Immediate or Early Placement of Implants Following Tooth Extraction: Review of Biologic Basis, Clinical Procedures, and Outcomes.

Stephen T. Chen, Thomas G. Wilson, Christoph H. F. Hämmerle

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**Purpose:** The aim of this article was to review the current literature with regard to survival and success rates, along with the clinical procedures and outcomes associated with immediate and delayed implant placement.

**Materials and Methods:** A MEDLINE search was conducted of studies published between 1990 and June 2003. Randomized and nonrandomized clinical trials, cohort studies, casecontrol studies, and case reports with a minimum of 10 cases were included. Studies reporting on success and survival rates were required to have follow-up periods of at least 12 months.

**Results:** Thirtyone articles were identified. Most were short-term reports and were not randomized with respect to timing of placement and augmentation methods used. All studies reported implant survival data; there were no reports on clinical success. Peri-implant defects had a high potential for healing by regeneration of bone, irrespective of healing protocol and bone augmentation method. Sites with horizontal defects (HD) of 2 mm or less healed by spontaneous bone fill when implants with rough surfaces were used. In the presence of HDs larger than 2 mm, or when socket walls were damaged, concomitant augmentation procedures with barrier membranes and bone grafts were required. Delayed implant placement allowed for resolution of local infection and an increase in the area and volume of soft tissue for flap adaptation. However, these advantages were diminished by simultaneous buccolingual ridge resorption and increased requirements for tissue augmentation.

**Discussion:** Immediate and delayed immediate implants appear to be predictable treatment modalities, with survival rates comparable to implants in healed ridges. Relatively few long-term studies were found. Successful clinical outcomes in terms of bone fill of the peri-implant defect were well established. However, there was a paucity of data on long-term success as measured by peri-implant tissue health, prosthesis stability, and esthetic outcomes.

**Conclusions:** Short-term survival rates and clinical outcomes of immediate and delayed implants were similar and were comparable to those of implants placed in healed alveolar ridges.

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History of Treated Periodontitis and Smoking as Risks for Implant Therapy

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Purpose: The aim of this review was to evaluate a history of treated periodontitis and smoking, both alone and combined, as risk factors for adverse dental implant outcomes.

Materials and Methods: A literature search of MEDLINE (Ovid) and EMBASE from January 1, 1966, to June 30, 2008, was performed, and the outcome variables implant survival, implant success, occurrence of peri-implantitis and marginal bone loss were evaluated.

Results: Considerable heterogeneity in study design was found, and few studies accounted for confounding variables. For patients with a history of treated periodontitis, the majority of studies reported implant survival rates > 90%. Three cohort studies showed a higher risk of peri-implantitis in patients with a history of treated periodontitis compared with those without a history of periodontitis (reported odds ratios from 3.1 to 4.7). In three of four systematic reviews, smoking was found to be a significant risk for adverse implant outcome. While the majority of studies reported implant survival rates ranging from 80% to 96% in smokers, most studies found statistically significantly lower survival rates than for nonsmokers.

Conclusions: There is an increased risk of peri-implantitis in smokers compared with nonsmokers (reported odds ratios from 3.6 to 4.6). The combination of a history of treated periodontitis and smoking increases the risk of implant failure and peri-implant bone loss.

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Clinical and esthetic outcomes of implants placed in postextraction sites.

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Abstract

PURPOSE: The aim of this review was to evaluate the clinical outcomes for the different time points of implant placement following tooth extraction.

MATERIALS AND METHODS: A PubMed search and a hand search of selected journals were performed to identify clinical studies published in English that reported on outcomes of implants in postextraction sites. Only studies that included 10 or more patients were accepted. For implant success/survival outcomes, only studies with a mean follow-up period of at least 12 months from the time of implant placement were included. The following outcomes were identified: (1) change in peri-implant defect dimension, (2) implant survival and success, and (3) esthetic outcomes.

RESULTS AND CONCLUSIONS: Of 1,107 abstracts and 170 full-text articles considered, 91 studies met the inclusion criteria for this review. Bone augmentation procedures are effective in promoting bone fill and defect resolution at implants in postextraction sites, and are more successful with immediate (type 1) and early placement (type 2 and type 3) than with late placement (type 4). The majority of studies reported survival rates of over 95%. Similar survival rates were observed for immediate (type 1) and early (type 2) placement. Recession of the facial mucosal margin is common with immediate (type 1) placement. Risk indicators included a thin tissue biotype, a facial malposition of the implant, and a thin or damaged facial bone wall. Early implant placement (type 2 and type 3) is associated with a lower frequency of mucosal recession compared to immediate placement (type 1).

