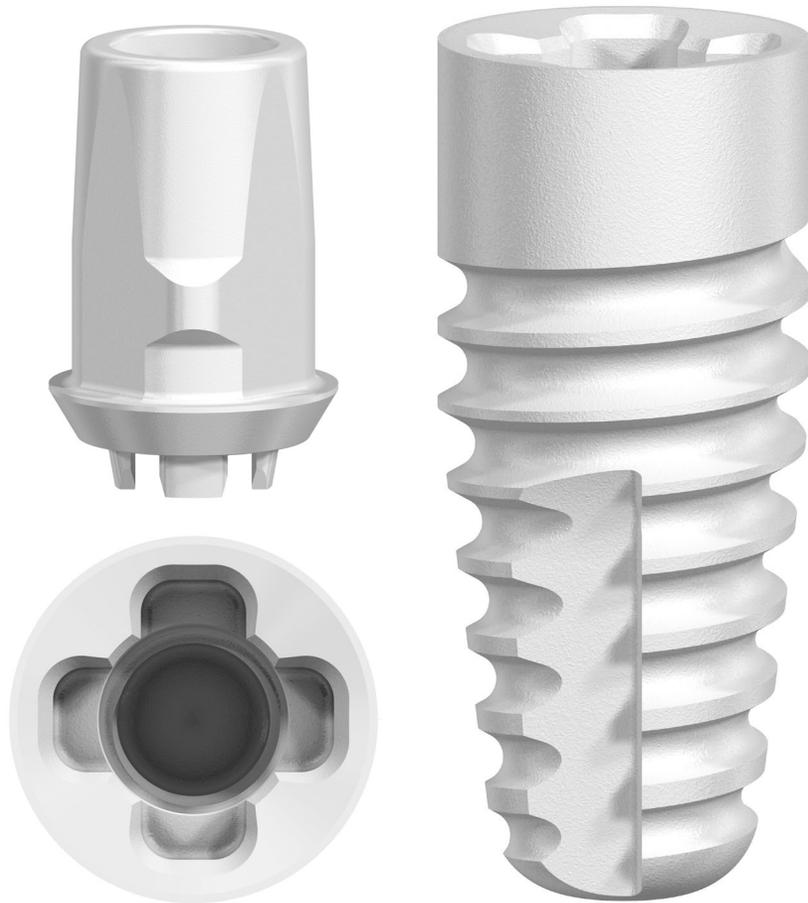


# **NobelPearl™**

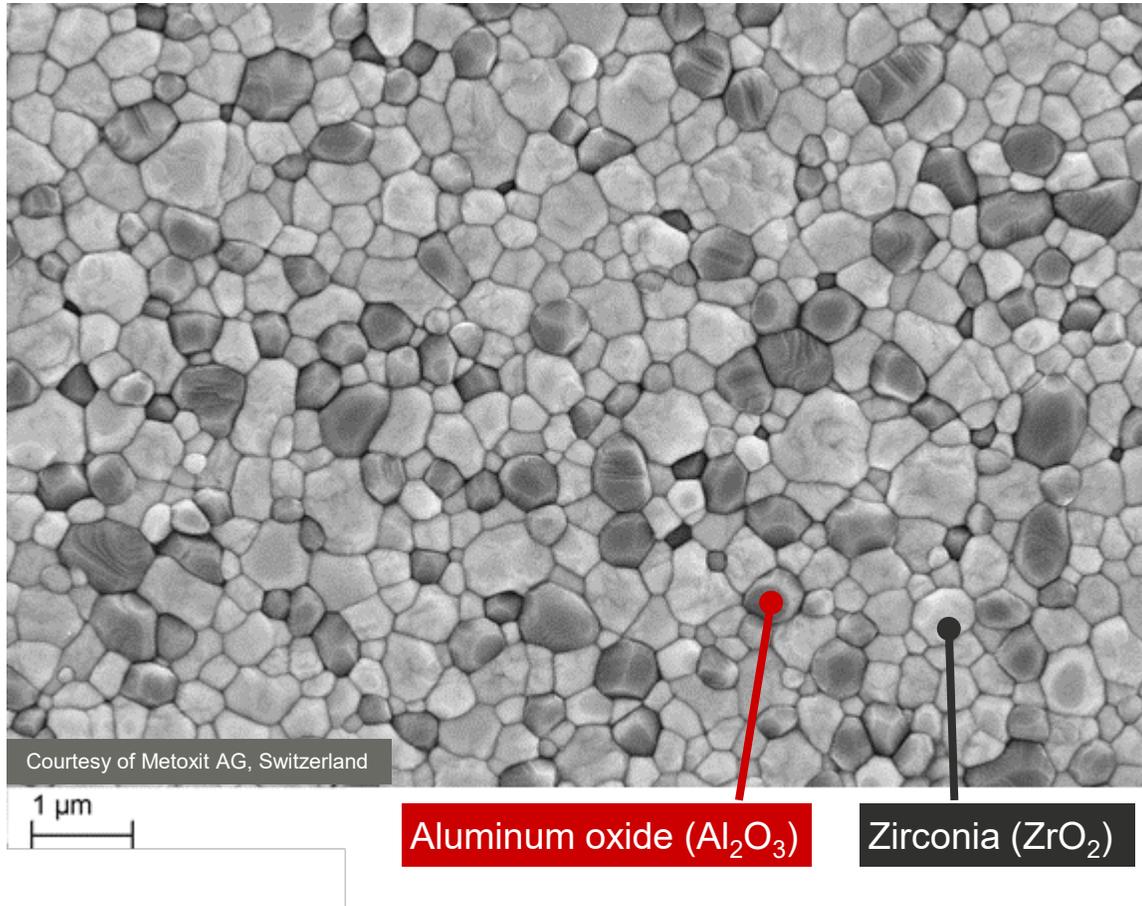
**Scientific evidence**

# Engineered for primary stability and available for a broad range of indications



- The thread design and tapered implant shape of NobelPearl, combined with the tapered drill protocol, are designed to achieve high primary stability.<sup>1</sup>
- The reservoir for bone chips at the apex of the implant is designed to facilitate implant insertion.<sup>1</sup>
- Thanks to its two-piece, screw-retained, cement-free internal connection design, NobelPearl offers greater restorative flexibility compared with one-piece or cemented ceramic implants.<sup>1</sup>

# Milled from strong zirconia



- NobelPearl implants and abutments are made of alumina-toughened zirconia (ATZ)
- ATZ is a hybrid ceramic comprising alumina added to tetragonal zirconia polycrystals (TZP).
- ATZ shows improved hardness, bending strength, and toughness versus TZP.<sup>1,2</sup>
- Hydrothermal aging has no negative effect on the fracture resistance of ATZ.<sup>1,3</sup>

