



ORIGINAL ARTICLE

Long-term survival rate of implant-supported overdentures with various attachment systems: A 20-year retrospective study



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Abstract *Background/purpose:* The aim of the present study is to review the survival rate of dental implants with overdenture rehabilitation within the past 20 years.

Materials and methods: Patients ($n = 187$) treated with implant-supported overdentures from November 1993 to October 2013 were studied. Oral rehabilitations were completed and followed-up over average of 103 ± 21 months (range, 6–240 months). There were of 131 males and 56 females (mean age 64.2 years; range, 37–87 years) who received 32 dentures with 149 implants (22%) in maxillae and 161 dentures with 533 implants (78%) in mandibles. Most of the patients ($n = 136$) were routinely followed up every 6 months, for the others, information for data collection on implant survival was performed by telephone ($n = 51$).

Results: In total, 650 implants (95.3%) survived, and 32 implants (4.7%) failed. The 32 failed implants included 28 Steri-Oss implants (20.9%), one F-2 (0.8%), two Xive (1.6%), and one Nobel Biocare implant (2.3%). According to the attachment systems, eight failed implants combined with O-ring (22.9%), 11 with ball attachment (11.6%), seven with bar-clip (20.6%), one with milled-bar (0.2%), and one implant with locator (1.2%).

Conclusion: The overall survival rate of dental implants with overdenture rehabilitation was 95.3% (91.3% in maxillae vs. 96.4% in mandibles) within the past 20 years. With careful

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treatment planning, implant-supported overdenture is an interesting treatment alternative with better esthetic, retention, stability, and good hygienic maintenance for patients with severe ridge resorption.

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Introduction

Long-term prognosis and predictability of implant-supported prostheses have been well documented.^{1–6} Fully edentulous patients with severely resorbed ridges combined with unfavorable jaw relations often experience problems with their conventional prostheses, due to an impaired load-bearing capacity. Thus, patients have to change food preparation in order to accommodate their insufficient masticatory function. Implant-supported overdenture is an optional treatment for the patients who undergo moderate to severe ridge resorption, which offers better esthetics, retention, and stability of the prosthesis and also have some advantages over full arch fixed implant prostheses, such as fewer implants required and lower cost.^{7–9} However, the survival rate of implant-supported overdenture still reveals an unclear tendency. A systematic review of implants with a minimal 5 years of loading reported higher failure rates for implant-supported overdenture than fixed implant-supported prostheses.¹⁰ Besides, the attachment of an overdenture plays a very important role on both stability and retention of the prostheses. A randomized clinical trial of mandibular long-bar implant-supported overdenture showed similar patient satisfaction as with a fixed implant prostheses.¹¹ The objective of the present study is to review the survival rate of dental implants with overdenture rehabilitation combined with different attachment designs in our clinical experience in the past 20 years.

Materials and methods

The patients ($n = 187$) have been treated with implant-supported overdentures (implant, 682; denture, 193) at the Implant Center of Kaohsiung Veterans General Hospital, Taiwan from November 1993 to October 2013 were studied (Fig. 1). Oral rehabilitations were completed and followed over an average of 103 ± 21 months (range, 6–240 months).

The patients included 131 males and 56 females (mean age 64.2 years; range, 37–87 years) who received 32 dentures with 149 implants (22%) in maxilla and 161 dentures with 533 implants (78%) in mandible (Table 1). Most of the patients ($n = 136$) were routinely followed up every 6 months; for the others, information for data collection on implant survival was gathered by telephone ($n = 51$). Fifteen patients (70 implants) were excluded due to death during the follow-up period and four sleep implants were classified in the failed group. Orthopantomographic assessments were routinely carried out and cone-beam computer tomographic examinations were supplemented in severely atrophied areas in maxillae and mandibles. Nine different implant systems and six attachment systems were involved in the present study, implant system and number were: (1) Steri-Oss (Steri-Oss, Yorba Linda, California, USA), 134 implants (19.6%); (2) F-2 (FRIADENT GmbH, Mannheim, Germany); 119 implants (17.4%); (3) Xive (FRIADENT GmbH, Mannheim, Germany), 122 implants (17.9%); (4) Straumann (Straumann AG, Basel, Switzerland), 187 implants (27.4%); (5) Nobel Biocare (Nobel Biocare, Göteborg, Sweden), 44 implants (6.4%); (6) Lifecore (LifeCore Biomedical, Chaska MN, USA), 41 implants (6.0%); (7) Anthogyr (Anthogyr, Sallanches, France), 18 implants (2.6%); (8) Swiss plus (Zimmer Dental Inc, Carlsbad CA, USA), 14 implants (2.1%); and (9) 3i (BIOMET 3i, Palm Beach Gardens, FL), 3 implants (0.4%; Fig. 2). Attachment system and involved implant number were: (1) ball attachment, 95 implants (13.9%); (2) O-ring, 35 implants (5.1%); (3) bar-clip, 34 implants (5.0%); (4) milled-bar, 417 implants (61.1%); (5) magnet, nine implants (1.3%); (6) locator, 86 implants (12.6%); and (7) support, six implants (0.9%; Fig. 3). Descriptive analysis was applied to the patients, implant systems, and types of attachment. Retrograde assessment of the jaw bone with failed implants was based on an evaluation of the bone morphology according to Lekholm and Zarb.¹² An implant still in function in the oral cavity, without any clearly uncomfortable symptoms and signs (pain, mobility), was considered to have survived.

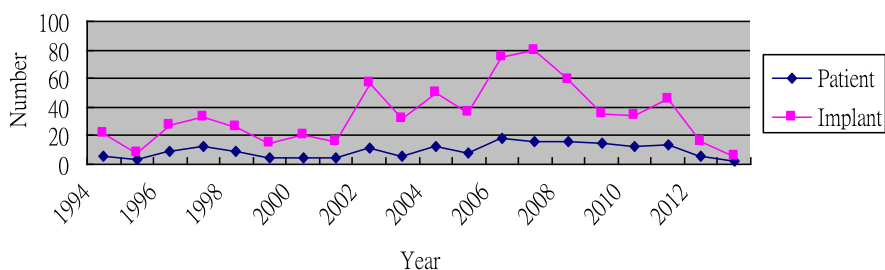


Figure 1 Distribution of patients and implant placements within the past 20 years.

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