Guidelines for flapless surgery.

Sclar AG.


Erratum in:


Abstract

With the introduction of in-office cone beam computed tomography (CT), improved access to conventional CT scanning, and dental implant treatment planning software allowing on-the-spot 3-dimensional evaluations of potential implant sites, the use of "flapless" implant surgery has gained popularity among surgeons. Although the flapless approach was initially suggested for and embraced by novice implant surgeons, the successful use of this approach often requires advanced clinical experience and surgical judgment. This article reviews the advantages and disadvantages of and indications and contraindications for flapless dental implant surgery, with special emphasis on requirements for establishing or maintaining long-term health and stability of the peri-implant soft tissues. Prerequisites for surgeons wishing to use the flapless tissue punch approach in dental implant surgery are outlined and put into perspective relative to conventional open-flap surgery techniques and other minimally invasive procedures currently used in implant surgery. Procedures for single- and multiple-tooth applications are illustrated.

Precision of flapless implant placement using real-time surgical navigation: a case series.

Elian N, Jalbout ZN, Classi AJ, Wexler A, Sarment D, Tarnow DP.


Abstract

PURPOSE: To demonstrate the predictability of flapless surgery using navigation surgery.

MATERIALS AND METHODS: Computer-generated preoperative implant planning was compared to actual placement by CT (computerized tomography) scanning of patients before and after surgery. Once pre- and postoperative coordinates of virtual implants were obtained, linear distances and angles were calculated. Coronal and apical errors consisted of the shortest distance from the preoperative planning to the postoperative overlay.

RESULTS: Fourteen implants were placed in 6 patients who received CT scans before and after implant placement. Preoperative implant planning using software was compared to actual placement. The average discrepancy of the head of the implant was 0.89 mm +/- 0.53
The average discrepancy of the apex of the implant was 0.96 mm +/- 0.50 SD (range, 0.25 to 1.99). The average angular discrepancy and standard deviation were 3.78 degrees +/- 2.76 SD (range, 0.60 to 9.87).

CONCLUSION: Optical computerized navigation is vulnerable to technological and technical errors. Yet, the present case series suggests that less than 1 mm of mean linear deviation and less than 4 degrees of angular deviation might be attainable.

Interventions for replacing missing teeth: management of soft tissues for dental implants.

Esposito M, Grusovin MG, Maghaireh H, Coulthard P, Worthington HV.


Comment in:

- Evid Based Dent. 2008;9(3):77.

Abstract

BACKGROUND: Dental implants are usually placed by elevating a soft tissue flap, but in some instances, they can also be placed flapless reducing patient discomfort. Several flap and suturing techniques have been proposed. Soft tissues are often manipulated and augmented for aesthetic reasons. It is often recommended that implants are surrounded by a sufficient width of attached/keratinized mucosa to improve their long-term prognosis.

OBJECTIVES: To evaluate whether (1a) flapless procedures are beneficial for patients, and (1b) which is the ideal flap design; whether (2a) soft tissue correction/augmentation techniques are beneficial for patients, and (2b) which are the best techniques; whether (3a) techniques to increase the perimplant keratinized mucosa are beneficial for patients, and (3b) which are the best techniques; and (4) which are the best suturing techniques/materials.

SEARCH STRATEGY: The Cochrane Oral Health Group's Trials Register, The Cochrane Central Register of Controlled Trials, MEDLINE and EMBASE were searched. Handsearching included several dental journals. Authors of all identified trials, an internet discussion group and 55 dental implant manufacturers were contacted to find unpublished randomised controlled trials (RCTs). The last electronic search was conducted on 15 January 2007.

SELECTION CRITERIA: All RCTs of root-form osseointegrated dental implants comparing various techniques to handle soft tissues in relation to dental implants. Outcome measures were: prosthetic and implant failures, aesthetics evaluated by patients and dentists, biological complications, postoperative pain, patient preference, ease of maintenance by patient, and width of the attached/keratinized mucosa.

DATA COLLECTION AND ANALYSIS: Screening of eligible studies, assessment of the methodological quality of the trials and data extraction were conducted in duplicate and independently by two review authors. Authors were contacted for missing information. Results were expressed as random-effects models using mean differences for continuous
outcomes and risk ratios for dichotomous outcomes with 95% confidence intervals (CI). Heterogeneity was to be investigated including both clinical and methodological factors.