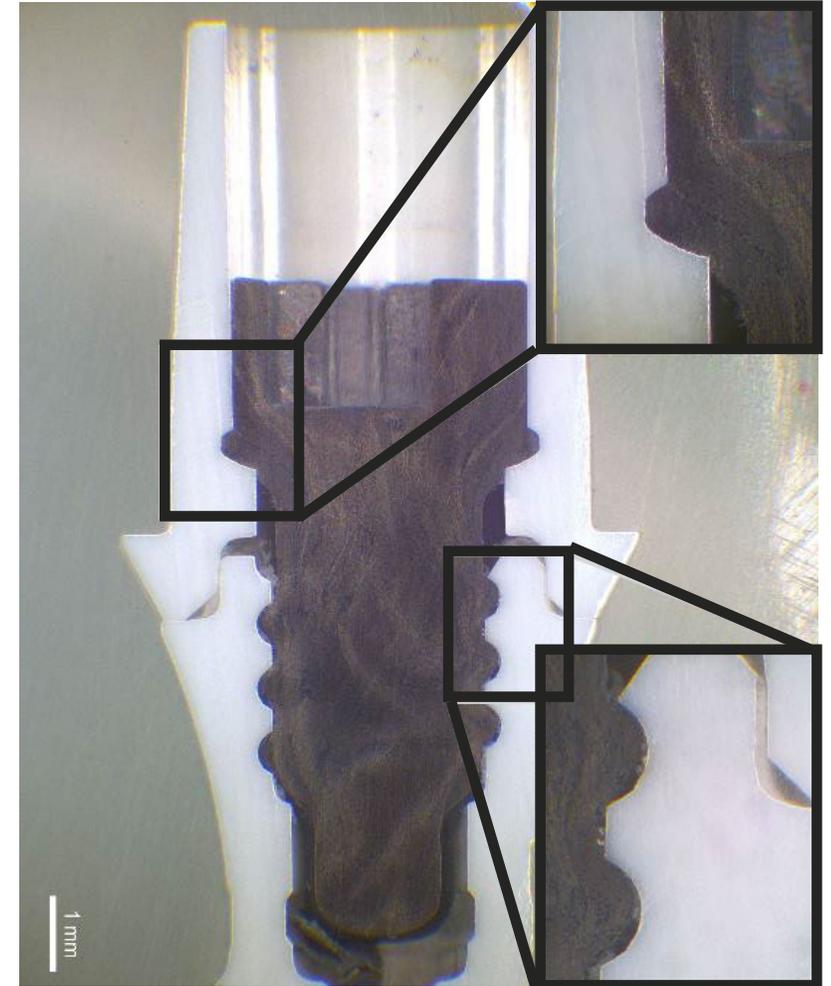
# Precision manufacturing



- NobelPearl implants and abutments are milled from strong hot isostatic-pressed ATZ blanks.<sup>1</sup>
- No thermal process (sintering) or finishing takes place after the final milling of the external and internal implant geometry.<sup>1</sup>
- This manufacturing method enables a high level of dimensional precision and accuracy.<sup>1</sup>

# High-performance, 100% metal-free screw

- The innovative, metal-free VICARBO® screw is made of carbon fiber-reinforced polymer and designed for a strong ceramic-to-ceramic connection.<sup>1</sup>
- It is biocompatible as well as compatible with MRI and X-ray imaging.<sup>1</sup>
- The threads of the screw are round on their flanks and distribute forces evenly within the implant body.<sup>2</sup>
- With an internal connection designed for ceramic implants, the risk of peri-implantitis due to intraoral cementation is minimized.<sup>3</sup>



1. Nobel Biocare. Data on file.  
2. Tartsch J. ZMK 2018;11(34):750-760. [Read online](#)  
3. Wilson TG Jr. J Periodontol 2009;80(9):1388-1392. [Read online](#)

