Int. J. Oral Maxillofac. Surg. 2015; 44: 239–244
http://dx.doi.org/10.1016/j.ijom.2014.10.008, available online at http://www.sciencedirect.com

International Journal of Oral & Maxillofacial Surgery

Clinical Paper
Pre-Implant Surgery

Survival rate of osseointegrated implants in atrophic maxillae grafted with calvarial bone: a retrospective study

J. C. Quiles[1], F. A. Souza[2], A. P. F. Bassi[2], I. R. Garcia Jr.[2], M. T. França[3], P. S. P. Carvalho[1,2]
[1]São Leopoldo Mandic School of Dentistry and Research Center, Campinas, Brazil; [2]Department of Surgery and Integrated Clinic, Araçatuba Dental of School, Universidade Estadual Paulista Júlio de Mesquita Filho, São Paulo, Brazil; [3]Private Practice Clinic, Araçatuba, Brazil

J. C. Quiles, F. A. Souza, A. P. F. Bassi, I. R. Garcia Jr. , M. T. França, P. S. P. Carvalho: Survival rate of osseointegrated implants in atrophic maxillae grafted with calvarial bone: a retrospective study. Int. J. Oral Maxillofac. Surg. 2015; 44: 239–244.

Abstract. The aim of this study was to evaluate the clinical survival rate of osseointegrated implants placed in the atrophic maxilla that has been reconstructed by means of autogenous bone grafts harvested from a cranial calvarial site. Further, we sought to analyse the level of peri-implant bone after prosthetic rehabilitation and to determine subjective patient satisfaction with the treatment performed. This study conformed to the STROBE guidelines regarding retrospective studies. Twenty-five patients who had received osseointegrated implants with late loading in the reconstructed atrophic maxilla were included in the study. The survival rate and level of peri-implant bone loss were evaluated. A questionnaire related to the surgical and prosthetic procedures was completed. The observed implant survival rate was 92.35%. The mean bone loss recorded was 1.76 mm in the maxilla and 1.54 mm in the mandible. The results of the questionnaire indicated a high level of patient satisfaction, little surgical discomfort, and that the patients would recommend the procedure and would undergo the treatment again. From the results obtained, it is concluded that the cranial calvarial site is an excellent donor area; calvarial grafts provided stability and maintenance of bone volume over the course of up to 11 years.

Key words: bone graft; cranial calvarial; osseointegrated implants; implant survival; marginal bone loss; subjective evaluation.

Accepted for publication 8 October 2014
Available online 4 November 2014

The consequence of the absence of a tooth is continuous bone resorption. Depending on the period over which this occurs, it may become unfeasible to place implants in the edentulous region due to the absence of the minimum bone height and/or thickness required.[1,2] The surgical procedure most often used for the reconstruction of these areas is bone grafting, for which materials of autogenous, homogeneous, heterogeneous, or synthetic origin may be applied. Material of autogenous origin is the only type that presents the biological property of osteogenicity. The scientific literature presents a wide variety of possible donor areas, both intraoral and extraoral. The latter include the cranial calvarium,[3–5] fibula,[6] iliac crest,[7–9] rib,[10,11] and tibia.[12,13]

Among the possible extraoral donor areas, the most commonly used and studied is the iliac crest. This is characterized by corticomedullary bone with a predominance of the medullary portion, which has a good thickness. Its surgical advantages include better acceptance by the patient and a shorter surgical time, due to the possibility of simultaneously opening

the receptor and donor areas. However, it leads to a higher rate of complications and morbidity, greater need for analgesics, greater susceptibility to infection, longer hospitalization time, greater postsurgical remodelling of the bone graft, and a higher failure of implants placed in these areas when compared with the calvarial cranial donor site, and also results in an external scar.[14] With the iliac crest graft, postsurgical discomfort in the donor area lasting months or even years has been reported, in addition to pain on walking.[15]

Another commonly used donor site is the cranial calvarium. This bone is of a membranous origin, formed of bones of the cortical and spongy types, with a predominance of the cortical portion. It presents rapid vascularization at the grafted site, which is a prerequisite for successful osteogenesis.[3] There are many advantages to the choice of calvarial bone. This procedure presents a lower rate of complications and morbidity, a reduction in pain at the donor site, is less susceptible to infection, is subject to less resorption and postsurgical remodelling of the graft, involves a shorter hospitalization, and demonstrates higher success rates and better bone quality in comparison with the iliac crest graft; it also results in an imperceptible scar and does not affect respiration or walking.[4,16]

The follow-up of clinical cases submitted to reconstructive surgery of the atrophic maxilla and mandible has become important in terms of evaluating patient satisfaction and the effectiveness of the procedure before undertaking the practice of extensive rehabilitations using bone grafts and implants. Within this context, the aim of the present study was to perform a retrospective evaluation of the success of implants placed in the atrophic maxilla reconstructed with autogenous bone obtained from the cranial calvarium, and to measure the patients' personal satisfaction with their treatment from the initial surgical stage through to the conclusion of the rehabilitative stage.