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⇒ Dort kann Artikel gespeichert werden

⇒ In dem Artikel wird die Chronische Parodontitis als möglicher Risk Factor diskutiert
Implant treatment in periodontitis-susceptible patients: a systematic review.

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Abstract

Implant treatment in individuals with periodontitis-associated tooth loss is frequently debated. The objective of the present systematic review was to assess the principles and outcome of implant treatment in periodontitis-susceptible patients. Studies considered for inclusion were searched in MEDLINE (PubMed) and relevant journals were hand-searched. The search was restricted to studies published in English from 1980 to 2006. Prospective and retrospective cohort studies assessing implant treatment in partially and totally edentulous individuals with a history of periodontitis-associated tooth loss were included when the follow-up period was >1 year, when more than five patients were included in the study, and when the treatment involved titanium implants. The outcome measures were loss of suprastructures, loss of implants, loss of teeth, health status of peri-implant tissues and health status of periodontal tissues. Screening of eligible studies and data extraction were conducted by the reviewer. A total of 23 studies were identified. The survival rates of suprastructures and implants were high in individuals with a history of periodontitis-associated tooth loss. Therefore, implant treatment in periodontitis-susceptible patients is not contraindicated provided adequate infection control and an individualized maintenance programme. However, the higher incidence of peri-implantitis may jeopardize the longevity of the implant treatment. Consequently, further long-term prospective studies of sufficient numbers of well-characterized patients are needed before definitive conclusions can be drawn about the long-term outcome of implant treatment in periodontitis-susceptible patients.


Karoussis IK, Salvi GE, Heitz-Mayfield LJ, Brägger U, Hämmerle CH, Lang NP.


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Abstract

AIM: The aim of this 10-year study was to compare the failure, success and complication rates between patients having lost their teeth due to periodontitis or other reasons.

MATERIAL AND METHODS: Fifty-three patients who received 112 hollow screw implants (HS) of the ITI Dental Implant System were divided into two groups: group A - eight patients with 21 implants having lost their teeth due to chronic periodontitis; group B - forty five
patients with 91 implants without a history of periodontitis. One and 10 years after surgical placement, clinical and radiographic parameters were assessed. The incidences of peri-implantitis were noticed over the 10 years of regular supportive periodontal therapy.

RESULTS: Success criteria at 10 years were set at: pocket probing depth (PPD) \(\leq 5\) mm, bleeding on probing (BoP-), bone loss \(<0.2\) mm annually. The survival rate for the group with a past history of chronic periodontitis (group A) was 90.5\%, while for the group with no past history of periodontitis (group B) it was 96.5\%. Group A had a significantly higher incidence of peri-implantitis than group B (28.6\% vs. 5.8\%). With the success criteria set, 52.4\% in group A and 79.1\% of the implants in group B were successful. With a threshold set at PPD \(<6\) mm, BoP- and bone loss \(<0.2\) mm annually, the success rates were elevated to 62\% and 81.3\% for groups A and B, respectively. Relying purely on clinical parameters of PPD \(<5\) mm and BoP-, the success rates were at 71.4\% and 94.5\%, and with a threshold set at PPD \(<6\) mm and BoP-, these proportions were elevated to 81\% and 96.7\% for groups A and B, respectively.

CONCLUSIONS: Patients with implants replacing teeth lost due to chronic periodontitis demonstrated lower survival rates and more biological complications than patients with implants replacing teeth lost due to reasons other than periodontitis during a 10-year maintenance period. Furthermore, setting of thresholds for success criteria is crucial to the reporting of success rates.

**Osseointegrated implants in patients treated for generalized chronic periodontitis and generalized aggressive periodontitis: 3- and 5-year results of a prospective long-term study.**

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**Abstract**

BACKGROUND: The successful use of osseointegrated implants in periodontally healthy patients has been documented in numerous longitudinal studies in recent years. However, the extent to which these positive results apply to periodontally diseased patients remains unclear. The aim of the present prospective longitudinal study of partially edentulous patients treated for generalized chronic periodontitis and generalized aggressive periodontitis was a clinical, microbiological, and radiographic comparison of teeth and implants and assessment of the implant success rate.

