

# [Roxolid: A Better Material for Dental Implants?](#)

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Any thoughts on Straumann's Roxolid implants?

At the European Association for Osseointegration (EAO) Straumann presented a new material, Roxolid, that the company says may make dental implants smaller and stronger. Roxolid™, is an alloy of titanium and zirconium. According to published research<sup>1</sup>, 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 essential for osseointegration. Interestingly, preclinical study results presented at the meeting showed that Roxolid integrated with bone better than pure titanium<sup>2</sup>. According to Straumann:

“The combination of enhanced strength and osseointegration could open the door for a new generation of smaller, safer 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.”

An additional finding presented at the EAO was the observation that Roxolid enhanced osseointegration beyond Straumann's 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.”

Straumann says that 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.

1 Steinemann S. *Periodontol* 2000 1998;17:7-21

2 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

## 6 Responses to “Roxolid: A Better Material for Dental Implants?”

- Dr. Morales September 24th, 2008

I'm looking forward to testing it

- JRB September 24th, 2008

My thoughts on this are pretty skeptical...#1 reason: We all know (or should know) that zirconia cracks under lower stress elements than does titanium...with that being said...this article is proving one thing and one thing only...it osseointegrates much faster...which is GREAT, however I don't care how well it is osseointegrated, because my thought is once it is restored to function then the stress levels of occlusion, sheer, and tension (and any other elements of stress) could put microscopic cracks in the zirconia which would then lower the strength of the implant...hence eventually opening the doorways up for failure.

I think the concept is great however it needs a lot and I mean a lot of testing and LONG term results...short term might prove to be the best thing since sliced bread, however if you know anything about science and how zirconia and titanium work together then this should answer this question...”MAY MAKE DENTAL IMPLANTS SMALLER AND STRONGER” - What is the biggest word in this statement...would you build a golf club driver head with titanium and zirconia...the stress of impact would crack the zirconia and distort the titanium...2 different metals that react 2 different ways under stress...

I know that is a high stress scenario, however it proves my point on how different they are under stress levels.

Again I am excited to see more literature, however I don't want to read only on how it osseointegrates faster and better than any other implant...I want studies to show the full spectrum...

These companies how us so fixated on focusing on one thing, that we tend to forget about the full picture....great for osseointegration but not great for long term function.

- Peter Fairbairn September 24th, 2008

Did not know Zirconia would improve osseointegration as unlike Titanium it is not a semi-conductor. This although interesting may be not that valuable in real practice when improved grafting techniques would offer better long term benefits. SLA can have another meaning..

- JW September 25th, 2008

At the EAO I talked to a Straumann sales rep who admitted that the increase in strength is comparable with TiAl6V4. Titanium Alloy is safely used since the eighties in implant dentistry and many big manufacturers started to use it more and more, for example even 3i uses it today. Why present a solution which isn't science based yet, as a big innovation... The risks JRB describes have to be taken in consideration and these will probably not be revealed in the first years of function. So long term research should be conducted first.

- Darick Nordstrom September 26th, 2008

Amazing that research found that bone will integrate with PEEK plastic better than Zr. Unfortunately, it won't hold up to dental stress either, but hopefully the research and innovation will continue, and who knows but that an out-of-the-box approach will positively transform some aspect of craniofacial implantology.

Even though it is complicated by choices and an overwhelming info base, this is an amazing age to be living in.

- [Gerald Niznick](#) September 28th, 2008

I was at the EAO and saw a demonstration at Straumann's booth of bending of a bar of the Roxolid material compared to pure titanium. They even let me test it by pulling on what looked like a fish scale to see how much force it took to bend two bars, one of pure titanium and the other of the Titanium Zirconium alloy. Yes it was a little stiffer. I was later told that when someone else did this test, the bar of Roxolid snapped and the technician conducting the marketing demonstration quickly put the pieces out of sight. Adding an element to titanium to provide greater stiffness with less modulus of elasticity could result in fractures over time of small diameter implants. Many companies sell small diameter implants (3.0mm-3.5mm) and only the NobelReplace 3.5 has a well known history of fractures... but that is because the size of the tri-lobe results in walls that are only 0.009" thick. When you use an internal hex, it is closer to being round and therefore the walls can be kept thicker even with small diameter implants. Straumann has become the new Nobel with products and research developed for marketing to justify "premium" pricing. As for faster osseointegration, let them

compare it to HA coated implants and see what is faster. What does it matter if an osteoblast attaches to the metal in 3 weeks or 4 weeks when you can immediate load the implant relying only on the initial stability for success? More important is to use a tapered implant inserted into an undersized socket to increase stability in soft bone so that you can immediate load more often. Another important issue that Straumann overlooks is the surface area of thread engagement. Their implant uses shallow threads, widely spaced, minimizing load carrying capabilities. Straumann has introduced Roxolid to solve a problem that was already solved by switching from pure titanium to titanium 6Al/4V medical grade titanium alloy 27 years ago with the first Core-Vent Implant. The Micro-Vent 3.3mmD implant was launched in 1987 and 3i has been selling a 3.2mmD implant for about 17 years without fracture being a problem because they were both alloy. Straumann made such a big story about their using only pure titanium that when they now need something stronger, they had to switch to a new material rather than be seen as copying what has been around for 20 years.