Materials and methods

The STROBE guidelines (Strengthening the Reporting of Observational studies in Epidemiology) were followed for this retrospective study. The clinical records of 32 patients treated at the Continuing Education Nucleus (Nec-Odonto) post-graduate institution specializing in implant dentistry in Araçatuba, Brazil were retrieved from the database. All of these patients underwent reconstructive surgery by means of autogenous bone grafts harvested from the cranial calvarium with later placement of osseointegrated implants. Of these 32 patients, one could not be contacted at the address or using the telephone number provided in the clinical records, one patient was travelling in another country and had no return date, one patient was hospitalized, three patients did not respond to the telephone call or letter, and one patient had not yet completed the final prosthetic phase (Fig. 1). Hence the study included a total of 25 patients.

Twenty of the patients were women and five were men, and they ranged in age from 43 to 75 years (mean 57 years). These patients underwent the surgical and rehabilitative procedures during the years 1999–2011. The inclusion criteria used were: (1) Patients who were partially or completely edentulous in the maxilla and/or mandible, who presented severe atrophy in height and/or thickness making it impossible to perform rehabilitation with dental implants, those with significant deficiencies in residual bone below the nasal cavity and maxillary sinus, and those with the absence of teeth due to agenesis; these patients had to have undergone reconstructive surgery with autogenous bone harvested from the calvarial cranial site. (2) Patients whose treatment was completed with an implant-supported denture that had been in place for at least 6 months. (3) Patient agreement and the provision of a signed term of free and informed consent.

The exclusion criteria were the following: (1) Patients intellectually incapable of responding to the psychosocial evaluation questions about the rehabilitative treatment received. (2) Patients who did not complete the prosthetic rehabilitation.

All patients evaluated underwent bone reconstruction surgery by means of autogenous bone grafts harvested from the cranial calvarium. The surgeries were performed in a hospital environment, under

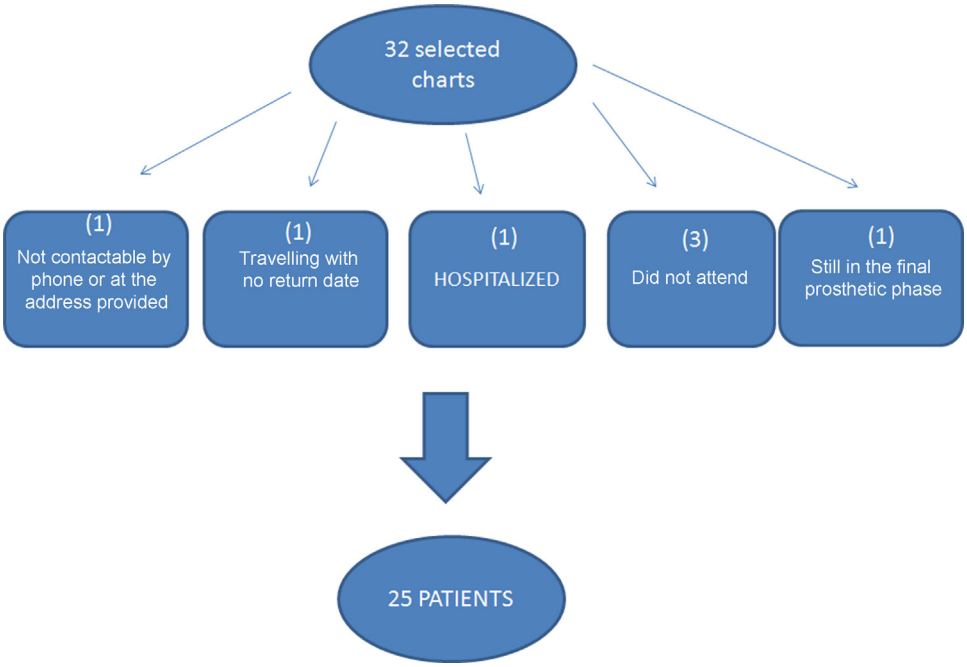

Fig. 1. Flow diagram of patient selection for this study.