

[Clin Oral Implants Res.](#) 2002 Apr;13(2):144-53.

The use of reduced healing times on ITI implants with a sandblasted and acid-etched (SLA) surface: early results from clinical trials on ITI SLA implants.

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Abstract

ITI dental implants are available with two bone-anchoring surfaces, a titanium plasma-sprayed (TPS) surface, and a recently introduced sandblasted and acid-etched (SLA) surface. Cell culture and animal tests demonstrate that the SLA surface stimulates bone cell differentiation and protein production, has large amounts of bone-to-implant contact, and results in large removal torque values in functional testing of the bone contact. As a result of these studies, a prospective human clinical trial was initiated to determine whether the 4.1 mm diameter SLA ITI solid screw implants could be predictably and safely restored as early as six weeks after implant placement surgery. The protocol restricted the use of the reduced healing time to a) healthy patients with sufficient bone volume to surround the implant, and b) those patients who had good bone quality (classes I-III) at the implant recipient site. Patients with poorer bone quality (class IV) did not have restorations until 12 weeks after implant placement. The clinical trial is an ongoing multicenter trial, with six centers in four countries, and with follow-up over five years. The primary outcome variable was abutment placement with a 35 Ncm force, with no counter torque and no pain or rotation of the implant. A secondary outcome was implant success, as defined by no mobility, no persistent pain or infection, and no peri-implant radiolucency. To date, 110 patients with 326 implants have completed the one-year post-loading recall visit, while 47 patients with 138 implants have completed the two-year recall. Three implants were lost prior to abutment connection. Prosthetic restoration was commenced after shortened healing times on 307 implants. The success rate for these implants, as judged by abutment placement, was 99.3% (with an average healing time of 49 days). Life table analyses demonstrated an implant success rate of 99.1%, both for 329 implants at one year and for 138 implants at two years. In the 24-month period after restoration, no implant losses were reported for the 138 implants. These results demonstrate that, under defined conditions, solid screw ITI implants with an SLA endosseous surface can be restored after approximately six weeks of healing with a high predictability of success, defined by abutment placement at 35 Ncm without counter torque, and with subsequent implant success rates of greater than 99% two years after restoration.

[Int J Oral Maxillofac Implants](#). 2003 Sep-Oct;18(5):659-66.

Early loading of nonsubmerged titanium implants with a sandblasted and acid-etched (SLA) surface: 3-year results of a prospective study in partially edentulous patients.

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Abstract

PURPOSE: The aim of this study was to evaluate the success rate of ITI implants with the SLA surface that were loaded after 6 weeks of healing. **MATERIALS AND METHODS:** In this prospective cohort study, a total of 104 implants were placed in posterior sites of 51 partially edentulous patients exhibiting bone densities of Class 1, 2, or 3. After a healing period of 6 weeks, all implants were functionally loaded with cemented crowns or fixed partial dentures. The patients were recalled at 3, 12, 24, and 36 months for clinical and radiographic examination.

RESULTS: One implant failed to integrate during healing, and 1 implant was lost to follow-up and considered a dropout. The remaining 102 implants showed favorable clinical and radiographic findings and were considered successfully integrated at the 3-year examination. This resulted in a 3-year success rate of 99.03%.

DISCUSSION: The peri-implant soft tissues were stable over time, as evidenced by no changes in the mean probing depths and the mean attachment levels during the follow-up period. None of the radiographs exhibited signs of continuous peri-implant radiolucency, which confirmed ankylotic stability of all 102 implants. The radiographic evaluation of the bone level at the implant indicated stability of the bone crest levels. **CONCLUSION:** The results of this prospective study demonstrated that early loading of ITI implants with the SLA surface after an unloaded healing period of 6 weeks provided successful tissue integration with high predictability, and that successful tissue integration was well maintained up to 3 years of follow-up in this study population.

[Int J Oral Maxillofac Implants](#). 2004 Nov-Dec;19(6):880-6.