MAIN RESULTS: Eight potentially eligible RCTs were identified and five trials including 140 patients in total were included. Two trials (100 patients) compared flapless placement of dental implants with conventional flap elevation, two trials (20 patients) crestal versus vestibular incisions, and one trial (20 patients) Erbium:YAG laser versus flap elevation at the second-stage surgery for implant exposure. On a patient, rather than per implant basis, implants placed with a flapless technique and implant exposures performed with laser induced statistically significant less postoperative pain than flap elevation. There were no other statistically significant differences for any of the remaining analyses.

AUTHORS’ CONCLUSIONS: Flapless implant placement is feasible and has been shown to reduce patient postoperative discomfort in adequately selected patients. There is insufficient reliable evidence to provide recommendations on which are the best incision/suture techniques/materials, or whether techniques to correct/augment perimplant soft tissues or to increase the width of keratinized/attached mucosa are beneficial to patients or not. Properly designed and conducted RCTs are needed to provide reliable answers to these questions.

Flap vs. "flapless" surgical approach at immediate implants: a histomorphometric study in dogs.

Caneva M, Botticelli D, Salata LA, Souza SL, Bressan E, Lang NP.


Abstract

AIM: To compare the remodeling of the alveolar process at implants installed immediately into extraction sockets by applying a flap or a "flapless" surgical approach in a dog model.

MATERIAL AND METHODS: Implants were installed immediately into the distal alveoli of the second mandibular premolars of six Labrador dogs. In one side of the mandible, a full-thickness mucoperiosteal flap was elevated (control site), while contra-laterally, the mucosa was gently dislocated, but not elevated (test site) to disclose the alveolar crest. After 4 months of healing, the animals were sacrificed, ground sections were obtained and a histomorphometric analysis was performed.

RESULTS: After 4 months of healing, all implants were integrated (n=6). Both at the test and at the control sites, bone resorption occurred with similar outcomes. The buccal bony crest resorption was 1.7 and 1.5 mm at the control and the test sites, respectively.

CONCLUSIONS: "Flapless" implant placement into extraction sockets did not result in the prevention of alveolar bone resorption and did not affect the dimensional changes of the alveolar process following tooth extraction when compared with the usual placement of implants raising mucoperiosteal flaps.
The clinical and radiographic outcome of implants placed in the posterior maxilla with a guided flapless approach and immediately restored with a provisional rehabilitation: a randomized clinical trial.

Van de Velde T, Sennerby L, De Bruyn H.


Abstract

OBJECTIVES: To evaluate and compare the outcome of dental implants placed using a flapless protocol and immediate loading with a conventional protocol and loading after 6 weeks.

MATERIALS AND METHODS: Fourteen patients with bilateral maxillary edentulous areas were treated using Straumann SLA-implants. Using a randomized split-mouth design, implants were placed in one side of the maxilla using a stereolithographic surgical guide for flapless surgery and immediately loaded on temporary abutments with a bridge (test). Implants in the other side were placed using the conventional protocol and loaded after 6 weeks of healing (control). Clinical and radiographic evaluation of peri-implant tissues was performed at time of implant surgery, and after 1 week, 6 weeks, 3, 6, 12 and 18 months.

RESULTS: A total of 70 implants were placed (36 test and 34 control). One implant (test) was lost after 3 months, resulting in a survival rate of 97.3% for the test implants and 100% for the control implants. Marginal bone levels were not statistically significantly different between the test and control implants but at baseline the marginal bone level was significantly lower compared to the other evaluation periods (P < 0.05). The mean bone level for test and control implants was 1.95 mm ± 0.70 and 1.93 mm ± 0.42 after 18 months, respectively. There was a significant change in height of the attached mucosa at implants placed with a conventional flap between post-operative and 1 week and between 1 week and 6 weeks. Statistically significant differences were found between the test side and the control side for opinion about speech, function, aesthetics, self-confidence and overall appreciation the first 6 weeks.

CONCLUSION: Implants can successfully integrate in the posterior maxilla using a flapless approach with immediate loading similar to a conventional protocol. The mucosal tissues around implants placed with a conventional flap changed significantly compared with flapless placed implants.

Radiographic evaluation of marginal bone levels during healing period, adjacent to parallel-screw cylinder implants inserted in the posterior zone of the jaws, placed with flapless surgery.

Nickenig HJ, Wichmann M, Schlegel KA, Nkenke E, Eitner S.

Clin Oral Implants Res. 2010 Dec;21(12):1386-93. doi:

Abstract
OBJECTIVE: The purpose of this study was to compare changes at the marginal bone level adjacent to implants placed with flapless surgery and flap surgery during a stress-free healing period.

