



THE AMERICAN PROSTHODONTIC SOCIETY

PROSTHODONTICS

Spring 2006

UPDATE

Vol. 1 No. 4

Editor: John L. Reyher, DDS, MS, Danville, IL, concentrated his career in clinical practice and clinical research in the Department of Veterans Affairs

Current Overview

Rosentritt M, Behr M, Gebhard R and Handel G. Influence of stress simulation parameters on the fracture strength of all-ceramic fixed-partial dentures. Dent Mater 22: 176-182, 2006.

**Dentures
Frequency
Fracture**

The purpose of this study was to evaluate the effect of different stress simulations on the fracture yield strength of Empress all-ceramic FPD's. This study demonstrated that a reduction of fracture resistance was most dramatic when combinations of thermal and mechanical stresses were applied.

Stronger chewing forces and providing an artificial periodontium decreased the fracture resistance. Using different materials for the antagonist or abutments also influenced fracture resistance. Other stresses such as chewing frequency, increasing lateral movement, and increasing the phase load did not affect the fracture resistance.

Dr. Martin Rosentritt, Department of Prosthodontics, University of Regensburg, D-93042 Regensburg, Germany, e-mail: martin.rosentritt@klinik.uni-regensburg.de

In This Issue

Dentures	1
Experimental studies	3
Implants	4
Literature review	9
Materials	10
Medications	14
Restorations	15

Please send questions or reprint requests to person whose address is given at the conclusion of each article.

**Dentures
Mandible stains**

Yamashita J, Wang Q and Dechow P. Biomechanical effects of fixed partial denture therapy on strain patterns of the mandible. J Prosthet Dent 95: 55-62, 2006.

The purpose to this study was to evaluate the change in stress distribution in the mandible as a result of fixed partial dentures (FPD) therapy for one missing posterior tooth. The observation of subpontic osseous hyperplasia that sometimes occurs beneath posterior pontics might well be explained by altered stress distribution in the bone following FPD therapy.

Four mandibles were obtained and loaded before and after FPD therapy and the stress distribution was compared. The observation was made that no differences existed when loading teeth not involved with the FPD. The magnitude of the stress was altered when the FPD was loaded. This also suggests that the deformation pattern did not seem to change with the FPD in place.

It was concluded that this data might indicate that the FPD actually contributed to normal bone physiology and in possibly stimulating the bony remodeling process. It was recommended in this article that either implant or FPD therapy be initiated soon after tooth loss to prevent residual alveolar bone loss.

Dr. Junro Yamashita, Department of Biologic Materials and Sciences, Division of Prosthodontics School of Dentistry, University of Michigan, 1011 North University Avenue, Ann Arbor, MI 48109-1078, fax: 734-763-3453, e-mail: yamashit@umich.edu

PROSTHODONTICS UPDATE is a member benefit of The American Prosthodontic Society and is sponsored by Northern Implants.

American Prosthodontic Society
426 Hudson Street
Hackensack, NJ 07601
1-877-499-3500
www.prostho.org

Northern Implants, LLC
10355 B Democracy Lane
Fairfax, VA 22030
1-800-799-6447
info@northernimplants.com

PROSTHODONTICS UPDATE is published quarterly by
Anadem Publishing, Inc.
3620 North High Street
Columbus, OH 43214
1-800-633-0055
anadem@anadem.com
www.anadem.com

Contributing Writer Jason Peacock, DDS

All rights reserved. Reproduction in any form, including photocopying, in whole or in part, without written permission, is prohibited by law. © Copyright 2006 by Anadem Publishing, Inc.

The material in **PROSTHODONTICS UPDATE** is presented to professionals for educational and informational purposes and is based upon information from sources believed to be true. Any opinions expressed herein are those of the articles' authors and are not to be construed as the opinions or recommendations of the publisher. The material presented is not meant to be, and should not be relied upon for, recommendations regarding diagnosis or treatment for any individual case.

Prombonas A and Vlissidis D. Comparison of the midline stress fields in maxillary and mandibular complete dentures: A pilot study. J Prosthet Dent 95: 63-70, 2006.

**Dentures
Maxilla fractures**

The aim of this study was to evaluate and compare the stresses induced on mandibular complete dentures to the stresses on maxillary complete dentures reported in a previous study. This study was done in response to the observation that twice as many maxillary dentures fracture than do mandibular dentures.

