Immediate loading of single-tooth implants in the posterior region.

Abboud M, Koeck B, Stark H, Wahl G, Paillon R.


Abstract

PURPOSE: The aim of this study was to evaluate the clinical response and safety of immediately loaded single-tooth implants placed in the posterior region of the maxilla and mandible.

MATERIALS AND METHODS: Single-tooth implants were placed in healed extraction sites in 20 adult patients. Temporary pre-fabricated acrylic resin crowns were prepared and adjusted. The crown occlusion was adjusted to obtain minimal contacts in maximum intercuspation. After 6 weeks a ceramometal or all-ceramic crown was cemented. Radiographic and clinical examinations were made at baseline and at 3, 6, and 12 months. Cortical bone response and peri-implant mucosal responses were evaluated.

RESULTS: The marginal bone level at the time of implant placement was preserved. The mean change in marginal bone level was 0.01 mm at 12 months. The mean Periotest value after 360 days was -4. The peri-implant mucosal adaptation to the anatomic form of the provisional crown resulted in a natural esthetic outcome, and a gain in papilla length was observed. One implant failure was recorded because of provisional luting cement impaction.

DISCUSSION: Clinical research has shown that immediate loading is a possible treatment modality. The immediate functional loading of implants placed in this study resulted in bone adaptation to loading. A satisfactory success rate with positive tissue responses was achieved.

CONCLUSIONS: The results of this limited investigation indicated that immediate loading of unsplinted single-tooth implants in the posterior region may be a viable treatment option with an esthetic outcome.

Microbiologic characterization of ligature-induced peri-implantitis in the microswine model.

Hickey JS, O'Neal RB, Scheidt MJ, Strong SL, Turgeon D, Van Dyke TE.


Abstract

The purpose of this study was to evaluate the microbiologic changes associated with induction of peri-implantitis in the microswine. A split-mouth design was utilized. Three implants were placed in the edentulous mandibular bicuspid region of 2 microswine yielding
12 implants for evaluation. The experimental implant abutments were ligated with 4-0 silk suture material to induce peri-implantitis for a period of 45 days. The control implant abutments were not ligated. The control implants were scaled and cleaned at each time interval using plastic scalers. The attachment level (AL), probing depth (PD), gingival index (GI), and plaque index (PI) were measured at day 0 (baseline) and days 14 and 45. Microbiologic samples were taken from the "sulcus" with paper points at each interval and were dispersed in prereduced media; plated on selective and non-selective media; and grown under aerobic, anaerobic, and capnophilic atmospheres. A greater AL, increased PD, and higher GI and PI scores were noted among the experimental implants. The controls remained essentially unchanged. Radiographs revealed that experimental implants showed an increased amount of bone loss when compared to control. Bone loss caused the implant threads to be exposed in the experimental implants. Microbiologic studies revealed that there was a shift from Gram-positive facultative organisms to Gram-negative obligate anaerobes, including black pigmented Bacteroides, in experimental implants. The microbiota of the control implants remained primarily Gram-positive facultative organisms. The microswine appears to be a suitable animal model for evaluation of osseointegrated implants. Importantly, under the experimental conditions reported, osseointegrated implants were susceptible to "periodontal" breakdown or peri-implantitis.

Experimentally induced peri-implantitis: a review of different treatment methods described in the literature.

Baron M, Haas R, Dörbudak O, Watzek G.


Abstract

The aim of this article was to present the experimental peri-implantitis models described in the literature and to provide a review of currently used treatment methods. For this purpose, 29 English- and German-language studies published in internationally reviewed journals were examined for similarities and differences regarding animal models, types of implants, and methods used for inducing peri-implantitis. In almost all studies, the implants were located in the mandible, which suggests that peri-implantitis of the maxilla has been researched very little. While in most studies, peri-implantitis was induced by means of ligature and plaque accumulation, only 3 studies have been published that attempted to induce peri-implantitis by means of mechanical overload. Of the latter, only one author observed peri-implant bone resorption. Eleven studies reporting on ligature-induced peri-implantitis presented enough data to be subjected to further statistical data analyses. Meta-analysis revealed that the period of ligature application, and thus the duration of plaque accumulation, generally had no influence on the resultant depth of the bone defect. However, when screw-type and cylindric implants were analyzed separately, a weakly significant positive effect of the duration of ligature application on the resultant defect depth was determined for cylindric implants (P = .092). This could imply that smooth screw-type implants were less susceptible to ligature-induced peri-implant inflammation. Regenerative treatment methods included the membrane technique using non-resorbable membranes (guided bone regeneration), augmentation with autogenous bone, augmentation with bone substitute materials (hydroxyapatite or demineralized freeze-dried bone) or with recombinant
human bone morphogenetic protein-2, and a combination of membrane and augmentation procedures. While all described methods resulted in acceptable bone gain, it seems to be difficult to achieve new osseointegration (reosseointegration) of treated implants. Of all tested treatment methods, the combination of guided bone regeneration and augmentation with demineralized freeze-dried bone resulted in the most favorable results regarding bone gain and reosseointegration.

