biocare AB) in acrylic prosthesis in the maxilla. A specially designed surgical guideline was used to facilitate positioning of the implant and inclination of the posterior implants to achieve good bone anchorage and interimplant distance for good support of the prosthesis. Follow-up examinations were performed within 6 months, 1 year, and thenceforth every six months. Radiographic evaluation of marginal bone level was performed after 3 and 5 years in function. Survival was estimated at patient level

and implant level using the estimated limit of the statistical test Kaplan-Meier with 95% confidence intervals. Nineteen immediately loaded implants were lost in seventeen patients, giving an estimated of 5 years survival rate of 93% and 98% at the patient level and implant level, respectively. Survival rate of implants was 100%. The remodeling of marginal bone level was on mean of 1.52 mm (s.d. 0.3 mm) and 1.95 mm (s.d. 0.4 mm) from the implant/abutment junction after 3 and 5 years, respectively. High survival rates at the patient level and implant level indicate that the concept of immediate function for completely edentulous maxilla using the current protocol is feasible in the results of medium and long term.

Regenerative treatment of peri-implantitis using bone substitutes and membrane: a systematic review

Sahrmann P, Attin T, Schmidlin PR. Clin Implant Dent Relat Res. 2011 Mar;13(1):46-57

This systematic review had as objective to evaluate the available literature on the use of bone graft substitutes and membranes for the treatment of peri-implantitis regeneration. A survey of electronic databases was conducted to evaluate all types of clinical trials treating bone defects derivate from peri-implantitis using guided bone regeneration (GBR) techniques. During the first screening, 399 titles were identified. Finally, 17 articles related to 173 implants were included. The articles were mostly directed to radiographic bone fill of the defect. Qualitative measures of the "bone fill" were reported: 10.4% of implants showed "complete bone fill", while 85.5% had incomplete closure of the defect. No bone fill was shown at 4.0%. Little information (53.2%) was provided regarding the probing depth before or after treatment. Data relative to the inflammatory state of the soft tissues were also scarce and reported in three studies only. A high heterogeneity on disinfection protocols and regenerative materials used. High percentage of low-quality studies resulted in the impossibility of a meta-analysis. Complete filling of the bone defects using GBR does not seem to be a predictable result. In most cases the health condition of the mucosa is not taken into consideration. Better controlled tests are needed to determine the most appropriate treatment protocols for the success of the regenerative treatment of peri-implantitis using the GBR technique.