# Proven osseointegration

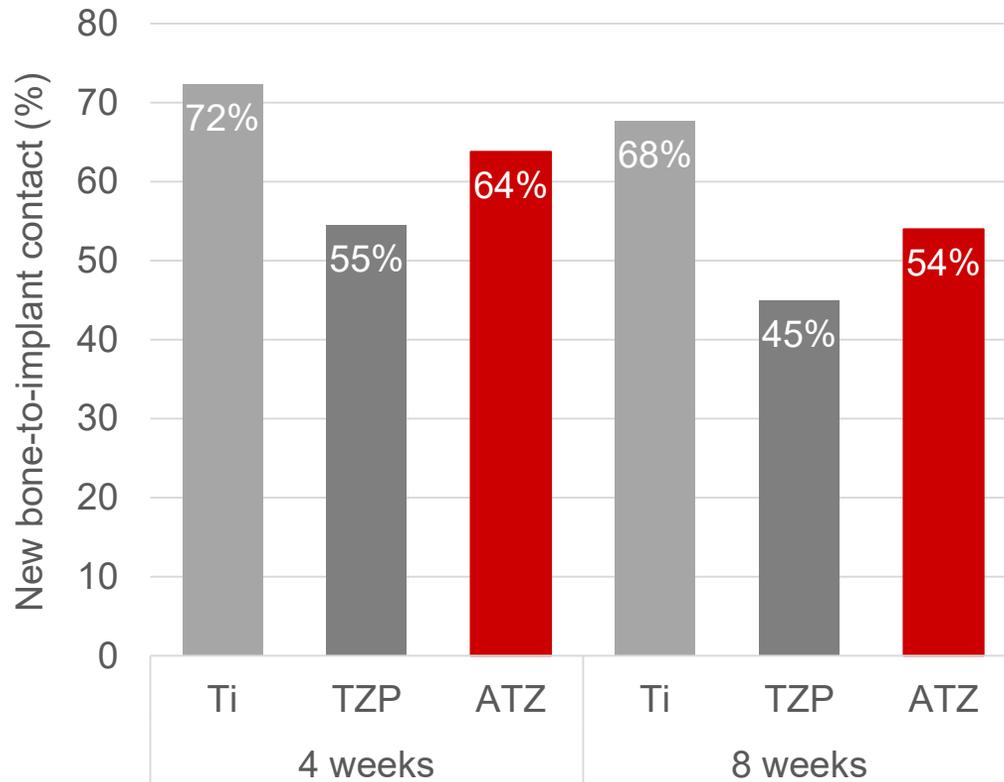


Courtesy of Dr. Gahlert, Germany

Orthopantomogram 3 months after insertion of NobelPearl implant.<sup>3</sup>

- No differences in osseointegration of zirconia compared to titanium implants with sandblasted and acid-etched surface (meta-analysis of animal studies).<sup>1</sup>
- Zirconia accelerates and promotes the adhesion and proliferation of osteoblasts (*in vitro*).<sup>2</sup>

