



Osseointegration Over Bone Plate Staple

Thomas J. Balshi

Prior to the introduction of osseointegration to North America in the early 80's, a multitude of implant forms were employed to comply with patient needs. Although use was limited and for the most part selectively prescribed for patients truly in need, many of these implants later required additional treatment. The three major categories of pre-osseointegration implants were: blade implants, subperiosteal implants and transosseous implants.

In the next several issues of *Insights*, I will present post implant follow-up and retreatment of patients who have undergone pre-osseointegration implant treatment. The first patient to be presented is a 67-year-old Floridian who prior to onlay bone grafting and Branemark implants in the maxilla, had successfully worn a mandibular overdenture supported by a transosseous (mandibular bone plate staple) implant. In her medical history a notable lumpectomy with radiation therapy was concluded with no apparent recurrence. The important dental clinical findings included the need for a fixed tissue integrated prosthesis supported by Branemark fixtures in the maxillary arch and the stabilization of the mobile mandibular overdenture. The patient's chief complaints included the following:

1. Inadequate maxillary esthetics
2. Lack of lip support

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An Evaluation of Impression Techniques for Osseointegrated Implants

M. Spector, et al.

Several techniques have been advocated for transfer of implant location prior to fabrication of a prosthesis. Components have been provided to make transfers with impression plaster, hydrocolloid impression materials, and elastomeric impression materials. No scientific evidence is available to document their accuracy or superiority.

In fabricating the superstructure for osseointegrated implants, the primary objective is to achieve a passively fitting prosthesis. Failure to meet this objective can result in a loss of fixture integration and progressive treatment failure. Forced tightening of the superstructure can result in microfractures of bone, a zone of marginal ischemia, and healing with a nonmineralized attachment to the implant fixture. Adequate stress distribution may also encourage maintenance of marginal bone close to the implant fixture.

Measurable distortions resulted from the transfer of implant positions as recorded with three impression techniques. The magnitude of the distortions were

similar with the three techniques evaluated. In addition to dimensional changes in the materials used, positioned errors were also attributed to the mechanical components used in the transfer process. Although the errors measured are relatively small, the study demonstrates the potential for distortions with the three transfer techniques used.

Impression materials and techniques evaluated were:

1. *Guide pin retained transfer copings* united with autopolymerizing acrylic and dental floss. An impression was made with a polysulfide rubber impression material in an acrylic resin open-top custom tray.
2. *A polyvinyl siloxane* impression made in a stock tray over hydrocolloid transfer copings.
3. *A condensation silicone* impression made in a stock tray over hydrocolloid transfer copings.

The treatment objective in implant prosthodontic rehabilitation using osseointegrated implants is to achieve a passively fitting prosthesis. On the basis of results of this study, further work is indicated to isolate a technique that will reliably and predictably reproduce the intraoral relationship of implant fixtures.

J. Prosthet Dent 1990;63:444-7

Reconstruction of the Severely Resorbed Maxilla with Bone Grafting and Osseointegrated Implants: A Preliminary Report

J. Jensen, et al.

Patients with severe atrophy of the maxillary alveolar process and/or excessively pneumatized maxillary sinuses are difficult to treat by conventional implant techniques due to the lack of sufficient amount of alveolar bone into which implants can be anchored.

Onlay bone grafts have been recommended for augmentation of the atrophic alveolar ridges; however, it is now generally recognized that these grafts are prone to extensive resorption when exposed to *external loading*. Osseointegrated implants can provide *internal loading*. Without

implants, there may even be a greater risk that the grafted bone will be gradually resorbed with time. In the cases presented, radiographs indicated consolidation of the grafted bone when implants were installed after 4 months, probably due to functional stimulation of bone by the implants.

Difficulty has been reported in obtaining adequate soft tissue coverage over both immediate and preformed grafts and

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APOLOGY!