**Outcome of implant-supported single-tooth replacements performed by dental students. A 10-year clinical and radiographic retrospective study.**

Bonde MJ, Stokholm R, Isidor F, Schou S.


School of Dentistry, Aarhus University, Aarhus, Denmark.
mikael.juul.bonde@odontologi.au.dk

**Abstract**

AIM: To evaluate the treatment outcome of implant-supported single-tooth replacements performed by dental students as part of their undergraduate dental curriculum after a mean follow-up period of 10 years (range: 7.5 to 12 years).

MATERIALS AND METHODS: A total of 51 patients were consecutively treated by dental students with 55 implants supporting single crowns. The treatment was performed under supervision of dentists and oral and maxillofacial surgeons, all with special knowledge about oral implantology. Survival of implant crown, survival of implant, probing depth, bleeding on probing and peri-implant marginal bone level change were evaluated at the end of the follow-up period. In addition, biological and technical complications during the entire follow-up period were assessed.

RESULTS: A total of 45 patients with 49 implants were available at the end of the study. The survival of the implant crowns as well as the implants was 94%. The mean probing depth at patient level was 4.8 mm. The probing depth varied between 2 and 10 mm at the individual site. The mean bleeding on probing score was 0.57 at patient level and absence of bleeding around all sites of the implants was rarely observed. The mean bone level change was -0.14 mm (range: 1.2 to -1.1 mm) during the first year of loading and 0.16 mm (range: 1.4 to -1.8) after 10 years at patient level. Five episodes of peri-implant inflammation due to excess cement were registered in five patients. Moreover, a fistula was observed at two implants in two patients. Finally, five technical complications occurred in five patients.

CONCLUSIONS: Implant-supported single-tooth replacements performed by dental students as part of their undergraduate dental curriculum were characterised by high survival rates as well as few biological and technical complications. It seems acceptable to include implant therapy in the clinical undergraduate dental curriculum, provided a focus remains on straightforward cases with substantial supervision by trained dentists and oral and maxillofacial surgeons.
The positive relationship between excess cement and peri-implant disease: a prospective clinical endoscopic study.

Thomas GW.
tom@tgwperio.com

Abstract

BACKGROUND: Cement-retained restorations are commonly used on dental implants. Residual excess cement after placement of fixed partial dentures has been associated with clinical and radiographic signs of peri-implant disease. The purpose of this study was to explore the relationship between excess dental cement and peri-implant disease using the dental endoscope.

METHODS: Thirty-nine consecutive patients with implants exhibiting clinical and/or radiographic signs of peri-implant disease were studied. Patients were enrolled in the study during a 5-year period in a private periodontal practice. Twelve of these patients had similar implants without signs of inflammation; these implants served as controls. There were 20 controls and 42 test implants. All were evaluated using a dental endoscope initially, and all but one implant was evaluated at a 30-day follow-up. Results from both groups were assessed by two trained operators and recorded.

RESULTS: None of the controls and all 42 of the test implants had clinical signs of peri-implant disease at initial treatment. Excess cement was found in none of the controls and 34 of the test sites. Thirty days after cement removal, 25 of 33 test sites from which the cement was removed had no clinical or endoscopic signs of inflammation.

CONCLUSIONS: Excess dental cement was associated with signs of peri-implant disease in the majority (81%) of the cases. Clinical and endoscopic signs of peri-implant disease were absent in 74% of the test implants after the removal of excess cement.

Endosseous implant failure influenced by crown cementation: a clinical case report.

Gapski R, Neugeboren N, Pomeranz AZ, Reissner MW.
rgapski@pitimplant.com

Abstract

Implant dentistry has developed predictable treatment outcomes. Nevertheless, there are multiple reasons for implant failure. This case report documents a previously unreported type of implant failure that occurred 1 month after crown cementation. The implant failure is believed to be associated with retained excess subgingival cement.
Cement removal from restorations luted to titanium abutments with simulated subgingival margins.

Agar JR, Cameron SM, Hughbanks JC, Parker MH.


School of Dental Medicine, University of Connecticut Health Center, Farmington, USA.

Abstract

STATEMENT OF PROBLEM: The process of removing excess cement from subgingival margins after cementation of restorations to implant abutments may lead to scratching of the abutments or incomplete cement removal.

PURPOSE: The purpose of this study was to investigate and to compare the surfaces of abutments after the removal of three cements (glass ionomer, resin, and zinc phosphate) by use of three instruments (gold coated scaler, rigid plastic scaler, and stainless steel explorer).