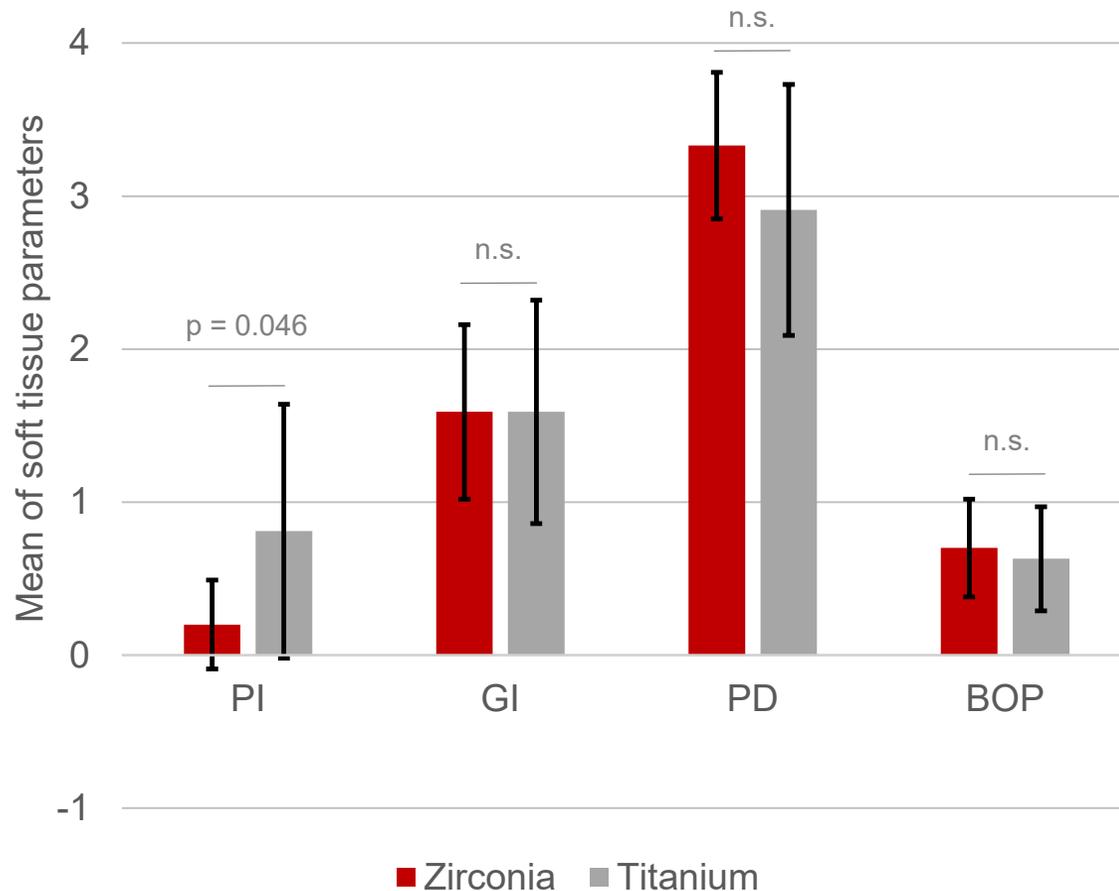
# Proven osseointegration



Histomorphometric results for TZP and ATZ compared with titanium.

- In an animal study comparing ATZ and TZP with titanium, all implants showed:
  - Good osseointegration
  - High bone crest levels
  - Stability over time
- **New bone-to-implant contact values were significantly higher for ATZ at 4 and 8 weeks compared with TZP ( $p < 0.001$ ).**
- **No inflammatory cell infiltrates or fibrous encapsulations seen for any implants.**

# A soft-tissue friendly solution



n.s. = not significant

1. Cionca N, et al. Clin Oral Investig 2016;20(8):2285-2291. [Read online](#)
2. Kajiwara N, et al. Implant Dent 2015;24(1):37-41. [Read online](#)
3. Linares et al. J Clin Periodontol 2016;43(6):538-546. [Read online](#)

- **Significantly lower mean plaque index (PI) at zirconia vs titanium implants.<sup>1</sup>**
- **No significant differences between zirconia and titanium implants, regarding:**
  - Mean gingival index (GI)
  - Mean probing depth (PD)
  - Mean bleeding on probing (BOP).<sup>1</sup>
- **Similar blood flow in peri-implant mucosa around zirconia and natural teeth.<sup>2</sup>**
- **Higher grade of collagenization around the zirconia implants for potentially better soft-tissue sealing compared to titanium, shown pre-clinically.<sup>3</sup>**