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Exposure to Dental Radiation— A Perspective

N. J. Serman

The disturbing effect of unfavorable articles on patient exposure to radiation in the lay press is that the dentist and the hygienist are often placed on the defensive when recommending dental radiographs for their patients. This renders the efforts of educating patients to accept oral radiographic procedures all the more trying. Public concern often stems from insufficient knowledge or confusion. Furthermore, because the harmful effects of low doses of radiation may not have been studied as a directly observable discrete change in specific individuals, the field is left open to conjecture. The science of dental radiology suffers, because it attracts negative attention disproportionate to its potential for causing radiation injury.

The aim of every operator should always be to expose the patient to as close to zero radiation as possible. The amounts of radiation received from correctly taken dental radiographs are comparable to the background radiation received by the population. The average increase in exposure to the patient to radiation on an annual basis is not significant, and without the information obtained from the radiographs, a complete dental assessment cannot be made. Provided that the operator is taking radiographs only after a clinical assessment has been made that they are required at that stage, and provided that minimal doses and maximal radiation protection are continued on page 6

Complications, Supplementary Treatment, and Maintenance in Edentulous Arches with Implant- Supported Fixed Prostheses

G. Johansson and S. Palmqvist

Excellent long-term treatment results have been reported for fixed prostheses supported by osseointegrated implants fabricated according to the Branemark technique. The failure rates for fixtures and prostheses are low, and the system provides opportunities for adding supplementary fixtures and for rebuilding of the framework and superstructure.

The clinical procedures are well known, and the time required for both the surgical and the prosthodontic steps in the treatment sequence has been studied within the Swedish dental insurance system. However, very little attention has been paid to the time required for supplementary treatment and maintenance.

The purpose of this investigation was to study the frequency of various complications and the time used for supplementary treatment and maintenance in patients with edentulous arches treated continued on page 6

Oral, Maxillofacial and Craniofacial Prosthesis and Episthesis Treatment on Osseointegrated Implants Concepts and Principles

E. Yontchev

The retention of prosthetic appliances is the most important problem in oral and maxillofacial prosthetics. As long as the teeth exist and it is possible to use some other biophysical or mechanical phenomena, the retention of the dental and oral prosthesis and maxillofacial and craniofacial episthesis is a relatively easy task. During the last century, trials have been made to use implants in the prosthodontic rehabilitation of totally and partially edentulous jaws. But more extensive defects both intraorally and extraorally have been left aside for many biomedical and biomechanical reasons.

The first well prepared trials to rehabilitate the patient with a large defect of external ear and surrounding area and another one with evisceratio orbitae as well as the first patient with hemimaxillectomy were done in Gothenburg, Sweden using the experience of dental rehabilitation and a new type of titanium continued on page 6

The Longitudinal Clinical Effectiveness of Osseointegrated Dental Implants: The Toronto Study. Part 1: Surgical Results

G. A. Zarb and A. Schmitt

The 1982 introduction to North America of the technique of osseointegration by Professor P-I Branemark and his Swedish colleagues catalyzed a dramatic shift in prosthodontists' attitudes regarding the feasibility and desirability of routine implantations to support dental prostheses in edentulous patients. Branemark's proposed technique is a compelling synthesis of sound biologic principles and longitudinal clinical testing. Endorsement of its acceptability came from the Swedish National Board of Health and Welfare and from the Council on Dental Materials of the American Dental Association (1988).

Recognizing the profound implications of this prosthodontic technique on patient treatment and dentist professional education, the authors sought to investigate the veracity of Branemark's published claims. This is the first in a series of reports that analyze the results of a clinical study in an edentulous population group with demonstrated chronic inability to wear dentures. This report deals with the surgical results.

In this prospective study, 46 edentulous patients who had undergone traditional denture optimization therapy without success were treated with osseointegrated implants according to the surgical protocol described by Dr. P.I. Branemark. Two hundred seventy-four implants were placed continued on page 6

Matrices in Metal Ceramics

B. Kucey

Restorative rehabilitation was formerly a gnathologic approach using complex instrumentation and laboratory techniques which encouraged the creation of intricate anatomic occlusal detail in gold alloys that was adjustable and could be polished.

