

Aesculap[®] T-Space[®] Titanium / PEEK

Transforaminal Lumbar Interbody Fusion System



Aesculap Spine

Aesculap® T-Space®



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Foreword

The high incidence of spinal disorders and consecutive symptoms calls for optimized diagnostics and therapies.

Minimally invasive surgical procedures, being generally cost-efficient, significantly less invasive with fewer complications, and producing better outcomes, are of particular interest.

Minimally invasive spine surgery relies on various retractor systems to create small ventral and dorsal access channels to the spine, innovative implants reduce tissue trauma and novel percutaneous procedures.

The obvious approach is using combinations of different methods. Accordingly, the innovative S⁴ Spinal System, the Spine Classics retractor system and the T-Space cage for intercorporeal fusion form an excellent treatment concept.

In this way, minimally invasive mono- and bisegmental fusion surgeries at the lumbar spine can be successfully performed after a relatively short learning curve.

Spine Classics



S⁴ Spinal System



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B

T-Space – PEEK

The material used is biocompatible PEEK-Optima®, which was introduced by Invibio in 1999. PEEK stands for PolyEtherEther-Ketone. PEEK-Optima® polymer comply with ISO10993-1, USP Class VI and ASTM F2026 for use as a medical implant material.

The use of PEEK-Optima® as an orthopedic device material enjoys increased popularity in recent years due to the material's unique combination of characteristics.

It's properties include radiolucency, high mechanical strength, biocompatibility and compatibility with standard sterilization methods.

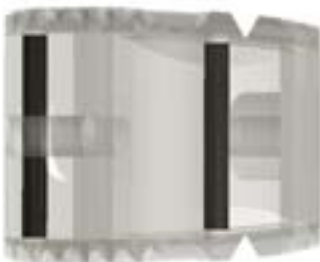
The intrinsic radioscopic transparency of the material on X-rays and CT scans makes it possible to view bone growth adjacent to the implant. This allows quick and simple assessment of the bone structure and progress towards bone fusion. To verify the position of our PEEK implants on radioscopic images, we have enclosed non-radiolucent tantalum marker which serve as location marker.

Of particular interest is the modulus of elasticity of PEEK-Optima® of 3.6 GPa, which is similar to that of cortical bone. This specific stiffness encourages load sharing between implant material and natural bone, thereby stimulating bone healing activity. The material provides excellent strength and rigidity.

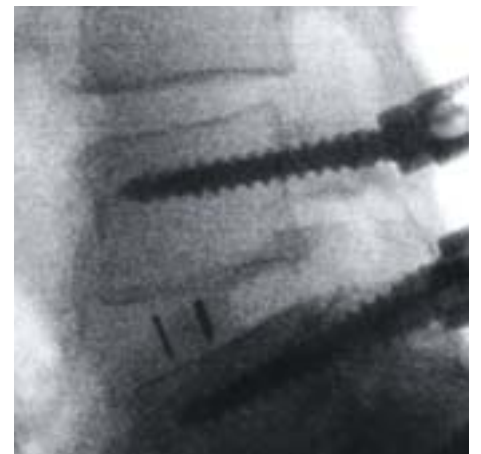
PEEK-Optima® also exhibits high fatigue resistance and low wear factor.

Extensive investigations into the biocompatibility of PEEK-Optima® have proven that the material is suitable for the use as a long-term implant.

Lateral view



AP view



T-Space – Titanium

The heart of this implant is a solid titanium alloy core (Ti6AL4V / ISO5832-3).

The core is mantled with the proven Plasmapore coating to increase the area of contact between implant and endplate.

Plasmapore is a pure titanium coating (Ti / ISO5832-2) which offers an optimal foundation for the ingrowth of bone due to its balanced relationship between pore depth, porosity and roughness.

Using a special manufacturing procedure, the raw material is sprayed with pure titanium powder.

Molten titanium particles settle on the core of the implant where they cool rapidly, building a firm form-lock between coating and core.

In this way, each layer of the coating is built up and a suitable surface for bone ingrowth is created.

Aim of the Plasmapore coating:

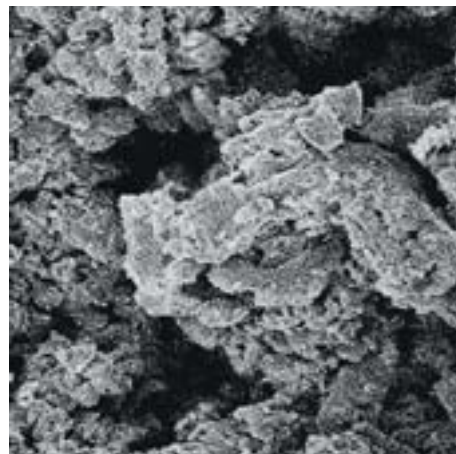
Primary stability

- The increased surface roughness of the Plasmapore coating together with a posterior fixation device, e.g. S⁴ Spinal System, ensures immediate stability of the motion segment.

Secondary stability

- Bone growth into the coating emerges within a short period due to the different features of Plasmapore. Bone fusion between vertebrae and implant is achieved in this way.

The coating concept, which has been proven as a result of many years of use in the field of hip prosthetics, has now become a new standard in spinal surgery.



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C

Implant features – T-Space PEEK



Position verification despite X-ray transparency



- PEEK-Optima® allows quick and simple assessment of the bone structure and progress towards bone fusion
- Rod style marker for easy and accurate implant positioning and localization

Intelligent implant design



- Anatomical shape and serrated profile for an accurate implant fit and high primary stability
- Optimized ratio between contact area and opening
- Restoration of the natural lordosis in all levels for the spinal balance
- Adequate selection of sizes presenting the right implant to fit the patient

Thought-out instruments

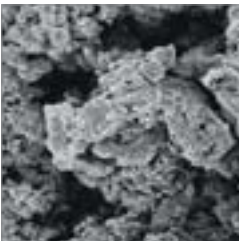


- Simple in handling
- Reliable
- Reduced and clearly arranged

Implant features – T-Space Titanium



Plasmapore coating: rapid and safe osteointegration



- High primary stability due to a rough surface
- High secondary stability due to a fast migration of bone cells into the Plasmapore structure