Dentures were fabricated on laboratory models and rosette strain gauges were attached to evaluate the stresses under loading. It was found that the stresses were different in quantity and quality between maxillary and mandibular dentures. The previous study demonstrated that the maxillary denture was under continuous tensile stress during loading.

The mandibular denture demonstrated a tendency toward compressive stresses with low tensile stresses. This information could explain why maxillary dentures fracture more often than mandibular dentures due to the fact that polymethyl methacrylate is stronger in compression than in tension.

Dr. Anthony Prombonas, Department of Dental Technology, Technological and Education Institution of Athens, Skiathou 44, Glyfada, Athens 16561, Greece, fax: 30-210-9631291, e-mail: aprob@teiath.gr

Sader M, Balduino A, Soares Gde A and Borojevic R. Effect of three distinct treatments of titanium surface on osteoblast attachment, proliferation, and differentiation. Clin Oral Implants Res 16: 667-675, 2005.

**Experimental studies
Osteoblast activity
Surface treatments**

The objective of this study was to compare the effect of surface topography on osteoblast activity utilizing three surface treatments. Samples were prepared from commercially pure titanium. Surface treatment consisted of grinding, alumina oxide blasting, or alumina oxide blasting followed by acid etching 2 times.

Cells were derived from the endosteal surface of the femoral bone obtained from Balb/c mice. These cells were cultured onto the treated samples to evaluate cell morphology, cell viability, and alkaline phosphatase activity. There was no difference in the 3 samples with respect to adherence and spreading of the osteoblast, cell numbers after 28 days, as well as alkaline phosphatase activity.

The only difference was in cell morphology with the osteoblasts being more flat on the smooth titanium surfaces, which resembled bone-lining cells. This “bone-lining” feature of cells on smooth surfaces may act to isolate the implant from the adjacent tissue.

One significant finding, within the limits of this study, was that left over alumina particles did not seem to effect osteoblast activity.

Dr. Glória de Almeida Soares, Programa de Engenharia Metalúrgica e de Materiais, PEMM/COPPE/UFRJ, PO Box 68505, Rio de Janeiro, Brazil, tel: 55-21-2562-8539, fax: 55-21-2280-7443, e-mail: gloria@ufrj.br

**Implants
Cytokines
Failure**

Campos M, Godoy dos Santos M, Trevilatto P, Scarel-Caminaga R, Bezerra F and Line S. Interleukin-2 and interleukin-6 gene promoter polymorphisms, and early failure of dental implants. Implant Dent 14: 391-396, 2005.

The objective of this study was to analyze and correlate early implant loss with the presence of genetically elevated levels of IL-2 and IL-6. These cytokines are mediators in a number of biologic responses.

This study looked at 74 healthy Caucasian patients, absent of risk factors, who had 1 or more implants placed. The control group consisted of 40 individuals who had implants placed and functioning for 1 year or more.

The study group consisted of 34 patients with implants that failed before or at the time of abutment placement. Using a data analysis program designed for this type of study, genotype distribution of IL-2 and IL-6 were compared between the 2 groups. No significant difference was found.

The conclusion is that the presence of polymorphisms associated with IL-2 or IL-6 by themselves do not seem to be related to early implant loss.

Department of Morphology, Dental School of Piracicaba, State University of Campinas, Piracicaba, Brazil.

**Implants
Provisional for
reinforced framework**

Meiers J and Freilich M. Use of a prefabricated fiber-reinforced composite resin framework to provide a provisional fixed partial denture over an integrating implant: A clinical report. J Prosthet Dent 95: 14-18, 2006.

The aim of this clinical report was to introduce a new provisionalization technique for implants. The authors use a fiber-reinforced material as a framework, which is bonded to and cantilevered off an adjacent natural tooth. This article reviews the steps needed for this process on a 46 year-old female with implant placement number 10.

The author has prepared a fiber-reinforced composite (FRC) framework ready by use of a custom made steel mold. The FRC

framework has foil protecting the unpolymerized wings with the pontic support having already been polymerized. The wings are adapted to the facial or lingual of the adjacent tooth by finger pressure and then bonded in place with flowable resin using standard etch and bond techniques. The pontic is then added with a particulate resin composite.