However, today's esthetically familiar patients commonly request posterior restorations with porcelain occlusal surfaces, creating problems for the dental technician and the dentist. Detailed porcelain restorations are arduous and routinely delegated to highly skilled ceramists.

Procedures using matrices to reduce construction time of restorations for the desired anatomy have been documented. A systematic restorative process as a control for esthetics, phonetics, and function in fixed prosthodontics was introduced by Preston. This article describes a technique that refines these perceptive methods and encourages using the diagnostic wax-up through the entire restorative process.

The steps involved in restorative oral rehabilitations include (1) diagnostic casts, (2) diagnostic wax-up on replica casts, (3) preparation guides, (4) provisional restorations, (5) final wax-up, (6) cutback of final wax-up and (7) porcelain application.

A matrix serves to conserve time, simplify technical steps, and increase consistency as treatment is accomplished. The matrices may be used in steps 2 through 7.

J Pros. Dent. Sept. 1989

Mandibular Bone Resorption in Patients Treated with Tissue Integrated Prostheses and in Complete Denture Wearers

L. Sennerby, et al.

The mandibular bone resorption of patients who had received tissue integrated prostheses (TIP) following short ($x = 2.4$ years) and long ($x = 23.9$ years) periods of edentulism were compared with the resorption previously reported in complete denture patients. Bone height measurements were made from standardized cephalometric radiographs, while area measurements were made using a digitized video image analyzed by a computer. The patients were followed for 5 to 13 years ($x = 7.8$ years). The results of the comparison suggest that treatment with TIP may reduce mandibular bone resorption in the areas adjacent to the most distal fixture. The results also suggest that a functional difference between basal and alveolar bone may be present and account for some of the differences in resorption (Gerrow).

Abstracted by Gerrow for J of Oral & Maxillofacial Imp, V4, #1, 1989

First Molar Replacement with an Osseointegrated Implant

Thomas J. Balshi

The efficiency of the Branemark method of osseointegration for restoration of the completely edentulous jaw is well documented. Restoration of the partially edentulous patient using osseointegration is also illustrated in the dental literature. Replacement of the single tooth using a single osseointegrated implant is reported as a viable treatment method; however, most examples of single tooth replacement are illustrated by anterior teeth. This article describes the effective use of two osseointegrated Branemark implants for the replacement of a single molar. Adequate bone dimensions are a prerequisite to this treatment.

The patient was a 39 year old woman in excellent general health with no known allergies or sensitivities to medications. Her primary concern focused on the difficulty of, and her frustration in, performing ideal plaque control procedures in the area of the provisional fixed partial

denture in the mandibular left posterior area replacing the first molar. She expressed a desire to restore the area with individual teeth.

The use of osseointegrated fixtures should be considered a conservative approach to the replacement of lost molars. Availability of single tooth replacement systems compatible with Branemark osseointegrated fixtures permits the use of a single fixture to accomplish the same clinical results; however, it is my opinion that multiple fixtures in the molar area provide better distribution of forces to the alveolar bone.

In the mandibular arch, the inferior alveolar canal may prevent the placement of long fixtures. However, it appears that the stability provided by two 10 mm long osseointegrated fixtures yields a bone anchored restoration with a crown/root ratio similar to that of the natural dentition. The use of two fixtures offers greater prosthesis stability for molar replacement than does the use of a single fixture, not because the strength of the single fixture osseointegrated interface cannot withstand

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Clinical and Microbial Evaluation of Treatment Regimens to Reduce Denture Stomatitis

