Straumann® SLActive®
Performance beyond imagination

High Performance
Discover the science
MORE THAN 10 YEARS OF CLINICAL SUCCESS AND PROVEN PREDICTABILITY

IMMEDIATE LOADING
High predictability in immediate loading.

COMPROMISED PATIENTS
Outstanding success in compromised patient groups.

ENHANCED BONE GRAFTING
Significantly higher formation of new bone aggregate.
More than 10 years ago, Straumann® pioneered accelerated osseointegration with the innovative hydrophilic SLActive® surface, reducing the healing period from 6–8 down to 3–4 weeks for most indications.¹ Since then SLActive® implants have made faster treatment and better outcomes a reality.¹ The extensive healing potential of SLActive® can now be seen even in severely compromised patients and with challenging treatment protocols²,¹³

Leading researchers worldwide are looking at what’s behind the outstanding clinical performance of SLActive®. As new insights emerge, recently discovered nano-structures explain why the SLActive® surface goes beyond hydrophilicity.

Discover the science of high performance.

NEW INSIGHTS INTO SLACTIVE® SURFACE PERFORMANCE

**NANO-STRUCTURES ON SLACTIVE® SURFACE**

Distinct nano-structures are present on the SLActive®, but not on the SLA® surface.²³⁴

**INCREASED SURFACE AREA**

Nano-structures increase the SLActive® surface area by more than 50%.²³

**NANO-STRUCTURES SUPPORT EARLY OSSEOINTEGRATION**

In-vitro research shows that nano-structures enhance fibrin network formation and bone cell mineralisation²³⁴.
Distinct nano-structures recently discovered on the SLActive® surface, prove for the first time, that the SLActive® surface topography differs from that of SLA®.

NANO-STRUCTURES PRESENT ON THE SLACTIVE® SURFACE

• Larger surface area in contact with bone enhances BIC*32
• SLA/SLActive® micro-roughness increases the surface area by at least 100% compared to the machined surface26
• Nano-structures increase the SLActive® surface area by more than 50%25

NANO-STRUCTURES ON SLACTIVE® INCREASE SURFACE AREA BY MORE THAN 50 %25

* BIC = Bone to implant contact

Implant surface area increase

Y-axis: 1 = 100 %

- Turned/machined Ti surface
- Roxolid® SLA®
- Roxolid® SLActive®
The latest in-vitro research suggests that hydrophilicity alone does not fully explain the accelerated osseointegration associated with the SLActive® surface properties. New data indicates that nanostructures on the SLActive® surface support fibrin network formation and mineralization, thus facilitating the early phases of osseointegration.

Indeed, SLActive® with nano-structures shows a higher level of fibrin network formation and bone cell mineralization compared to SLActive® without nano-structures (in vitro).²³,²⁴

**ENHANCED FIBRIN NETWORK FORMATION ON SLACTIVE® WITH NANO-STRUCTURES²³,²⁴**

SEM imaging of fibrin network formation on Roxolid® SLActive®. (15 min incubation with human whole blood.)*

**HIGHER BONE CELL MINERALISATION ON SLACTIVE® WITH NANO-STRUCTURES²³,²⁴**

Mineralisation of human bone cells measured after 28 days laid on top of blood incubated surfaces. Summarized Ca²⁺ concentrations at the end of culture as a function of surface.*

* Empa, Swiss Federal Laboratories for Materials Science and Technology. www.empa.ch

** Experimental surface to study the effect of nanostructures
IMMEDIATE LOADING WITH LONG-LASTING RESULTS

Ever increasing patient expectations continue to drive demand for faster, safer and more efficient treatment protocols. Immediate loading allows a patient to benefit from the restoration straightaway. However, this demanding protocol carries a higher risk of failure due to pre-mature loading of a healing implant. New long-term data from a randomized, controlled, multicenter study demonstrate the impressive performance of SLActive® with immediate loading. The SLActive® implants showed a 10-year survival rate of 98.2% in this challenging protocol.²

As new clinical data is now available, discover how you can benefit from the high performance SLActive® surface to support your patients’ healing capabilities.

Study design

**Indication**
Maxilla or mandible of partially edentulous patients; temporary restoration (single crown or 2–4 unit fixed partial denture) was replaced by permanent restoration 20 to 23 weeks post surgery.

**Randomized, controlled, multicenter study**

**64 Patients**

10 years
Study follow-up

**31**

**Immediate loading**
39 implants (restored the same day)

**Early loading**
50 implants (restored after 28–34 days)

Conclusion
SLActive® implants provide a long-term highly predictable treatment option. Crestal bone changes in immediate and early loading are comparable to those observed with conventional loading.

Implant survival rate in immediate loading, after 10 years²

98.2% survival rate

Randomized controlled multicenter study (30 patients, 39 implants)
One of the most challenging patient groups for implant treatment includes patients who have undergone a combination of tumor surgery, chemotherapy and radiotherapy. Irradiation leads to decreased bone vascularity, impaired osteoblastic activity and reduced bone vitality, which severely compromise bone quality in these patients. The fragile mucosa and the risk of osteoradionecrosis present further challenges. However, from a quality-of-life perspective, this patient group stands to benefit the most from implant-supported prosthetic rehabilitation.

