



Scientific Review for Straumann® SLA® implant surface.

The Straumann SLA® surface is one of the best documented surfaces in dental implantology. Over the last 20 years more than 100 clinical and preclinical SLA® studies have been published in peer-reviewed journals including clinical studies with more than 10 years of observation time.

REDUCING HEALING TIME TO 6 WEEKS WITH HIGH CLINICAL SUCCESS

Micro-rough implant surfaces are commonly used as bone anchorage surfaces for dental implants today. These surfaces have demonstrated superior osseointegration properties compared to smooth or polished surfaces (**Buser et al. 1991**). It has been shown in many studies that the bone-to-implant contact increases significantly with a higher surface roughness (**Shalabi et al. 2006**). Optimal results are achieved in a narrow range for moderately rough surfaces with Ra/Sa values of 1.0–2.0 µm (**Wennerberg & Albrektsson 2009**). The Straumann® SLA® surface is a moderately rough surface (Sa value of about 1.5 µm) which is optimal to enhance bone-to-implant contact according to the consensus paper of **Lang & Jepsen 2009**.

Because of these enhanced osseointegration properties, the healing time from implant placement to implant loading could be reduced from 3 to 6 months of uninterrupted healing to 6 weeks until the implant can be prosthetically loaded. The following clinical studies impressively demonstrated the successful use of SLA® Implants in early loading protocols after 6 weeks:

- **Roccuzzo et al. 2008:** 100 % success rate with 53 implants in 27 patients after 5 years
- **Bornstein et al. 2005:** 99 % success rate with 100 implants in 102 patients after 5 years, crestal bone loss of less than 0.2 mm per year

- **Cochran et al. 2011:** 99 % success rate with 385 implants in 120 patients after 5 years
- **Cochran et al. 2007:** 97 % success rate with 990 implants in 590 patients after 5 years
- **Salvi et al. 2004:** 100 % survival rate with 67 implants in 27 patients after one year

LONG-TERM RELIABILITY SUPPORTED BY STRONG EVIDENCE

Fischer & Stenberg 2012 documented 10-year follow-ups of 102 implants in 23 patients. The average bone loss was 1 mm after 10 years which is far below the success criteria defined by **Albrektsson et al. 1986**. Peri-implant mucositis was reported only for one patient with a history of peri-implant disease.

Roccuzzo et al. 2013 documented the performance of 252 implants with the SLA® surface. They compared the long-term outcome (10 years) of 126 periodontally compromised patients with periodontally healthy patients. No implant was lost in the group of periodontally healthy patients. In the groups of periodontally compromised patients only 6 implants were removed due to biological complications. In 96 patients with moderate periodontitis only 3 implants were lost and the same number of implants was lost in 102 patients with severe periodontitis, leading to a survival rate of 97 % in these groups.

In a large study, **Buser et al. 2012** documented data of 511 implants placed in 303 patients. In this group of patients only 6 implants were lost; in 9 cases the patients showed signs of suppuration or had a history of peri-implant mucositis. The strict success criteria of **Buser et al. 1991** have been met for 496 implants, relating to a success rate of 97%.

In conclusion, it can be stated that the SLA® surface is one of the best documented surfaces in dental implantology. Very high implant survival and success rates of 97 % to 100 % can be reached after 5 years if the implant is loaded after 6 week or later. The high long-term survival rates of 97 % after 10 years in function impressively demonstrate the strong performance of SLA® implants over a long period of time. A chemically modified SLA® surface has been developed to further improve this excellent implant surface. This advanced surface allows even shorter healing times and helps to reach predictable treatment outcomes in challenging cases. The SLActive® surface is combining the clinical proven excellent long-term performance of the SLA® surface with a fast and reliable osseointegration process supported by the chemical modification of this well-established surface.

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