METHODS: Five partially edentulous patients treated for generalized aggressive periodontitis (GAgP) and 5 treated for generalized chronic periodontitis (GCP) were enrolled in this study. The GAgP patients received 36 implants, and the GCP patients 12 implants. The teeth were examined 2 to 4 weeks before extraction of the non-retainable teeth (baseline), and 3 weeks after insertion of the final abutments (second examination). All further examinations were performed during a 3-month recall schedule over a 5-year period for the GAgP patients and
over a 3-year period for the GCP patients. At each session clinical parameters were recorded at teeth and implants and the composition of the subgingival microflora was determined by dark-field microscopy and DNA analysis. Intraoral radiographs of the teeth and implants were taken for control purposes at baseline; after insertion of the superstructure; and 1, 3, and 5 years later.

RESULTS: The clinical findings indicated healthy periodontal and peri-implant conditions in both patient groups throughout the study. However, an increased probing depth and an attachment loss were recorded in the GAgP patients after the third year (P<0.001). The distribution of the microorganisms revealed no significant differences between the patient groups or between implants and teeth. Moderate bone loss at teeth and implants was registered in both groups. The success rates recorded were 100% in the GCP patients and 88.8% (maxilla: 85.7%; mandible: 93.3%) in the GAgP patients.

CONCLUSIONS: The 3-year and 5-year follow-ups show that osseointegrated implants may be successful in oral rehabilitation of partially edentulous patients treated for generalized aggressive periodontitis and generalized chronic periodontitis. However, as no significant differences were recorded between conditions at teeth and at implants, progression of the disease cannot be ruled out.

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Do periodontopathogens disappear after full-mouth tooth extraction?

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Abstract

AIM: To monitor the intra-oral microbiological changes after full-mouth extraction using quantitative polymerase chain reaction (qPCR).

MATERIAL AND METHODS: Nine patients with severe, aggressive periodontitis, for whom a full-mouth tooth extraction was the only remaining treatment option were recruited. Before and 6 months after extraction, microbial samples were obtained (tongue, saliva and subgingival plaque) and analysed by qPCR.

RESULTS: The elimination of subgingival niches, by extraction of all natural teeth, resulted in a 3-log reduction of Porphyromonas gingivalis and Tannerella forsythia, and more modest reductions of Aggregatibacter actinomycetemcomitans and Prevotella intermedia. However, the detection frequencies of these periodontopathogens in saliva and on the tongue remained unchanged after full-mouth tooth extraction.

CONCLUSION: In contrast to what has been believed so far, full-mouth tooth extraction does not result in eradication of all periodontopathogens but only in a significant reduction. The clinical consequences of this observation remain speculative.
A comprehensive and critical review of dental implant prognosis in periodontally compromised partially edentulous patients.

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Abstract

OBJECTIVES: The outcome of implant treatment in periodontally compromised partially edentulous patients has not been completely clarified. Therefore, the aim of the present study was to perform, applying a systematic methodology, a comprehensive and critical review of the prospective studies published in English up to and including August 2006, regarding the short-term (<5 years) and long-term (≥5 years) prognosis of osseointegrated implants placed in periodontally compromised partially edentulous patients.

MATERIAL AND METHODS: Using The National Library Of Medicine and Cochrane Oral Health Group databases, a literature search for articles published up to and including August 2006 was performed. At the first phase of selection the titles and abstracts and at the second phase full papers were screened independently and in duplicate by the three reviewers (I. K. K., S. K., I. F.).

RESULTS: The search provided 2987 potentially relevant titles and abstracts. At the first phase of evaluation, 2956 publications were rejected based on title and abstract. At the second phase, the full text of the remaining 31 publications was retrieved for more detailed evaluation. Finally, 15 prospective studies were selected, including seven short-term and eight long-term studies. Because of considerable discrepancies among these studies, meta-analysis was not performed.