Intelligent implant design



- Anatomical shape and serrated profile for an accurate implant fit and high primary stability
- Uniform load sharing on a large contact area
- Restoration of the natural lordosis in all levels for the spinal balance
- Adequate selection of sizes presenting the right implant to fit the patient

Thought-out instruments



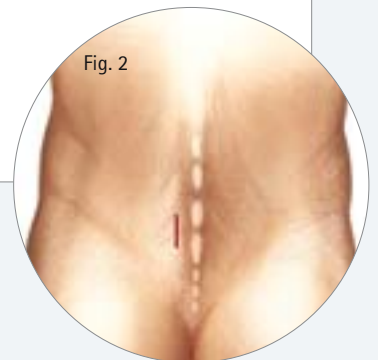
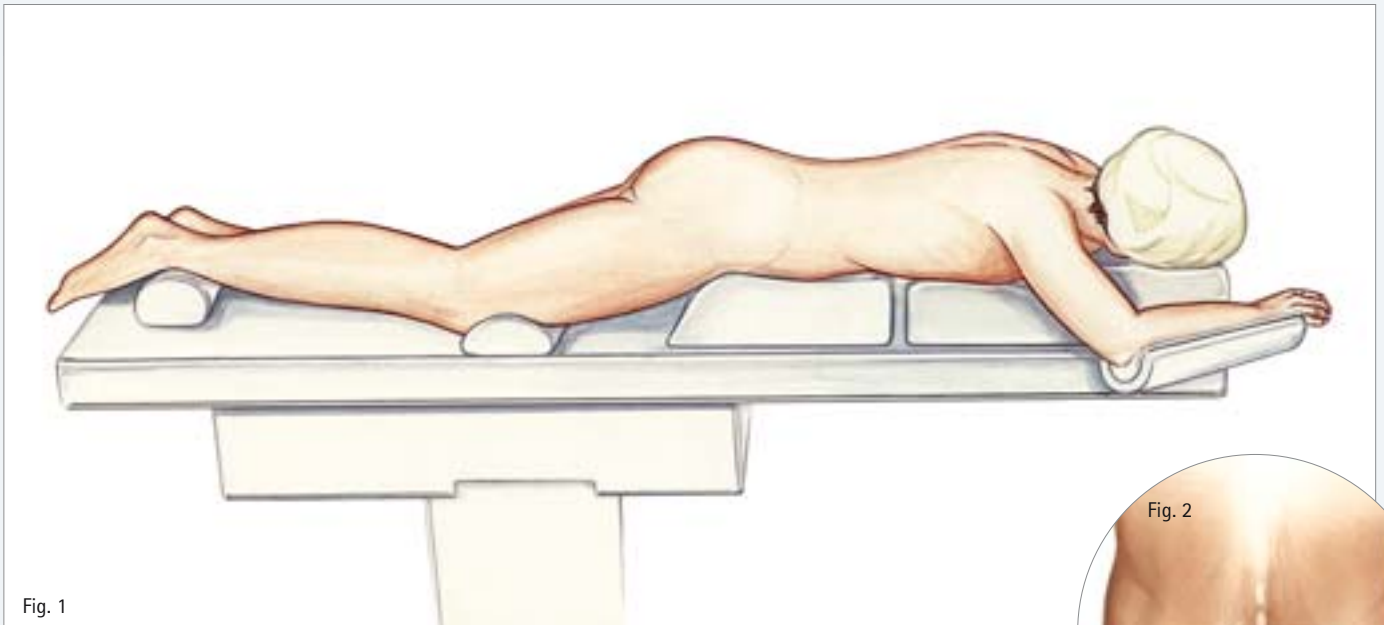
- Simple in handling
- Reliable
- Reduced and clearly arranged

Aesculap® T-Space®

Surgical Technique

D



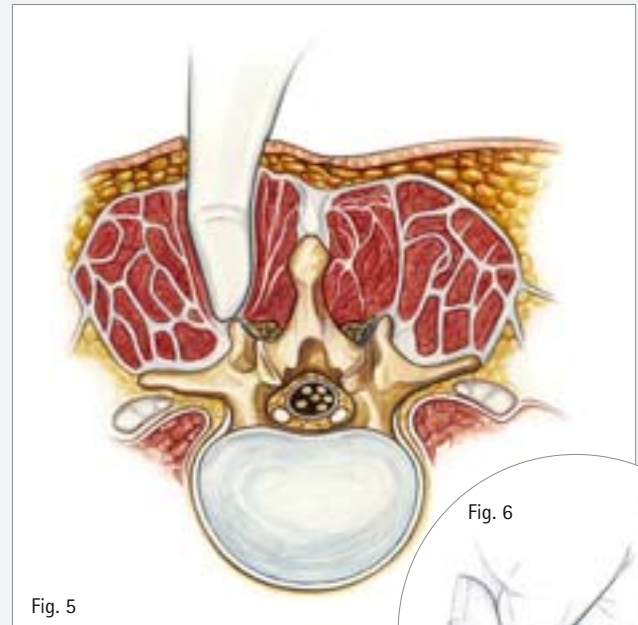
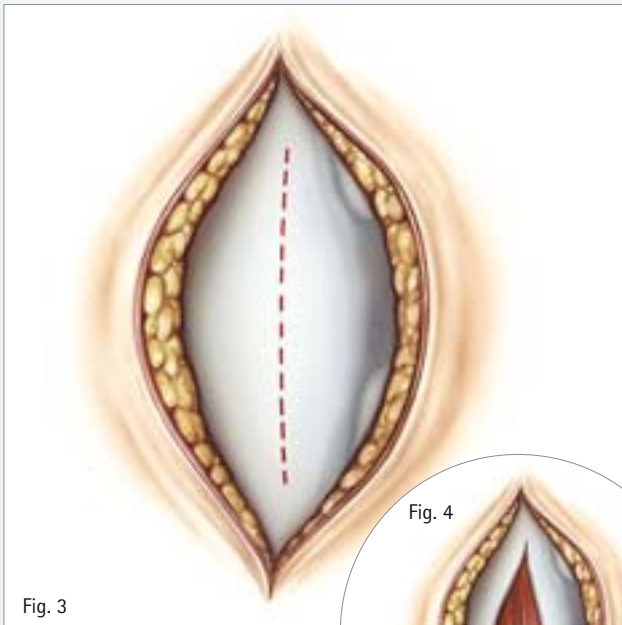


Positioning of the patient and incision marking (Fig. 1-2)

- A minimally invasive approach requires the patient to be placed on a radiolucent table which allows for AP views of the various anatomic structures.
- The appropriate position of the longitudinal incision (4-5 cm in length) is determined by using a C-arm. The intended skin incision is marked paraspinally on the right respectively on the left side.

