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Editor: Edwin A. McGlumphy, DDS, MS, Associate Professor, Department of Restorative & Prosthetic Dentistry, College of Dentistry, The Ohio State University

Current Overview

Hile D, Sonis S, Doherty S, Tian X, Zhang Q, Jee W, and Trantolo D. Dimensional stability of the alveolar ridge after implantation of a bioabsorbable bone graft substitute: a radiographic and histomorphometric study in rats. J Oral Implantol 31:68-76, 2005.

**Implants
Bioabsorbable bone
graft substitute**

In the world of modern dentistry, the replacement of teeth is a routine and reliable procedure, but the dentist and the surgeon struggle to obtain the desired quality and quantity of alveolar bone. Bone grafting procedures continue to improve with the introduction of new techniques and materials. One such material is polyester poly (propylene glycol-co-fumaric acid) (PPF). This material can be light cured in situ to form a porous scaffold which can act by itself as a graft or as a volumizer/extender of an autogenous graft.

In this study alveolar defects in rat jaws were treated with either PPF with nanometer hydroxyapatite fillers, PPF with micrometer HA filler, demineralized freeze dried bone allograft, or left untreated. The rats were sacrificed at 2, 4, 7 and 12 weeks postoperatively. The grafted sites were sectioned and examined with radiographic and histologic techniques. No postoperative complications or clinical signs of infection were noted and all sites appeared visually to have been completely filled in with bone.

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The alveolar ridge heights of all mandibular sites treated with a graft material showed similar measurement at 7 and 12 weeks, but the defects treated with the PPF with nanometer HA reached a stabilized state much faster (week 4) than the others. The defects treated in the maxillary arch showed similar ridge heights as soon as 4 weeks, but the DFDBA and the PPF with nanometer HA actually demonstrated an increase in ridge height at 7 to 12 weeks.

According to the histologic evaluation, all graft materials showed evidence of new bone formation. The 4 week postoperative samples showed that the PPF and DFDBA materials were equally effective in new bone generation. By the seventh week all defect sites were filled with new bone regardless of the treatment modality.

The results of this study suggest that the PPF with nanometer HA fillers can function effectively as a graft material and in fact may allow us to place the implants at an earlier point in time due to its rapid maturity.

Dr. David D. Hile, Cambridge Scientific, Inc., 180 Fawcett Street St., Cambridge, MA 02138, e-mail: hiledd@yahoo.com

Implants Comparison

Eckert S, Choi Y, Sanchez A, and Koka S. Comparison of dental implant systems: quality of clinical evidence and prediction of 5-year survival. Int J Oral Maxillofac Implants 20:406-415, 2005.

The authors requested supporting evidence/data from major implant companies. Five manufacturers replied for 7 implant systems. A total of 59 references were reviewed and the level of evidence was noted by all of the 4 authors. The levels were: 1-randomized clinical trials; 2-cohort study; 3-case control cross-sectional studies; 4-case reports/case series; and 5-expert opinion.

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American Prosthodontic Society
426 Hudson Street
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10355 B Democracy Lane
Fairfax, VA 22030
1-800-799-6447
info@northernimplants.com

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Contributing Writer Kumar Shah, DDS

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No obvious differences were apparent between the various implant systems in terms of success rates. Only 3 manufacturers provided higher levels of evidence and only 2 of the 3 had a follow-up period of more than 5 years. The major form of evidence supplied by the manufacturers was more from case series studies.

An overall average implant survival rate of 96% was demonstrated for a total of 7,398 implants. This is more than the 85% 5-year survival standard set by the ADA. This study only included articles provided by the manufacturer and should not be considered a systematic review of the literature.

Dr. Steven Eckert, Mayo Medical School, Division of Prosthodontics, Mayo Clinic, Rochester, MN 55905, e-mail: seeckert@mayo.edu

Derbabian K and Simonian K. Immediate loading of dental implants: overview and rationale. J Calif Dent Assoc 33:337-341, 2005.

***Implants
Immediate loading***

Compared to the early studies and protocol by Branemark and his group, more immediate load studies are being done. Similar success rates have been established for 1-stage or 2-stage implants. The rationale is that even in non-loaded 2-stage implants, there is some amount of functional loading. Schnitmann was one of the first to realize the possibility of immediate loading. Tarnow had a 97% success rate for both immediately loaded and conventional implant cases.