The author advocates the use of a rubber dam to aid the form of the pontic as well as create a space for floss. When appropriate, the FRC complex is easily removed using finishing burrs and grinding away the winged portion from the adjacent natural tooth.

Dr. Jonathan Meiers, Department of Oral Rehabilitation, Biomaterials and Skeletal Development, University of Connecticut School of Dental Medicine, 263 Farmington Avenue, Farmington, CT 06030-1615, fax: 860-679-1370, e-mail: meiers@nso2.uchc.edu

Yousef H, Luke A, Ricci J and Weiner S. Analysis of changes in implant screws subject to occlusal loading: A preliminary analysis. Implant Dent 14: 378-382, 2005.

Implants Screws Failure

The objective of this study was to provide an initial evaluation of screw joint failure mechanics.

This experiment was executed based on the idea that the abutment to implant interface is dependent on preload, friction, and material properties. Three implants were analyzed using 7 implants from each of the following systems: Nobel Biocare (CeraOne), 3i (STA), and Bio-Lok (custom abutment).

Each sample was subjected to a 300N load at 50,000 cycles. Results indicated that there was a loss of torque, counterclockwise rotation, and screw dimensional changes in the Nobel Biocare but not in the 3i or Bio-Lok. Due to small sample sizing, no statistical comparisons were made.

The conclusion is that this experiment illustrated the mechanics of screw loosening through counterclockwise rotation and dimensional and joint distortions.

Department of Restorative Dentistry, University of Medicine & Dentistry of New Jersey, Newark, NJ 07103, e-mail: aboyouss@umdnj.edu

Scarano A, Assenza B, Piattelli M, Iezzi G, Leghissa G, Quaranta A, Tortora P and Piattelli A. A 16-year study of the microgap between 272 human titanium implants and their abutments. J Oral Implantol 31: 269-275, 2005.

Implants Screw retained abutments Cement retained abutments

The purpose of this study was to retrospectively evaluate 272 implants that had been removed due to failure. The study consisted

of 189 screw-retained abutments and 89 cement-retained abutments. At the time the implants were removed, each was washed with saline, then prepared and sectioned with diamond discs and ground to 30 μm for histological evaluation. Three slides were made for each implant.

Evaluation revealed that among the screw-retained abutments there was no exact adaptation of the abutment to the implant. In addition, the microgap measured at a mean of 61.3 $\mu\text{m} \pm 45 \mu\text{m}$. Bacteria were found within the microgap as well as the internal portion of the implant.

Cement-retained abutments demonstrated a smaller average microgap of 40.4 $\mu\text{m} \pm 3.4 \mu\text{m}$. Cement was found to fill all the spaces with less overall damage to the component parts. With exception of area where the cement had fractured, no bacteria were found within the microgap.

The implication of this study is that biological and mechanical influences may contribute to implant stability. The mechanical ramifications may influence screw loosening and abutment fracture. The biological influence may relate to crestal bone remodeling as well as soft tissue health. In conclusion, the cement-retained abutments showed a significantly smaller microgap with significantly less bacteria associated with the microgap.

Dental School, University of Chieti-Pescara, Chieti, Italy.

**Implants
Sinus lift and alveolar
distraction**

Kim S, Mitsugi M and Kim B. Simultaneous sinus lifting and alveolar distraction of the atrophic maxillary alveolus for implant placement: A preliminary report. Implant Dent 14: 344-346, 2005.

This article presents 2 case series in which the sinus lifting and alveolar distraction were done as a 1-stage surgery procedure. The first case involved a 16 year-old with ectodermal dysplasia. The alveolar distractor was positioned immediately after sinus lifting was completed.

The distraction lasted 5 months, followed by implant placement 1 month later. Implants were restored after 6 months of healing and were in good function 8 months later. The second case involved a 52 year-old woman with good health diagnosed with periodontal disease.

A similar 1-stage sinus lift and alveolar distractor were placed. Twelve weeks after the distractor had been removed, 4 implants were placed. Eight months later prosthetic therapy began. Implants were stable and in good function 9 months after the final prosthesis had been delivered.

