Stability OF Straumann Implants

Development of Implant Stability Quotient values of implants placed with simultaneous sinus floor elevation - results of a prospective study with 109 implants.

Kuchler U1,2, Chappuis V1, Bornstein MM1, Siewczyk M1,3, Gruber R4,5, Maestre L1, Buser D1.

Clin Oral Implants Res. 2016 Jan 16

Abstract

OBJECTIVES: In patients with implant placement and simultaneous sinus floor elevation (SFE), healing periods of 6 months have been the standard of care for more than 25 years. The primary objective of this prospective case series study was to determine what percentage of implants placed with SFE reach a threshold Implant Stability Quotient (ISQ) of ≥70 after 8 weeks of healing using Resonance Frequency Analysis (RFA).

MATERIAL AND METHODS: A total of 109 dental implants were placed in 97 patients. SFE was carried out with a lateral window approach and a mixture of autogenous bone chips and deproteinized bovine bone mineral (DBBM). Titanium screw-type, tissue-level implants with a chemically modified SLA surface were used. ISQ values were measured after implant insertion (ISQ_{BL}) and after 8 weeks of healing (ISQ_{8 wk}). Patients showing ISQ_{8 wk} ≥ 70 subsequently underwent restoration. Implants with an ISQ value < 70 were recalled at 2-week intervals.

RESULTS: The ISQ at baseline had a mean value of 68.3 (SD ± 9.8). At 8 weeks, the mean ISQ value was 73.6 (SD ± 6.4). This increase was statistically significant (P < 0.001). An ISQ_{8 wk} value ≥70 was observed for 91 implants (83%). One implant (0.9%) with a peri-implant infection and severe bone loss at 8 weeks was considered an early failure.

CONCLUSIONS: This study showed that 83% of implants reached the threshold level of ISQ ≥ 70 after 8 weeks, allowing an early loading protocol. The early failure rate was considered low with 0.9%. The RFA technology is a suitable method to objectively monitor implant stability longitudinally.
An experimental comparison of two different clinically used implant designs and surfaces.

Gottlow J¹, Barkamo S, Sennerby L.

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Abstract

BACKGROUND: Various designs of dental implants representing different geometries and surface technologies are commercially available and clinically used in patients. However, data with regard to bone tissue responses and stability for comparison of their biologic performances are rare.

PURPOSE: The aim of the present experimental investigation was to compare the bone tissue responses and implant stability between two commonly used dental implants representing different geometries and surface characteristics.

MATERIALS AND METHODS: A total of 90 dental implants (4.3 mm in diameter, 10 mm long) with an oxidized surface (Replace Select Tapered, TiUnite, Nobel Biocare AB, Gothenburg, Sweden) (OX) and 90 implants (4.1 mm in diameter, 10 mm total length) with a hydrophilic sand-blasted and acid etched surface (Standard Plus, SLActive, Institut Straumann AG, Basel, Switzerland) (HSBA) were placed in the distal femur (n = 1) and tibia (n = 2) of 30 rabbits. The implants were analyzed with implant stability quotient (ISQ) measurements, removal torque (RTQ) and histomorphometry (bone-implant contact, BIC) after 10 days, 3, and 6 weeks. Moreover, RTQ values were corrected for differences in surface area by calculating the shear strength for each implant.

RESULTS: RTQ and ISQ measurements showed an increase with time for both implant types. A significantly higher RTQ value was observed for the HSBA implant at 3 weeks (p = .05). A lower ISQ value was seen for HSBA than for OX implants at placement in the tibia (p < 0.001). HSBA implants showed higher shear strength values than OX implants after 3 weeks (p < .001), and 6 weeks (p < .01). The morphometric measurements showed significantly higher BIC for HSBA implants after 10 days (p < .01), similar values after 3 weeks and significantly higher BIC for OX implants after 6 weeks (p < .001).