CONCLUSIONS: No statistically significant differences in both short-term and long-term implant survival exist between patients with a history of chronic periodontitis and periodontally healthy individuals. Patients with a history of chronic periodontitis may exhibit significantly greater long-term probing pocket depth, peri-implant marginal bone loss and incidence of peri-implantitis compared with periodontally healthy subjects. Even though the short-term implant prognosis for patients treated for aggressive periodontitis is acceptable, on a long-term basis the matter is open to question. Alterations in clinical parameters around implants and teeth in aggressive periodontitis patients may not follow the same pattern, in contrast to what has been reported for chronic periodontitis patients. However, as only three studies comprising patients treated for aggressive periodontitis were selected, more studies, specially designed, are required to evaluate implant prognosis in this subtype of periodontitis. As the selected publications exhibited considerable discrepancies, more studies, uniformly designed, preferably longitudinal, prospective and controlled, would be important.
Clinical and radiographic study of implant treatment outcome in periodontally susceptible and non-susceptible patients: a prospective long-term study.

De Boever AL, Quirynen M, Coucke W, Theuniers G, De Boever JA.


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.

Roccuzzo M, De Angelis N, Bonino L, Aglietta M.


Abstract

OBJECTIVES: The aim of this study was to compare the long-term outcomes of implants placed in patients treated for periodontitis periodontally compromised patients (PCP) and in periodontally healthy patients (PHP) in relation to adhesion to supportive periodontal therapy (SPT).

MATERIAL AND METHODS: One hundred and twelve partially edentulous patients were consecutively enrolled in private specialist practice and divided into three groups according to their initial periodontal condition: PHP, moderate PCP and severe PCP. Perio and implant treatment was carried out as needed. Solid screws (S), hollow screws (HS) and hollow cylinders (HC) were installed to support fixed prostheses, after successful completion of initial periodontal therapy (full-mouth plaque score <25% and full-mouth bleeding score <25%). At the end of treatment, patients were asked to follow an individualized SPT program. At 10 years, clinical measures and radiographic bone changes were recorded by two calibrated operators, blinded to the initial patient classification.

RESULTS: Eleven patients were lost to follow-up. During the period of observation, 18 implants were removed because of biological complications. The implant survival rate was 96.6%, 92.8% and 90% for all implants and 98%, 94.2% and 90% for S-implants only, respectively, for PHP, moderate PCP and severe PCP. The mean bone loss was 0.75 (+/- 0.88) mm in PHP, 1.14 (+/- 1.11) mm in moderate PCP and 0.98 (+/- 1.22) mm in severe PCP, without any statistically significant difference. The percentage of sites, with bone loss > or =3 mm, was, respectively, 4.7% for PHP, 11.2% for moderate PCP and 15.1% for severe PCP, with a statistically significant difference between PHP and severe PCP (P<0.05). Lack of adhesion to SPT was correlated with a higher incidence of bone loss and implant loss.

CONCLUSION: Patients with a history of periodontitis presented a lower survival rate and a statistically significantly higher number of sites with peri-implant bone loss. Furthermore, PCP, who did not completely adhere to the SPT, were found to present a higher implant failure rate. This underlines the value of the SPT in enhancing the long-term outcomes of implant therapy, particularly in subjects affected by periodontitis, in order to control reinfection and limit biological complications.
Implant therapy in aggressive periodontitis patients: a systematic review and clinical implications.

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Abstract

Implant therapy in partially edentulous patients has proven to be a predictable procedure with a high implant survival rate. The success rate in patients with a history of aggressive periodontitis, however, is still unclear. A Medline/PubMed search was conducted to identify and summarize articles published in English and reported on the survival of implants in aggressive, rapidly progressive, or juvenile periodontitis patients. Our search revealed only 9 articles, 4 of which were case reports. Although available evidence is weak, it suggests good short-term survival of implants placed in periodontally well-maintained aggressive periodontitis patients. Bone loss around implants in aggressive periodontitis patients, however, appears to occur more frequently than it does in chronic periodontitis patients or periodontally healthy individuals. A summary and critical analysis of the aforementioned articles is presented.

Outcome of dental implants in partially edentulous patients with and without a history of periodontitis: a 5-year interim analysis of a cohort study.

Gatti C, Gatti F, Chiapasco M, Esposito M.


Abstract

PURPOSE: To evaluate the outcome of dental implants placed in partially edentulous patients with a history of severe periodontitis (SP), moderate periodontitis (MP) and no periodontitis (NP).