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Surgical Technique



Fascial incision (Fig. 3-4)

- A slightly arcuate fascial incision 1.5 cm from the midline is performed. This allows a firm hold of the speculum and counter retractor, facilitating the exposure of the individual segment.

Exposure and blunt dissection of the paraspinal muscles (Fig. 5-6)

- After splitting of the thoracolumbar fascia a blunt dissection of the paraspinal muscles is performed with the fingertip. In accordance with the palpatory finding, a correction of the skin incision is still possible, as the muscle retractor should be introduced as vertically as possible and in the direction of the interlaminar space. The length of the retractor is selected by using the index finger.



- *Spine Classics retractor system*
- ▶ *Brochure O11402*

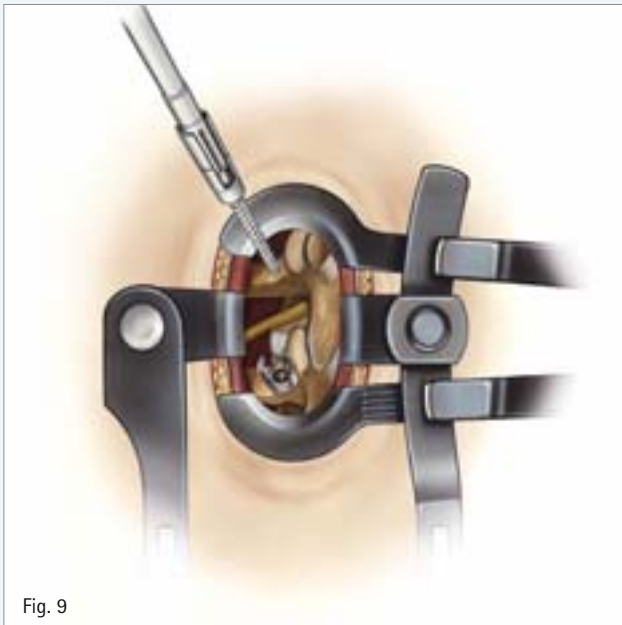


Introduction of the Spine Classics retractor system (Fig. 7-8)

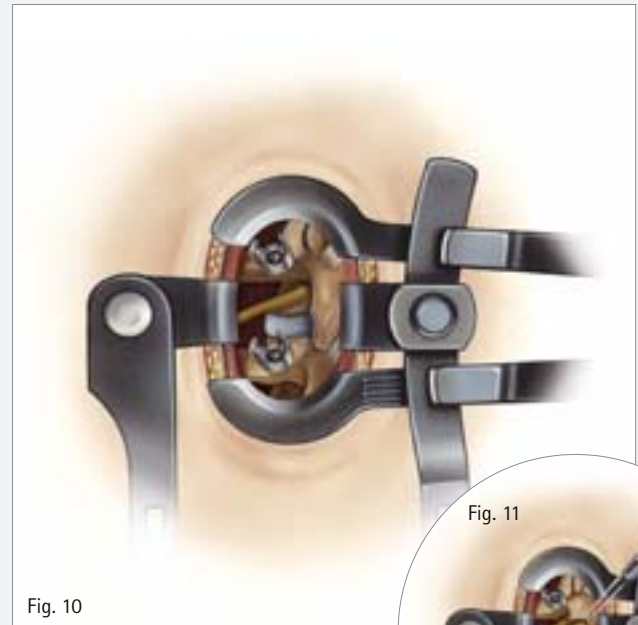
- The muscle retractor is introduced with closed blades and with the handle in the longitudinal direction of the body. It is then turned 90° with the handle towards the assistant and afterwards expanded.

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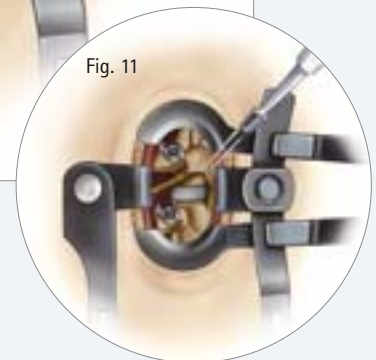
Surgical Technique



- *S⁴ Spinal System*
- ▶ *Surgical technique 026702*



- *Osteotome FJ658R*



Insertion of S⁴ screws (Fig. 9)

- Using the standard technique the S⁴ Spinal System pedicle screws are inserted.

Removal of facet joint (Fig. 10–11)

- A complete unilateral facetectomy should be considered on the side targeted for the implant insertion. The inferior articular process of the facet joint is resected first, then the subjacent superior articular process is resected.