In conclusion, the use of sinus lifting and alveolar distraction as a 1-stage procedure are presented and recommended for minimal sinus floor heights below 5 mm but greater than 2 mm.

Department of Oral and Maxillofacial Surgery, Oral Biology Research Institute,
College of Dentistry, Chosun University, Kagawa City, Korea, e-mail:
SGCKIM@mail.chosun.ac.kr

Minichetti J, D'Amore J and Hong A. Three-year analysis of Tapered Screw-Vent implants placed into extraction sockets grafted with mineralized bone allograft. J Oral Implantol 31: 283-293, 2005.

**Implants
Sockets
Mineralized bone
allograft**

The aim of this clinical study was to evaluate the short-term success rate of implants placed in sockets preserved with a mineralized bone allograft material. If immediate implant placement cannot be accomplished, then grafting should be considered to preserve the residual ridge. It has been demonstrated that up to 25% of the anterior maxilla will resorb within 1 year. In the posterior, up to 50% resorption may be noted in the first year.

This study evaluated 134 patients with 313 extraction sites among smokers and non-smokers. Hopeless teeth were extracted, the sockets were degranulated, and bleeding points were placed in each wall except the facial. In the event the facial wall was not intact, a barrier collagen membrane was placed. The sockets were grafted with Puros mineralized allograft of varying particle size.

A healing period of 3 to 6 months was allowed before implant surgery. A periodontal probe was used to test the graft hardness after healing by insuring that it did not penetrate the graft material beyond 2 mm. Implants were placed following standard protocol into 252 of the extraction sites.

Grafted sites were divided between the maxilla (56%) and mandible (44%). Two grafts failed; one due to infection and the other because of persistent pain and symptoms of dry socket. Of the 252 implants placed, 2 had not yet been uncovered at the end of the study, and a total of 6 others failed. A 97.6% success rate was reported for the implants.

The authors found this particular graft material to be easy to place, and it was found to be hard and resistant to the osteotomy implant preparation. They conclude that this material would be a clinically viable material to maintain bone and provide a sound foundation for implant placement. It is recommended that more long-term controlled studies need to be executed to determine the efficacy and safety of this allograft.

Dr. Minichetti, Englewood Hospital, NJ, e-mail: Dminichett@aol.com

**Implants
Stability
Bar-supported
overdenture**

Akca K, Akkocaoglu M, Comert A, Tekdemir I and Cehreli M. Human ex vivo bone tissue strains around immediately loaded implants supporting maxillary overdentures. Clin Oral Implants Res 16: 715-722, 2005.

The objective of this study was to evaluate initial implant stability when placing in the edentulous maxilla. The concern is whether the application of occlusal load with a bar-supported overdenture would put the integration interface of the implant at risk. This study utilized edentulous maxillas of cadavers.

The first stage of the study was to place the implants, test for insertion and removal torque values, and make impressions for overdenture fabrication. The second stage was to place the overdenture and evaluate strain levels and resonance frequency analysis. A force of 100 N was used to test strain values.

The article discusses the factors not accounted for and cautions the reader to consider them when planning treatment for an immediate overdenture. These factors include: bite force of different patients, dimensions of supporting bone, size and type of implant, and varying positions of implants. A high standard deviation was noted in the study, suggesting the possibility of other confounding factors.

This study does suggest that the strain levels would fall within an acceptable physiologic range; however, evidence may be lacking.

Dr. Kivanç Akça, Çetin Emeç Blv, 6. cadde, 54/3 06450 Öveçler, Ankara, Turkey, tel. 90-312-4726898, fax: 90-312-3113741, e-mail: akcak@hacettepe.edu.tr

**Implants
Surface treatments**

Bornstein M, Schmid B, Belser U, Lussi A and Buser D. Early loading of non-submerged titanium implants with a sandblasted and acid-etched surface. Clin Oral Implants Res 16: 631-638, 2005.

The objective of this study was to present 5-year results on a prospective study evaluating SLA surface treated implants. 51 patients were enrolled in the study with 104 implants placed. All patients enrolled in the study were healthy with no risk factors or need for bony augmentation procedures.

Examinations were performed at each recall appointment beginning at 3 months, 12 months, then every year after that. The examinations looked at plaque scores, sulcus bleeding, probing depths, mobility, attachment level, and the distance between the implant shoulder and the mucosal margin, as well as the bone.