MATERIALS AND METHODS: Sixty-two partially edentulous patients were consecutively enrolled in this study. Patients were divided into three groups according to their initial periodontal conditions, assessed with a modified Periodontal Screening and Recording (PSR) index: 26 patients were in the SP group, 7 in the MP group, and 29 in the NP group. Patients requiring periodontal treatment were treated prior to implantation. Various dental implants and procedures were used. In the SP group 129 implants were placed, 26 were placed in the MP group, and 72 in the NP group. Outcome measures were prosthetic success, implant survival, prevalence of peri-implantitis and mean peri-implant bone level changes on periapical radiographs.

RESULTS: Six patients dropped out, two from each group, at 5 years. Two implants and their prosthesis failed with peri-implantitis in one patient and two implants were successfully treated for peri-implantitis in another patient in the SP group. After 5 years, patients affected
by SP and MP lost on average twice the amount of peri-implant bone compared with healthy patients (2.6 mm versus 1.2 mm). This difference was highly statistically significant.

CONCLUSIONS: Patients with a history of SP and MP lose more peri-implant bone than periodontally healthy patients and might be at higher risk for peri-implantitis and implant failures.

A comparison of clinical outcomes for implants placed in fresh extraction sockets versus healed sites in periodontally compromised patients: a 1-year follow-up report.

Deng F, Zhang H, Zhang H, Shao H, He Q, Zhang P.


Abstract

PURPOSE: The aim of this 1-year prospective study was to evaluate, in patients with severe periodontitis, the clinical performance of implants placed immediately after extraction of remaining teeth or in healed sockets and immediately loaded for prosthetic oral rehabilitation, and to compare the clinical outcomes for implants placed in fresh extraction sockets versus healed sites.

MATERIALS AND METHODS: All patients in this study had received periodontal treatment; however, the teeth were eventually deemed hopeless. The remaining teeth were extracted, the periodontally compromised sites were debrided, implants were inserted guided by a surgical template, and a provisional restoration was delivered immediately. The opposing arch was restored with a complete denture. Definitive prostheses were inserted after 6 months. Initial implant and prosthesis stability and the inflammatory response were evaluated. Clinical and radiographic analyses were performed.

RESULTS: A total of 84 rough-surfaced implants were placed (50 in the maxilla and 34 in the mandible). Of these, 32 were placed in fresh extraction sockets. Four implants in three patients failed within the first 6 months, resulting in an implant survival rate of 95.2%. All of the failed implants had been placed in fresh maxillary extraction sockets. The survival rates were 92% (46/50) in the maxilla and 100% (34/34) in the mandible. Prosthetic success was 100%. The mean bone level change (± SE) between baseline and 12 months was -1.12 ± 0.18 mm. There were no statistically significant differences in insertion torque and alveolar bone loss between postextraction sites and healed sites.

CONCLUSIONS: The implant failure rate was higher in maxillary postextraction sites. This indicates a heightened risk of failure for immediate implants placed in periodontally compromised maxillae. Nevertheless, a satisfactory prosthetic success was achieved after 1 year.
Immediate and delayed implant placement into extraction sockets: a 5-year report.


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Abstract

BACKGROUND: As a complement to the earlier reported 3-year results from a prospective multicenter study of immediate and delayed placement of implants into fresh extraction sockets, the 5-year results are reported.

PURPOSE: The purpose of this 5-year report was to evaluate the immediate and long-term success of implants placed into fresh extraction sockets, with respect to implant size and type, bone quality and quantity, implant position, initial socket depth, and reason for tooth extraction.

MATERIALS AND METHODS: This paper presents the 5-year results of the original 12 centers that participated with 143 consecutively included patients. A total of 264 implants were placed either immediately after tooth extraction or after a short soft-tissue healing time (3-5 weeks). The patients were divided into five subgroups, depending on the type of insertion method used.

RESULTS: The outcome demonstrated that the cumulative implant survival rate after 5 years of loading has not changed and remains 92.4% in the maxilla and 94.7% in the mandible. No difference in failure rates can be seen between the groups when relating the failures to insertion method.

CONCLUSION: This prospective study demonstrated that placing Brånemark implants into fresh extraction sites can be successful over a period of 5 years of loading. One of the outcomes of the study shows that there is a clinical correlation between implant failure and periodontitis as a reason for tooth extraction, even if it is difficult to give it a casual association. It can be hypothesized that periodontitis affected tissues might have a negative local influence because of the presence of infrabony defects that could possibly increase the gap between bone and implant or jeopardize achievement of primary stability.