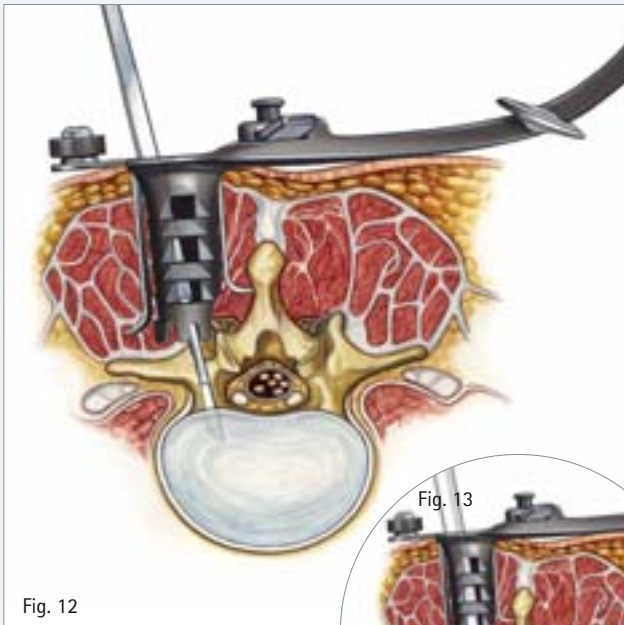


Fig. 12

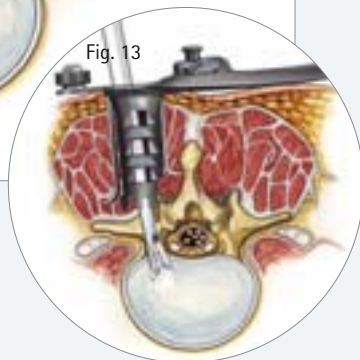


Fig. 13

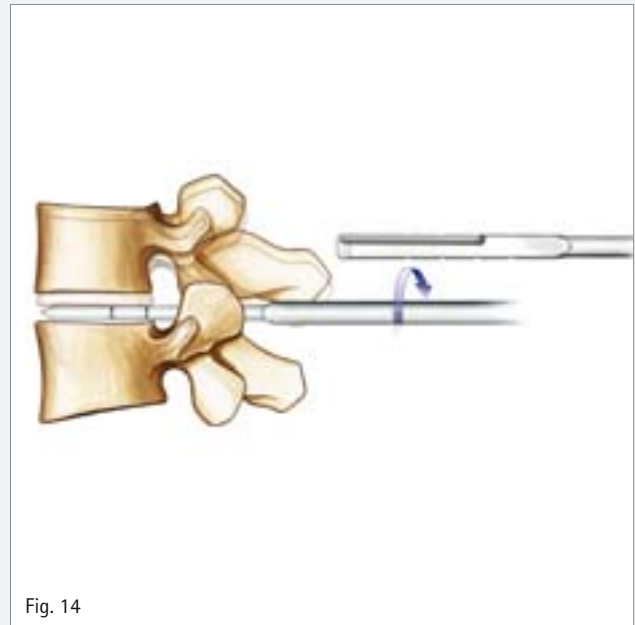


Fig. 14

- *T-Handle FJ646R*
- *Distractors FJ647R-FJ657R*

Opening of the disc and removal of disc material (Fig. 12-13)

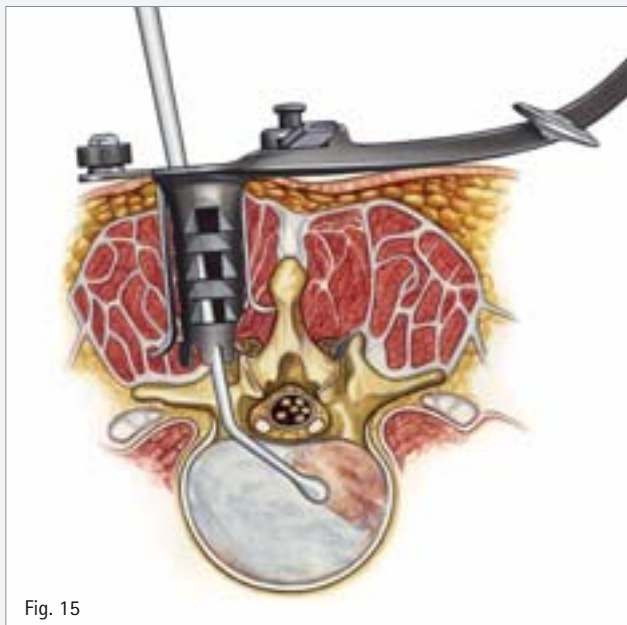
- To open the disc a small window is cut into the annulus.
- Rongeurs are used to remove the opened annulus.
- Posterior osteophytes are removed by using Kerrisons.

Restoration of disc height (Fig. 14)

- The desired restoration of the natural disc height can be set using the distractors. They are available in heights from 7-17 mm in 2 mm increments.
- The distractor must be inserted horizontally and then rotated. Rotating clockwise the distractors are blunt. A special designed sharp rim allows removal of disc material. If so, the distractor has to be rotated counterclockwise.

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Surgical Technique



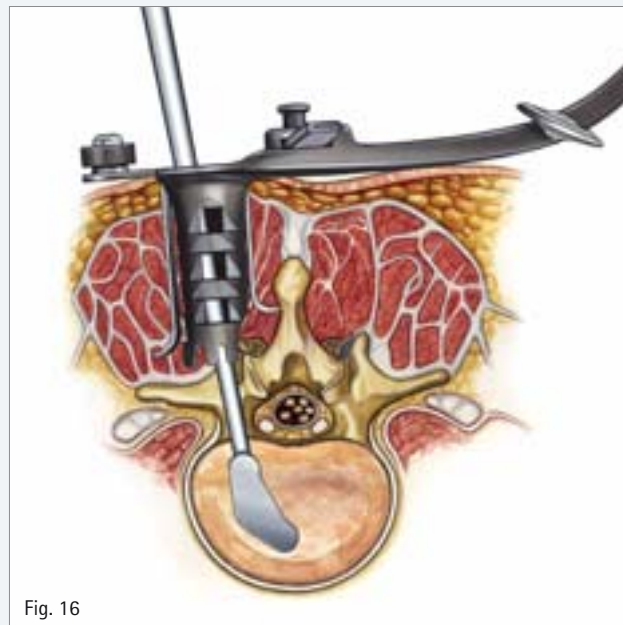
- Bone curettes, angled FJ679R-FJ680R or FJ698R-FJ699R
- Rectangular curette, straight FJ681R
- Rectangular curettes, angled FJ682R-FJ683R or FJ702R-FJ703R
- Bone rasps, angled FJ685R-FJ686R or FJ704R-FJ705R

Cleaning of the intervertebral space (Fig. 15)

- The disc space is cleared using rongeurs, bone curettes and rectangular curettes.
- The bone rasps are used to refresh the cartilaginous endplates. Alternatively the rectangular curettes can be used.

Note:

Excessive preparation of the endplates may weaken the construct and cause subsidence of the interbody device.



- Slap hammer FJ666R
- Trial implants FJ667R-FJ677R or FJ619R-FJ629R

Determination of implant size using trial implants (Fig. 16)

- The trial implants are available in heights from 7-17 mm in 2 mm increments.
- Using the slap hammer the desired trial implant is inserted.

Note:

The trial implants are essential to ensure the correct implant size to be used.

