



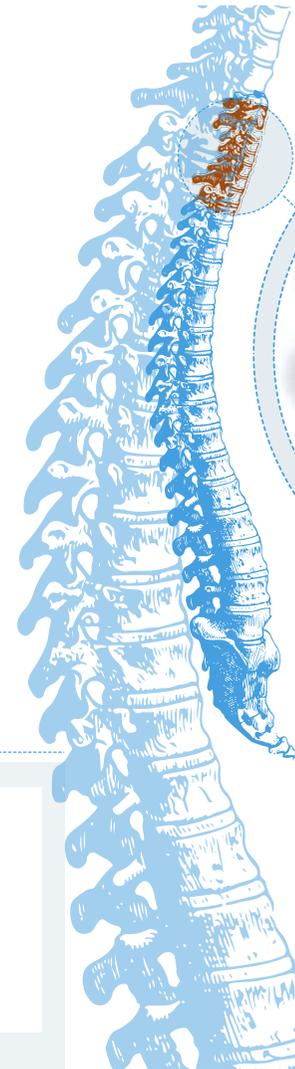
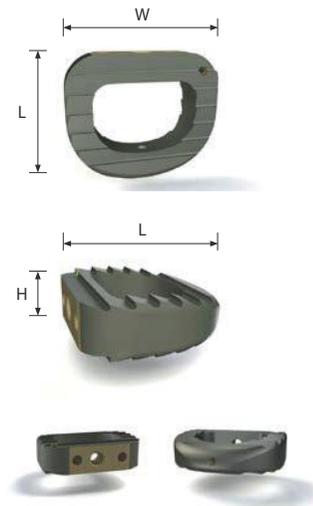
TSC ACIF DOMED

Biomimetic Cervical Cage system



To accommodate the various anatomical ranges, the TSC ACIF Domed cage is available in a wide variety of heights and endplate footprints

- SMALL**
 - Length (mm): 13
 - Width (mm): 14,5
 - Height (mm): 4 (03.500) - 5 (03.501) - 6 (03.502) - 7 (03.503) - 8 (03.504) - 9 (03.505) - 10 (03.506)
- MEDIUM**
 - Length (mm): 15
 - Width (mm): 17
 - Height (mm): 4 (03.507) - 5 (03.508) - 6 (03.509) - 7 (03.510) - 8 (03.511) - 9 (03.512) - 10 (03.513)
- LARGE**
 - Length (mm): 15
 - Width (mm): 19
 - Height (mm): 5 (03.519) - 6 (03.514) - 7 (03.515) - 8 (03.516) - 9 (03.517) - 10 (03.518)



TSC ACIF DOMED

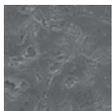
Biomimetic Cervical Cage system



MACRO PHASE
 From pure PEEK material to functionalized implants
 Starting from pure PEEK optima material, Orthobion produces the shape, height and footprint size of each TSC ACIF Domed implant.



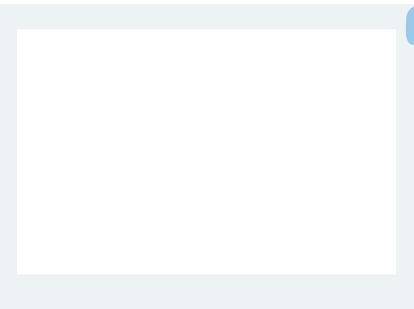
MICRO PHASE
 Engineered Topography
 A unique (engineered) topography is carved out with exact parameters that result in a cell attractive surface topography with increased micro-roughness, which enables cells to spread over, form stable aggregates (cell-clusters) and strongly adhere to the surface as this topography provides optimal anchorage for contact osteogenesis.

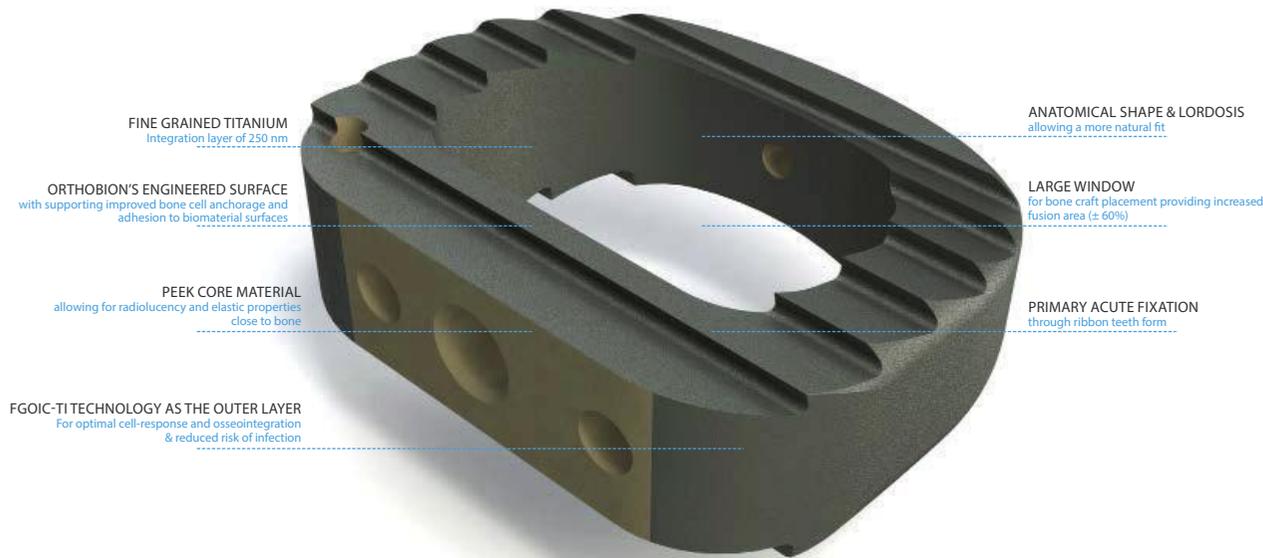


NANO PHASE
 Modified Surface
 A unique high-energy, low-temperature, Vapor deposition technique, of Titanium atoms is applied. The integrative layer of less than 300 nanometers (1000 times thinner than existing plasma spray coating techniques) makes the TSC ACIF Domed into a new kind of Titanium-PEEK composite (FGOIC[®] + PEEK).

