

10-Year Survival and Success Rates of 511 Titanium Implants with a Sandblasted and Acid-Etched Surface: A Retrospective Study in 303 Partially Edentulous Patients

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Introduction

The sandblasted, large-grit, acid-etched (SLA®) surface has been scientifically well documented in many preclinical and clinical studies. The aim of this retrospective study was to assess the 10-year survival and success rates of titanium implants with this surface in a large cohort of partially edentulous patients.

Materials and methods

Records of partially edentulous patients treated with SLA® Implants at the School of Dental Medicine, University of Bern, between May 1997 and January 2001 were retrospectively evaluated. The implants were placed in single-tooth gaps, distal extension situations, and extended edentulous spaces. Eligible patients were contacted and invited to participate in the study, and informed consent was obtained. At the 10-year follow-up, information on medical conditions, smoking history, medications, complications and enrollment in a maintenance care program were collected via questionnaire, and a radiographic examination was performed. The parameters assessed were: peri-implant suppuration/fistula, modified plaque index (mPLI), modified sulcus bleeding index (mSBI), probing depth (PD), distance from implant shoulder to mucosal margin (DIM), and distance from implant shoulder to first bone-to-implant contact (DIB).

Implants were classified as successful, surviving or failed according to the success in Tab. 1:

Criteria of Success

Absence of persistent subjective complaints such as pain, foreign body sensation and/or dysesthesia
Absence of a peri-implant infection with suppuration
Absence of mobility
Absence of a continuous radiolucency around the implant

Tab. 1: Criteria of Success

Results

Of 358 patients fulfilling the inclusion criteria, 303 patients (143 male and 160 female, mean age 48 years) with 511 implants participated in the study. Most implants (54.6%) were 4.1 mm in diameter, while the remainder were 4.8 mm (42.3%) or 3.3 mm (3.1%). The majority (85.8%) were Standard implants. Around half (52.3%) were placed in the posterior mandible, with 29.5% and 16.6% in the posterior and anterior maxilla, respectively, only 1.6% were placed in the anterior mandible.

Over 10 years, six implant failures and no implant fractures were noted. Signs of suppuration, indicating acute peri-implantitis, were found at two implants and a history of acute peri-implantitis was found for another seven implants. Based on the success criteria, this retrospective study demonstrated a 10-year implant survival rate of 98.8% and a 10-year implant success rate of 97.0%, similar to those reported for 5 years^{1, 2, 3}. The classification of all implants is shown in Tab. 2.

Classification of Implants		
Classification	n	%
Implant failures	6	1.2
Surviving implants: peri-implantitis at examination	2	0.4
Surviving implants: history of peri-implantitis	7	1.4
Successful implants	496	97.0
Total	511	100
10-year implant success rate		97.0
10-year implant survival rate		98.8

Tab. 2: Classification of Implants

Mean DIM and DIB values were -0.42 ± 1.27 mm and 3.32 ± 0.73 mm, respectively; no or minimal bone loss, or bone gain was observed for 60.8% of implants, while 34.9% showed moderate bone loss and 4.4% showed progressive bone loss over the 10-year period. The mean mPLI, mSBI and PD values were 0.65 ± 0.64 , 1.32 ± 0.57 and 3.27 ± 1.06 mm, respectively.

Conclusion

- High survival (98.8%) and success (97.0%) rates were demonstrated over 10 years.
- No implant fractures were observed.
- The prevalence of peri-implantitis was low (1.8%).
- Previously published 5-year survival and success rates can be maintained over 10 years.
- No or minimal bone loss, or bone gain, was observed for the majority of implants.

References

¹ Bornstein MM, Schmid B, Belsler UC, Lussi A, Buser D. Early loading of non-submerged titanium implants with a sandblasted and acid-etched surface. 5-year results of a prospective study in partially edentulous patients. *Clin Oral Implants Res* 2005;16:631-638. ² Cochran D, Oates T, Morton D, Jones A, Buser D, Peters F. Clinical field trial examining an implant with a sand-blasted, acid-etched surface. *J Periodontol* 2007;78:974-982. ³ Cochran D, Jackson JM, Bernard JP, ten Bruggenkate CM, Buser D, Taylor TD, Weingart D, Schoolfield JD, Jones AA, Oates TW Jr. A 5-year prospective multicenter study of early loaded titanium implants with a sandblasted and acid-etched surface. *Int J Oral Maxillofac Implants* 2011;26:1324-1332.

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