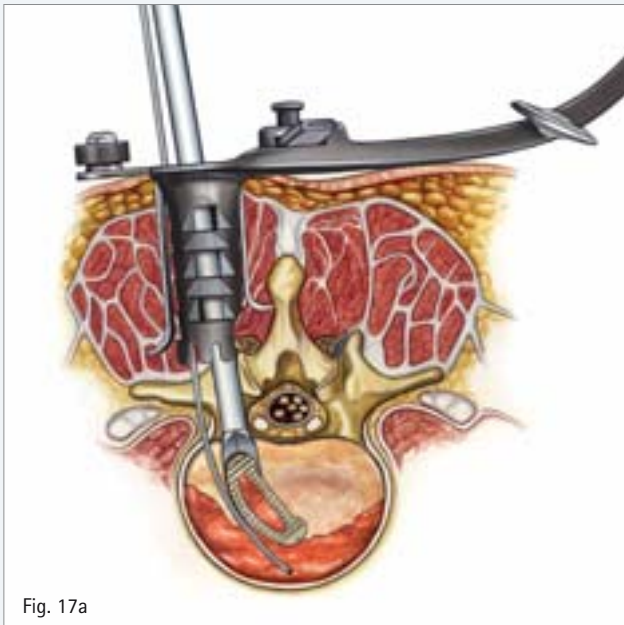


Fig. 17a

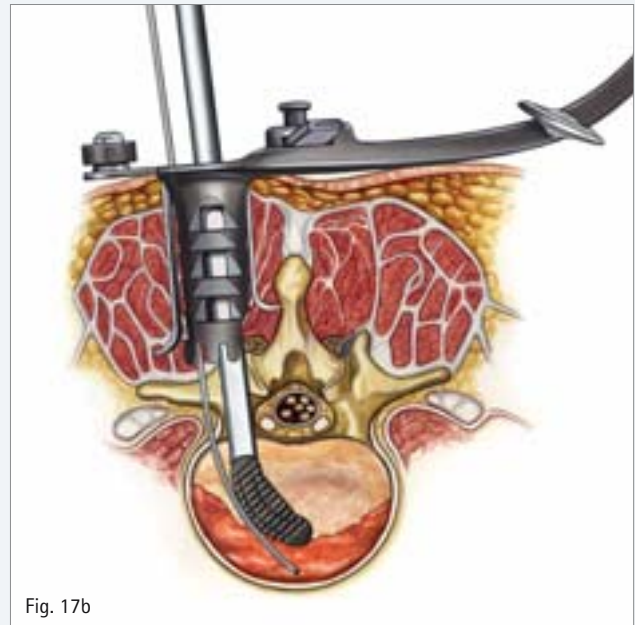


Fig. 17b

- Packing block FJ664R
- Punch FF913R
- T-Space PEEK inserter FJ660R
- Insertion guide FJ661R

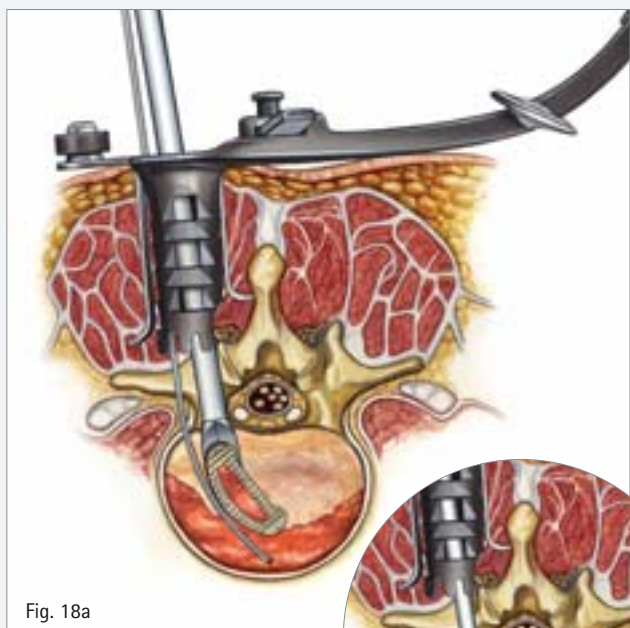
- T-Space Ti inserter FJ700R or FJ701R

Implant insertion (Fig. 17 a-b)

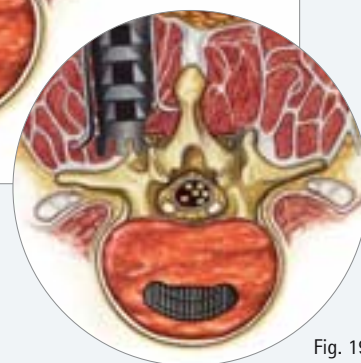
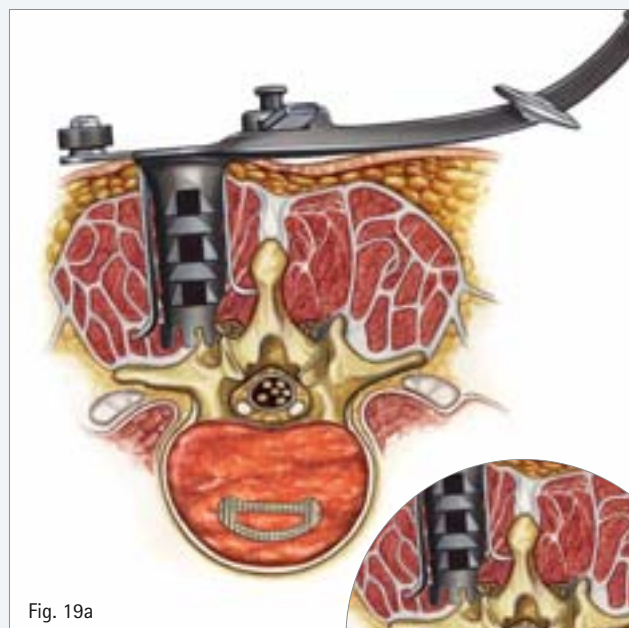
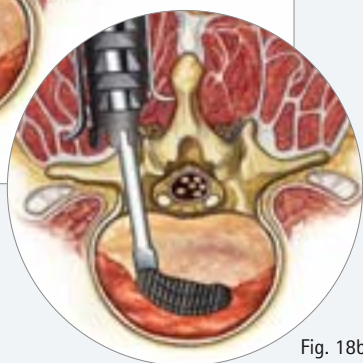
- The T-Space PEEK implant should be filled with bone or bone substitutes by using the packing block.
- It is recommended to place bone graft in the anterior part.
- The insertion guide allows a safe implantation of the T-Space implant.
- Partially the T-Space implant is inserted into the disc space using the implant inserter.
- The T-Space PEEK inserter has a clamp mechanism while the T-Space Titanium inserter has a screw joint.