A 3-arm study of early loading of rough-surfaced implants in the completely edentulous maxilla and in the edentulous posterior maxilla and mandible: results after 1 year of loading.

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Abstract

PURPOSE: The aim of the present prospective study was to evaluate the concept of early loading of rough-surfaced implants in the completely edentulous maxilla and in the edentulous posterior mandible and maxilla.

MATERIALS AND METHODS: Fifty-four consecutive patients were treated. Twenty patients were completely edentulous in the maxilla (group A), 19 patients were edentulous in the posterior left and/or right maxilla (group B), and 15 patients were edentulous in the posterior left and/or right mandible (group C). One patient in group B and 5 in group C were bilaterally treated. Two hundred thirty-four solid screw-type, sandblasted, large-grit, acid-etched (SLA) ITI implants were placed, 58 (25%) immediately after tooth extraction. Mean placement torque and standard deviations were measured at all sites. Sixty fixed prostheses were delivered after a mean delay of 9 days (range, 4 to 22 days). Mean marginal bone reduction was measured after 1 year of loading. **RESULTS:** Two implants were lost (0.9%), 1 before functional loading and 1 after 1 year. All other implants were clinically stable, with a mean marginal bone loss of 0.75 mm (+/-1.3 mm). Marginal bone loss ranged from 0 to 3.5 mm. Mean placement torque on implants placed in healed bone or immediately after tooth extraction ranged from 29.1+/-9.3 Ncm to 35.5+/-5.8 Ncm. No statistical difference was found ($P > .05$) between implants placed in healed bone and those placed immediately after tooth extraction. **DISCUSSION:** There is little documentation for immediate or early loading in the areas studied. However, in this study, favorable results were obtained in 54 consecutive patients in these regions. **CONCLUSION:** In this study population, early loading protocols can be applied with predictable results using rough-surfaced implants for rehabilitation of the completely edentulous maxilla, posterior maxilla, and posterior mandible.

[J Periodontol](#). 2007 Jun;78(6):974-82.

Clinical field trial examining an implant with a sand-blasted, acid-etched surface.

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Abstract

BACKGROUND: Conventionally, endosseous dental implants have required 3 to 6 months of uninterrupted healing based on observations for dental implants that were characterized by a relatively smooth machined surface. Many studies have since demonstrated that implants with a roughened surface resulted in greater bone apposition, earlier bone contact, and a stronger bond between the implant and the bone, suggesting that implants with roughened surfaces could be loaded earlier than 3 to 6 months. Formal clinical studies confirmed that implants with rough surfaces can have abutments placed and be loaded occlusally as early as 6 weeks postplacement. The purpose of this prospective, human clinical investigation was to evaluate a large number of implants with a specific rough surface (sand-blasted acid-etched [SLA]) placed in everyday practice under routine private-practice conditions. **METHODS:** A prospective, multicenter, human clinical observational study was initiated with the goal of recruiting a minimum of 500 patients and 800 implants. The implants were to be placed and restored in predominantly private-practice settings around the world. Ninety-two practitioners in 16 countries agreed to participate, and 86 followed the study design. Patients had to be in good health, have sufficient bone to encase the implant, and agree to return for recall appointments. Exclusion criteria included heavy smoking (>10 cigarettes a day) and bone augmentation procedures at the implant site. All implants were two-piece (an abutment was to be placed after 6 weeks of healing) and were characterized by the presence of a transmucosal polished collar. Each implant had an SLA surface. All implants were positioned using a non-submerged (single-stage) surgical technique. Survival and success rates were calculated by life-table analyses. **RESULTS:** A total of 706 patients were enrolled and 1,406 implants were placed. In the final analyses, 590 patients with 990 implants (70.4% of those enrolled) met all inclusion criteria, including placement of an abutment and provisional restoration within 63 days of surgical placement. The majority of implants were 10 and 12 mm long (78.7%) and were placed in type II and III bone (87%). Seventy-three percent of the implants were placed in the mandible, and 27% were placed in the maxilla. The cumulative survival rate was 99.56% at 3 years and 99.26% at 5 years. The overall success rate was 99.12% at 3 years and 97.38% after 5 years. **CONCLUSIONS:** Under private-practice