CONCLUSIONS: Both HSBA and OX implants were well integrated in bone and showed firm and increased stability from placement to after 6 weeks of healing. The HSBA implant showed more BIC after 10 days and the OX implant more BIC after 6 weeks of healing. The HSBA implant showed significantly higher shear strength after 3 and 6 weeks and higher RTQ values after 3 weeks than the OX implant. The results may be due to differences in surface roughness and hydrophilic properties.

Gottlow J¹, Dard M, Kjellson F, Obrecht M, Sennerby L.


Abstract

BACKGROUND: Titanium zirconium alloy with 13-17% zirconium (TiZr1317) shows significantly better mechanical attributes than pure Ti with respect to elongation and fatigue strength. This material may be suitable for thin implants and implant components exposed to high mechanical constraints.

PURPOSE: The aim of this study was to test the hypothesis that TiZr1317 and Ti implants show comparable osseointegration and stability.

MATERIALS AND METHODS: The mandibular premolars (P1, P2, P3) and the first molar (M1) in 12 adult miniature pigs were extracted 3 months prior to the study. Six specially designed implants made from Ti (commercially pure, Grade 4) or TiZr1317 (Roxolid®, Institut Straumann AG, Basel, Switzerland) with a hydrophilic sandblasted and acid-etched (SLActive, Institut Straumann AG, Basel, Switzerland) surface were placed in each mandible; three standard implants modified for evaluation of removal torque (RT) in one side and three bone-chamber implants for histologic observations in the contralateral side. RT tests were performed after 4 weeks when also the bone chamber implants and surrounding tissue were biopsied for histologic analyses in ground sections.

RESULTS: The RT results indicated significantly higher stability (p=0.013) for TiZr1317 (230.9±22.4Ncm) than for Ti implants (204.7±24.0Ncm). The histology showed similar osteoconductive properties for both implant types. Histomorphometric measurements showed a statistically significant higher (p=0.023) bone area within the chamber for the TiZr1317 implants (45.5±13.2%) than did the Ti implants (40.2±15.2%). No difference was observed concerning the bone to implant contact between the groups with 72.3±20.5% for Ti and 70.2±17.3% for TiZr1317 implants.

CONCLUSION: It is concluded that the TiZr1317 implant with a hydrophilic sandblasted and acid-etched surface showed similar or even stronger bone tissue responses than the Ti control implant.
Biomechanical evaluation of the interfacial strength of a chemically modified sandblasted and acid-etched titanium surface.

Ferguson SJ1, Broggini N, Wieland M, de Wild M, Rupp F, Geis-Gerstorfer J, Cochran DL, Buser D.


Abstract

The functional capacity of osseointegrated dental implants to bear load is largely dependent on the quality of the interface between the bone and implant. Sandblasted and acid-etched (SLA) surfaces have been previously shown to enhance bone apposition. In this study, the SLA has been compared with a chemically modified SLA (modSLA) surface. The increased wettability of the modSLA surface in a protein solution was verified by dynamic contact angle analysis. Using a well-established animal model with a split-mouth experimental design, implant removal torque testing was performed to determine the biomechanical properties of the bone-implant interface. All implants had an identical cylindrical shape with a standard thread configuration. Removal torque testing was performed after 2, 4, and 8 weeks of bone healing (n = 9 animals per healing period, three implants per surface type per animal) to evaluate the interfacial shear strength of each surface type. Results showed that the modSLA surface was more effective in enhancing the interfacial shear strength of implants in comparison with the conventional SLA surface during early stages of bone healing. Removal torque values of the modSLA-surfaced implants were 8-21% higher than those of the SLA implants (p = 0.003). The mean removal torque values for the modSLA implants were 1.485 N m at 2 weeks, 1.709 N m at 4 weeks, and 1.345 N m at 8 weeks; and correspondingly, 1.231 N m, 1.585 N m, and 1.143 N m for the SLA implants. The bone-implant interfacial stiffness calculated from the torque-rotation curve was on average 9-14% higher for the modSLA implants when compared with the SLA implants (p = 0.038). It can be concluded that the modSLA surface achieves a better bone anchorage during early stages of bone healing than the SLA surface; chemical modification of the standard SLA surface likely enhances bone apposition and this has a beneficial effect on the interfacial shear strength.
Biomechanical comparison of the sandblasted and acid-etched and the machined and acid-etched titanium surface for dental implants.