SLActive® showed a 100% success rate in irradiated patients in a recent randomized clinical trial (RCT). Based on published reviews, no other implant surface has demonstrated such high success rate in this patient group within an RCT setting. Remarkably, at the 5-year follow-up none of the surviving patients had an SLActive® implant failure. The effective implant survival rate was an outstanding 100%.

**SLACTIVE® PERFORMANCE IN IRRADIATED PATIENTS**

Randomized Clinical Trial³:
- 102 implants, 20 patients
- Post-surgery, radiotherapy and chemotherapy for oral carcinoma

\[\text{1-year follow-up}^3\]

\[\text{5-year follow-up}^{13,14}\]

One patient was excluded from the study due to tumor recurrence. Therefore, the graph is based on 19 patients with 97 implants.

Excludes four additional patients who died due to cancer. Therefore, the graph is based on 15 patients with 79 implants.

** Adjusted, excluding the patients deceased due to cancer.
Uncompromised performance
Even in diabetic patients

Patients with diabetes have reduced wound-healing capacity,\textsuperscript{15,16} putting dental implants at risk, particularly if the patient is unaware of the condition. Worldwide, 1 in 11 adults has diabetes, while among adults 60 years of age and older, the prevalence is twice as high.\textsuperscript{17}

Over the past 30 years, the number of people with diabetes in the US has quadrupled and, according to the U.S. Centers for Disease Control and Prevention, the figure could increase to as many as one in every three adults by 2050. In an estimated 50\% of people with type 2 diabetes, the disease remains undiagnosed.\textsuperscript{17}
The placement of implants in smokers is often associated with high failure rates, risk of post-operative infections, and marginal bone loss.\textsuperscript{29}

**HIGH PREDICTABILITY IN SMOKERS:**

A recent clinical study comparing SLActive\textsuperscript{®} performance in smokers and non-smoker patient groups reported excellent outcomes with SLActive\textsuperscript{®}:

- Roxolid\textsuperscript{®} SLActive\textsuperscript{®} narrow diameter implants showed 100\% survival rate in the smokers group after 6 months
- No difference in marginal bone loss (MBL) between smokers and non-smokers

**NEW IN-VITRO RESEARCH SHOWS THAT ROXOLID SLACTIVE\textsuperscript{®} SURFACE STIMULATES AN EARLY ANTI-INFLAMMATORY CELL RESPONSE\textsuperscript{20}**

- SLActive\textsuperscript{®} surface stimulates an early anti-inflammatory cell response compared to non SLActive\textsuperscript{®} surfaces as measured in vitro as a reduction in pro inflammatory markers* and an increase in anti-inflammatory** markers.\textsuperscript{31}
- SLActive\textsuperscript{®} is associated with an increased anti-inflammatory macrophage response in the early healing phase in both healthy and diabetic animals. This may be an important mechanism to improve osseous healing under compromised systemic conditions.\textsuperscript{21}

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* IL1b, IL6, Tnfa, IL1beta, IL-6, TNF-alpha (pro-inflammatory)
** Adjusted, excluding the patients deceased due to cancer mortality

Give a rising prevalence of type 2 diabetes – how can clinicians address the risk, particularly in older patients?

**GROWING CLINICAL EVIDENCE OF HIGHLY PREDICTABLE PERFORMANCE OF SLACTIVE\textsuperscript{®} IN DIABETIC PATIENTS:**

A new clinical study\textsuperscript{19} that compared SLActive\textsuperscript{®} performance in patients with and without diabetes showed uncompromised performance of SLActive\textsuperscript{®} implants:

- 100\% implant success rate in the diabetic group after 2 years
- Bone changes similar to those in healthy individuals

**PERFORMANCE IN SMOKER PATIENT GROUP\textsuperscript{30}**

- 100\% survival rate

**PERFORMANCE IN DIABETIC PATIENT GROUP\textsuperscript{19,31}**

- 100\% success rate
Enhanced bone regeneration
Even at compromised sites

Bone defects can greatly compromise the predictability of osseointegration. In a recent preclinical study, SLActive® was associated with significantly higher formation of new bone aggregate within eight weeks compared to the standard Straumann® SLA® hydrophobic surface.

BONE AGGREGATE FORMATION AT 8 WEEKS

Histological views of bone aggregate (new bone and grafting material) 8 weeks post-grafting.
Outstanding clinical performance even in compromised patients

Please contact your local sales representative to get more information about the advantages of the SLActive® surface now or visit www.straumann.com
REFERENCES


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6. International Headquarters

7. Institut Straumann AG

8. Peter Merian-Weg 12

9. CH-4002 Basel, Switzerland

10. Phone +41 (0) 61 965 11 11

11. Fax +41 (0) 61 965 11 01

12. www.straumann.com

13. Straumann distributes both its own regenerative products and those of botiss biomaterials GmbH in selected countries under the name "Botiss biomaterials®". Please contact your Straumann local partner for product availability and more information.

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