Implants can be immediately loaded in full function provided micromotion is controlled to fewer than 100 microns via case selection, cross arch stabilization and controlling occlusal overload, wide distribution of implants, and minimizing cantilever lengths. Initial primary stability is required for immediate loading.

The authors recommend at least a 10mm length implant that is stable at 35-50Ncm torque. There should be adequate number and distribution of these implants. The prosthesis should be passively fitted with even occlusal contact and minimum cantilever length. Removal of prosthesis during the healing should be avoided and parafunction may be considered a relative contraindication. Two case reports follow at the end of the article.

Dr. Krikor Derbabian, 2625 West Alameda Avenue, Suite 326, Burbank, CA 91505

Bergkvist G, Sahlholm S, Karlsson U, Nilner K, and Lindh C. Immediately loaded implants supporting fixed prostheses in the edentulous maxilla. A preliminary clinical and radiological report. Int J Oral Maxillofac Implants 20:399-405, 2005.

***Implants
Immediate loading
ITI implants***

The purpose of this study was to evaluate both clinically and radiologically the survival rate of ITI implants immediately loaded in the edentulous maxilla after 8 months. The inclusion criteria of this study

was edentulous maxilla with a good minimum alveolar bone width of 4mm. The mandible had to have sufficient teeth for a stable occlusion that was second premolar to second premolar. A total of 28 patients were included in this study. 12 patients were smokers, out of which 6 smoked more than 20 cigarettes a day. They were advised to refrain from smoking before and during the healing period.

Sand blasted large grid acid-edged solid screw implants were placed with diameters of 4.8mm, 4.1mm, and 3.3mm. All implant lengths were either 12 or 10 mm. 6 implants were placed in each patient in the anterior canine and premolar regions.

A removable prosthesis was shaped by a dental technician into a provisional that was screw-retained and implant-supported. This was delivered within 24 hours. There were no cantilevers on the provisional prosthesis and the occlusal surface was flat to reduce any unfavorable forces.

The provisional prosthesis was used for 15 weeks, after which 19 patients received a ceramic fused-to-metal prosthesis and 9 patients had gold and acrylic resin on titanium and acrylic resin prostheses. The following clinical parameters were registered both at 1 month for baseline and at 8 months: plaque scores; bleeding index; presence of hyperplasia; a visible prosthesis implant margin; occlusion; pain; and prosthesis mobility. Pockets were probed if peri-implant bleeding was present.

The authors found that although both plaque accumulation and bleeding index was increased after 8 months, there were no signs of peri-implantitis. No pain of prosthesis mobility was noted. The mean marginal bone level at baseline was 1.6mm and at 8 months was 3.2 mm. The narrow implants had significantly no marginal bone resorption than standard implants. Implants placed at the canine region also had significantly more bone resorption compared to the premolar implants. A total of 3 implants had failed in 2 patients, giving an accumulative survival rate of 98%. There was no complication noted for the ceramic fused to metal restorations. There was 1 denture tooth that fractured in the acrylic resin prosthesis.

The authors attributed the positive results of this study to a possible positive effect of splinting the implants immediately after placement. They stated that immediately loading ITI solid screw implants supporting a fixed prosthesis in the edentulous maxilla can be a viable treatment alternative when restoring the edentulous maxilla. They did recommend a future follow-up study to further strengthen this hypothesis.

Dr. Göran Bergkvist, Implantatcentrum, Norrköping, Sweden, e-mail: goran.bergkvist@ptj.se

Quinlan P, Nummikoski P, Schenk R, Cagna D, Mellonig J, Higginbottom F, Lang K, Buser D, and Cochran D. Immediate and early loading of SLA ITI single-tooth implants: an in vivo study. Int J Oral Maxillofac Implants 20:360-370, 2005.

**Implants
Immediate loading
Single tooth**

The purpose of this research study done on dogs was to compare early loading and immediate loading protocols to conventional loading protocols for single tooth implants. Edentulous ridges were created by extraction of premolars and first molars on the mandible. They were allowed to heal for 4 months prior to implant placement. They were divided into 4 groups (1 dog in each group). Each dog had 12 implants placed. There were 4 different time periods before loading. They were 3 months, 21 days, 10 days, and 2 days. The restorations were full contoured screw retained gold crowns. All crowns were placed out of occlusion.