How does the timing of implant placement to extraction affect outcome?

Quirynen M, Van Assche N, Botticelli D, Berglundh T.


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Erratum in:
Abstract

PURPOSE: To systematically review the current literature on the clinical outcomes and incidence of complications associated with immediate implants (implants placed into extraction sockets at the same surgery that the tooth is removed) and early implants (implants placed following soft tissue healing).

MATERIALS AND METHODS: A MEDLINE search was conducted for English papers on immediate/early placement of implants based on a series of search terms. Prospective as well as retrospective studies (randomized/nonrandomized clinical trials, cohort studies, case control studies, and case reports) were considered, as long as the follow-up period was at least 1 year of loading and at least 8 patients and/or at least 10 implants had been examined. Screening and data abstraction were performed independently by 3 reviewers. The types of complications assessed were implant loss; marginal bone loss; soft tissue complications, including peri-implantitis; and esthetics.

RESULTS: The initial search provided 351 abstracts, of which 146 were selected for full-text analysis. Finally, 17 prospective and 17 retrospective studies were identified, with observation times generally between 1 and 2 years for the prospective studies and around 5 years for the retrospective studies. The heterogeneity of the studies (including postextraction defect characteristics, surgical technique with or without membrane and/or bone substitute, implant location in socket, inclusion and exclusion criteria, and prosthetic rehabilitation), however, rendered a meta-analysis impossible. Most papers contained only data on implant loss and did not provide useful information on failing implants or on hard and soft tissue changes. In general, the implant loss remained below 5% for both immediate and early placed implants (range, 0% to 40% for immediate implants and 0% to 9% for early placed implants), with a tendency toward higher losses when implants were also immediately loaded.

CONCLUSION: Because of the lack of long-term data, questions regarding whether peri-implant health, prosthesis stability, degree of bone loss, and esthetic outcome of immediate or early placed implants are comparable with implants placed in healed sites remain unanswered.
BACKGROUND: ‘Immediate’ implants are placed in dental sockets just after tooth extraction. ‘Immediate-delayed’ implants are those implants inserted after weeks up to about a couple of months to allow for soft tissue healing. 'Delayed' implants are those placed thereafter in partially or completely healed bone. The potential advantages of immediate implants are that treatment time can be shortened and that bone volumes might be partially maintained thus possibly providing good aesthetic results. The potential disadvantages are an increased risk of infection and failures. After implant placement in postextractive sites, gaps can be present between the implant and the bony walls. It is possible to fill these gaps and to augment bone simultaneously to implant placement. There are many techniques to achieve this but it is unclear when augmentation is needed and which could be the best augmentation technique.

OBJECTIVES: To evaluate success, complications, aesthetics and patient satisfaction between ‘immediate’, ‘immediate-delayed’ and ‘delayed’ implants. To evaluate whether and when augmentation procedures are necessary and which is the most effective technique.

SEARCH STRATEGY: The Cochrane Oral Health Group's Trials Register (to 2 June 2010), CENTRAL (The Cochrane Library 2010, Issue 2), MEDLINE via OVID (1950 - 2 June 2010) and EMBASE via OVID (1980 - 2 June 2010) were searched. Several dental journals were handsearched.

SELECTION CRITERIA: Randomised controlled trials (RCTs) comparing immediate, immediate-delayed, and delayed implants, or comparing various bone augmentation procedures around the inserted implants, reporting the outcome of the interventions to at least 1 year after functional loading.

DATA COLLECTION AND ANALYSIS: Screening of eligible studies, assessment of the methodological quality of the trials and data extraction were conducted independently and in duplicate. Trial authors were contacted for any missing information. Results were expressed as random-effects models using mean differences for continuous outcomes and risk ratios (RR) for dichotomous outcomes with 95% confidence intervals (CIs). The statistical unit of the analysis was the patient.