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Surgical Technique



- *Impactor straight FJ662R*
- *Impactor angled FJ663R*



Final implant positioning (Fig. 18 a-b and Fig. 19 a-b)

- Using the impactor the implant is rotated 90° to achieve the final positioning.
- X-ray control.
- It is recommended to put bone material harvested from the facet joint around the T-Space implant.

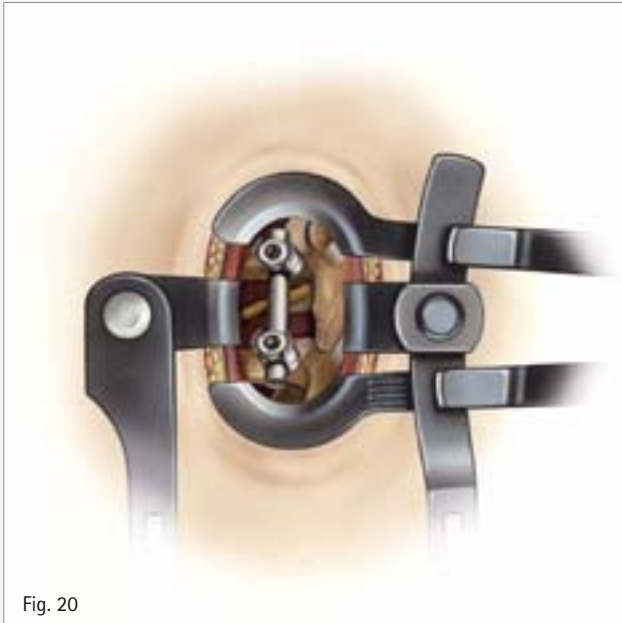


Fig. 20

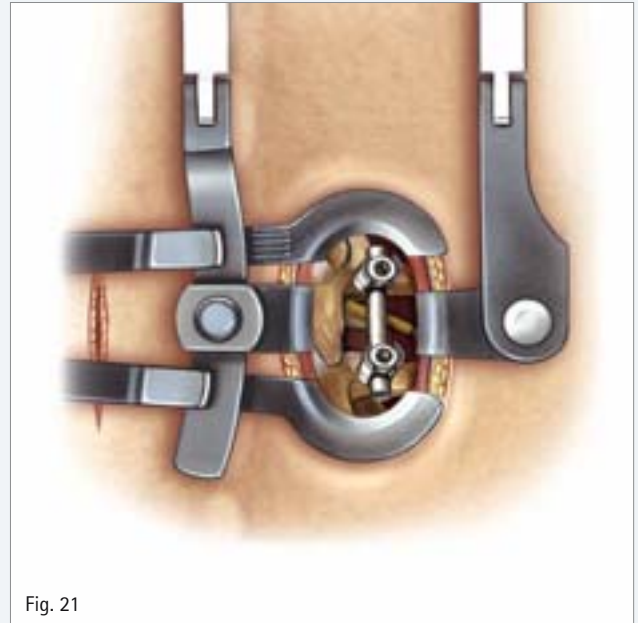


Fig. 21

- *S⁴ Spinal System*
- ▶ *Surgical technique O26702*

Application of rod and set screw (Fig. 20)

- Final assembly of the S⁴ Spinal System.
- Compression is applied to the pedicle screws to support the contact area between the T-Space implant and the endplates.
- Final tightening of the S⁴ pedicle screws and removal of the tabs.

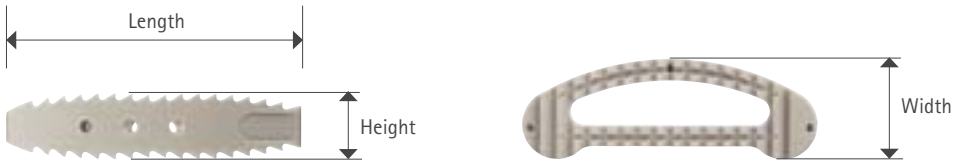
S⁴ screw positioning on the contra-lateral side (Fig. 21)

- S⁴ Spinal System is applied on the contra-lateral side.

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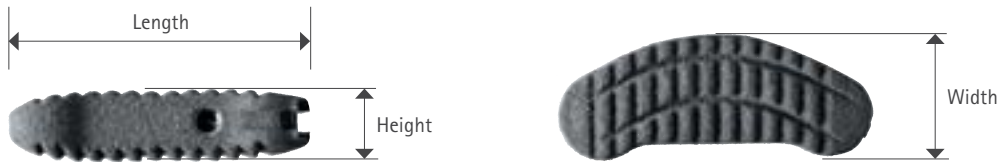
E₁

Ordering Information – Implants – T-Space PEEK



Art. no.	Description	Height	Width	Length	Angle
FJ687P	T-Space PEEK	7 mm	11 mm	26 mm	5°
FJ689P	T-Space PEEK	9 mm	11 mm	26 mm	5°
FJ691P	T-Space PEEK	11 mm	11 mm	26 mm	5°
FJ693P	T-Space PEEK	13 mm	11 mm	26 mm	5°
FJ695P	T-Space PEEK	15 mm	11 mm	26 mm	5°
FJ697P	T-Space PEEK	17 mm	11 mm	26 mm	5°
FJ317P	T-Space PEEK	7 mm	11 mm	30 mm	5°
FJ319P	T-Space PEEK	9 mm	11 mm	30 mm	5°
FJ321P	T-Space PEEK	11 mm	11 mm	30 mm	5°
FJ323P	T-Space PEEK	13 mm	11 mm	30 mm	5°
FJ325P	T-Space PEEK	15 mm	11 mm	30 mm	5°
FJ327P	T-Space PEEK	17 mm	11 mm	30 mm	5°
FJ707P	T-Space PEEK	7 mm	11 mm	34 mm	5°
FJ709P	T-Space PEEK	9 mm	11 mm	34 mm	5°
FJ721P	T-Space PEEK	11 mm	11 mm	34 mm	5°
FJ723P	T-Space PEEK	13 mm	11 mm	34 mm	5°
FJ725P	T-Space PEEK	15 mm	11 mm	34 mm	5°
FJ727P	T-Space PEEK	17 mm	11 mm	34 mm	5°