MATERIAL AND METHODS: Six investigators removed zinc phosphate, glass ionomer, and resin cements with explorers, gold coated scalers, and rigid plastic scalers with a model simulating clinical conditions. The surface of Brånemark abutments with cemented restorations were examined with a microscope at 20x for scratches and cement remnants.

RESULTS: Statistical analysis of the results were inconclusive about which combination of instrument and cement worked most effectively.

CONCLUSION: A surprising amount of cement remnants and scratching of abutments was observed. Although the six investigators were experienced in prosthodontic and implant procedures, there was variation in the results of their cement removal.

Complications associated with excess cement around crowns on osseointegrated implants: a clinical report.

Pauletto N, Lahiffe BJ, Walton JN.


Department of Oral Biological and Medical Sciences, Faculty of Dentistry, University of British Columbia, Vancouver, Canada.

Abstract

The potential advantages and disadvantages of cement-retained implant crowns are reviewed, with a focus on complications related to residual excess cement. A series of 4 case reports illustrates the symptoms and treatment modalities associated with excess cement around implant crowns, and suggestions are offered for the prevention of such problems.
Experimental peri-implant tissue breakdown around different dental implant surfaces: clinical and radiographic evaluation in dogs.


Abstract

PURPOSE: Tissue reactions to 4 different implant surfaces were evaluated in regard to the development and progression of ligature-induced peri-implantitis.

MATERIALS AND METHODS: In 6 male mongrel dogs, a total of 36 dental implants with different surfaces (9 titanium plasma-sprayed, 9 hydroxyapatite-coated, 9 acid-etched, and 9 commercially pure titanium) were placed 3 months after mandibular premolar extraction. After 3 months with optimal plaque control, abutment connection was performed. Forty-five days later, cotton ligatures were placed around the implants to induce peri-implantitis. At baseline and 20, 40, and 60 days after placement, the presence of plaque, peri-implant mucosal redness, bleeding on probing, probing depth, clinical attachment loss, mobility, vertical bone loss, and horizontal bone loss were assessed.

RESULTS: The results did not show significant differences among the surfaces for any parameter during the study (P > .05). All surfaces were equally susceptible to ligature-induced peri-implantitis over time (P < .001). Correlation analysis revealed a statistically significant relationship between width of keratinized tissue and vertical bone loss ($r^2 = 0.81$; $P = .014$) and between mobility and vertical bone loss ($r^2 = 0.66$; $P = .04$), both for the titanium plasma-sprayed surface.

DISCUSSION AND CONCLUSIONS: The present data suggest that all surfaces were equally susceptible to experimental peri-implantitis after a 60-day period.

Microbiologic and radiographic analysis of ligature-induced peri-implantitis with different dental implant surfaces.

Shibli JA, Martins MC, Lotufo RF, Marcantonio E Jr.


Abstract

PURPOSE: The goal of this study was to evaluate microbiota and radiographic peri-implant bone loss associated with ligature-induced peri-implantitis.

MATERIALS AND METHODS: Thirty-six dental implants with 4 different surfaces (9 commercially pure titanium, 9 titanium plasma-sprayed, 9 hydroxyapatite, and 9 acid-etched) were placed in the edentulous mandibles of 6 dogs. After 3 months with optimal plaque control, abutment connection was performed. On days 0, 20, 40, and 60 after placement of cotton ligatures, both microbiologic samples and periapical radiographs were obtained. The presence of Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella
intermedia/nigrescens, Campylobacter spp, Capnocytophaga spp, Fusobacterium spp, beta-hemolytic Streptococcus, and Candida spp were evaluated culturally.

RESULTS: P intermedia/nigrescens was detected in 13.89% of implants at baseline and 100% of implants at other periods. P gingivalis was not detected at baseline, but after 20 and 40 days it was detected in 33.34% of implants and at 60 days it was detected in 29.03% of dental implants. Fusobacterium spp was detected in all periods. Streptococci were detected in 16.67% of implants at baseline and in 83.34%, 72.22%, and 77.42% of implants at 20, 40, and 60 days, respectively. Campylobacter spp and Candida spp were detected in low proportions. The total viable count analysis showed no significant differences among surfaces (P = .831), although a significant difference was observed after ligature placement (P < .0014). However, there was no significant qualitative difference, in spite of the difference among the periods. The peri-implant bone loss was not significantly different between all the dental implant surfaces (P = .908).

DISCUSSION AND CONCLUSIONS: These data suggest that with ligature-induced peri-implantitis, both time and periodontal pathogens affect all surfaces equally after 60 days.

Influence of different treatment approaches on non-submerged and submerged healing of ligature induced peri-implantitis lesions: an experimental study in dogs.

