

Insights

A Digest of Recent Trends, Techniques and Clinical Concepts of Dental and Facial Esthetics



Oral Hygiene for Osseointegrated Implants

Thomas J. Balshi

Successful prosthodontic rehabilitation of the edentulous or partially edentulous patient with osseointegrated implants has been well established. Scientific and clinical documentation have demonstrated well the effective results of the biomechanical union between the titanium oxide of load carrying implants. The literature has been replete with numerous articles on the surgical and prosthodontic techniques as well as the basic biologic and physiologic aspects of osseointegration.

Recently, however, there has been an increased interest in the post prosthodontic maintenance of patients with tissue integrated reconstruction. Because the attachment mechanism between the osseointegrated implant and living bone is distinctly different from that of the natural dentition, there is increasing interest in the response of the peri-implant mucosa with regard to oral hygiene and specifically plaque and calculus control.

Meffert has stated that "a prerequisite for successful dental implant procedures today is controlling plaque which can compromise the perimucosal seal of the soft tissue to an endosseous implant." Lang takes the position that the soft tissue surrounding implants is characterized by structures which are similar to those encountered around

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4th Annual Meeting — Academy of Osseointegration

Multiplaner Reformatted CT Images of the Jaw — Alternate Systems to the Dentascan GE-9800

Charles Berman

Precision is necessary in the alignment of the patient's head so that the resulting multiplaner images are parallel to the plane of the intended implant. If the reformatted angle is 90 degrees from the axial cuts, the vertical plane of the gantry should be parallel to the mean plane of the alveolar process that is being evaluated. If the reformatted angle is greater or less than 90 degrees, as it is with some scanners, the technician will have to make modifications in the vertical angle of the reformatted image as it differs from 90 degrees.

Cases were demonstrated where the vertical plane or vertical angle of the gantry was not consistent with the mean plane of the alveolar process and where the angle of the reformatted image was 90

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Abutment Design in Partial Edentulous Cases

Steve Lewis

The development and utilization of osseointegrated implants over the past two decades has led to remarkable results in the treatment of edentulous patients. Professor P.I. Branemark and his colleagues have demonstrated high levels of success over extended periods of time in the treatment of this patient group. However, long-term studies in the treatment of partially edentulous patients are not available although some of the initial reports look promising. Application of this new biotechnology for partially edentulous patients requires the consideration of many complex interrelated factors. The surgical placement of the implant fixtures as well as the prosthodontic treatment are especially more demanding. In addition, the "Branemark" system was designed to

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Treatment Modalities for Peri-Implantitis — A Preliminary Study

S.A. Jovanovic; E.J. Richter; H. Spiekermann

Long-term success of dental implants has stimulated multidisciplinary interest in identifying factors which are associated with peri-implant health and disease. A critical feature that is common to all oral implant designs and material is the status of the soft tissue implant interface. In spite of a biological seal, crestal bone loss next to osseointegrated dental implants can occur. The etiology of this bone loss has varied, but falls into two categories: One deals with the biomechanical factors associated with load concentrations and the other deals with bacterial proliferation.

The preliminary findings show that the topography of bone loss around osseointegrated dental implants can be divided in five classes: 1) horizontal, 2) angular, 3) circumferential and angular, 4) horizontal and angular, and 5) circumferential, horizontal and angular.

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Insurance Reimbursement, Private and Medicare

Alan H. Kaye

"Dentistry" has been left out of the Medicare system since its inception and regardless of how you view it, thousands of seniors are unable to take advantage of dental care. This lack of dental treatment among the elderly is purely one of economics; the question is how to extend care to those who truly need it.

Approximately 15-25% of the estimated 45 million seniors in this country suffer from jaw atrophy and osteoporosis. In lay terms this means many people cannot chew and maintain an adequate diet. According to the Surgeon General's Report of July 1988, in 1979 1/6 of all accidental deaths in people over the age of 75 appeared to have been caused by poor or ill fitting replacement teeth.