MATERIAL AND METHODS: Seven hundred and eighty-five implants were placed in 417 patients with a flapless approach and 459 implants were placed in 227 patients using flap techniques. The marginal bone level was determined radiographically, using digitized panoramic radiographs, at two time points: at implant placement (baseline) and after the healing period.

RESULTS: The median follow-up time was 0.5 years (SD, 1.2; range: 0.3-0.7). Implants placed with flapless surgery had a mean crestal bone loss of 0.5 mm (SD, 0.5; range: -0.7-2.4) and implants placed with flap surgery had a mean bone loss of 0.5 mm (SD, 0.7; range: -2.0-3.0) after healing. Differences in bone level changes between smokers and non-smokers were statistically significant for the flapless group (P<0.01).

CONCLUSIONS: A radiographic evaluation of marginal bone levels adjacent to implants showed comparable results for implants placed with flapless surgery and flap surgery. Appropriate case selection after virtual planning of the implant position and a sound surgical protocol is necessary for flapless surgery. Smoking habits may compromise the efficacy of flapless implant procedures.

Flapless surgery and its effect on dental implant outcomes.
Brodala N.

Abstract

PURPOSE: The aim of this article was to review the current literature with regard to the efficacy and effectiveness of flapless surgery for endosseous dental implants. The available data were evaluated for short- and long-term outcomes.

MATERIALS AND METHODS: A MEDLINE search was conducted on studies published between 1966 and 2008. For the purpose of this review, only clinical (human) studies with five or more subjects were included, and clinical opinion papers were excluded. Clinical studies or reports were further rated in terms of the level or weight of evidence using criteria defined by the Oxford Center for Evidence-Based Medicine in 2001.

RESULTS: The available data on flapless technique indicate high implant survival overall. The prospective cohort studies demonstrated approximately 98.6% (95% CI: 97.6 to 99.6) survival, suggesting clinical efficacy, while the retrospective studies or case series demonstrated 95.9% (95% CI: 94.8 to 97.0) survival, suggesting effective treatment. Six studies reported mean radiographic alveolar bone loss ranging from 0.7 to 2.6 mm after 1 year of implant placement. Intraoperative complications were reported in four studies, and these included perforation of the buccal or lingual bony plate. Overall, the incidence of intraoperative complications was 3.8% of reported surgical procedures.
CONCLUSION: Flapless surgery appears to be a plausible treatment modality for implant placement, demonstrating both efficacy and clinical effectiveness. However, these data are derived from short-term studies with a mean interval of 19 months, and a successful outcome with this technique is dependent on advanced imaging, clinical training, and surgical judgment.

 Artikel frei einsehbar unter: www.iti.org -> Publications -> Proceedings of the fourth ITI Consensus Conference -> Group 2: Emerging Techniques and Technologies in Implant Dentistry

**Minimally invasive flapless implant placement: follow-up results from a multicenter study.**

Becker W, Goldstein M, Becker BE, Sennerby L, Kois D, Hujoel P.


**Abstract**

BACKGROUND: The placement of implants using a minimally invasive flapless approach has the potential to reduce operative bleeding and postoperative discomfort and minimize crestal bone loss. This article presents follow-up data on a prospective clinical study of implants placed using a flapless procedure.

METHODS: The original study reported on 57 patients (33 female patients with an age range of 24 to 86 years; 24 male patients with an age range of 27 to 81 years) recruited from three clinical centers (Tucson, Arizona; Gothenburg, Sweden; and Tel Aviv, Israel) who received 79 implants. After an average of 3 years and 8 months, the patients were contacted and invited to return to their respective clinics for reexamination. Thirty-seven patients with 52 implants returned for a follow-up examination; the remaining 20 patients (27 implants) were not available for reexamination and were considered study drop-outs.

RESULTS: The cumulative survival rate at the 3- to 4-year follow-up examination remains at 98.7%, reflecting the loss of one implant. The mean probing depth at abutment connection was 2.2 mm, as reported in the initial study (examination 2 at approximately 2 years postplacement); it was 2.4 mm at the 3- to 4-year second follow-up examination. This change was not clinically or statistically significant. Bleeding score changes also were not significant between the two intervals. The average crestal bone level was -0.7 mm at examination 2 and -0.8 mm at examination 3, a change that approached significance (P <0.06).

CONCLUSIONS: Minimally invasive flapless surgery offers patients the possibility of high implant predictability with clinically insignificant crestal bone loss for up to 4 years. Proper diagnosis and treatment planning are key factors in achieving predictable outcomes.