Acrylic resin templates were fabricated to allow repeated positioning of radiographic probes. Radiographs were made at 1, 2 and 3 months after loading. Crestal bone height was digitally calculated at the different time intervals. Bone density was also measured by computer assisted densitometric image analysis software. Histologic block samples were also looked at, as were the primary, secondary and total bone-to-implant contact and percentage of bone marrow and connective tissue-to-implant contact both mesially and distally.

Clinically, no inflammation or suppuration was seen in any group. There was 100% survival rate for the implant. Although they found some significant difference at 1 and 2 months, by 3 months there was no statistically significant different crestal bone height among all groups. Bone density measurements had no statistically significant difference within the group except for a difference in group C (10 days) at 1 month.

The total bone-to-implant contact analysis showed a marginally significant difference between groups A and B; 3 months and 2 days for bone marrow contact. There was no statistically significant difference when comparing primary or secondary bone-to-implant contact or connective tissue-to-implant contact. It was concluded that early and immediate loading of single unit SLA surface implants is a possible treatment protocol.

Paul Quinlan, Department of Dental Diagnostic Science, University of Texas Health Science Center at San Antonio, San Antonio, TX 78229-3900

Kwon K-R, Sachdeo A, and Weber H-P. Achieving immediate function with provisional prostheses after implant placement: A clinical report. J Prosthet Dent 93:514-517, 2005.

**Implants
Masticatory
function**

Two case reports are presented here in which the authors attempt to improve the patients' masticatory function soon after implant surgery.

In one of their cases, the authors placed 2 inter foramina ITI Straumann implants in the mandible and at the same time placed 4 transitional implants interspersed among the foramina, avoiding the 2 implants. They then used the patients' existing mandibular-completed dentures to attach the 4 transitional implants, while leaving the 2 ITI implants submerged. Only after 6 months healing period, a new mandibular 2 implant overdenture prosthesis was fabricated.

In the second case, the mandibular arch was immediately loaded after placement of 4 ITI implants. The implants were rigidly connected by a bar, and an overdenture prosthesis that was already fabricated was used to pick up the clips.

Both cases had a provisional prosthesis that was functional during the healing stage, thus making implant therapy more readily acceptable to patients.

Dr. Amit Sachdeo, Harvard University, School Of Dental Medicine, Department of Graduate Prosthodontics, 188 Longwood Avenue, Boston, MA 02115, fax: 617-432-0901, e-mail: amit_sachdeo@hsdm.harvard.edu

**Implants
Oxidized titanium
implants
Turned titanium
implants**

Jungner M, Lundqvist P, and Lundgren S. Oxidized titanium implants (Nobel Biocare TiUnite) compared with turned titanium implants (Nobel Biocare Mark III) with respect to implant failure in a group of consecutive patients treated with early functional loading and two-stage protocol. Clin Oral Implants Res 16:308-12, 2005.

A total of 394 Nobel Biocare implants were placed by 5 surgical teams. The objective was to study the 2 types of implant surfaces that were similar in size and shape. 199 NB TiUnite (oxidized Ti) and 195 NB Mark III (turned Ti) implants were used. Out of the TiUnites, 128 were in the maxilla and 71 in the mandible. There were 96 Mark III in the maxilla and 99 in the mandible.

Sixty-three patients underwent 1-stage surgery while the other 73 had a 2-stage conventional procedure. They were followed for at least 5 months after loading the implants with a restoration. Survival criteria were a functional restoration without any discomfort, pathology or infection.

There were 7 implant failures; 6 in the maxilla and 1 in the mandible. All 7 implants that failed were Mark III implants placed under the conventional 2-stage protocol. There was no statistically significant gender difference in failure etiology. They concluded a 100% success rate for NB TiUnite and a 96.4% success rate for the NB Mark III implants.

Måns Jungner, Department of Oral and Maxillofacial Surgery, Karolinska Hospital, SE-171 76 Stockholm, Sweden, tel: 46-8-517-726-33, fax: 46-8-517-734-65, e-mail: mans.jungner@ks.se

Chee W. Treatment planning: implant supported partial overdentures. J Calif Dent Assoc 33:313-316, 2005.

**Implants
Removable partial
dentures**

The author presents a few cases where implants have been used for support and retention for an RPD. An RPD may be the choice of treatment if there is a loss of ridge contour due to residual ridge resorption, condition of abutment teeth, and a long edentulous span.

Implant supported overdenture prostheses may retain the benefits of an RPD and conventional partial overdentures while reducing the maintenance complications. This also makes the prosthesis independent of the rest of the dentition. Also, surgical placements of such implants are less demanding; however, it is important to ensure that there is adequate inter-occlusal clearance for a prosthesis.