Li D¹, Ferguson SJ, Beutler T, Cochran DL, Sittig C, Hirt HP, Buser D.


Abstract

To make a direct biomechanical comparison between the sandblasted and acid-etched surface (SLA) and the machined and acid-etched surface (MA), a well-established animal model for implant removal torque testing was employed, using a split-mouth experimental design. All implants had an identical cylindrical solid-screw shape with the standard ITI thread configuration, without any macroscopic retentive structures. After 4, 8, and 12 weeks of bone healing, removal torque testing was performed to evaluate the interfacial shear strength of each surface type. Results showed that the SLA surface was more powerful in enhancing the interfacial shear strength of implants in comparison with the MA surface. Removal torque values of the SLA-surfaced implants were about 30% higher than those of the MA-surfaced implants (p = 0.002) except at 4 weeks, when the difference was at the threshold of statistical significance (p = 0.0519). The mean removal torque values for the SLA implants were 1.5074 Nm at 4 weeks, 1.8022 Nm at 8 weeks, and 1.7130 Nm at 12 weeks; and correspondingly, 1.1924 Nm, 1.3092 Nm, and 1.3226 Nm for the MA implants. It can be concluded that the SLA surface achieves a better bone anchorage than the MA surface, and that sandblasting before acid etching has a beneficial effect on the interfacial shear strength. As regards the bone-implant interfacial stiffness calculated from the torque-rotation curve, the SLA implants showed an overall more than 5% higher stiffness compared with the MA implants, although the difference did not reach the statistical significance level.
Immediate and early loading of SLA ITI single-tooth implants: an in vivo study.

Quinlan P¹, Nummikoski P, Schenk R, Cagna D, Mellonig J, Higginbottom F, Lang K, Buser D, Cochran D.


Abstract

PURPOSE: The purpose of this investigation was to determine whether early and immediate loading of dental implants resulted in adverse consequences as determined clinically, radiographically, and histologically.

MATERIALS AND METHODS: In a canine model, 48 sand-blasted, large-grit, acid-etched (SLA) surfaced implants were placed at 4 different times before definitive restoration and loading. These times were 3 months (group A), 21 days (group B), 10 days (group C), and 2 days (immediately) (group D) before loading. Each implant was restored at the same time with a single gold screw-retained crown. Immediately after restoration all crowns were placed in function. Standardized periapical radiographs were made 1, 2, and 3 months after restoration. At the end of the study, block sections were obtained for histologic examination. Changes in crestal bone height on the mesial and distal aspects of each implant and the change in bone density of the coronal 3 mm of crestal bone were recorded. Primary, secondary, and total bone-to-implant contact; bone marrow-to-implant contact; and connective tissue-to-implant contact were evaluated histologically.

RESULTS: All implants were osseointegrated at the end of the study; no clinical failures of integration were noted. The changes in crestal bone heights for groups A, B, C, and D (means +/- SE) were 0.02 +/- 0.07 mm, 0.30 +/- 0.08 mm, 0.15 +/- 0.08 mm, and 0.35 +/- 0.18 mm, respectively. Total bone-to-implant contact for the 4 groups was 69.1%, 71.3%, 74.6%, and 75.2%, respectively (P > .57).

DISCUSSION: Under the conditions of this study no statistically significant differences were noted between the 4 different loading protocols for any of the parameters recorded. This finding is consistent with other recent studies and case reports.

CONCLUSION: The findings of this study indicate that early and immediate loading of single-unit SLA surfaced implants was possible in this model. (More than 50 references.)
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.

Ganeles J1, Zöllner A, Jackowski J, ten Bruggenkate C, Beagle J, Guerra F.