MAIN RESULTS: Fourteen eligible RCTs were identified but only seven trials could be included. Four RCTs evaluated implant placement timing. Two RCTs compared immediate versus delayed implants in 126 patients and found no statistically significant differences. One RCT compared immediate-delayed versus delayed implants in 46 patients. After 2 years patients in the immediate-delayed group perceived the time to functional loading significantly shorter, were more satisfied and independent blinded assessor judged the level of the perimplant marginal mucosa in relation to that of the adjacent teeth as more appropriate (RR = 1.68; 95% CI 1.04 to 2.72). These differences disappeared 5 years after loading but significantly more complications occurred in the immediate-delayed group (RR = 4.20; 95% CI 1.01 to 17.43). One RCT compared immediate with immediately delayed implants in 16 patients for 2 years and found no differences. Three RCTs evaluated different techniques of bone grafting for implants immediately placed in extraction sockets. No statistically significant difference was observed when evaluating whether autogenous bone is needed in postextractive sites (1 trial with 26 patients) or which was the most effective augmentation technique (2 trials with 56 patients).

AUTHORS' CONCLUSIONS: There is insufficient evidence to determine possible advantages or disadvantages of immediate, immediate-delayed or delayed implants, therefore these preliminary conclusions are based on few underpowered trials often judged
to be at high risk of bias. There is a suggestion that immediate and immediate-delayed implants may be at higher risks of implant failures and complications than delayed implants on the other hand the aesthetic outcome might be better when placing implants just after teeth extraction. There is not enough reliable evidence supporting or refuting the need for augmentation procedures at immediate implants placed in fresh extraction sockets or whether any of the augmentation techniques is superior to the others.


A retrospective study of 1925 consecutively placed immediate implants from 1988 to 2004.

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Abstract

PURPOSE: The purpose of the present study was to evaluate implant survival rates with immediate implant placement (IIP) into fresh extraction sockets and to determine risk factors for implant failure.

MATERIALS AND METHODS: A retrospective chart review was conducted of all patients in whom IIP was performed between January 1988 and December 31, 2004. Treatment required atraumatic tooth extraction, IIP, and mineralized freeze-dried bone allograft with an absorbable barrier to cover exposed implant threads. Implant failure was documented along with time of failure, age, gender, medical history, medications taken, postsurgical antibiotic usage, site of implant placement, and reason for implant failure. Statistical analysis was performed using chi-square and logistic regression analysis methods.

RESULTS: A total of 1925 IIPs (1398 machined-surface and 527 rough-surface implants) occurred in 891 patients. Seventy-one implants failed to achieve integration; a total of 77 implants were lost in 68 patients. The overall implant survival rate was 96.0% with a failure rate of 3.7% prerestoration and 0.3% postrestoration. Machined-surface implants were twice as likely to fail as rough-surface implants (4.6% versus 2.3%). Men were 1.65 times more likely to experience implant failure. Implants placed in sites where teeth were removed for periodontal reasons were 2.3 times more likely to fail than implants placed in other sites. Patients unable to utilize postsurgical amoxicillin were 3.34 times as likely to experience implant failure as patients who received amoxicillin.

CONCLUSIONS: With a 1- to 16-year survival rate of 96%, IIP following tooth extraction may be considered to be a predictable procedure. Factors such as the ability to use postsurgical amoxicillin and reason for tooth extraction should be considered when treatment planning for IIP.
Immediate placement of implants into extraction sockets: implant survival.

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Abstract

In 51 patients (21 males and 30 females) aged 16 to 72 years, a total of 109 Nobelpharma implants were placed into extraction sockets immediately following extraction. The follow-up period varied between 1 and 67 months with a mean of 30.5 months. Osseointegration was determined by clinical stability, lack of symptoms, and lack of peri-implant pathology based on radiographic examination. The implant survival rate was 93.6%. Six implants were mobile at the abutment connection stage, and one was lost when function commenced. The success rate was 92.0% for implants replacing teeth extracted because of periodontitis and 95.8% for implants replacing teeth extracted for other reasons. Two other complications occurred: 12 cover screws perforated the gingiva during healing; and infection developed in five cases. The incidence of infection was higher in the periodontitis group. It was found that immediate placement of implants into extraction sockets is a safe and predictable procedure if certain guidelines are followed.

Retrospective analysis of implant survival and the influence of periodontal disease and immediate placement on long-term results.


Comment in:


Abstract

PURPOSE: The purpose of this study was to investigate the cumulative survival rates of dental implants placed in a private periodontal practice and the effects of periodontal disease and immediate placement on implant survival.