The authors then present a case where the patient was treated with a maxillary implant supported overdenture where neither the dentition nor the mucosa was used for support. Three implants replacing 5 units were used for total support and retention, with use of a bar and a few latch clips.

Dr. Winston Chee, 1156 East Green Street, Suite 102, Pasadena, CA 91106-2515

Guirguis M. Key transfer technique for restoring implants with extreme cervix proximity in the esthetic zone: a case report. J Oral Implantol 31:139-144, 2005.

**Implants
Restoration
Cervix proximity**

When implants are placed too near each other, it may be difficult to make an impression using standard impression copings. The author presents a case where he had to develop a customized key transfer technique to position both analogs in the master cast.

An impression was first made with one impression coping attached to one implant. The resultant cast had one analog in the cast. An angled abutment was then placed in the analog to create space for the adjacent abutment. This was preserved via an acrylic resin orientation jig. A superstructure was then cast over the abutment and a try-in was then completed in the patient's mouth.

The casting was then indexed with a resin key. A regular impression was made for the other implant and a cast poured out. After separation, the index was placed accurately over the teeth on the cast and an analog secured to the casting with wax. A section from the cast was removed so that the second analog was hanging in air. Stone was then poured around the analog to secure it to the cast. A dowel was also added under the cast to allow for easy separation of individual dies.

Dr. Mounir Guirguis, Rabwah Areej Dental Center, PO Box 1347, Al-Khobar 31952, Saudi Arabia, e-mail: mounirguirguis@hotmail.com

Implants
Single tooth
implant replacement
Master cast
accuracy

Vigolo P, Fonzi F, Majzoub Z, and Cordioli G. Master cast accuracy in single-tooth implant replacement cases. an in vitro comparison. A technical note. Int J Oral Maxillofac Implants 20:455-460, 2005.

It is important to have an accurate transfer of the position and orientation of the implant in the master cast. Minor movements of impression copings can occur in a single tooth implant cast. As a result, a 3-dimensional inaccuracy may occur.

The purpose of this in vitro study was to evaluate the accuracy of the master cast obtained with copings modified by sand blasting, with the roughened surface coated with impression adhesive or with a gold machined UCLA abutment as an impression coping.

There were 20 impressions in each group. A resin model with a single implant was used to simulate a clinical condition. Based on certain markings and landmarks, they measured the mesial and distal angles in reference to the resin model.

In group A the standard deviation was 36.34 minutes for the molar implant angle and 34.39 minutes for the premolar implant angle. In group B there were 4.36 minutes and 5.56 minutes, respectively. Group B exhibited a significantly better precision compared to group A.

This study indicates that the use of a gold machined UCLA abutment as impression copings for the single tooth implant may enhance the accuracy of the final master cast.

Paolo Vigolo, Department of Clinical Odontostomatology, University of Padova, Institute of Clinical Dentistry, Padova, Italy, e-mail: paolovigolo@virgilio.it

Implants
Single-tooth
implant restoration

Dhanrajani P and Al-Rafee M. Single-tooth implant restoration: a retrospective study. Implant Dent 14:125-130, 2005.

This is a retrospective study of single tooth implant restorations in which the authors present a 6 year audit of implants done at the Riyadh Dental Centre (Saudi Arabia). The single tooth implants were either conventionally treated with a standard protocol of 3-6 months (83.6%) healing prior to loading or had immediately loaded provisional prosthesis (10.8%).

The third group had immediate placement of implants after an extraction, followed by immediate loading with a provisional crown (5.4%). Mainly, 4 implant systems were used. They were Branemark MkII (78.23%), 3i Osteotite(12.9%), Calcitek Omniloc (5.44%) and Steri-oss Replace (3.4%). Out of 101 patients, 15 had controlled diabetes, 17 were occasional smokers and 7 were heavy smokers.

Out of the failure in implants, all but 1 were smokers. The one non-smoker was with the immediately loaded group. 9 out of 147 implants had failed: 5 in the conventionally loaded group; 2 in each of the other 2 groups.

All fixtures lost were from the Branemark group. 23 patients had prosthetic complications of abutment screw loosening (22 in the Branemark and 1 Calcitek); 2 were posterior implants, while 7 were anterior. However, they did not state if they were maxillary or mandibular implants.