conditions, implants with an SLA surface could be placed and restored predictably within 6 to 8 weeks. Data from this prospective, multicenter, human observational study reinforced the results of more formal clinical studies and demonstrated that implants with the SLA surface can be restored in patients in approximately half of the time of conventional healing periods.

[Clin Oral Implants Res.](#) 2008 May;19(5):433-41. Epub 2008 Mar 26.

Five-year results from a randomized, controlled trial on early and delayed loading of implants supporting full-arch prosthesis in the edentulous maxilla.

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Abstract

OBJECTIVES: The overall aim was to compare the clinical outcomes of early and delayed implant loading in the totally edentulous maxilla during 5 years of function. **MATERIALS AND METHODS:** Twenty-four patients with edentulous maxillae were randomized in two groups and subjected to early (test, n=16) or delayed (control, n=8) loading. A total of 142 implants were placed and 139 implants (Straumann AG) were loaded with full-arch bridges and followed for 5 years. **RESULTS:** All patients received and maintained a fixed bridge throughout the study period. Five (5.3%) test implants in three patients and two (4.3%) control implants in two patients were lost during the 5 years (NS). There were no differences in implant stability as measured with resonance frequency analysis at 5 years. More bone loss occurred at test than at control implants, -0.8 mm (SD 1.2) vs. -0.3 mm (SD 1.1), respectively. However, test implants showed a more coronal marginal bone level than control implants after 5 years, 2.9 mm (SD 1.1) vs. 3.7 mm (SD 1.2) from the implant shoulder, respectively. No control implants and four (4.4%) test implants in three (18.8%) patients showed >3 mm bone loss after 5 years. Two of the latter implants in one patient also showed increased probing depths, bleeding at probing and plaque accumulation. Tooth fracture was the most common prosthetic complication. The use of lingual gold onlay effectively reduced the number of resin-related complications as opposed to a resilient mouth guard. **CONCLUSIONS:** The present randomized controlled trial showed no important differences between early and delayed loading of implants in the edentulous maxilla after 5 years of function. A favourable long-term marginal bone response to the sandblasted large-grit acid-etched (SLA) surface was observed. Technical complications were mainly resin-related which could be avoided by the use of a lingual gold onlay. It is concluded that early loading of SLA-surface implants for support of full-arch bridges represents a viable therapy for the totally edentulous maxilla.

Clinical and radiographic study of implant treatment outcome in periodontally susceptible and non-susceptible patients: a prospective long-term study.