In the past, Medicare always covered the "physicians" services when grafting the maxilla or mandible to help reverse atrophy. Recently, claims were being denied

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Paris World Congress on Implantology and Biomaterials

Results with the Branemark System

Magnus Jacobsson

The term osseointegration has been defined as living bone tissue in direct contact with a loaded implant surface at the light microscopic level. The following criteria have been put forward to define implant success: 1) when clinically tested every implant is immobile, 2) a radiograph must not show any signs of per-implant radiolucency, 3) the vertical bone loss should be less than 0.2 mm per year after the first postoperative year, 4) the function of the implant must be characterized neuropathies, paraesthesia or damage to the mandibular canal and 5) that in the context of the above mentioned criteria the implant survival rate should be no less than 85% over a five year period.

In an international multicenter study on the Branemark implants, the following results were obtained: Survival rate for mandibular implants: 5 full years-93% (195 implants), 3 full years-96% (1029 implants), 1 full year-97% (2520 implants). Survival rate for maxillary implants: 5 full years-100% (12 implants), 3 full years-89% (164 implants), 1 full year-91% (631 implants).

It is concluded that the Branemark implant system will function well over long periods of time as evidenced by several studies and that its use is a safe clinical procedure.

* Presented at the World Congress on Implantology and Biomaterials, Paris, France, March 1989.

Comparative Analysis of the Bone/Implant Interface by Microradiography and Polarized Light Microscopy

L.P. Garetto, W.E. Roberts

An index precisely defining mineralized tissue contact at the endosseous interface is important for accurate biomechanical evaluation of rigid osseous fixation ("osseointegration"). Branemark endosseous fixtures (13 x 3.75 mm) were implanted in mandibles of four adult dogs. After an 8 week unloaded healing phase, a 3 N continuous load was applied for 13 weeks. Implants with adjacent bone were fixed in 70% ethanol, embedded in plastic and cut into 100 um cross sections through the center of the implant. Central sections were microradiographed on Kodak High Resolution Spectroscopic Plates for 60 min. at 27 kvp. The interface adjacent to the lingual cortex was analyzed histomorphometrically at 100x by polarized light (P) and microradiographic (M) microscopic techniques. Using a linear

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Surgical Experiences with Branemark Implants in Partially Edentulous Cases—A Six Year Experience

Paul H.J. Krogh

The use of Branemark implants in fully edentulous jaws has been well established and documented. However, there is very little documented, written or published about the use of these implants in partially edentulous patients.

This report deals with over 400 consecutively placed fixtures in excess of 125 patients since October 1982. Over 150 prostheses have been in function on these implants from three months to five years. The success rate for individual implants is in excess of 90% and the bridge success rate is in excess of 97%. A statistical analysis of the experience was presented.

There was a discussion of the relationship of success rates to the position of implant placement in the jaws as well as surgical procedures to enhance the esthetics of the prosthesis. Esthetics are enhanced by: 1) proper fixture placement, 2) proper abutment length, 3) control of soft tissue, and 4) the use of porcelain. Experiences with connecting natural teeth and implants was discussed. Adjunctive surgical procedures which use implants in combination with orthognathic surgery and inferior alveolar nerve repositioning was also presented.

* Presented at the World Congress on Implantology and Biomaterials, Paris, France, March 1989.

Tissue Integrated Prostheses in Maxillofacial Rehabilitation

P-I Branemark

Prosthetic restoration of maxillofacial defects requires stable retention of the synthetic substitute for the original anatomy. Based on two decades of clinical experience of osseointegrated titanium anchorage elements in oral rehabilitation, components and procedures were developed for extraoral application.

Typical defect anatomy was identified, surgical and prosthetic procedures described and clinical cases reported in order to illustrate the structural and functional rehabilitation that can be achieved by providing mechanical stability for the maxillofacial prosthesis. Even cases with a combined intra and extraoral defect were included in the presentation.

