

Scientific Review for Straumann® Roxolid® SLA® Implants

MORE TREATMENT OPTIONS WITH SMALLER IMPLANTS

Roxolid® is a unique implant material combining both excellent biocompatibility and high mechanical strength. Roxolid® is a metal alloy composed of ~15% zirconium and ~85% titanium which leads to an increased mechanical resistance compared to pure titanium. A higher mechanical resistance of titanium-zirconium alloys compared to pure titanium has been reported by **Kobayashi et al. 1995**. Roxolid® Implants have an up to 40% higher fatigue strength than comparable titanium implants (Bernhard et al. 2009). In addition, it has been shown that titanium-zirconium alloys have a better biocompatibility than titanium (Ikarashi et al. 2005). Thanks to the molecular structure of Roxolid®, the well-established SLA® surface (Institute Straumann AG, Switzerland) can be created on the implant. These unique properties allow the clinician to cover more treatment options with smaller implants.

LESS INVASIVE PROCEDURES AND PRESERVING TISSUE

Today, clinicians often select the widest and longest implant for therapy. This may lead to a loss of soft and hard tissues during surgery. In addition, bone grafting procedures may be required to create sufficient bone volume around the implant. By using smaller-sized implants, biologic structures might be maintained during the surgical procedure and additional guided bone regeneration procedures may become obsolete. In the clinical study by **Benic et al. 2013**, it was shown that diameter-reduced Roxolid® Implants performed equally successful compared to Ø 4.1mm titanium implants. The study reported 100% survival and success rates for both implants after one year. This indicates that Ø 3.3mm Roxolid® Implant

can be placed in many situations where a Ø 4.1mm implant would usually be used instead. In a non-interventional study, which was performed in 40 centers in 7 countries, 603 Roxolid® Implants were placed in 357 patients (Freiberger et al. 2012). The study reported survival rates of 98% and success rates of 97% after two years. Clinicians also documented that for 54% of the placed implants a bone augmentation procedure could be avoided by using Ø 3.3mm Roxolid® Implants.

Various published clinical studies have documented the successful use of Roxolid® Implants in numerous clinical indications:

- Edentulous mandibles, 99% survival rate after one year (**Al-Nawas et al. 2012**)
- Horizontally resorbed ridges, 100% survival rate up to 19 months (**Chiapasco et al. 2012**)
- Atrophied maxilla, 100% survival rate up to 16 months (**Cordaro et al. 2013**)
- Partially edentulous patients, 95% survival rate after 2 years (**Barter et al. 2012**)
- Single-tooth replacement, 100% survival rate after one year (**Benic et al. 2013**)
- Posterior implant positions, 95% survival rate after one year (**Tolentino et al. 2013**)

INCREASE PATIENT ACCEPTANCE WITH LESS INVASIVE PROCEDURES

Every surgical intervention places a burden on the patient. Such intervention might not only lead to pain, trauma and discomfort during the healing process, but also fear and anxiety. In a survey among 20'000 patients, Prof. Riegl and partners asked patients for possible reasons why they did not take implant therapy into consideration so far. Out of the about 8000 answers of patients who could

be considered relevant for implant treatment, the majority of patients stated that they fear the cost of the treatment (36%), the surgical intervention (13%) and the duration of the therapy (5%). Since less invasive procedures can help reduce trauma, time and cost of dental implant treatment, these procedures might be ideal to increase patient acceptance.

LONG-TERM RELIABILITY SUPPORTED BY STRONG EVIDENCE

The Straumann® SLA® surface is one of the best documented surfaces in dental implantology. The superior osseointegration properties of the SLA® surface compared to machined surfaces were demonstrated first by **Buser et al. 1991** and **Cochran et al. 1996**. These studies have shown that the micro-rough SLA® surface leads to higher a bone-to-implant contact and higher removal torque values than machined surfaces (**Buser et al. 1998**).

Over the last 20 years more than 100 clinical and preclinical SLA® studies have been published in peer-reviewed journals including studies with more than 10 years of ob-

servation time. Until today, 10-year data of a total of 763 SLA® Implants placed in 452 patients have been scientifically documented and published in several clinical studies (**Fischer & Stenberg 2012**, **Buser et al. 2012**, **Rocuzzo et al. 2013**). In these long-term studies, survival rates reached 95% to 97% and even in patients with moderate or severe periodontal disease an implant survival rate of 97% was reported (**Rocuzzo et al. 2013**). To our knowledge, there is no other dental implant surface available on the market today which is supported by such extensive clinical long-term documentation.

In conclusion, it can be stated that the available evidence shows that Roxolid® Implants have a higher tensile strength than pure titanium implants and are highly biocompatible. In addition, the Straumann® SLA® surface is one of the best documented surfaces in dental implantology showing successful implant treatment outcomes over a period of 10 years. The combination of the titanium-zirconium alloy Roxolid® with the SLA® surface ensures a predictable use in many clinical indications with very high success and survival rates.

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