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Abstract

OBJECTIVES: To evaluate the implant survival rate, periodontal and radiographic parameters of non-submerged screw implants with two different surfaces (TPS and SLA) in periodontally non-susceptible patients (NSP) and in patients with chronic adult periodontitis (CAP) or with generalized aggressive periodontitis (GAP). **MATERIAL AND METHODS:** In 110 healthy partially edentulous subjects, 68 patients with CAP and 16 patients with GAP, a total of 513 implants were installed and followed for on average 48.1±25.9 months. Only fixed partial dentures were used as suprastructures. All patients were offered a supportive periodontal maintenance program. Smoking habits, health impairment, plaque score, bleeding on probing (BOP), type of surface, bone score, bone loss on radiographs and the number of failed implants were noted. **RESULTS:** Implant survival in the NSP and CAP group was 98% and 96% after 140 months (NS), but only 80% after 100 months in the GAP group (P=0.0026). The overall rate of implant loss was 4.7%, but 15.25% in the GAP group (6/16 patients). The average marginal bone loss for all implants was 0.12±0.71 mm on the mesial side and 0.11±0.68 mm on the distal side. Bone loss/year was 0.08±0.31 and 0.07±0.3 mm in the NSP group, but 0.17±0.2 and 0.17±0.19 mm in the GAP group. Only in the GAP group, was bone loss significantly related to BOP, age, inflammation, presence of plaque, probing depth. Implants with a TPS surface had a lower survival than implants with an SLA surface (93% vs. 97%; P=0.06), especially in the GAP group (80% vs. 83%; P=0.005). Smoking habits had a significant influence on implant survival only in the GAP group (P=0.07), declining in current smokers to 63%, and to 78% in former smokers. Overall, impaired general health had no significant influence (P=0.85). However, impaired health further reduced implant survival in the GAP group (survival: 71%). In a statistical model to predict the chance for implant failing, only periodontal classification (P=0.012) and implant surface type (P=0.027) were significant. **CONCLUSION:** Periodontally healthy patients and patients with CAP show no difference in peri-implant variables and implant survival rate, but patients with GAP have more peri-implant pathology, more marginal bone loss and a lower implant survival implant rate. SLA surface had a better prognosis than the TPS surface.

[Clin Oral Implants Res.](#) 2008 Nov;19(11):1119-28.

Immediate and early loading of Straumann implants with a chemically modified surface (SLActive) in the posterior mandible and maxilla: 1-year results from a prospective multicenter study.

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Abstract

OBJECTIVE: Immediate and early loading of implants can simplify treatment and increase patient satisfaction. This 3-year randomized-controlled trial will therefore evaluate survival rates and bone-level changes with immediately and early loaded Straumann implants with the SLActive surface. **MATERIAL AND METHODS:** Partially edentulous patients ≥ 18 years of age were enrolled. Patients received a temporary restoration (single crown or two to four unit fixed partial denture) out of occlusal contact either immediately (immediate loading) or 28-34 days later (early loading group), with permanent restorations placed 20-23 weeks after surgery. The primary endpoint was change in crestal bone level from baseline (implant placement) to 12 months; the secondary variables were implant survival and success rates. **RESULTS:** A total of 383 implants (197 immediate and 186 early) were placed in 266 patients; 41.8% were placed in type III and IV bone. The mean patient age was 46.3 ± 12.8 years. Four implants failed in the immediate loading group and six in the early loading group, giving implant survival rates of 98% and 97%, respectively ($P=NS$). There were no implant failures in type IV bone. The overall mean bone level change from baseline to 12 months was 0.77 ± 0.93 mm (0.90 ± 0.90 and 0.63 ± 0.95 mm in the immediate and early groups, respectively; $P < 0.001$). However, a significant difference in implantation depth between the two groups ($P < 0.0001$) was found. After adjusting for this slight difference in initial surgical placement depth, time to loading no longer had a significant influence on bone-level change. Significant influence was found for: center ($P < 0.0001$), implant length ($P < 0.05$) and implant position ($P < 0.0001$). Bone gain was observed in approximately 16% of implants. **CONCLUSIONS:** The results demonstrated that Straumann implants with the SLActive surface are safe and predictable when used in immediate and early loading procedures. Even in poor-quality bone, survival rates were comparable with those from conventional or delayed loading. The mean bone-level change was not deemed to be clinically significant and compared well with the typical bone resorption observed in conventional implant loading.

[Int J Oral Maxillofac Implants](#). 2007 Sep-Oct;22(5):755-60.

Enhanced implant stability with a chemically modified SLA surface: a randomized pilot study.

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Abstract

PURPOSE: Chemical modification to a sandblasted, large-grit, acid-etched (SLA) implant surface has been shown to enhance the rate of osseointegration. The goal of the present study was to examine changes in stability for implants with a chemically modified SLA surface and to compare their outcomes to those of control implants.