Future trends in technical and methodological development were discussed as well as a rational clinical organization for tissue integrated prosthesis in craniofacial reconstruction.

* Presented at the World Congress on Implantology and Biomaterials, Paris, France, March 1989.

Biocompatibility Tests of Titanium Alloys in a Cell Culture System

K. Elaghi, H.F. Hildebrand, J. Breme

Titanium and titanium alloys are more and more used for oral and orthopedic implants. Very little is known about toxic effects of titanium and its compounds in occupational medicine and alloys made on the basis of this metal are especially considered for their excellent performance in biocompatibility.

This investigation presented the effect of different titanium alloys on cell growth in a culture system using human epithelial lung cells (L132) because of their sensitivity to cytotoxic tests. Pure titanium seems to induce the best biological response in maintaining the highest survival rate. A difference of cell viability is noted depending on the thermal treatment of TiAl₆V₄.

Cells exposed to titanium powder are not affected after 48 hour incubation. The authors could not observe any modification of cell morphology and B-glucuronidase activity. Titanium particles are not phagocytized in contrast to other metals if they are industrial pure metal compounds.

* Presented at the World Congress on Implantology and Biomaterials, Paris, France, March 1989.

Diagnosis, Planning and Treatment Complications for Facial Esthetics and Osseointegrated Prosthesis

Thomas J. Balshi
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Diagnosis and treatment planning for potential osseointegration candidates must be based on a comprehensive understanding of the biomechanics of osseointegration. The formula for this success is based on the "team approach" of both medical and dental specialists. Non-clinical care in the area of cosmetology and hair styling are often considered a vital part of the facial esthetics team. Both intraoral and extraoral examinations are conducted. Audio and video tape recordings play an increasingly important role in phonetic evaluation. The psychological and social factors are studied in light of the patient's general psycho-social predisposition. Radiographic history plays an additionally important role in the comprehensive assessment of candidates for osseointegration. Computerized imaging can be used for patients requiring improved oral facial esthetics. Images can be altered to create projections showing the possible result of oral and facial treatment.

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Osseointegration Tidbit — Peridex — A Useful Agent in Therapy

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Periodontal disease has long been associated with deposits of plaque on the teeth and for centuries oral hygiene procedures that remove plaque deposits have been recommended to keep the teeth and periodontium in good health. By definition osseointegrated implants do not have a soft tissue bone-implant interface or periodontal ligament. Nevertheless, inflammation and periodontal disease can compromise or even defeat implants. Consequently, prudent post-treatment care for osseointegrated cases should include aggressive plaque control, as well as mechanical, occlusal and technical check-ups for ideal case survival.

The use of chlorhexidine has been well studied in the periodontal literature and has been shown to be an extremely effective agent against inflammatory gingivitis and the retardation of supragingival plaque formation. Consequently, it has been widely utilized to help prevent gingival inflammation and bleeding which may progress to periodontitis. Chlorhexidine gluconate 0.12% (Peridex Oral Rinse) is considered to be a second generation antimicrobial by virtue of its anti-plaque effect and substantivity, which is long-term bacterial control by molecular binding to the oral surfaces in an ongoing manner.

Peridex has been shown to kill bacteria associated with gingival inflammation and bleeding after a 30-second rinse, with up to 100% reduction in aerobes, anaerobes, Streptococci and Actinomyces in vitro. In addition, the clinical use of Peridex has an excellent safety profile, and we have not seen any systemic adverse reactions or bacterial resistance or fungal

overgrowth. One potential negative aspect of the product is temporarily tooth discoloration. In some of our osseointegrated implant cases, we have seen golden-brown stain occurring on titanium abutments; however, this stain has been easily removed with routine prophylaxis measures.

