

## 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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Clin Implant Dent Relat Res 2012; Epub ahead of print. doi:10.1111/j.1708-8208.2012.00456.x

### 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<sup>1, 2, 3</sup>. 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  $-0.42 \pm 1.27$  mm and  $3.32 \pm 0.73$  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  $0.65 \pm 0.64$ ,  $1.32 \pm 0.57$  and  $3.27 \pm 1.06$  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

<sup>1</sup> Bornstein MM, Schmid B, Belser 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. <sup>2</sup> 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. <sup>3</sup> 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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