MATERIALS AND METHODS: A randomized controlled trial was conducted with 31 patients. Each patient received 2 implants with the same physical properties but with surfaces that were chemically different. The control implants had a standard SLA surface, while the test implants had a chemically modified surface. Resonance frequency analysis was assessed weekly over the first 6 weeks following implant placement. **RESULTS:** All implants proved clinically successful, allowing for restoration. Most implants were placed in the mandible (50 of 62). A shift in implant stability from decreasing stability to increasing stability ($P < .001$), occurred after 2 weeks for the test implants and after 4 weeks for the control implants. **CONCLUSION:** The findings from this pilot study provide clinical support for the potential for chemical modification of the SLA surface to alter biologic events during the osseointegration process and demonstrate levels of short-term clinical success similar to those observed for implants with an SLA surface.

[J Periodontol.](#) 2010 Jun;81(6):809-18.

Early loading at 21 days of non-submerged titanium implants with a chemically modified sandblasted and acid-etched surface: 3-year results of a prospective study in the posterior mandible.

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Abstract

BACKGROUND: This study evaluates 3-year success rates of titanium screw-type implants with a chemically modified sandblasted and acid-etched surface (mod SLA), which were functionally loaded after 3 weeks of healing. **METHODS:** A total of 56 implants, inserted in the posterior mandibles of 39 partially edentulous patients, underwent undisturbed healing for 3 weeks. At day 21, the implants were fully loaded with provisional crowns. Definitive metal ceramic restorations were fabricated after 6 months of healing. Clinical measurements regarding soft tissue parameters and radiographs were obtained at different time points up to 36 months after implant placement. The soft tissue and radiographic parameters for the mod SLA implants after 3 years in function were compared to a historic control group of implants with an SLA surface using an early loading protocol after 6 weeks. **RESULTS:** None of the implants failed to integrate. However, two implants were considered "spinners" at day 21 and were left unloaded for an extended period. Therefore, 96.4% of the inserted implants were loaded according to the protocol tested. All 56 implants, including the "spinners," showed favorable clinical and radiographic findings at the 3-year follow-up examination. All 56 implants were considered successfully integrated, resulting in a 3-year survival and success rate of 100%. Dental implants with a mod SLA surface demonstrated statistically significant differences for probing depths and clinical attachment level values compared to the historic control group, with the mod SLA surface implants having overall lower probing depths and clinical attachment level scores. **CONCLUSION:** This prospective study using an early loading protocol demonstrates that titanium implants with the mod SLA surface can achieve and maintain successful tissue integration over a period of 3 years.

[J Periodontol.](#) 2009 Jan;80(1):152-62.

Early implant placement with simultaneous guided bone regeneration following single-tooth extraction in the esthetic zone: 12-month results of a prospective study with 20 consecutive patients.

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Abstract

BACKGROUND: Early implant placement is one of the treatment options in postextraction sites in the anterior maxilla. Implant placement is performed after a soft tissue healing period of 4 to 8 weeks. Implant placement is combined with a simultaneous guided bone regeneration (GBR) procedure to rebuild esthetic facial hard and soft tissue contours. **METHODS:** In this prospective case-series study, 20 consecutive patients treated with an implant-borne single crown were prospectively followed for 12 months. Clinical, radiologic, and esthetic parameters were recorded to assess treatment outcomes. **RESULTS:** At the 12-month examination, all 20 implants were successfully integrated, demonstrating ankylotic stability and healthy peri-implant soft tissues as documented by standard parameters. The esthetic outcomes assessed by a pink esthetic score (PES) and a white esthetic score (WES) demonstrated pleasing results overall. The WES values were slightly superior to the PES values. The periapical radiographs showed minimal crestal bone loss around the used bone level implants, with mean bone loss of 0.18 mm at 12 months. Only one implant showed >0.5 mm bone loss, combined with minor mucosal recession of 0.5 to 1.0 mm. **CONCLUSIONS:** This prospective case series study evaluating the concept of early implant placement demonstrated successful tissue integration for all 20 implants. The short-term follow-up of 12 months revealed pleasing esthetic outcomes overall, as assessed by objective parameters. The risk for mucosal recession was low; only one patient showed minor recession of the facial mucosa. These encouraging results need to be confirmed with 3- and 5-year follow-up examinations.