One implant was lost at 3 weeks after surgery, 1 patient dropped out at 3 months, and 1 patient was lost to follow-up. A total of 4 implants were lost to evaluation. Of the 100 remaining implants all were considered successful at 5 years.

The gingival evaluations demonstrated some statistically significant changes but exhibited no clinically significant changes throughout the study. In conclusion, this study demonstrated a 99% success rate for the SLA surface implants at 5 years.

Dr. Daniel Buser, Department of Oral Surgery and Stomatology, Freiburgstrasse 7, CH-3010 Berne, Switzerland, tel: 41-31-632-25-55, fax: 41-31-632-98-84, e-mail: daniel.buser@zmk.unibe.ch

Sano H. Microtensile testing, nanoleakage, and biodegradation of resin-dentin bonds. J Dent Res 85: 11-14, 2006.

***Literature review
Resin-dentin bond***

The purpose of this article was to review the literature, much of which the author was involved in, that has increased our current understanding of the resin-dentin bond. Microtensile bond strength was the author's initial approach to the investigation of this bond.

Through the research process, a technique for evaluating the cohesive strength of the dentin-resin bond was developed using hourglass shaped specimens. An additional outcome of the author's original studies was that as the surface area of bond on the specimens increased as the bond strength decreased. This original work later led to the publication of a paper introducing microtensile bond testing.

The early focuses of the author's career also led to researching the nature of dentin-bond leakage and the discovery that leakage could still occur despite the absence of a gap. This leakage was coined nanoleakage to differentiate from microleakage. The nanoleakage was too small to allow for the passage of microorganisms; however, they proposed that enzymes might penetrate and participate in the breakdown of the bond interface.

Later in the author's career, a paper was published demonstrating dissolution of resin with time as well as increased porosity of the hybrid layer. The author proposes that the biodegradation of the hybrid-layer involves three stages. The first begins with the acid-etch process exposing the collagen fibril matrix. The second is dissolution of the resin that originally penetrated the collagen matrix due to small voids within the hybrid layer. The third is the degradation of the collagen fibrils via enzymatic attack. These enzymes are believed to arise from the mineralized dentin. The author suggests the potential use of chlorhexidine in primers, etchants, or adhesives as a mechanism to inhibit the enzyme activity.

H. Sano, Department of Restorative Dentistry, Division of Oral Health Science, Hokkaido University Graduate School of Dental Medicine, North 13, West 7, Kita-ku, Sapporo 060-8586 Japan, e-mail: sano@den.hokudai.ac.jp

**Literature review
Standard of care
Edentulous mandible**

Fitzpatrick B. Standard of care for the edentulous mandible: A systematic review. J Prosthet Dent 95: 71-78, 2006.

The purpose of this paper was to review the literature and test a hypothesis that there is in fact no single standard of care met by one single treatment modality for the edentulous mandible. This study reviewed 47 articles evaluating conventional complete dentures, 2-implant supported overdentures, and complete implant-supported fixed prostheses.

The review showed successes with each treatment option. The review also showed increased patient satisfaction over complete dentures with implant-supported prostheses; however, these articles were limited to a population of patients already dissatisfied with conventional dentures or populations not specifically defined within the study. Based on surveys reviewed in this article, dentists may be partial to one modality over the other, which may be influenced by training and experience.

The author makes a suggestion that perhaps the standard of care for the patient is to provide choices with all the appropriate information. The author discusses the potential litigation dentists may face when the literature limits the standard of care to one single treatment modality. The conclusion is that there is not enough evidence in the literature to substantiate the statement that the standard of care for the edentulous mandible is the 2-implant supported overdenture.

Dr. Brian Fitzpatrick, 12th Floor, King George Tower, 71 Adelaide Street, Brisbane QLD 4000, Australia, fax: 617-32235050, e-mail: brianfitz@bohndental.com.au

**Materials
Amalgam bond
Layer thickness**

Overton J and Vance R. Effect of adhesive volume on the bond strength of bonded complex amalgam restorations. Am J Dent 18: 320-322, 2005.

The purpose of this study was to evaluate whether a significant decrease in bond strength would result if a thin versus thicker layer of Amalgambond had been used.