MATERIALS AND METHODS: A retrospective chart review was conducted on 149 consecutive patients. Each patient had a single implant placed. For the purpose of analysis, patients were divided into 2 groups: those who were periodontally healthy and those who had periodontal disease. Implants were placed into available bone either immediately or after a healing period. All failed implants were removed and recorded. The effects of periodontal status and placement time on implant survival were evaluated using Cox proportional hazards regression and log-rank tests.
RESULTS: Of the 149 implants in the study, 22 failed during the observation period. The 127 censored cases (i.e., implants that had not failed at the end of the observational period) were observed for a mean of 943 days (SD 932, range 35 to 4,030). Failed implants were observed for a mean of 722 days (SD 1,026, range 18 to 3,548). The presence of periodontal disease appeared to be associated with a greater failure rate, but there was no observed effect associated with time of placement. The percentages of censored immediate placement cases and delayed placement cases were nearly identical. Among the 77 implants associated with periodontal disease, placement time was not strongly associated with percentage censored. Forty-three of the 55 immediately placed implants (78.18%) and 18 of the 22 implants (81.18%) whose placement was delayed were censored. Both Cox proportional hazards regression and log-rank tests established that survival was adversely affected by periodontal disease (P < .05) but unaffected by time of placement (P > .50). The lower 1-sided 95% confidence limit for median survival time was 3,548 days for patients without periodontal disease and 1,799 days for patients with disease.

DISCUSSION AND CONCLUSION: Implant survival was compromised by a history of periodontitis but not affected by immediate or delayed placement.

Immediate and early function of implants placed in extraction sockets of maxillary infected teeth: a pilot study.

Villa R, Rangert B.


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Erratum in:


Abstract

STATEMENT OF PROBLEM: Infection in tooth extraction sites has traditionally been considered an indication to postpone implant placement until the infection has been resolved.

PURPOSE: The aim of this study was to evaluate the survival rate of immediate and early-loaded implants placed immediately after extraction of teeth with endodontic and periodontal lesions or root fracture in the maxilla.

MATERIAL AND METHODS: Thirty-three patients with teeth judged to be unrestorable because of endodontic or periodontal lesions or root fracture were included in the study. After tooth extraction, 1 to 6 implants (n=76) were placed in each patient using flap or flapless surgery in fresh extraction sockets, and a fixed provisional prosthesis was placed immediately or within 36 hours. Definitive prostheses were inserted after 6 to 12 months. The treatment protocol considered initial implant and prosthesis stability and control of the inflammatory response. Clinical and radiographic analyses were performed to evaluate the treatment outcome. Data were reported using descriptive statistics.

RESULTS: After 1 year, 2 implants were lost, resulting in a 97.4% survival rate. A mean (SD) marginal bone loss of -0.91 (1.50) mm was recorded during the observation period. No signs
of infection around the implants were detected at any follow-up visit. There was a tendency towards less bone loss with the flapless protocol, -0.74 (1.34) mm, versus flap, -1.02 (1.60) mm, and less bone loss for single, -0.55 (1.52) mm, versus multiple restorations, -0.86 (1.24) mm, with the flapless approach.

CONCLUSIONS: A high 1-year survival rate was achieved for immediately placed and immediately/early-loaded implants in the maxilla, despite the presence of infection in the location of the extracted teeth.

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**Early loading of interforaminal implants immediately installed after extraction of teeth presenting endodontic and periodontal lesions.**


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**Abstract**

BACKGROUND: Infection in tooth extraction sites has traditionally been considered an indication to postpone implant insertion until the infection has been resolved.

PURPOSE: The aim of this study was to evaluate the survival rate of early-loaded implants placed immediately after extraction of teeth with endodontic and periodontal lesions in the mandible.

MATERIALS AND METHODS: Twenty patients in need of mandibular implant treatment and with teeth showing signs of infection in the interforaminal area were included in the study. The patients received four to six implants (Brånemark System, Nobel Biocare AB, Göteborg, Sweden) in or close to the fresh extraction sockets and received a provisional prosthesis within 3 days. Final prostheses were delivered after 3 to 12 months. The surgical protocol paid special attention to the preservation of high implant stability and control of the inflammatory response. The patients were followed up for 15 to 44 months.

RESULTS: No implants were lost, resulting in a 100% survival rate. A mean marginal bone loss of 0.7 mm (SD 1.2 mm) was registered during the observation period. No signs of infection around the implants were detected at any follow-up visit.

CONCLUSION: A high survival rate can be achieved for immediately placed and early-loaded implants in the mandible despite the presence of infection at the extracted teeth.