It was concluded that immediate loading as well as immediate insertion of implants may be potentially more successful, but larger long term studies are needed.

Dr. P. J. Dhanrajani, HCF Dental Centre, Sydney, Australia, e-mail: parbha@mail.com

Abbo B and Razzoog M. A procedure for repairing a fixed implant-supported complete denture. J Prosthet Dent 93:588-589, 2005.

Implants Titanium Repairing

The authors claim that with use of titanium welded or milled bars there may be more maintenance and repair for a fixed implant-supported completed denture prosthesis. They offer one method of repair if a fracture of acrylic resin occurs, which leaves the metal exposed; they recommended air abrading the surface and treating it with a metal adhesive.

Then 2 thin coats of an opaque microfilled resin composite should be followed by a gingival colored microfilled resin composite. The tooth can then be built up with shades of dentine and enamel resin composites. After contouring and polishing, the prosthesis can be screwed in its place. One disadvantage of this method would be that a color mismatch is more likely to occur, especially after a period of time in function.

Dr. Bill Abbo, 715 South Forest Avenue, Apt #203, Ann Arbor, MI 48104, fax: 734-763-3453, e-mail: abbovan@umich.edu

Kainulainen V, Sandor G, Carmichael R, and Oikarinen K. Safety of zygomatic bone harvesting: a prospective study of 32 consecutive patients with simultaneous zygomatic bone grafting and 1-stage implant placement. Int J Oral Maxillofac Implants 20:245-252, 2005.

Implants Zygomatic bone harvesting

The authors attempted to use the zygomatic bone for harvesting bone for grafting to an implant site. This intra-oral method of harvesting had an apparently low level of morbidity or post-operative complications, although 11 sites did have a maxillary sinus perforation.

A total of 70 implants were placed and the follow up period was 26.9 months on average. Only 2 implants failed during this period. The

authors claimed that the zygomatic graft yielded enough bone for 2-3 implant placements. Thus, they concluded that it was a safe alternative donor site for a bone graft.

Dr. Vesa Kainulainen, Department of Oral and Maxillofacial Surgery, Institute of Dentistry, University of Oulu and Oulu University Hospital, Oulu, Finland, e-mail: vesa.kainulainen@oulu.fi

Materials
Bilateral sinus
elevation
Autogenous
bone vs.
 β -Tricalcium
phosphate graft

Szabó G, Huys L, Coulthard P, Maiorana C, Garagiola U, Barabas J, Nemeth Z, Hrabak K, and Suba Z. A prospective multicenter randomized clinical trial of autogenous bone versus beta-tricalcium phosphate graft alone for bilateral sinus elevation: histologic and histomorphometric evaluation. Int J Oral Maxillofac Implants 20:371-381, 2005.

The purpose of this study was to utilize clinical, radiographic, and histologic methods to evaluate the efficacy of using β -TCP as a graft material for sinus augmentations. This study was comprised of 20 patients who received bilateral sinus augmentation procedures with β -TCP (1.5 to 2g) in 1 sinus and autogenous bone (3 to 4cm³) in the other. After 6 months of healing, the patients underwent implant placement and it was at this time that the samples of the grafted areas were taken.

The histologic evaluation revealed comparable results for the 2 graft materials. In the β -TCP biopsies, bone formation was preceded by a proliferation of cell-rich osteogenic mesenchyme and the establishment of a new capillary network. The graft granules were shown to be resorbed and replaced with newly formed bone. The average percent of graft area replaced by new bone was approximately 37% for β -TCP and 38% for the autogenous graft; hence, no significant difference. The β -TCP graft material demonstrated a significantly ($p < 0.001$) slower rate of resorption (13.95%) when compared to the autogenous graft.

Although autogenous bone remains the gold standard for our current augmentation procedures, the performance of the β -TCP in clinical trials leads one to conclude that it is a satisfactory graft material and can be predictably and reliably utilized to augment the maxillary sinus for the purpose of supporting dental implants.

Dr. György Szabó, Department of Oral and Maxillofacial Surgery, Semmelweis University, Budapest, Hungary, e-mail: szabo@szajseb.sote.hu

Materials
Ceramic
restorations
Resin luting agent

Pagniano R, Seghi R, Rosenstiel S, Wang R, and Katsube N. The effect of a layer of resin luting agent on the biaxial flexure strength of two all-ceramic systems. J Prosthet Dent 93:459-466, 2005.