L. G. DePaola, et al.

This 28 day study evaluated the effect of Listerine Antiseptic (L), and Placebo (C) rinses/denture soaks or tissue conditioning relines (R) on palatal inflammation and microbial flora of 78 patients with denture stomatitis (DS). Hour long denture soaks and 3 daily oral rinses of 20 ml for 30 sec were performed by L and C; while R maxillary dentures were relined (Coe-Comfort) every 7 days. During the study period no other denture hygiene techniques were employed. Prior to, and after the 28 days and at each relined palatal inflammation, denture stability and denture plaque were scored. Denture plaque, palatal mucosa swabs, and saliva samples were also taken and cultured on both selective and non-selective media. The microbial data were recorded as the ratio of the # of colonies recovered on selective media converted to a percent. The mean severity of DS was significantly less in both the L ($p < .01$) and R ($p < .05$) as compared to C. Analysis of variance revealed significant differences in ranked adjusted percentage counts in 2/13 organisms investigated, *F. nucleatum* ($p < .05$) and total Bacteroides ($p < .05$). Yeast populations were reduced but not significantly. L and R were equally effective in reducing DS and denture plaque flora. Bacterial pathogens may play a significant role in the development of DS. Supported by Warner-Lambert Study 931-378.

Presented at ICP Toronto, 1989

Functional Evaluation of Bridges on Blade Implants Compared with Bilateral Distal-Extension Mandibular Removable Partial Dentures

E. Mushimoto, et al

Effects of bridge or denture supported dental implants for the rehabilitation of masticatory function have been reported. But the physiological mechanism contributing to the masticatory system remains unclear. It has also been emphasized that implant overloading is the most problematical aspect. The purpose of this study was to clarify the features of chewing motions and evaluate the function of bridges on blade implants electromyographically and kinesigraphically.

Ten subjects were selected, four had bridges on blade implants (G1) and six had bilateral distal extension mandibular removable partial dentures (G2). EMG's of the bilateral masseter and posterior temporal muscles were recorded simultaneously with Kinesigraph (MKG, Myotronics Research Inc., Seattle Wash.) during mastication of test foods (peanuts, raisins, and chewing gum). The data were compared with G1 and G2 and analyzed statistically by Analysis of Variance. Chewing motions of frontal vector in MKG were altered by test foods in G1 and G2, opening distance and maximum width in G1 during gum chewing were smaller than others. EMG cycle time during gum chewing in G2 elongated, but in G1 obvious changes were not observed among the test foods. Integrated EMG's during gum chewing were decreased both in G1 and G2.

Presented at ICP Toronto, July 1989

The Effect of Topically Applied Local Anaesthetics on Leukocyte Migration and Metabolic Activation in Titanium Chambers

A. S. Eriksson, et al.

Our recent studies have shown that the inflammatory response plays an important role for the further development of the tissue surrounding an implant. In the present study we have examined leukocyte migration and metabolic activation in a hollow pure titanium implant during the initial 72 hours after insertion and using pharmacological treatment to modulate the leukocyte response.

A porous titanium chamber was inserted in the rat abdominal wall (Eriksson et al., 1988). Prior to closure of the wound the tissue was treated with topical application of 10 mg of lidocaine given as an aerosol (Xylocain^R, Astra, Sweden) in 50% of the animals. The exudate was sampled 8h, 24h, 48h and 72h after insertion. Six rats from each group were examined. Exudate cells were stained, counted and their metabolic activation was measured by chemiluminescence. In vitro effects of amide anaesthetics on human and rat peripheral blood leukocytes were assayed (using chemiluminescence and leukotriene B₄(LTB₄) measurements) after stimulation with serumopsonized zymosan or bovine serum albumin (BSA)-anti BSA immune complexes. In the non-treated animals the number of leukocytes in the titanium chambers increased slightly with time after insertion. In lidocaine-aerosol treated animals a decrease in leukocyte numbers with time was observed. After 8 hours leukocytes from control animals had an increased responsiveness to stimulation with zymosan particles in vitro. In contrast, leukocytes from lidocaine aerosol

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3. Phonetic difficulty
4. Inability to show teeth when speaking
5. Numbness of the upper lip
6. Excessive mobility of the mandibular overdenture.

The prosthodontic treatment plan for the maxillary arch called for the fabrication of an accurately fitting, esthetically acceptable tissue integrated fixed prosthesis; the mandibular arch required a stabilized precision attachment overdenture supported by the existing transosseous implant.