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FINE GRAINED TITANIUM
Integration layer of 250 nm

ANATOMICAL SHAPE & LORDOSIS
allowing a more natural fit

ORTHOBION'S ENGINEERED SURFACE
with supporting improved bone cell anchorage and adhesion to biomaterial surfaces

LARGE WINDOW
for bone graft placement providing increased fusion area ($\pm 60\%$)

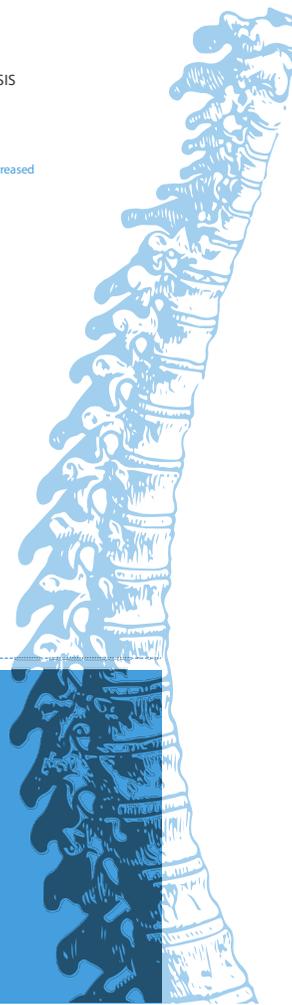
PEEK CORE MATERIAL
allowing for radiolucency and elastic properties close to bone

PRIMARY ACUTE FIXATION
through ribbon teeth form

FGOIC-TI TECHNOLOGY AS THE OUTER LAYER
For optimal cell-response and osseointegration & reduced risk of infection

TSC ACIF DOMED

Biomimetic Cervical Cage system



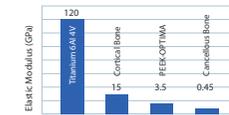
The process of osseointegration involves a complex chain of physiological events, from protein adsorption at the implant's surface to site infiltration and biological recognition by mesenchymal stem-cells and osteoblasts, leading to bone deposition and mineralization by those cells at the surface, creating a bonding process between bone and implant (BIC). All these events are directly and indirectly affected by the surface of the implant.

Orthobion, therefore, used PEEK optima material as a core material for all the advantages:

- Radiolucency
- Mechanical properties of TSC ACIF Domed close to both cancellous bone and cortical bone



Comparison of x-Ray transparency
From left to right: Uncoated PEEK, FGOIC-Ti (TSC ACIF Domed) PEEK, Plasma Spray Coated PEEK (PSC PEEK). In comparison it is apparent that PSC coating eliminates the X-ray transparency of the PEEK material. By contrast, both the FGOIC-Ti PEEK and the uncoated PEEK minimally affect the X-ray transparency.

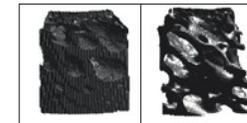


- Load sharing capabilities between bone and implant
- Chemical resistance – stability

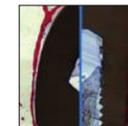
At the same time, all the cell-growth promoting advantages of Titanium (6Al 4V) were added:

- Biocompatibility
- Osseo-integration capability*
- Amorphous structures
- Hydrophilic characteristics
- Wettability

With this ideal blend, Orthobion was able to combine both PEEK and Titanium for all the advantages, yet eliminating all its disadvantages, into award-winning technology.



Left: strong and densely formed new bone growing on the foundation of the FGOI/Ti coating on the implant
Right: weaker and more porous newly formed bone in the "uncoated" PEEK control group.



Bone – Implant – Contact:
Fibrous tissue interface that limits bone contact with PEEK (left image), while FGOIC-Ti material allows direct Bone-Implant-Contact (right image)

This blend has a desired effect on bone growth and early bone-formation, all made possible by the improved integrations of the implants. These integrations go through 3 phases of bone growth:

1. **Osteoinduction:** Pluripotent cells are stimulated to develop into bone cells
2. **Osteoconduction:** The ongoing growth of those bone cells on the implant's surface
3. **Osteointegration:** The firm attachment of bone cells onto the implant

ENGINEERED TOPOGRAPHY WITH FGOIC-TI TECHNOLOGY

The TSC ACIF Domed cage, is designed with a unique FGOIC-Ti technology (Fine Grained Osseo-Integrative Coating of Titanium). FGOIC-Ti is a unique surface technology that forms the perfect blend of PEEK and Titanium.

By tailoring the properties of the biomaterial's surface with micro- and nano-structures, Orthobion was able to engineer a biomimetic imprint, where the interaction between the biomaterial and the bio-environment were optimized, causing for a desired behavior from both cells and proteins, in bone formation needs.

Orthobion developed a high energy, low-temperature Titanium vapor deposition Nano-coating, where the PEEK material receives all the desired effects of a Titanium implant, without any disadvantages