Ceramic restorations have been around for a long time, but in recent times patients' demand for esthetic restorations has greatly increased; therefore, so has the demand for all ceramic restorations. Glass-ceramics

are now one of the most popular because of their strength, good esthetics, and good clinical experience in the anterior.

Patients' esthetic demands are so great that they also want esthetic restorations for the posterior teeth, but the overall strength of the ceramic systems have not been high enough to resist the forces generated in the posterior. Greater than 90% of the glass-ceramic restoration failures can be attributed to problems starting from the internal surface at the bonded interface.

Numerous studies have been done previously that suggest that there is a significant relationship between the restoration strength and the type of luting agents used. In this study disks of Empress 1 and 2 were etched and either left alone or layered with a thin layer of resin luting agent (Nexus 2). These samples were tested on a ball-on-ring configuration and the biaxial flexure strength was measured.

The application of the resin cement did not influence the generation of stress within the samples, but rather it improved the samples' ability to resist fracture. The use of a silane agent and a resin luting cement was believed to improve the strength, on the basis of crack bridging. The molecules of the silane agent and the cement are believed to enter into the micro-flaws of the ceramic and create a resultant compressive state upon curing. These effects hinder the propagation of micro-cracks and hence increase the functional load that is necessary to prevent catastrophic failure of the all-ceramic restoration.

Dr. Roland Pagniano and Associates, Inc., 6805 Avery-Muirfield Dr., Suite 201, Dublin, OH 43016, fax: 614-932-9451, e-mail: DublinDentalCare@SBCglobal.net

Bartlett D. Three patient reports illustrating the use of dentin adhesives to cement crowns to severely worn teeth. Int J Prosthodont 18: 214-218, 2005.

**Materials
Dentin adhesives
Crowns**

Three cases were described where there was a severe loss to tooth structure due to bulimia nervosa and dentinogenesis imperfecta. Crowns were fabricated over these severely worn teeth and cemented using a resin adhesive, Panavia 21. The restorations lasted 10 years in one patient and 6 years in another. The third was a more recent case. The author claims to provide an alternative treatment for extractions and implant placement for the younger adult with generalized severe tooth wear.

Dr. David Bartlett, Division of Conservative Dentistry, Guy's, King's and St Thomas' Dental Institute, King's College, London, England, e-mail: david.bartlett@kcl.ac.uk

Materials
Fiber reinforced
composite posts

Goracci C, Raffaelli O, Monticelli F, Balleri B, Bertelli E, and Ferrari M. The adhesion between prefabricated FRC posts and composite resin cores: microtensile bond strength with and without post-silanization. Dent Mater 21:437-444, 2005.

Since the introduction of the fiber reinforced composite (FRC) posts, there has been a continuous effort to improve the bond strength between the posts and various core materials. In numerous clinical studies, it has been shown that FRC posts undergo adhesive failures at the core-post interface.

This study evaluated the affect of the application of a silane agent before applying a resin core material. Silane agents are utilized to improve the bonding of the fibers to the resin matrix within the post; therefore, it was assumed that the affect can be achieved at the core-post interface.

The results of this study show that there is no significant influence on the bond strength at the core-post interface by the post or core material. The only significant effect on the bond strength was the silanization of the post. This study shows that using a silane agent as an adhesion promoter between the post and the core material really does work and should be utilized clinically.

Dr. Cecilia Goracci, Research Center for Dental Health, 19 Piazza Attias, 57120 Livorno, Italy, tel: 39-0586-892-283, fax: 39-0586-898-305, e-mail: cecilia.goracci@tin.it

Materials
Resin luting agent
Dowel-head
retention

Aksoy G, Cotert S, and Korkut L. Effect of an adhesive resin luting agent on the dowel-head retention of three different core materials. J Prosthet Dent 93:439-445, 2005.

The two most common areas of failure for a post and core restoration occur at the post-tooth and post-core interfaces; therefore it is important to do all that is possible to improve the bonding at these interfaces. This study evaluated the retention of 3 different core materials with and without the application of a resin luting agent (Panavia F).

The results of this study show that the application of the resin luting agent did significantly improve the retention values of all materials tested. In both the bonded and nonbonded samples the amalgam and composite core materials significantly out-performed the glass ionomer material. The retention values for the amalgam and composite materials were very similar. The composite material had a greater retention value in the nonbonded test (177MPa vs. 128MPa for amalgam), but in the bonded test the amalgam core out-performed the composite (296MPa vs. 284MPa for composite). Overall, there was no significant difference between the amalgam and the composite, but application of the resin bonding agent did significantly improve all retention values.