Ordering Information – Implants – T-Space Titanium

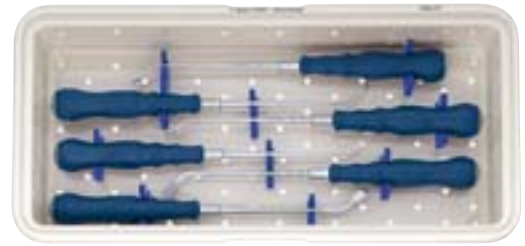


Art. no.	Description	Height	Width	Length	Angle
SJ327T	T-Space Titanium	7 mm	12 mm	26 mm	5°
SJ329T	T-Space Titanium	9 mm	12 mm	26 mm	5°
SJ331T	T-Space Titanium	11 mm	12 mm	26 mm	5°
SJ333T	T-Space Titanium	13 mm	12 mm	26 mm	5°
SJ335T	T-Space Titanium	15 mm	12 mm	26 mm	5°
SJ337T	T-Space Titanium	17 mm	12 mm	26 mm	5°
SJ349T	T-Space Titanium	9 mm	12 mm	26 mm	8°
SJ351T	T-Space Titanium	11 mm	12 mm	26 mm	8°
SJ353T	T-Space Titanium	13 mm	12 mm	26 mm	8°
SJ355T	T-Space Titanium	15 mm	12 mm	26 mm	8°
SJ357T	T-Space Titanium	17 mm	12 mm	26 mm	8°
SJ367T	T-Space Titanium	7 mm	12 mm	30 mm	5°
SJ369T	T-Space Titanium	9 mm	12 mm	30 mm	5°
SJ371T	T-Space Titanium	11 mm	12 mm	30 mm	5°
SJ373T	T-Space Titanium	13 mm	12 mm	30 mm	5°
SJ375T	T-Space Titanium	15 mm	12 mm	30 mm	5°
SJ377T	T-Space Titanium	17 mm	12 mm	30 mm	5°
SJ389T	T-Space Titanium	9 mm	12 mm	30 mm	8°
SJ391T	T-Space Titanium	11 mm	12 mm	30 mm	8°
SJ393T	T-Space Titanium	13 mm	12 mm	30 mm	8°
SJ395T	T-Space Titanium	15 mm	12 mm	30 mm	8°
SJ397T	T-Space Titanium	17 mm	12 mm	30 mm	8°

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E2

Ordering Information – Preparation Instruments – T-Space PEEK

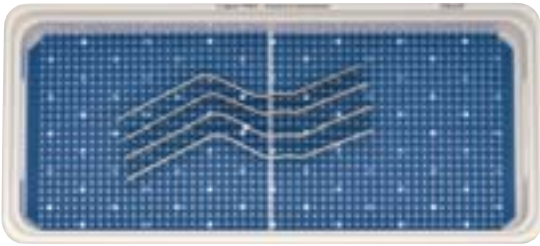







FJ015 T-Space PEEK instrumentation

consisting of:

	Art. no.	Description	Recommended	Optional
	FJ646R	T-Handle for distractors	1	
	FJ647R	Distractor, 7 mm	1	
	FJ649R	Distractor, 9 mm	1	
	FJ651R	Distractor, 11 mm	1	
	FJ653R	Distractor, 13 mm	1	
	FJ655R	Distractor, 15 mm		1
	FJ657R	Distractor, 17 mm		1
	FJ658R	Straight osteotome, 8 mm	1	
	FJ679R	Left angled bone curette, 45°		1
	FJ680R	Right angled bone curette, 45°		1
	FJ698R	Left angled bone curette, 20°	1	
	FJ699R	Right angled bone curette, 20°	1	
	FJ681R	Curette, straight	1	
	FJ682R	Left angled curette, 45°		1
	FJ683R	Right angled curette, 45°		1
	FJ702R	Left angled curette, 20°	1	
	FJ703R	Right angled curette, 20°	1	
	FJ685R	Left angled bone rasp, 45°		1
	FJ686R	Right angled bone rasp, 45°		1
	FJ704R	Left angled bone rasp, 20°	1	
	FJ705R	Right angled bone rasp, 20°	1	
	FJ641P	Tray for prep. instr.	1	

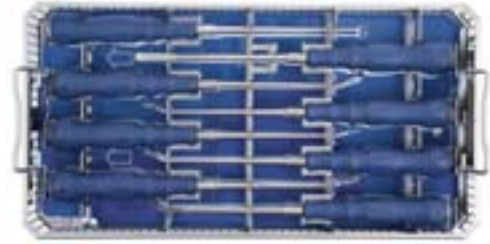
Ordering Information – Implantation Instruments – T-Space PEEK



	Art. no.	Description	Recommended	Optional
	FJ051R	Retractor S	1	
	FJ052R	Retractor M	1	
	FJ053R	Retractor L	1	
	FJ054R	Retractor XL	1	
	FJ666R	Slap hammer for trials	1	
	FJ667R	T-Space trial, 7 mm	1	
	FJ669R	T-Space trial, 9 mm	1	
	FJ671R	T-Space trial, 11 mm	1	
	FJ673R	T-Space trial, 13 mm	1	
	FJ675R	T-Space trial, 15 mm		1
	FJ677R	T-Space trial, 17 mm		1
		FJ660R	T-Space PEEK insertion instrument	1
FJ661R		T-Space insertion guide	1	
FJ662R		T-Space impactor, straight	1	
FJ663R		T-Space impactor, angled	1	
	FJ664R	T-Space PEEK packing block	1	
	FF913R	Punch	1	
	FJ642P	Tray for impl. instr.	1	






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Ordering Information – Preparation Instruments – T-Space Titanium

