INPLASY

Long-term survival and success rate of dental implants placed in reconstructed areas with extraoral autogenous bone grafts: A systematic review and meta-analysis

INPLASY202390004
doi: 10.37766/inplasy2023.9.0004
Received: 03 September 2023
Published: 03 September 2023

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ADMINISTRATIVE INFORMATION

Support - The authors declare that no funding was provided for the elaboration of this study.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202390004

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 03 September 2023 and was last updated on 03 September 2023.

INTRODUCTION

Review question / Objective What is the survival and success rate of dental implants placed in extra-oral autogenous bone graft, reported in longitudinal studies?

Condition being studied Continuity defects of the jaws or insufficient alveolar bone volume arising from tumor resections, traumatic avulsions, resorption atrophy, or inflammatory diseases result in substantial morbidity with functional deficiencies and/or cosmetic deformities, when not adequately treated. Aiming to minimize the sequelae in bone structures with or without soft tissue involvement caused by resections or trauma, reconstructive surgeries with grafting techniques from different autologous extraoral donor sites, including mainly iliac crest and fibula , and in atrophic maxilla cases, also calvarial bone , may be applied.

METHODS

Search strategy Five databases were used for the search (PubMed/MEDLINE, the Cochrane Central Register of Controlled Trials, Embase, Web of Science, and LILACS) of relevant articles published before June 2023 without any restrictions regarding publication date or language. In addition, the gray literature was searched using the OpenGrey database (www.opengrey.eu), and the studies' reference lists were evaluated (cross-referenced) to identify other potential studies for inclusion.

Participant or population Patients with dental implants placed in reconstruction areas through microvascularized or non-vascularized extra-oral autogenous bone graft.

Intervention Dental implants placed in bone reconstructions through extra-oral autogenous bone graft.

Comparator Survival, success rate, and marginal bone loss of dental implants placed in different types of extraoral autogenous bone graft (iliac, fibula or calvaria [vascularized or non-vascularized]).

Study designs to be included Observational cohort studies (prospective or retrospective) and clinical trials (randomized or not).

Eligibility criteria The exclusion criteria included animal studies, in vitro studies, case series, case reports, and reviews. Studies evaluating implants placed only in radiotherapy areas were excluded. No studies were excluded due to language, publication date and number of patients.

Information sources Two review authors performed the search for studies in duplicate. Five databases were used for the search (PubMed/MEDLINE, the Cochrane Central Register of Controlled Trials, Embase, Web of Science, and LILACS) of relevant articles published before June 2023 without any restrictions regarding publication date or language. In addition, the gray literature was searched using the OpenGrey database (www.opengrey.eu), and the studies' reference lists were evaluated (cross-referenced) to identify other potential studies for inclusion. Studies identified by at least one reviewer were included in the selection phase.

Main outcome(s) The primary outcome is the implant survival rate. The secondary outcomes are implant success rate, graft survival, and mean marginal bone loss.

Quality assessment / Risk of bias analysis Two review authors performed in duplicate the risk-of-bias analysis. The Newcastle-Ottawa Scale (NOS) was used in the analysis of cohort studies.

Strategy of data synthesis The dichotomous variable (implant failure) of the included studies was categorized into subgroups based on the type of bone graft adopted (iliac, fibula or calvaria [vascularized or non-vascularized]), and a meta-analysis was conducted at implant level using Comprehensive Meta-Analysis (version 4, Biostat, USA). For the dichotomous variables, crude numbers were considered because of the presence of 0 events in at least one group of each possible comparison, which prevented any synthesis by means of effect measures. The estimates of the intervention effects were expressed as risk ratio (RR) with 95% CIs. Prediction intervals were calculated to describe the distribution of true effects around the summary effect.
For the analyses, the random effects model was considered due to the variation between the studies (population, follow-up time, and settings) with the generic variance approach. To address within-patient correlation of treatment outcomes in clustered studies, the methods described in the Cochrane Manual were used. A within-patient correlation coefficient of 0.07 was used and the sample size was revised in studies that did not adjust for clustering. Chi2 tests evaluated heterogeneity, considering it to be low for values ≤ 25%, moderate for values > 25% and ≤ 50%, and high for values > 50. The statistical significance level of the meta-analysis effect was set at $P < 0.05$.

Subgroup analysis The dichotomous variable (implant failure) of the included studies was categorized into subgroups based on the type of bone graft adopted (iliac, fibula or calvaria [vascularized or non-vascularized]).

Sensitivity analysis Publication bias was graphically investigated using a funnel plot. For meta-analyses with more than 10 studies, Egger's test was used.

Language restriction No language restrictions.

Country(ies) involved Brazil.

Keywords Bone graft; Dental Implant; Implant survival.

Contributions of each author
Author 1 - Vittorio Moraschini - Concept/Design; Data analysis/interpretation; Drafting article.
Author 2 - Rafael Louro - Concept/Design; Data analysis/interpretation; final review.
Author 3 - Jamil Shibli - Data analysis/interpretation; final review.
Author 4 - Monica Calasans-Maia - Concept/Design; Data analysis/interpretation; Drafting article.