The study was conducted using 2 groups of 15 extracted teeth reduced to 6 mm wide cylindrical samples. Copper bands were adapted and then sealed to each sample with compound wax. Each sample was prepared using the Amalgambond activator and adhesive agent according to the manufacturer's directions.

The Amalgambond Plus mixture was applied to group I using 5 μ l and to group II using 10 μ l. Amalgam was subsequently condensed into each sample. Each specimen was then reduced to a 4 mm high amalgam restoration.

Bond strength was measured by placing each sample in a Universal Instron testing machine measuring the force required to dislodge the amalgam from the dentinal cylinder. Group I mean force was 14.71 MPa (± 3.41). Group II mean force was 15.67 MPa (± 3.72). A student's t-test resulted in no significant difference between the two ($p < 0.05$).

The conclusion is that a thinner layer of Amalgambond may be used clinically to bond amalgam without the risk of losing bond strength.

Dr. J. Overton, Department of Restorative Dentistry, University of Texas Health Science Center-MSc 7890, 7703 Floyd Curl Drive, San Antonio, Texas 78229-3900, e-mail: overtonj@uthscsa.edu

Soltan M, Smiler D and Gailani F. A new "platinum" standard for bone grafting: autogenous stem cells. Implant Dent 14: 322-325, 2005.

**Materials
Bone grafting
Stem cells**

This article presents a new technique of bone grafting by using stem cells. Autogenic bone graft materials provide osteoconductive, osteoinductive, and osteogenic properties, making them ideal for their use as graft materials.

The authors discuss the potential morbidity, associated with autogenic bone harvesting techniques, from such canals as infection, hematomas, nerve damage, blood loss, extended surgery time and anesthesia. They discuss in great detail the process of osteogenesis from stem cell precursors. Essentially, stem cells have the potential to differentiate into mesenchymal cells, which in turn provide the 3 different bone cells: osteoprogenitor, preosteoblasts, and osteoblast-like cells.

The authors propose a technique that would allow the use of higher concentrations of these stem cells in grafting procedures. The proposed technique consists of an aspiration of bone marrow from the anterior iliac crest, posterior ilium, or sternum, done by hematologists and oncologists. The bone marrow is then mixed with an osteoconductive scaffold and subsequently placed into the needed graft site and protected with a resorbable membrane.

Dr. Soltan, Riverside, CA, e-mail: SoltanDDS@aol.com

Chen M, Chen C, Hsu S, Sun S and Su W. Low shrinkage light curable nanocomposite for dental restorative material. Dent Mater 22: 138-145, 2006.

**Materials
Composite
Shrinkage**

The purpose of this study was to develop a new composite material with reduced polymerization shrinkage while maintaining ideal conventional properties of other composites. The inorganic

component of this new composite was nano-sized silica particles dispersed into the organic component of epoxy resin.

Samples of a microcomposite and 3 variants of the nanocomposite were prepared, using a mold. These samples were tested and compared. The nanocomposites demonstrated lower polymerization shrinkage, with higher strength and improved thermal stability. The conclusion is that this material would be recommended as a dental restorative material.

Dr. Wei-Fang Su, Department of Materials Science and Engineering, National Taiwan University, 1 Roosevelt Road, Sec. 4, Taipei 106, Taiwan, ROC, tel: 886-2-2368-0407, fax: 886-2-2363-4562, e-mail: suwf@ntu.edu.tw

Materials Luting agents

Kramer N, Ebert J, Petschelt A and Frankenberger R. Ceramic inlays bonded with two adhesives after 4 years. Dent Mater 22: 13-21, 2006.

The purpose of this study was to compare 2 luting agents, in a prospective split mouth study, being used to bond IPS Empress ceramic inlays and onlays. The 2 luting agents that were compared were EBS Multi/Compolute and Syntac/Variolink II. No statistically significant differences were noted between the 2 agents over a 4-year recall period.

Observations were made in addition to the actual study and were presented in the paper. This study showed some tendency toward marginal ditching of restorations with both types of luting agents. The prevalence of fractures and cracks increased significantly after 1 year from their initial evaluation at the time the restoration was seated.