The amalgam and composite cores out-performed the glass ionomer, but there was no significant difference between the 2 materials (128MPa and 177MPa, respectively). The application of the resin luting agent did significantly improve the retention values of all materials tested, but the bonding agent improved the amalgam, and composites cores performed better than other materials.

Dr. H. Serdar Cotert, Ege Universitesi Dishekimligi Fakultesi, Protetik Dis Tedavisi Anabilim Dali, 35100 Bornova, Izmir, Turkey, fax: 90-232-388-0325, e-mail: cotert@dent.ege.edu.tr

Frankenberger R and Tay F. Self-etch vs etch-and-rinse adhesives: effect of thermo-mechanical fatigue loading on marginal quality of bonded resin composite restorations. Dent Mater 21:397-412, 2005.

**Materials
Self-etch vs. etch-
and-rinse adhesives**

The purpose of this study was to evaluate the marginal integrity of class 2 composite resin restorations prepared with either a self-etch or an etch-and-rinse adhesive system. The all-in-one self-etch bonding systems are quite popular in today's dental office because the system is quick and easy to use and it tends to have a decreased incidence of post-op sensitivity. The advantage of these 1-step self-etch systems is also their downfall. Their weak etching capabilities allow a portion of the smear layer to remain, preventing chemical irritation of the pulpal tissues. On the other hand, the inability to remove a sufficient amount of the smear layer prevents the formation of retentive resin pegs, hence compromising the long-term stability of the restoration.

In this study the thermo-mechanical loading of the restorations was found to significantly reduce the enamel marginal integrity of the restorations bonded with the self-etch systems (gap free margins – etch-and-rinse (90%), 2-step self-etch (75%), all-in-one (55%). The margins bonded to dentine showed a slightly different result; the etch-and-rinse systems and 2-step self-etch systems showed a similar percentage of gap free margins (62-70% and 62-63% respectively), while the all-in-one systems showed a significantly ($p<0.05$) worse performance (percent of gap free margins $<40\%$). The etch-and-rinse and 2-step self-etch systems demonstrated hybrid layers of 5-6um and incomplete infiltration of the resin into the etched microstructure. The micro-gaps can be significant in terms of patient post-op sensitivity.

The present study showed that all bonding agents showed good margin integrity before loading and a decrease in marginal integrity after thermo-mechanical loading. In general, the conventional 3-step etch-and-rinse (with separate components) demonstrated a greater capacity to predictably and reliably form bonds to dentine and enamel. In terms of the self-etch systems, the 2-step systems were significantly better than the all-in-one systems. The decrease in margin integrity for the all-in-one systems was attributed to the hydrophilic nature of the bonding

resins. The hydrophilic bonding components are prone to water sorption and this could be severe enough to degrade the marginal integrity.

Dr. Roland Frankenberger, Dental Clinic I Operative Dentistry and Periodontology, University of Erlangen-Nuremberg, Gluckstrasse 11, D-91054 Erlangen, Germany, fax: 49-9131-853-3603, e-mail: frankbg@dent.uni-erlangen.de

Materials
Sinus augmentation
Mineralized allograft

Froum S, Tarnow D, Wallace S, Jalbout Z, Cho S, Rohrer M, and Prasad H. The use of a mineralized allograft for sinus augmentation: an interim histological case report from a prospective clinical study. Compend 26:259-268, 2005.

The augmentation of the maxillary sinus with autogenous bone is a procedure that has been done predictably for many years, but the downfall of this procedure is the inherent necessity for a second surgical site. Over the years surgeons have utilized numerous different categories of graft materials (e.g., allografts, xenografts, alloplasts), but autogenous grafts continue to be the gold standard treatment.

For many years, surgeons have utilized mineralized cancellous bone allografts (MCB) for the reconstruction and augmentation of oral alveolar defects, but it was the intention of this article to evaluate the affects of a newly developed processing and sterilization technique. The processing technique destroys microbes while maintaining the porous bone mineral and extracellular collagen matrix proteins that are responsible for cellular adhesion and bone remodeling.

In this case report, the graft was comprised of 10% autogenous bone and 90% Puros (processed MCB). At 9 months post augmentation, a second surgery was performed for the placement of 3 implants and the retrieval of a trephine core sample of the grafted tissue. The histologic evaluation revealed the following composition of the biopsy: 25% vital bone, 58% connective tissue and marrow, and 17% residual graft material.