Schwarz F, Jepsen S, Herten M, Sager M, Rothamel D, Becker J.


Abstract

OBJECTIVE: [corrected] The aim of the present study was to evaluate non-submerged and submerged healing of ligature induced peri-implantitis in dogs.

MATERIAL AND METHODS: Peri-implantitis was induced by ligature placement in five beagle dogs (n = 30 implants). The defects were randomly and equally allocated in a split-mouth design to either closed treatment + non-submerged healing (CNS), or open treatment + submerged healing (OS) using an Er:YAG laser (ERL), an ultrasonic device (VUS), or plastic curettes + local application of metronidazole gel (PCM), respectively. The animals were sacrificed after 3 months. Clinical, radiological and histological (e.g. new bone-to-implant contact (BIC)) parameters were assessed.

RESULTS: All treatment procedures resulted in statistically significant improvements of all clinical parameters at both CNS and OS implants. Radiological improvements were merely observed at OS implants. Histomorphometrical analysis revealed that all CNS implants exhibited comparable low amounts of new BIC (1.0-1.2%), while mean BIC was statistically significant higher in the respective OS groups [ERL (44.8%), PCM (14.8%), VUS (8.7%)].

CONCLUSION: Within the limits of the present study, it was concluded that (i) OS improved the outcome of treatment in comparison with CNS and (ii) ERL seemed to be more suitable to promote re-osseointegration than PCM and VUS.
Comparison of naturally occurring and ligature-induced peri-implantitis bone defects in humans and dogs.

Schwarz F, Herten M, Sager M, Bieling K, Sculean A, Becker J.


Abstract

OBJECTIVES: The aim of the present study was to evaluate and compare naturally occurring and ligature-induced peri-implantitis bone defects in humans and dogs.

MATERIAL AND METHODS: Twenty-four partially and fully edentulous patients undergoing peri-implant bone augmentation procedures due to advanced peri-implant infections were included in this study (n=40 implants). Furthermore, peri-implantitis was induced by ligature placement and plaque accumulation in five beagle dogs for three months following implant insertion (n=15 implants). The ligatures were removed when about 30% of the initial bone was lost. During open flap surgery, configuration and defect characteristics of the peri-implant bone loss were recorded in both humans and dogs.

RESULTS: Open flap surgery generally revealed two different classes of peri-implant bone defects. While Class I defects featured well-defined intrabony components, Class II defects were characterized by consistent horizontal bone loss. The allocation of intrabony components of Class I defects regarding the implant body allowed a subdivision of five different configurations (Classes Ia-e). In particular, human defects were most frequently Class Ie (55.3%), followed by Ib (15.8%), Ic (13.3%), Id (10.2%), and Ia (5.4%). Similarly, bone defects in dogs were also most frequently Class Ie (86.6%), while merely two out of 15 defects were Classes Ia and Ic (6.7%, respectively).

CONCLUSIONS: Within the limits of the present study, it might be concluded that configurations and sizes of ligature-induced peri-implantitis bone defects in dogs seemed to resemble naturally occurring lesions in humans.

Sandblasted/acid-etched vs smooth-surface implants: implant clinical reaction to experimentally induced peri-implantitis in Beagle dogs.

Martines RT, Sendyk WR, Gromatzky A, Cury PR.


Abstract

This study uses a sandblasted/acid-etched implant vs a smooth-surface implant to compare implant mobility and clinical reactions of peri-implant tissues to experimentally induced peri-implantitis in Beagle dogs. The right and left mandibular premolars were extracted from 5 Beagle dogs, and 2 smooth-surface (SS) implants and 2 sandblasted/acid-etched (SLA) implants were placed in each animal. After 120 days, healing abutments were connected. Fifteen days later, the prosthetic abutments were connected, the hygiene regimen was suspended, and peri-implantitis was induced by the insertion of cotton ligatures into the soft
tissue around the implants. At baseline and 30, 60, and 90 days later, clinical attachment level (CAL), probing depth (PD), and mobility (MO) were measured. Probing depth increased significantly in the SLA group alone when baseline PD was compared with 30-, 60-, and 90-day evaluations (P < .05). No significant differences were noted between the 2 implant groups (P > .05). The loss in CAL was significant in both groups when the baseline value was compared with 30-, 60-, and 90-day evaluations (P < .02). Comparison between the 2 implant groups revealed a greater loss in CAL in the SLA group at the 90-day evaluation period (P = .04). A significant increase in mobility was seen in both groups when baseline values and 90-day evaluations were compared (P < .04). However, no statistically significant differences were noted between the 2 implant groups (P > .05). Experimentally induced peri-implantitis results in a greater loss of CAL in SLA implants than in SS implants in dogs; however, no differences in mobility or in PD have been noted between the 2 implant groups.