ORIGINAL ARTICLE

Clinical and radiographic evaluation of new dental implant system: Results of a 3-year prospective study ☆

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Abstract *Background/purpose*: The aim of this study was to evaluate implant survival, crestal bone level changes, and clinical parameters of IDcam dental implants over a mean follow-up period of 3 years.

Materials and methods: Seventy-two patients, 32 females and 40 males, received 255 implants. Implant-supported metal—ceramic fixed restorations were inserted. Following completion of restorations, each patient was re-examined at 6-month intervals. Radiographic crestal bone level changes were calculated, as well as soft tissue parameters including pocket probing depth, bleeding on probing, plaque index, and gingival index. Examination results were recorded from 18 months to 42 months. Implant survival was estimated using the Kaplan—Meier method. Associations between implant survival and recorded variables were estimated using Cox proportional regression analysis.

Results: The Kaplan—Meier survival analysis demonstrated a cumulative survival rate of 97.6%. Three implants in three patients failed to osseointegrate at stage 2 surgery, and three implants in three patients were lost after loading. The mean marginal bone losses were 0.35 ± 0.14 mm, 0.47 ± 0.15 mm, and 0.58 ± 0.16 mm, as determined 6 months, 12 months, and 24 months after prosthetic loading, respectively. Cox proportional regression analysis revealed that the variables such as age, sex, type of the restoration, and implant region had no significant influence on implant failure ($P > 0.05$). Coefficients of correlation between implant survival and crestal bone loss, pocket probing depth, bleeding on probing, plaque index, and gingival index were found to be nonsignificant ($P > 0.05$).

Conclusion: Survival and radiographic and clinical assessments of implants after 2 years of function demonstrated promising results for an IDcam dental implant system.

Introduction

Dental implants are considered one of the most significant scientific breakthroughs in dentistry, and are frequently used in the rehabilitation of total and partial edentulism in most clinical scenarios.[1,2] Branemark et al[3] and Albrektsson et al[4] introduced and presented long-term data on the success of dental implants. They reported 90% implant survival over 10—15 years of follow up.[5,6] Since then the use of dental implants for oral rehabilitation of fully and partially edentulous patients has greatly broadened the scope of clinical dentistry, creating additional treatment options in complex cases in which functional rehabilitation was previously limited or inadequate.[1] Many different implant systems, varying in body shape, material, surface properties, diameter, length, and interface geometry, have been introduced into the dental market.[7,8] At present, far more than 100 different implant systems are avilable.[9] From the clinician's perspective, there is a consensus that long-term scientific evidence is needed to determine the predictability of such a system.

In 2009, IDcam (IDI system, Paris, France) dental implant systems were introduced into the dental market. The implant is made of two phases, Ti6Al4V Grade 4 and 5. Its state of surface is sandblasted, acid etched, and TiO_2 coated. The main features of an implant are that it is threaded, is of cylindro-tapered shape, has a morse taper implant-abutment connection, and has a concave-shaped apex design, namely, concave security osseo wedging apex (Fig. 1). The threads are V-shaped low threads and squared-shaped high threads, which act as self-drilling and condensing threads, respectively. The concave security osseo wedging apex, with its concave shape, was designed to act as a bone reservoir for bone grafting, to limit the risks of damaging the sinus membrane and nerve with its "securit" round-shaped end, and to increase the apical bone retention surface with its peripheral and wedging groove. To the best of the authors' knowledge, there is no published article relating to the predictability and versatility of this system.

The aim of this study was to evaluate the clinical and radiographic outcomes of IDcam implant systems in patients treated with implant-supported fixed full-arch prostheses (FFPs), fixed partial prostheses (FPPs), or single crowns (SCs). Study outcomes are implant survival; radiographic changes in crestal bone levels; clinical parameters of probing depth (PD), gingival index (GI), and plaque index (PI); and bleeding on probing (BOP) over a mean follow-up period of 3 years.

Materials and methods

The study was performed at the Department of Prosthodontics, Faculty of Dentistry, Gazi University. The study protocol was reviewed and approved by the Clinical Research Ethics Board of Faculty. The surgical and prosthetic treatments, and follow-up visits were performed between November 2009 and October 2013. All patients received oral and written information about the study, and those who agreed to participate gave their written consent. The patients that required treatment with implant-supported FFPs, FPPs, or SCs were selected. The following criteria were used for excluding patients from this study:

(1) Need for augmentation of the implant site
(2) Presence of persistent and unresolved infection in the implant site
(3) Having passed at least 2 months after tooth extraction
(4) Heavy smokers (>10 cigarettes/d)
(5) Uncontrolled diabetes
(6) Receiving bisphosphonate therapy at the time of implantation
(7) Active periodontal disease
(8) Severe bruxism or clenching habits
(9) Any medical history that could affect implant surgery
(10) Lost to follow up

Figure 1 Design of the IDcam implants used in the study.