[Clin Oral Implants Res.](#) 2009 Feb;20(2):162-8.

A randomized, controlled clinical trial to evaluate a new membrane for guided bone regeneration around dental implants.

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Abstract

OBJECTIVES: The use of barrier membranes in guided bone regeneration (GBR) procedures for the treatment of alveolar bone defects is common practice. The objective of this study was to test whether a synthetic bioresorbable polyethylene glycol (PEG) hydrogel membrane could result in a similar amount of vertical bone fill as a standard collagen membrane, both combined with a membrane supporting material. **MATERIAL AND METHODS:** The study enrolled 37 patients requiring implant treatment with an expected osseous defect in the posterior maxilla or mandible. After raising a mucoperiosteal flap, the implant sites were prepared and dental implants placed. The defect height was then measured and defects <3 mm were excluded from the study. Defects were grafted with bovine bone mineral and randomly covered with either a collagen membrane (control group, 18 patients) or a PEG hydrogel membrane (test group, 19 patients), which is applied as a liquid. After a healing period of 6 months, surgical re-entry was performed and the change in vertical bone height from baseline evaluated. **RESULTS:** Well-vascularized hard tissue was apparent at all sites and the regenerated bone was similar to the surrounding native bone. Mean vertical defect fill after 6 months was 5.63±1.84 mm at test sites and 4.25±1.16 mm at control sites, and the mean defect fills were 94.9% and 96.4% at test and control sites, respectively. More soft tissue complications were observed with the PEG membrane (e.g., delayed or incomplete wound healing) but all sites recovered uneventfully. **CONCLUSIONS:** The new PEG hydrogel membrane was as successful as a standard collagen membrane in the treatment of bony dehiscence defects around dental implants with simplified clinical handling.

[J Clin Periodontol](#). 2008 Sep;35(9):817-24. Epub 2008 Jul 21.

Ten-year results following treatment of intra-bony defects with enamel matrix proteins and guided tissue regeneration.

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Abstract

BACKGROUND: Surgery utilizing an enamel matrix protein derivative (EMD) or guided tissue regeneration (GTR) has been shown to promote periodontal regeneration. **Aim:** To evaluate the 10-year results following treatment with EMD, GTR, EMD+GTR, and open flap debridement (OFD). **MATERIAL AND METHODS:** Thirty-eight patients out of an initial group of 56 participants were treated with one of the four modalities. Results were evaluated before surgery, at 1 year, and at 10 years. Primary outcome variable was CAL change. **RESULTS:** Treatment with EMD yielded a mean CAL gain of 3.4±/−1.0 mm ($p<0.001$) and 2.9±/−1.4 mm ($p<0.001$) at 1 and 10 years, respectively. GTR resulted in a mean CAL gain of 3.2±/−1.4 ($p<0.001$) at 1 year and 2.8±/−1.2 mm ($p<0.001$) at 10 years. Mean CAL gain in the EMD+GTR group was of 3.3±/−1.1 mm ($p<0.001$) and 2.9±/−1.2 mm ($p<0.001$) at 1 and 10 years, respectively. Treatment with OFD demonstrated a mean CAL gain of 2.0±/−1.2 mm ($p<0.01$) at 1 year and 1.8±/−1.1 mm ($p<0.01$) at 10 years. Compared with OFD, the three regenerative treatments resulted in statistically significant ($p<0.05$) higher CAL gain, at both 1 and 10 years. The CAL change between 1 and 10 years did not present statistically significant differences in any of the four groups. **CONCLUSION:** The present results indicate that the clinical outcomes obtained with all four approaches can be maintained over a period of 10 years.