The remaining graft material is of little concern because, as with other mineralized graft materials, a portion of it will continue to resorb over time, while the remaining material may in fact act as a stabilizer of the graft and implants because of its increased density. The results of this case report show that processed mineralized cancellous bone allografts (Puros) are a viable option for the surgeon.

Stuart Froum, Department of Surgical Services (Periodontics), New York University College of Dentistry, New York, NY

Ongthiemsak C, Mekayarajjananonth T, Winkler S, and Boberick K. The effect of compressive cyclic loading on retention of a temporary cement used with implants. J Oral Implantol 31:115-120, 2005.

The purpose of this research study was to evaluate the effect of cyclic compressive loading on retention of a temporary cement used to retain implant crowns. Ten implant abutments and analogs (Zimmer) were used. The abutments were torqued to 30Ncm after the analogs were embedded in resin. A t-shape resin pattern was made over the die.

The pattern had 1mm diameter indentation, 0.5mm in depth that was 3mm from the long axis of the implant. These were duplicated and cast in type III gold alloy. They were cemented with ZOE temp cement and then subjected to dislodgement after 24 hours. Compressive cyclic loading at 20-130 Newtons was done to simulate mastication. They were subjected to 500,000; 1,000,000 or 5,000,000 cycles for each group. They represent 6 months, 1 year and 2 years in function respectively. They were then subjected to the same mechanical testing device.

They found no statistically significant difference between the different time intervals for retentive forces. There was a statistically significant reduction in retentive forces after cyclic loading, but there was no statistically significant difference from increasing the number of cycles. Thus, they concluded that vertical off axis load can significantly reduce the retentive force of a zinc oxide eugenol temporary cement.

Dr. Chakree Ongthiemsak, Department of Prosthodontics, Prince of Songkla University, Hat Yai, Songkla, Thailand, e-mail: ochakree@ratree.psu.ac.th

Guilherme A, Henriques G, Zavanelli R, and Mesquita M. Surface roughness and fatigue performance of commercially pure titanium and Ti-6Al-4V alloy after different polishing protocols. J Prosthet Dent 93:378-385, 2005.

For years we have utilized precious metals in the frameworks of our dental prostheses, but for numerous reasons there has been a shift away from precious metals. Recently, titanium has gained popularity because of its machinability and biocompatibility. The downside to titanium is its inherent difficulties with casting and polishing. With many metals, the surface quality has a direct affect on the ability of the metal to function under load.

In this study the strength of commercially pure titanium and Ti-6Al-4V were compared. The effects of two polishing techniques (conventional methods and electrolytic polishing) were also evaluated in terms of surface finish and overall strength of the metal.

**Materials
Temporary cement
Compressive
cyclic loading**

**Materials
Titanium
Ti-6Al-4V alloy**

The results of this study showed that the commercially pure titanium was significantly weaker than the alloy, regardless of the polishing technique. The electrolytic polishing technique provided a significantly smoother surface finish, but the improved finish failed to significantly affect the overall strength of the material. The results of this study show the titanium prosthetic frameworks should be made of titanium alloy and finished with electrolytic techniques.

Dr. Guilherme Elias Pessanha Henriques, Rua Campos Salles, 2006/92, CEP: 13416-310 / Piracicaba, Sao Paulo, Brazil, fax: 00-55-19-34125218

**Surgery
Ablative mandibular
surgery
Stent**

Tomsett K, Chambers M, Martin J, Gillenwater A, and Lemon J. A technique for fabrication of an immediate mandibular surgical stent securing a skin graft. J Prosthet Dent 93:395-7, 2005.

An immediate surgical stent may sometimes be required for patients undergoing ablative mandibular surgery followed by a skin graft. The authors used a plastic perforated tray and relined it with a tissue conditioner at the time of surgery, after the skin graft was placed. They then managed to secure the stent to the mandible and associated teeth by using silk sutures and ligature wires through the perforations. This stent would remain in position for about 5-7 days post-surgery.

Dr. Mark Chambers, The University of Texas, MD Anderson Cancer Center, Department of Head and Neck Surgery, Section of Oncologic Dentistry, Box 441, 1515 Holcombe Boulevard, Houston, TX 77030-4009, fax: 713-794-4662, e-mail: mchamber@mdanderson.org

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