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 >or=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.
Immediate and early non-occlusal loading of Straumann implants with a chemically modified surface (SLActive) in the posterior mandible and maxilla: interim results from a prospective multicenter randomized-controlled study.


Abstract

OBJECTIVE: Immediate and early loading of dental implants can simplify treatment and increase overall patient satisfaction. The purpose of this 3-year prospective randomized-controlled multicenter study was to assess the differences in survival rates and bone level changes between immediately and early-loaded implants with a new chemically modified surface (SLActive). This investigation shows interim results obtained after 5 months.

MATERIAL AND METHODS: Patients > or =18 years of age missing at least one tooth in the posterior maxilla or mandible were enrolled in the study. Following implant placement, patients received a temporary restoration either on the day of surgery (immediate loading) or 28-34 days after surgery (early loading); restorations consisted of single crowns or two to four unit fixed dental prostheses. Permanent restorations were placed 20-23 weeks following surgery. The primary efficacy variable was change in bone level (assessed by standardized radiographs) from baseline to 5 months; secondary variables included implant survival and success rates.

RESULTS: A total of 266 patients were enrolled (118 males and 148 females), and a total of 383 implants were placed (197 and 186 in the immediate and early loading groups, respectively). Mean patient age was 46.3+-12.8 years. After 5 months, implant survival rates were 98% in the immediate group and 97% in the early group. Mean bone level change from baseline was 0.81+-0.89 mm in the immediate group and 0.56+-0.73 mm in the early group (P<0.05). Statistical analysis revealed a significant center effect (P<0.0001) and a significant treatment x center interaction (P=0.008).

CONCLUSIONS: The results suggested that Straumann implants with an SLActive can be used predictably in time-critical (early or immediate) loading treatment protocols when appropriate patient selection criteria are observed. The mean bone level changes observed from baseline to 5 months (0.56 and 0.81 mm) corresponded to physiological observations from other studies, i.e., were not clinically significant. The presence of a significant center effect and treatment x center interaction indicated that the differences in bone level changes between the two groups were center dependent.
Early loading (2 or 6 weeks) of sandblasted and acid-etched (SLA) ITI implants in the posterior mandible. A 1-year randomized controlled clinical trial.

Salvi GE¹, Gallini G, Lang NP.

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Abstract

The aim of this 1-year prospective controlled clinical trial was to evaluate the effect of early loading of ITI solid screw titanium implants with a sandblasted and acid-etched (SLA) surface on clinical and radiographic parameters.

MATERIAL AND METHODS: Twenty-seven consecutively admitted patients presenting bilateral edentulous posterior mandibular areas and in need of prosthetic reconstruction were recruited. Sixty-seven ITI standard solid screw implants with an SLA surface, a diameter of 4.1 mm and a length of 8, 10 or 12 mm were installed bilaterally in molar and premolar areas according to a one-stage surgical protocol. One week (test) and 5 weeks (control) after implant placement, solid ITI prosthetic abutments were connected using a torque of 35 N cm. No provisional restoration was fabricated. Two weeks (test) and 6 weeks (control) after implant placement, porcelain-fused-to-metal single-tooth crowns were cemented. Clinical measurements were obtained at day 0 and 2, 6, 12, 24 and 52 weeks thereafter. Periapical radiographs were taken immediately after implant placement, after 6 weeks and at the 1-year examination.

RESULTS: After 1 year, implant survival was 100%. Two test and one control implants rotated at the time of abutment connection and were left unloaded for 12 additional weeks. At the 1-year examination, no statistically significant differences were found between the test and control sites with respect to pocket probing depths (2.6 mm +/- 0.5 vs. 2.7 mm +/- 0.5), mean clinical attachment levels (3.1 mm +/- 0.4 vs. 3.2 mm +/- 0.5), mean percentages of sites bleeding on probing (9.7% vs. 8.3%), mean widths of keratinized mucosa (1.8 mm +/- 0.4 vs. 1.9 mm +/- 0.5), mean PerioTest values (-1.4 PTV +/- 0.9 vs. -1.6 PTV +/- 0.8) or mean crestal bone loss measurements (0.57 mm +/- 0.49 vs. 0.72 mm +/- 0.50).