[Int J Periodontics Restorative Dent.](#) 2007 Jun;27(3):221-9.

Nine-year results following treatment of intrabony periodontal defects with an enamel matrix derivative: report of 26 cases.

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Abstract

Treatment of intrabony periodontal defects with an enamel matrix derivative (EMD) has been demonstrated, in the short term, to result in periodontal regeneration and to significantly improve clinical parameters such as probing depth (PD) and clinical attachment level (CAL). The present study evaluated deep intrabony defect sites at 9 years after treatment with EMD. Twenty-one patients with a total of 26 deep intrabony defects with PD \geq 6 mm and intrabony depth \geq 3 mm, as identified by probing and radiographs, were consecutively treated with EMD. PD, recession of the gingival margin (GR), and CAL were evaluated prior to treatment and at 1 and 9 years after treatment. At 1 year, mean PD was significantly reduced. At 9 years, mean PD was statistically significantly increased versus the 1-year results but still significantly improved versus baseline. After 1 year, mean GR had increased significantly; at 9 years, measurements showed statistically significant improvements compared to the 1-year results and baseline. The mean CAL changed from 10.0 \pm 2.3 mm at baseline to 6.8 \pm 2.3 mm at 1 year and to 7.0 \pm 1.9 mm at 9 years. No treated teeth were lost during the observation period. The clinical improvements obtained following treatment with EMD can be maintained over a period of 9 years.

[Clin Oral Implants Res.](#) 2008 Aug;19(8):796-803.

Maxillary sinus grafting with Bio-Oss or Straumann Bone Ceramic: histomorphometric results from a randomized controlled multicenter clinical trial.

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Abstract

INTRODUCTION: This investigation was designed to compare the histomorphometric results from sinus floor augmentation with anorganic bovine bone (ABB) and a new biphasic calcium phosphate, Straumann Bone Ceramic (BCP). **MATERIALS AND METHODS:** Forty-eight maxillary sinuses were treated in 37 patients. Residual bone width was ≥ 6 mm and height was ≥ 3 mm and < 8 mm. Lateral sinus augmentation was used, with grafting using either ABB (control group; 23 sinuses) or BCP (test group; 25 sinuses); sites were randomly assigned to the control or test groups. After 180-240 days of healing, implant sites were created and biopsies taken for histological and histomorphometric analyses. The parameters assessed were (1) area fraction of new bone, soft tissue, and graft substitute material in the grafted region; (2) area fraction of bone and soft tissue components in the residual alveolar ridge compartment; and (3) the percentage of surface contact between the graft substitute material and new bone. **RESULTS:** Measurable biopsies were available from 56% of the test and 81.8% of the control sites. Histology showed close contact between new bone and graft particles for both groups, with no significant differences in the amount of mineralized bone ($21.6 \pm 10.0\%$ for BCP vs. $19.8 \pm 7.9\%$ for ABB; $P=0.53$) in the biopsy treatment compartment of test and control site. The bone-to-graft contact was found to be significantly greater for ABB ($48.2 \pm 12.9\%$ vs. $34.0 \pm 14.0\%$ for BCP). Significantly less remaining percentage of graft substitute material was found in the BCP group ($26.6 \pm 5.2\%$ vs. $37.7 \pm 8.5\%$ for ABB; $P=0.001$), with more soft tissue components ($46.4 \pm 7.7\%$ vs. $40.4 \pm 7.3\%$ for ABB; $P=0.07$). However, the amount of soft tissue components for both groups was found not to be greater than in the residual alveolar ridge. **DISCUSSION:** Both ABB and BCP produced similar amounts of newly formed bone, with similar histologic appearance, indicating that both materials are suitable for sinus augmentation for the placement of dental implants. The potential clinical relevance of more soft tissue components and different resorption characteristics of BCP requires further investigation.