

Backgrounder: „Roxolid™“ – a new high performing material

At the European Association for Osseointegration meeting in September 2008 in Warsaw, Straumann presented a new groundbreaking high performance material for implants. The new material is a combination of titanium and zirconium and has been given the name ‘Roxolid’ to convey its combined characteristics of strength and osseointegration.

In addition, Straumann has created an eye-catching visual (see illustration below), incorporating a dynamic schematic DNA helix to express the notion of biocompatibility and the combination of natural elements to create something unique. The helix itself has a clear visual association with the threads of the implant.



Visual branding element for Roxolid

Stronger than pure titanium

Roxolid is considerably stronger than pure titanium¹, the current material of choice for implants.

Pure titanium is well known for its biological compatibility with the human body and its resistance to corrosion. The discovery of bone integration with titanium (osseointegration) opened the way for its use in orthopaedic surgery and subsequently in implant dentistry. However, the mechanical properties are limited for small diameter implants, which are needed for narrow spaces. This prompted the use of alternative materials, such as titanium alloys (e.g. Ti-6Al-4V, ‘TAV’). Unfortunately, additional strength for these alloys came at the price of osseointegration due to surface characteristics².

According to published research², titanium and zirconium are the only two metals commonly used in implantology that do not inhibit the growth of osteoblasts, the bone forming cells that are

¹ Based on internal specifications and ASTM F67

² Wong M. et al. J. Biomed Mater Res 1995;29:1567-1575 and Wong M. et al. J. Biomed Mater Res 1995; 29:1567-1575



essential for osseointegration. In addition to this attribute, Roxolid can be combined with Straumann's third-generation SLActive surface technology, unlike other alloys such as TAV, which cannot accommodate the sophisticated microstructuring processes required.

The combination of strength and osseointegration

The combination of enhanced strength and osseointegration could open the door for a new generation of smaller implants, which would be particularly advantageous in situations where there is limited space between teeth. A further potential advantage could be the use in thin bone (narrow bone ridge), where wider implants would necessitate bone augmentation/grafting procedures.

Roxolid has now obtained regulatory clearance in the US

Recently Roxolid obtained regulatory clearance in the US. Roxolid implants are expected to become available in initial markets in the course of 2009.

A new level of osseointegration indicated

Preclinical results presented in Warsaw indicate that Roxolid may enhanced osseointegration beyond the current SLActive gold standard. In a preclinical study, titanium-SLActive implants were compared with Roxolid-SLActive equivalents at 4 weeks after placement. Histomorphometry revealed significantly more bone growth around the Roxolid implant. The removal torque values for the new material were significantly higher, leading to the conclusion that Roxolid improved osseointegration performance.³

Initial results from large clinical program

In a prospective pilot clinical trial, which is still ongoing, small diameter (3.3mm) Roxolid implants were placed in 22 patients. Preliminary data (6-12 months) were presented at the EAO in September 2008, showing very promising survival rates. This is the first of a number of clinical studies evaluating the new material. A multicenter double-blind randomized study is underway in 8 European centers with 88 patients and the planning phase of a non-interventional study involving more than 300 patients in Europe and North America has been completed.

In the future, safe, high strength, small diameter implants with enhanced osseointegration properties are expected to offer a number of advantages to dental professionals and patients. These include enhanced esthetics and the possibility of avoiding bone graft/augmentation procedures in patients with narrow bone ridges, which in turn will translate into simpler and less traumatic treatments.

³ Gottlow J et al. Preclinical data presented at the 23rd Annual meeting of the Academy of Osseointegration (AO), Boston, February 2008, and at the 17th Annual Scientific Meeting of the European Association for Osseointegration (EAO), Warsaw, September 2008