CONCLUSION: Based on these results, loading of titanium implants with an SLA surface as early as 2 weeks did not appear to jeopardize the osseointegration healing process in the posterior mandible. Furthermore, implants rotating at 35 N cm, if left unloaded for additional 12 weeks, did not negatively affect clinical and radiographic outcomes.
Surgical procedures in partially edentulous patients with ITI implants.

Buser D\textsuperscript{1}, von Arx T.


Abstract

Today, partially edentulous patients represent the majority of patients seeking treatment with implant-supported prostheses. This chapter presents the specific aspects of the surgical handling of partially edentulous patients with either single-tooth gaps, extended edentulous spaces or distal extension situations. Due to differences in treatment objectives, a distinction is made between sites without esthetic priority (non-esthetic sites) and with esthetic priority (esthetic sites). In non-esthetic sites, the primary goal of the surgical therapy is to achieve a predictable hard and soft tissue integration of the implant to re-establish function with the implant-supported prosthesis. In esthetic sites, the goal of surgical therapy is to achieve successful tissue integration and to obtain esthetic soft tissue contours to re-establish both function and esthetics. Therefore, the surgeon must have a clear understanding of the specific needs in a given situation, and must master the necessary surgical techniques concerning a correct implant placement and a correct soft tissue handling to achieve the treatment objectives. In non-esthetic sites, a non-submerged approach is clearly preferred, thus avoiding a second-stage procedure for abutment connection. If a soft tissue correction is necessary to re-establish keratinized peri-implant mucosa, this is done at the time of implant placement with mucogingival surgery. In esthetic sites, a submerged implant placement is preferred to achieve esthetically pleasing soft tissue contours. If a soft tissue augmentation is necessary, this is done at the time of implant placement with connective tissue grafts. Thus, the second surgical procedure after 8-10 weeks of healing is reduced to a mucosaplasty like a punch biopsy, avoiding an open flap procedure. Based on favorable properties of the TPS surface, short implants (6 or 8 mm) and short healing periods of 3-4 months have been successfully utilized in partially edentulous patients in the last 14 years. The introduction of the SLA surface allows a further reduction of the healing period to 6 weeks of healing in all sites with normal bone density (class I-III). In summary, the ITI philosophy offers straightforward surgical concepts to predictably achieve the treatment objectives with the least demanding surgical protocol, reducing the related chairtime and costs for the patient and the clinician.
Conventional and early loading of unsplinted ITI implants supporting mandibular overdentures.

Payne AG¹, Tawse-Smith A, Duncan WD, Kumara R.


Abstract

The aim of this study was to compare the success rates after 1 and 2 years of conventionally and early loaded pairs of unsplinted ITI implants supporting mandibular overdentures in edentulous patients. Twenty-four participants (age range 55-80 years) were randomly allocated with maximum concealment to two treatment groups. In the first group, the implants were allowed to heal for 12 weeks before being functionally loaded (control) and the second group had 6 weeks of healing with identical loading. All participants had new conventional complete maxillary and mandibular dentures prior to the study. Two sandblasted large-grit acid-etched (SLA) surface ITI implants were placed in the mandibular interforaminal area, following a standardized nonsubmerged surgical protocol. After 6 or 12 weeks of healing, matrices were processed into the fitting surface of the pre-existing mandibular dentures and the implants loaded. Implant success was determined using mobility tests and radiographs taken at baseline and 52 and 104 weeks after surgery. Clinical peri-implant parameters were also documented. Results showed all implants successfully osseointegrated, according to accepted criteria, after 2 years. Mean loss of crestal bone height after 1 year was 0.35 +/- 0.22 mm (control) vs. 0.27 +/- 0.18 mm (test). After 2 years this reduced to 0.09 +/- 0.06 mm (control) vs. 0.12 +/- 0.17 mm (test). The mean Periotest value after 1 year was -4.9 (control) vs. -3.78 (test). After 2 years, the mean resonance frequency value for the control implants was 6797 Hz [mean implant stability quotient (ISQ) = 64.77] and for the test implants 6670 Hz (mean ISQ = 62.0). Shortened loading periods for these ITI implants did not cause any statistically significant differences in osseointegration or peri-implant parameters. We conclude that pairs of unsplinted SLA-surface ITI implants can be successfully loaded with mandibular overdentures 6 weeks after surgery.
Efficacy of standard (SLA) and modified sandblasted and acid-etched (SLActive) dental implants in promoting immediate and/or early occlusal loading protocols: a systematic review of prospective studies.