The authors observed that in each case of chipping, rotary adjustments had been made to that surface for occlusal adjustments at the time of delivery. In their study, no marginal fractures were noted, and they attributed this to the fact that they treated the internal surface of the ceramic using etch and silane coupling agent. The overall failure rate was 4%, showing no statistically significant differences between the 2 different luting agents.

Dental Clinic 1-Operative Dentistry and Periodontology, University of Erlangen-Nuremberg, Glueckstrasse 11, D-91054 Erlangen, Germany.

Materials Polyelectrolyte multilayer film

Etienne O, Picart C, Taddei C, Keller P, Hubsch E, Schaaf P, Voegel J, Haikel Y, Ogier J and Egles C. Polyelectrolyte multilayer film coating and stability at the surfaces of oral prosthesis base polymers: An in vitro and in vivo study. J Dent Res 85: 44-48, 2006.

The aim of this study was to evaluate experimentally the ability to apply a polyelectrolyte multilayer film onto three dental materials

and evaluate for usefulness. Discs made from PMMA (polymethylmethacrylate), PDM (polydimethacrylate), and VPS (vinylpolysiloxane) were prepared with one side polished. The multilayer film was applied to the discs via alternate submersion into polycationic and polyanionic solutions.

Evaluations for film-layer mass, thickness, wettability, and topography were carried out. In addition, in vitro and in vivo experiments were conducted to evaluate stability of the film layers.

Polished surfaces demonstrated more homogenous film layers, as did PMMA compared to PDM, which was more homogenous than was demonstrated on the VPS. Total coating was achieved, but variability among thickness was noted.

All samples showed a 10-fold increase in wettability with exception of the 5-fold increase seen in the VPS samples. The multilayer film was stable for up to 7 days in an in vitro salivary environment and up to 4 days in an in vivo oral environment.

The authors concluded that this polyelectrolyte multilayer film application could potentially have dental applications, specifically in coating the intaglio surface of denture base polymers. This application may improve wettability and potentially possess some antimicrobial properties.

Dr. Christophe Egles, Division of Cancer Biology and Tissue Engineering, Tufts University, School of Dental Medicine, 55 Kneeland St., Boston, MA 02111, e-mail: christophe.egles@tufts.edu

Belluz M, Pedrocca M and Gagliani M. Restorative treatment of cervical lesions with resin composites: 4-year results. Am J Dent 18: 307-310, 2005.

***Materials
Resin composites
Cervical lesions***

The purpose of this study was to evaluate 2 different resin composites in the treatment of carious and non-carious class V lesions.

This study was carried out on 21 patients with 132 lesions, of which 6 patients were lost to follow-up, leaving 116 restorations for statistical evaluation. Each patient had at least 1 lesion on each side. One side was restored with Ælite Fill (microhybrid composite) and the other side was restored with Ælite Flo (flowable resin).

In total, 18 carious teeth were restored with the microhybrid composite and 38 with the flowable resin. 32 non-carious teeth were restored with the microhybrid composite and 18 with the flowable resin. Evaluation of each restoration was done at 3, 6, 12, 24, 36, and 48 months for marginal discoloration and adaptation, color match, anatomic form, and recurrent decay.

The results of the study showed no significant difference between materials for retention in the carious lesions. The microhybrid showed better retention in non-carious lesions, and the flowable resin provided better marginal adaptation in carious lesions.

The microhybrid composite gave the best result when marginal discoloration was compared in non-carious lesions. No other significant differences were found for all other factors considered.

Section of Endodontics and Restorative Dentistry, Dental Clinic, Department of Medicine, Surgery and Dentistry, Hospital San Paolo Milano, University of Milan, Via Beldiletto 1/3, 20142 Milan, Italy.

**Medications
Bisphosphonates
Osteonecrosis of the
jaws**

Woo S-B, Hellstein J and Kalmar J. Systematic review: bisphosphonates and osteonecrosis of the jaws. Ann Int Med 44: 753-761, 2006.

Recently, considerable attention has been focused on osteonecrosis of the jaw related to medical treatment with bisphosphonates. Bisphosphonates are being successfully used to treat osteoporosis, Paget bone disease, multiple myeloma, and metastatic cancer to the bones. Long-term use of these drugs, however, may suppress bone metabolism; there is some disagreement among experts about whether the biomechanical properties of bone are compromised by long-term use. Another result of bisphosphonate use is the development of oral lesions.