Following the successful completion of prosthodontic treatment for the maxillary and mandibular arches, the patient then returned with a fracture of the left transmucosal pin of the bone plate Staple implant.

Resolution of this complication will describe the retreatment of the pre-osseointegration (staple) implant using the Branemark method of osseointegration.

Resolution of complication:

Subsequent to fracture of the mandibular bone plate Staple implant, a treatment plan was designed prescribing the use of Branemark fixtures between the vertical posts of the staple implant to ultimately support a fixed prosthesis. Special, narrow diameter (3.0 mm) fixtures were used between the interior staple pins. The right inferior alveolar canal was unroofed and the neurovascular bundle repositioned buccally, permitting the placement of two fixtures distal to the right transmucosal pin. Healing was unremarkable with no loss of feeling in the lip and minimal immediate post-operative discomfort.

Final prosthodontic treatment:

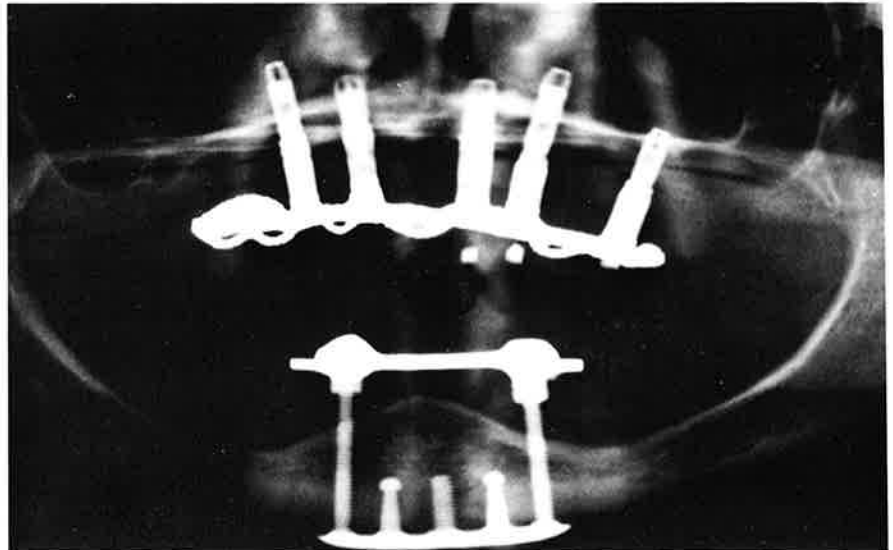
Osseointegration of six Branemark fixtures occurred successfully. The non-removable T.I.P. functions more effectively and comfortably than the previous removable overdenture.

Resolution of patient's initial complaints:

1. Esthetics of maxillary T.I.P. acceptable.
2. Upper lip support provided with maxillary prosthesis.
3. Phonetics improved through tooth position and design of maxillary T.I.P. framework and base.
4. Maxillary incisor lengthened to provide pleasing esthetic appearance at rest and during speech.
5. The upper lip parasthesia has partially resolved (almost four years since bone graft).
6. Mandibular overdenture mobility totally eliminated with placement of Branemark implants to support a non-removable bone anchored prosthesis.

Summary:

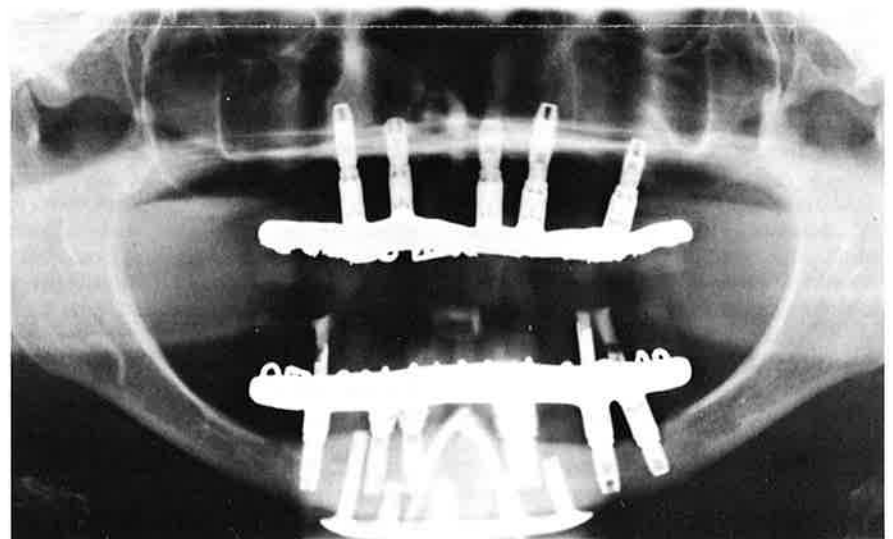
Complex implant prosthodontic rehabilitation can be successfully accomplished with precise and gentle surgical procedures, and meticulous prosthodontic continued on page 5



Pre-treatment panradiograph illustrates mandibular bone plate Staple implant with gold clip bar and maxillary T.I.P. Treatment completed in Florida six months earlier.



Postoperative lateral cephalometric radiograph: Remains of failed Staple implant beneath completed tissue integrated prosthesis.



Postoperative panradiograph: Completed nonremovable mandibular tissue integrated prosthesis supported by Branemark osseointegrated titanium implants.

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**Transoral Submental Lipectomy:
An Adjunct to Orthognathic Surgery**

B. Epker and J. P. Stella

As more adults seek consultation for the orthodontic surgical correction of various dentofacial deformities, the surgeon can expect to receive more requests for adjunctive cosmetic procedures. The presence of submental lipomatosis and/or a poor neck-chin angle is one such esthetic component about which patients frequently express concern. Furthermore, this area is often not optimally improved esthetically with only the planned orthognathic surgery, and on occasion it can even be worsened.

A plethora of techniques to remove submental fat have been proposed. Most of them are designed to correct submental lipomatosis and redundant tissue by using transcuteaneous techniques to gain access to the sub- and supra-platysmal fat pads with or without excision of skin. Others have extended rhytidectomies to effect a neck lift. More recently, surgeons have used transcuteaneous submental suction lipectomy to remove submental adipose tissue. To date, all techniques described have used skin incisions to obtain the desired cosmetic result. Moreover, none have reported submental lipectomy simultaneously performed with orthognathic surgery.

The transoral submental lipectomy involves a transoral technique that may be used independent of or in conjunction with most orthognathic surgical procedures except for reduction genioplasty.

This technique affords excellent access to the submental fat pads without a resulting facial scar. It is a valuable adjunctive procedure for those patients who have submental lipomatosis and desire a more acute neck-chin angle.

**Three Year Evaluation of the
Stryker DB Endosteal Implant
Used in Fixed, Removable, and
Fixed-Detachable Restorations**

M. O. Brose, et al.

The Stryker DB dental implant has been placed, restored, and evaluated up to 36 months at the College of Dentistry, The Ohio State University. This implant has been used in all sites where adequate bone existed—33% maxillary and 67% mandibular. It has been placed in fresh and healed extraction sites and has been restored with single and multiple fixed restorations and complete removable dentures. The surgical success rate, 0-6 months is 94%. The restored success rate, 7-36

months is 90%. There is a 100% success rate in the fresh sites at 17 months. Graphic implant healing profiles have been generated from standardized radiographs taken over 33 months using digitized optical densitometry and a computer program. These quantified profiles demonstrate the bone density and remodeling times at the bone-implant interface for different surgical techniques. They also demonstrate differences in: bone densities at various healing times; anterior/posterior sites; maxilla/mandible placement; free-standing and supported restorations. The data confirm the multifactorial influences on bone density levels near implants and the universal application of this implant system.

Presented at ICP, Toronto, July 1989

Reconstruction continued from page 1

implants using the onlay technique. This can increase the risk for contamination and may also be a decisive factor for graft and implant survival.