Chambrone L, Shibli JA, Mercúrio CE, Cardoso B, Preshaw PM.


Abstract

OBJECTIVE: To assess the survival percentage, clinical and radiographic outcomes of sandblasted and acid-etched (SLA) dental implants and its modified surface (SLActive) in protocols involving immediate and early occlusal loading.

METHODS: MEDLINE, EMBASE and the Cochrane Oral Health Group's Trials Register CENTRAL were searched in duplicate up to, and including, June 2013 to include randomised controlled trials (RCTs) and prospective observational studies of at least 6-month duration published in all languages. Studies limited to patients treated with SLA and/or SLActive implants involving a treatment protocol describing immediate and early loading of these implants were eligible for inclusion. Data on clinical and/or radiographic outcomes following implant placement were considered for inclusion.

RESULTS: Of the 447 potentially eligible publications identified by the search strategy, seven RCTs comprising a total of 853 implants (8% titanium plasma-sprayed, 41.5% SLA and 50.5% SLActive) and 12 prospective observational studies including 1394 SLA and 145 SLActive implants were included in this review. According to the Cochrane Collaboration's tool for assessing risk of bias, one of the studies was considered to be at a low risk of bias, whereas the remaining studies were considered to be at an unclear risk. Regarding the observational studies, all of them presented a medium methodological quality based on the Modified Newcastle-Ottawa scale. There were no significant differences reported in the studies in relation to implant loss or clinical parameters between the immediate/early loading and delayed loading protocols. Overall, 95% of SLA and 97% of SLActive implants still survive at the end of follow-up.

CONCLUSIONS: Despite of the positive findings achieved by the included studies, few RCTs were available for analysis for SLActive implants. Study heterogeneity, scarcity of data and the lack of pooled estimates represent a limitation between studies' comparisons and should be considered when interpreting the present findings.
Immediate vs. early loading of SLA implants in the posterior mandible: 5-year results of randomized controlled clinical trial.

Kokovic V¹, Jung R, Feloutzis A, Todorovic VS, Jurisic M, Hämmerle CH.


Abstract

OBJECTIVES: The aim of this study was to compare clinical results of immediate and early loading (EL) self-tapping implants placed in posterior mandibles.

MATERIAL AND METHODS: Twelve patients with bilateral edentulous posterior mandibular were randomly assigned to treatment either with immediate (test) or early loaded implants (control). Seventy-two self-tapping implants with SLA surface (Ø 4, 1/4, 8 mm; length 8 and 10 mm) were analyzed in this study. Test implants (36) were loaded on the day of surgery and control implants 6 weeks later. The measuring of implant stability quotient (ISQ) was performed on 0, 6th, 12th, and 52nd week after implant insertion. The bone resorption, modified plaque, and bleeding index were notified at 1 and 5 years later.