# Natural esthetics

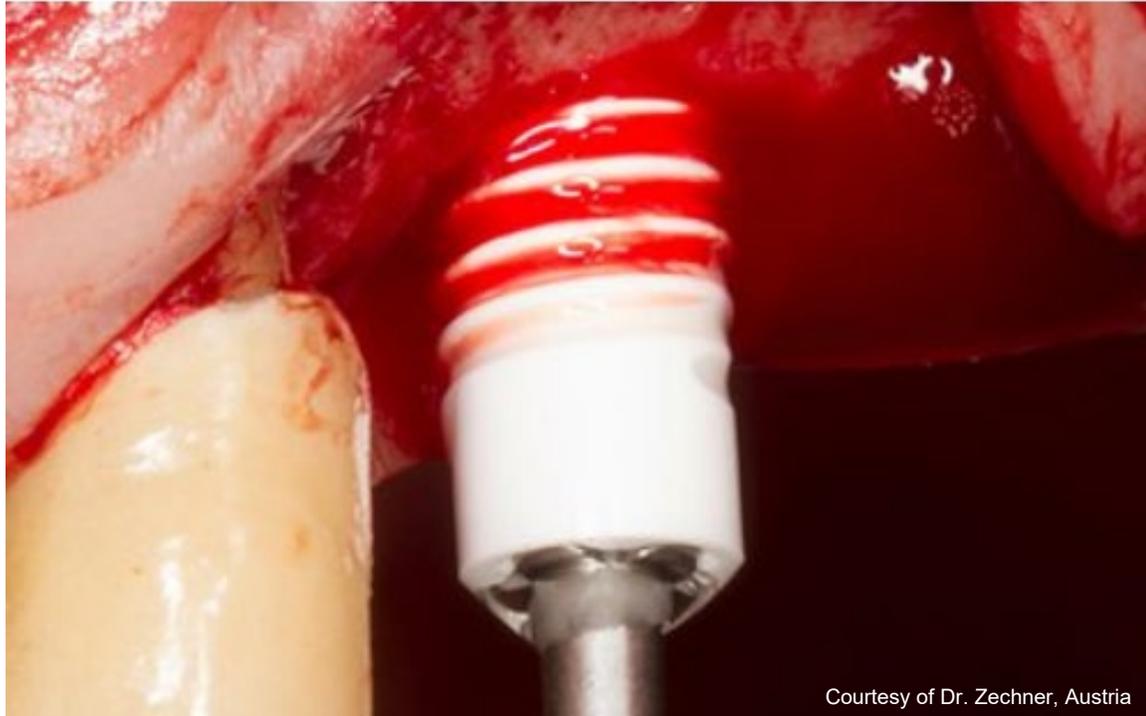


- Zirconia is white and therefore beneficial for patients with a thin mucosa biotype.<sup>1</sup>
- Zirconia implants lead to less mucosal discoloration than titanium.<sup>2</sup>
- Zirconia exhibits lower plaque accumulation<sup>3</sup> and bacterial adhesion<sup>4,5</sup> than titanium *in vivo*.
- Zirconia exhibits lower biofilm affinity than titanium *in vitro*.<sup>6</sup>

1. Cosgarea R, et al. Clin Oral Implants Res 2015;26(5):537-544. [Read online](#)  
2. Thoma DS, et al. Int J Periodontics Restorative Dent 2016;36(1):39-45. [Read online](#)  
3. Cionca N, et al. Clin Oral Investig 2016;20(8):2285-2291. [Read online](#)

4. Scarano A, et al. J Periodontol 2004;75(2):292-296. [Read online](#)  
5. Rimondini L, et al. Int J Oral Maxillofac Implants 2002;17(6):793-798. [Read online](#)  
6. Roehling S, et al. J Periodontol 2017;88(3):298-307. [Read online](#)

# Proven ZERAFIL™ surface



- The ZERAFIL™ implant surface of NobelPearl has been modified by sandblasting and acid-etching.
- This hydrophilic surface, combined with a partially machined collar, is proven to osseointegrate.<sup>1-2</sup>
- ZERAFIL™ has been designed for excellent soft-tissue attachment and a low inflammatory response.<sup>3-4</sup>

# Highly esthetic outcomes observed in clinical experience



- **Patients may explicitly request metal-free implants and restorations.<sup>1</sup>**
- **Up to 6 months post-surgery, the peri-implant bone condition was stable without evidence of soft-tissue irritation.<sup>1-2</sup>**

Intraoral image and radiography of restored tooth (FDI 25) 6 months after loading.

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- Wilson TG Jr. The positive relationship between excess cement and peri-implant disease: a prospective clinical endoscopic study. J Periodontol 2009;80(9):1388-1392. [Read on PubMed](#)

# Further reading and resources



- Dena Hashim: Recent development in ceramic implants overcoming the limitations of one piece implants. [Watch video on FOR website](#)
- Stefan Holst: Metal-free implants for high-end esthetics. [Watch video on FOR website](#)
- Stefan Holst: Ceramic implants come of age. [Read on Nobel Biocare blog](#)