This report demonstrates the use of a modified technique for reconstruction of the severely resorbed maxillary alveolar ridge by bone grafting to the maxillary sinus and anterior nasal cavity followed by installation of implants. A total of 51 implants placed in grafted bone and 7 of the 15 implants in nongrafted bone have so far been lost. Muscular hyperactivity probably contributed to the failure of one reconstruction, whereas several short implants (7-10 mm) were used in another. These cases indicate what can happen following an implant reconstruction when the load exceeds the bearing capacity of the reconstruction. The bearing capacity is dependent on the quantity and the quality of the bone. The fact that the bearing capacity of cancellous bone is less than that of cortical bone probably was the most important factor influencing the prognosis of the osseointegrated implants in the maxilla.

Osseointegration continued from page 4

treatment following a well organized treatment plan. The treatment of this patient begins at age 66 with iliac crest bone transplant using Branemark implants to rigidly fix the onlay grafts, and ended at age 69 following placement of Branemark special 3.0 mm diameter fixtures between vertical posts of a failed mandibular bone plate Staple implant concurrent with exposure and repositioning of the right inferior alveolar neurovascular bundle. Resolution of the patient's initial complaints were accomplished through the use of a *conversion prosthesis*, serving as a prototype to the final T.I.P. Continued professional oral hygiene, and close observation of implanted fixtures and prosthesis, are essential to the continued maintenance of optimal oral health.

Although the results so far are comparable with those obtained by Brien and Branemark using onlay bone graft techniques, the authors are reluctant to recommend the procedure due to the sudden loss of two reconstructions 2 and 23 months after loading the implants. Further data is therefore necessary before the procedure can be recommended for routine use.

J Oral Maxillofac Surg 48:27-32, 1990

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Exposure

continued from page 2

ensured, the additional amount of radiation to the patient is low. Because of the probable advantages to the patient under these circumstances, the operator should not hesitate to take the necessary radiographs. The lack of information from not taking radiographs will often result in the inability to make a complete dental assessment of the case, which may often seriously jeopardise the treatment.

Quintessence International 1990: V21, #4, 333-333

Oral, Maxillo Facial and Craniofacial Prosthesis

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implant. The size and form of the implant and operative technique were created by Prof. P-I Branemark. The concept, biomedical principles, and first results of the prosthetic rehabilitation of more than 30 patients with oral, maxillofacial and craniofacial defects were presented in 1983.

The concept of prosthetic treatment of craniofacial defects is the optimal rehabilitation of esthetic appearance and all main functions in the head and neck. The adaptation to prosthesis and episthesis depends on many factors but mainly on retention. The method of retention on Branemark osseointegrated implants of the intraoral prostheses and craniofacial epistheses provided good stability in rest, function, and short adaptation time.

The main biomedical principles of treatment are based on the proper choice of suitable patients, the biomechanical planning and the implant site, size and number. Other general and local factors which must be taken into account for a successful result are:

1. *Primum non nocere.* Materials must not irritate tissues. The titanium alloy used for Branemark implants is well tested and known to be biocompatible.

2. *Retention for esthetics.* The rehabilitation of the patient's appearance must be close to normal. The patient should be accepted by relatives and friends, adapting despite their handicap. Many psycho-social investigations support these observations.

3. *Retention of function.* Breathing, mastication, swallowing, phonetics, sight and hearing have an important role for survival but also for total rehabilitation. Good retention of the prosthesis helps to prevent air and fluid leakage and better function.

4. *Retention for prevention.* The stable retention of episthesis and the prosthesis obtained with osseointegrated titanium implants may prevent overloading of delicate

Molar Replacement

continued from page 2

functional forces, but rather because the distribution of stress to the contact areas of the machined screw joint components improves when multiple abutments are used.