The authors reviewed 368 reported cases of osteonecrosis of the jaws and found that almost all involved patients receiving intravenous nitrogen-containing bisphosphonates for multiple myeloma or metastatic breast cancer and also found that the mandible was affected more than twice as often as the maxilla. Of significance is the fact that 60% of cases followed a tooth extraction or other dental surgical procedure, and the other 40% were thought to arise from infection or some kind of trauma, particularly from dentures.

Factors that influence the development of osteonecrosis of the jaws include the total dose and kind of bisphosphonate. In the cases studied, most patients received high doses of pamidronate and zoledronic acid for cancer treatment. Osteoporosis treatment requires substantially lower doses, and oral medication is taken. Dental trauma and dental surgery and infection were found to be other factors in the development of osteonecrosis of the jaws. It is thought that the jaw area is more susceptible to osteonecrosis because of the thin separation from the oral area which has a significant amount of bacteria and from the teeth which are often subject to trauma.

In recommending management, the author suggests that patients about to undergo bisphosphonate treatment have a complete dental examination, including intraoral and panoramic radiographs. Any active infection should be treated, as well as potential problems such as impacted wisdom teeth. Also, patients should be informed about the possibility of osteonecrosis.

For patients who are involved in bisphosphonate therapy for more than 3 months, more conservative treatments are recommended along with use of local and systemic antibiotics. In treating patients with longer-term bisphosphonate treatment, the author recommends extra imaging such as CT scans, dead bone removal, oral rinses, systemic antibiotics and analgesics, and use of a soft stent. Discontinuation of bisphosphonate treatment until healing, if possible in light of the underlying disease, is suggested.

Dr. Sook-Bin Woo, Brigham and Women's Hospital, 45 Francis Street, Boston, MA 02115.

Pereira J, de Ornelas F, Rodrigues Conti P and Lins do Valle A. Effect of crown ferrule on the fracture resistance of endodontically treated teeth with prefabricated posts. J Prosthet Dent 95: 50-54, 2006.

Restorations Crown ferrule Fractures

The aim of this in-vitro study was to evaluate how the ferrule effect would impact failure in teeth treated with prefabricated post and composite cores. The study used 15 extracted maxillary canines with a root length of 15–16 mm. Each tooth was caries-free without prior endodontic therapy. The teeth were endodontically treated to a #35 ISO file and obturated via lateral condensation with gutta percha. The canal space was then prepared for a post using a #5 reamer to the length of 9 mm apical to the cemento-enamel junction (CEJ).

The control group was prepared by removing all coronal tooth structure to the CEJ and restoring with a cast post and core that was the same size as the prefabricated posts. The experimental groups were restored with prefabricated stainless steel posts and composite cores. The experimental groups had coronal tooth structure removed 0 mm, 1 mm, 2 mm, and 3 mm from the CEJ. All teeth were prepared for crowns with the margin placed at the CEJ.

The Ni-Cr alloy crowns were cemented to each tooth using glass ionomer cement. Each tooth was embedded into an acrylic resin block with a silicone spacer to simulate the periodontal ligaments. Each tooth was subjected to a load applied at a 45° angle at a cross head speed of 0.5 mm/min until failure occurred.

This experiment demonstrated that all failures in the control group occurred as a result of root fracture. The 0 mm group had failures as a result of core fracture. The other groups consisted mostly of crown decementation as a mode of failure. The 3 mm group demonstrated the highest resistance to failure. The 0 mm group requiring the least amount of force followed by the 1mm than 2 mm group. The control group was second to the 3 mm group for fracture resistance.

This study indicates that ferrule effect does have a significant impact on fracture resistance. It also demonstrates the mode of failure for the direct versus indirect technique of post and core restorations. Cast post and core restorations tend to fail by means of root fracture. Prefabricated posts and composite cores tend to fail by means of composite failure before root fracture can occur.

Dr. Jefferson Ricardo Pereira, Rua Antônio Xavier de Mendonca 8-08 apto 05,
Bauru, São Paulo, Brazil, CEP: 17012-385, fax: 55-14-32358277, e-mail:
jeffripe@rocketmail.com

This publication is provided as a membership benefit for you...



THE AMERICAN PROSTHODONTIC SOCIETY