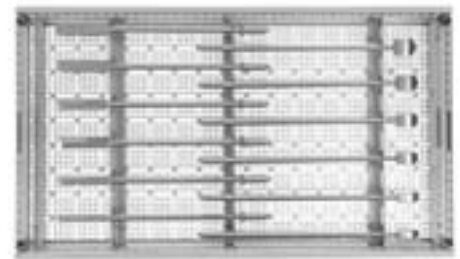






FJ630 T-Space Titanium instrumentation

consisting of:

	Art. no.	Description	Recommended	Optional
	FJ679R	Left angled bone curette, 45°		1
	FJ680R	Right angled bone curette, 45°		1
	FJ698R	Left angled bone curette, 20°	1	
	FJ699R	Right angled bone curette, 20°	1	
	FJ681R	Curette, straight	1	
	FJ682R	Left angled curette, 45°		1
	FJ683R	Right angled curette, 45°		1
	FJ702R	Left angled curette, 20°	1	
	FJ703R	Right angled curette, 20°	1	
	FJ658R	Straight osteotome, 8 mm	1	
	FJ685R	Left angled bone rasp, 45°		1
	FJ686R	Right angled bone rasp, 45°		1
	FJ704R	Left angled bone rasp, 20°	1	
	FJ705R	Right angled bone rasp, 20°	1	
	FJ633R	Tray for preparation instruments	1	
	JH217R	Wide Perf. basket lid	1	
	TE989	Graphic template for FJ633R	1	






Ordering Information – Implantation Instruments – T-Space Titanium



	Art. no.	Description	Recommended	Optional
	FJ646R	T-Handle for distractors	1	
	FJ647R	Distractor, 7 mm	1	
	FJ649R	Distractor, 9 mm	1	
	FJ651R	Distractor, 11 mm	1	
	FJ653R	Distractor, 13 mm	1	
	FJ655R	Distractor, 15 mm		1
	FJ657R	Distractor, 17 mm		1
	FJ666R	Slap hammer for trials	1	
	FJ667R	T-Space trial, 7 mm		1
	FJ669R	T-Space trial, 9 mm		1
	FJ671R	T-Space trial, 11 mm		1
	FJ673R	T-Space trial, 13 mm		1
	FJ675R	T-Space trial, 15 mm		1
	FJ677R	T-Space trial, 17 mm		1
	FJ619R	T-Space curved trial, 7 mm	1	
	FJ621R	T-Space curved trial, 9 mm	1	
	FJ623R	T-Space curved trial, 11 mm	1	
	FJ625R	T-Space curved trial, 13 mm	1	
	FJ627R	T-Space curved trial, 15 mm		1
	FJ629R	T-Space curved trial, 17 mm		1

Ordering Information – Implantation Instruments – T-Space Titanium



	Art. no.	Description	Recommended	Optional
	FJ051R	Retractor S	1	
	FJ052R	Retractor M	1	
	FJ053R	Retractor L	1	
	FJ054R	Retractor XL	1	
	FJ700R	T-Space Titanium insertion instrument		1
	FJ701R	T-Space Titanium curved insertion instrument	1	
	FJ661R	T-Space insertion guide	1	
	FJ662R	T-Space impactor, straight	1	
	FJ663R	T-Space impactor, angled	1	
	FJ635R	Tray for implantation instruments	1	
	JH217R	Wide Perf. basket lid	1	
	TE990	Graphic template for FJ635R	1	

Please note that either the straight or the curved trials and inserter fit into the tray.

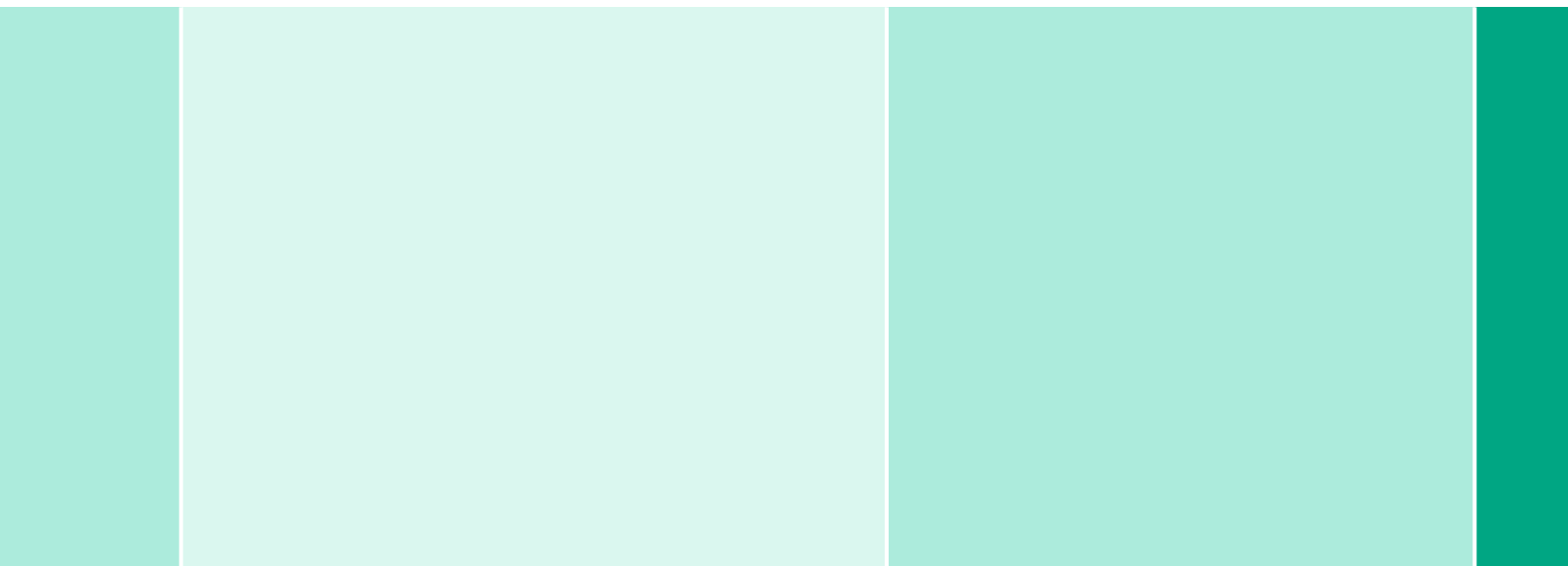
Lumbar Interbody Fusion Implants



ProSpace
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■ Titanium

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