RESULTS: After 5 years, survival in the both groups was 100%. The mean value of primary implant stability was 76.92 ± 0.79 ISQ. In the first 6 weeks, ISQ values significantly increased in the test group (77.92 ± 1.16 vs. 79.61 ± 0.90) as well as in the control group (7.92 ± 1.05 vs. 77.55 ± 0.99). A significant longitudinal increase in ISQ value was recorded in test and control group. The differences between immediate and early loaded implants were statistically insignificant (P > 0.05). At the 5 years, no statistically significant differences were found between immediate and early loaded implants with respect to mean crestal bone loss measurements (0.4 ± 0.24 vs. 0.8 ± 0.15 mm), mean bleeding index (0.22 ± 0.11 vs. 0.25 ± 0.11), and mean plaque index (0.17 ± 0.15 vs. 0.19 ± 0.20).

CONCLUSION: Based on these results, the self-tapping implants inserted in posterior mandible can provide adequate primary stability value as the main factor for immediate and EL protocol.
Immediate restoration of nonsubmerged titanium implants with a sandblasted and acid-etched surface: five-year results of a prospective case series study using clinical and radiographic data.

Levine RA\(^1\), Sendi P, Bornstein MM.


Abstract

The aim of this study was to evaluate the survival and success rates of immediately restored implants with sandblasted, large-grit, acid-etched (SLA) surfaces over a period of 5 years. Twenty patients (mean age, 47.3 years) received a total of 21 SLA wide-neck implants in healed mandibular first molar sites after initial periodontal treatment. To be included in the study, the implants had to demonstrate primary stability with an insertion torque value of 35 Ncm. A provisional restoration was fabricated chairside and placed on the day of surgery. Definitive cemented restorations were inserted 8 weeks after surgery. Community Periodontal Index of Treatment Needs (CPITN) indices and the radiographic distance between the implant shoulder and the first visible bone-implant contact (DIB) were measured and compared over the study period. The initial mean CPITN was 3.24, and decreased over the study period to 1.43. At the postoperative radiographic examination, the mean DIB was 1.41 mm for the 21 implants, indicating that part of the machined neck of the implants was placed slightly below the osseous crest. The mean DIB value increased to 1.99 mm at the 5-year examination. This increase proved to be statistically significant (P < .0001). Between the baseline and 5-year examinations, the mean bone crest level loss was 0.58 mm. Success and survival rates of the 21 implants after 5 years of function were 100%. This 5-year study confirms that immediate restoration of mandibular molar wide-neck implants with good primary stability, as noted by insertion torque values of at least 35 Ncm, is a safe and predictable procedure.
Immediate loading of single SLA implants: drilling vs. osteotomes for the preparation of the implant site.

Stavropoulos A¹, Nyengaard JR, Lang NP, Karring T.


Abstract

OBJECTIVES: To evaluate whether or not preparation of the implant site with osteotomes instead of drilling may improve peri-implant bone density and/or osseointegration, and whether or not this further improves the predictability of immediate loading of SLA implants.

MATERIAL AND METHODS: The second, third, and fourth premolars were extracted in both sides of the mandible in six dogs, and after at least 3 months four SLA implants were inserted into each side of the jaw. In three animals, the implant sites were prepared by means of osteotomes, while standard stepwise drilling was used in the remaining animals. In each side of the jaw, two non-adjacent implants were restored with single crowns 4 days after installation, while the remaining two implants were left without crowns to serve as non-loaded controls. After 2, 4, or 12 weeks of loading, specimens including the implants and surrounding tissues were obtained and processed for histologic analysis of undecalcified sections.

RESULTS: All implants placed with osteotomes were lost (five before delivery of the crowns and the rest during the first week after loading). None of the conventionally inserted implants, however, was lost, and histomorphometrical analysis revealed similar soft- and hard peri-implant tissue characteristics at immediately loaded and non-loaded implants at all observation times. Average bone-to-implant contact was 59-72% at immediately loaded implants vs. 60-63% at non-loaded ones.

CONCLUSION: Preparation of the implant site by means of osteotomes had a deleterious effect on osseointegration, while immediate loading of single, free-standing, SLA implants following a conventional surgical protocol did not jeopardize their osseointegration.