After the restoration was completed, the patient's level of frustration regarding oral hygiene techniques was alleviated. One year following the delivery of the final prosthesis, the patient continued to exhibit superb oral hygiene and indicated that she

Longitudinal

continued from page 2

in 49 dental arches, 43 mandibles and six maxillae. At the time of writing, 4 to 9 years after insertion of the implants, 244 or 89.05% of the individual implants remained osseointegrated. Of the 262 implants in place more than 5 years, 232 or 88.55% were still integrated. The implant success criteria developed in this clinical study endorsed the predictably favorable outcome of the Branemark technique.

J. Pros. Dent. 1990:63; 451-457

soft tissue and bone structures, irritation and decubitus ulcer.

5. *Maximal direct bone transfer loading.* The best transfer of the functional and static loading of prostheses is directly to bone. Previous studies of bridges retained on Branemark titanium implants showed that the bone can take loading in all directions by transfer through osseointegrated implants, while the skin and mucous membrane are vulnerable to prosthetic loading. The system of direct bone loading by osseointegration will stimulate bone remodeling, preventing resorption.

6. *Direct bone and soft tissue transfer loading for retention.* For patients with more extensive defects that involve movable structures, it has been necessary to transfer the load onto the adjacent soft tissue. Overhangs and undercuts of soft tissues present good possibilities for the support of the prosthesis. The implants can be placed far away from the defect. This combined method provides improved retention preventing air and fluid leakage.

7. *Psychological and social rehabilitation of the patient.* The osseointegrated method of prosthesis retention provided stability to all types of prosthesis without need for auxiliary devices. The good retention and stability of the prosthesis have helped patients to adapt in less time. Patients rehabilitated with prosthesis retained on Branemark osseointegrated implants have gone back to their previous work and have been able to manage their jobs. These patients pointed out that good retention and stability, and the feeling of security have been the factors for their **restitutum ad integrum**.

The experience and excellent results with osseointegrated retention of oral, maxillo and craniofacial prostheses and epistheses place this method of prosthetic rehabilitation first among methods of choice.

Presented at ICP Interlaken 1987

enjoyed normal function without conscious recollection of her partial edentulism.

This clinical example illustrates a conservative approach to prosthodontic treatment that fulfilled the patient's desire for individual tooth restoration and simultaneously restored integrity of the arch, function, and esthetics. Additional long term studies are needed to ascertain the effectiveness of this treatment method.

Quintessence, Int. 1990; V21:1:61-65

Complications

continued from page 2

with osseointegrated restorations at the Postgraduate Dental Education Center, Orebro, Sweden. The first 50 edentulous arches treated with osseointegrated fixed partial dentures at the center, were studied retrospectively with concern for complications and time used for supplementary treatment and maintenance. The longest observation period was 9 years, the shortest 3 years, and the mean 5.2 years. Twenty-two percent of the patients experienced fractures of artificial teeth and/or the acrylic resin superstructure. The most severe technical complications were fractured or bent abutment screws (three) and fracture of the framework (one). The average time for supplementary treatment and maintenance was as follows: for surgery, 0.16 hours per prosthesis and year; for prosthodontics, 0.64 hours per prosthesis and year; and for dental laboratory procedures, 1.0 hour per prosthesis and year.

These figures indicate that not only should the initial time and costs for patients with implant supported fixed prostheses be considered, but those for maintenance as well. The selection criteria for implant patients probably determine complication rates, but the social importance of treatment procedures must also be a factor in such decisions

Int. J. of Pros. 1990; V3;1:89-92

Topically Applied

continued from page 3

treated animals had a reduced responsiveness. Lidocaine and bupivacaine had inhibitory effects on leukocyte chemiluminescence and LTB₄ formation in vitro.

This study shows that leukocyte migration and activation as a part of the inflammatory response induced after implant insertion can be studied using quantitative techniques in a hollow titanium chamber. Topically applied amide anaesthetics reduced the slight inflammatory response. The inhibitory effect of the amide anaesthetics on chemiluminescence and LTB₄ formation implicate a role for oxygen radicals and arachidonic acid metabolites during the healing-in of titanium implants.

Source: World Congress on Implantology & Biomaterials Paris, March 1989

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