Due to its excellent antimicrobial and disinfectant properties, we have incorporated Peridex use with our osseointegrated cases as follows: For a typical totally edentulous patient we use a regimen of: (1) one week prior to Stage I surgery, rinse one capful b.i.d. for 30 seconds (preferred time of rinsing includes after breakfast and before bedtime); (2) post-operative Stage I, one capful b.i.d. 30 seconds for 2-3 weeks; (3) stop use after tissues have healed while patient is in integration phase waiting for a Stage II uncovering; (4) pre-op Stage II, one week

prior to the second stage surgery follow regimen number one (#1); (5) post-operative Stage II, 2-4 weeks adjusted as per tissue healing around abutments; and (6) maintenance care—every third day rinse or apply Peridex to implant abutments with the use of a rotary brush.

For the partially edentulous patient, we are more concerned with the periodontal pathogens that may be associated with the teeth. These microbes could shed to the surgical sites and possibly cause adverse effect to our implantation. We therefore modified therapy by rinsing two weeks before the Stage I surgery, with the rest of the regimen remaining the same. This regimen has been extremely helpful in tissue health, wound healing and maintenance of our osseointegrated implant cases. We enthusiastically suggest ongoing study of chlorhexidine and its use in this manner.

The Microbiota Associated with Successful or Failing Osseointegrated Titanium Implants

A. Mombelli, M.A.C. Van Oosten,
E. Schurch, Jr., N.P. Lang

In this study the microbiota associated with oral endosteal titanium hollow cylinder implants (ITI) was studied using microscopic, immunochemical and cultural methods. Samples from 5 edentulous patients with successfully incorporated implants serving as abutments for overdentures for more than one year were compared with samples from 7 patients with clinically failing implants. Unsuccessful sites were characterized by pocket probing depths of 6 mm or more, suppuration and visible loss of alveolar bone around the implant as visualized on radiographs. These sites harbored a complex

microbiota with a large proportion of Gram-negative anaerobic rods. Black-pigmented Bacteroides and Fusobacterium spp. were regularly found. Spirochetes, fusiform bacteria as well as motile and curved rods were a common feature in the darkfield microscopic specimens of these sites. Control sites in the same patients harbored small amounts of bacteria. The predominant morphotype was coccoid cells. Spirochetes were not present, fusiform bacteria, motile and curved rods were found infrequently and in low numbers. The microbiota in control sites in unsuccessful patients and in sites in successful patients were very similar. On the basis of these results, it is suggested that "periimplantitis" be regarded as a site specific infection which yields many features in common with chronic adult periodontitis.

* *Oral Microbiol Immunol* 1987;2:145-151.

Case Study: Implant Supporting Fixed Appliance

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A prerequisite for success in dental implant procedures today is controlling plaque, which can compromise the perimucosal seal of the soft tissue to an endosseous dental implant. Many implantologists use the ADA-accepted chlorhexidine gluconate 0.12% rinse (Peridex Oral Rinse) to control plaque and maintain oral hygiene in the post-restorative phases of endosseous implants. Use of a chlorhexidine rinse by implant patients in their home hygiene regimens has resulted in more than a 90% reduction of the oral bacteria and has retained anti-plaque activity even after five hours from administration via a 30 second rinse.

This study illustrates the use of chlorhexidine gluconate for plaque control therapy in an endosseous implant patient. Initially, the patient had less than a 50% modified O'Leary index (more than 50% of tooth surfaces had plaque upon staining with disclosing agents). This clinician's protocol is that all endosseous implant surgery candidates must demonstrate a 90% modified O'Leary index, or more than 90% of the surfaces free of plaque.

In this case study, a 47 year old patient with co-existing gingivitis and moderate periodontitis required a functional and more aesthetic appliance to replace missing teeth in the mandibular arch, #23-28 inclusive, and treatment of moderate periodontal disease in molar segments. The treatment modality included: (1) periodontal surgical procedures; (2) oral hygiene counseling on brushing; (3) rinsing with chlorhexidine twice daily; and (4) reflection of the full mucoperiosteal flap in the continued on page 4

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