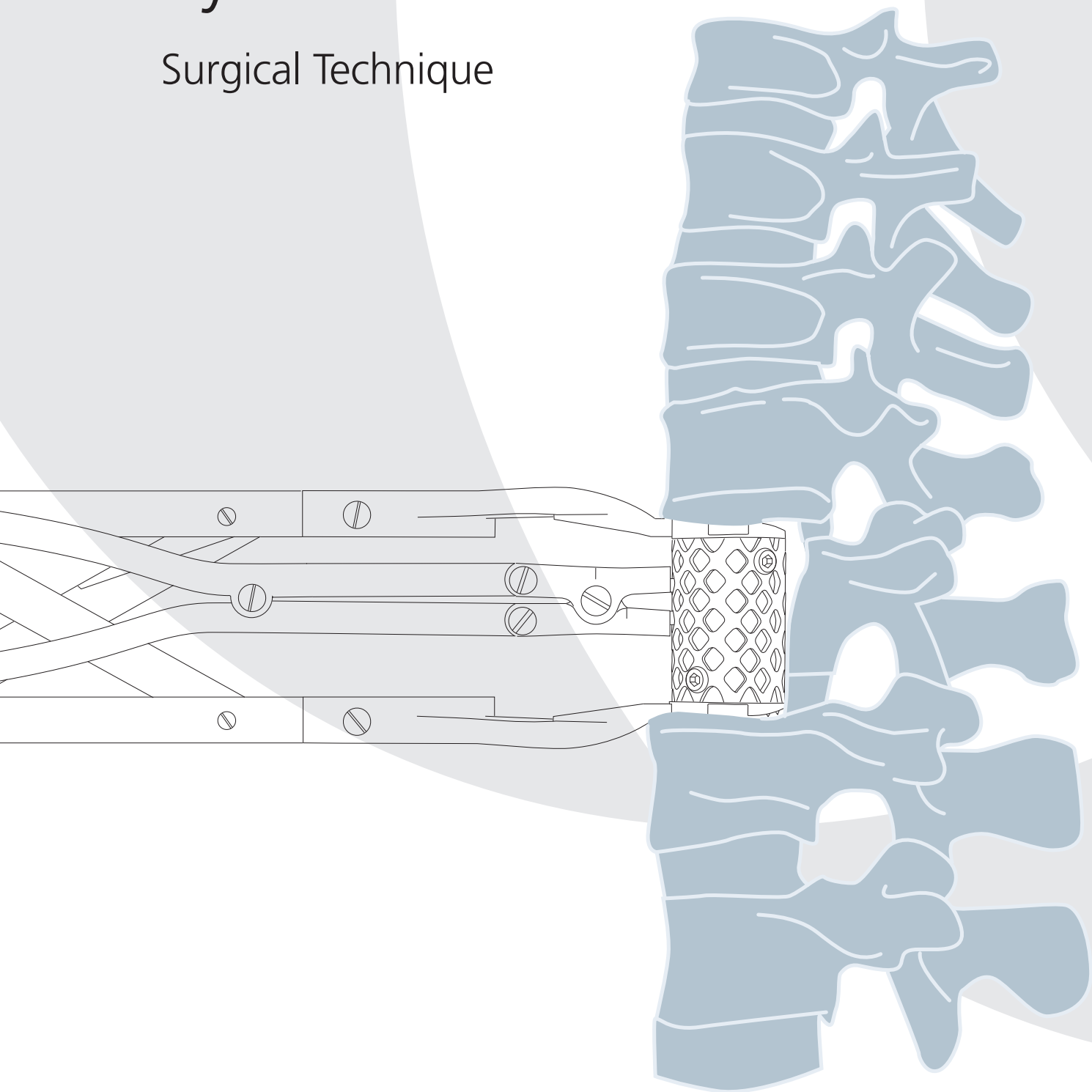


Vertebral Body System for the Cervical, Thoracic and Lumbar Spine

# SynMesh

Surgical Technique



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 Image intensifier control

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

**Processing, Reprocessing, Care and Maintenance**

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE\_023827) or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

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# AO Spine Principles

The four principles to be considered as the foundation for proper spine patient management underpin the design and delivery of the Curriculum: Stability – Alignment – Biology – Function.<sup>1,2</sup>

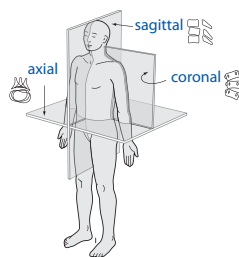
## Stability

Stabilization to achieve a specific therapeutic outcome



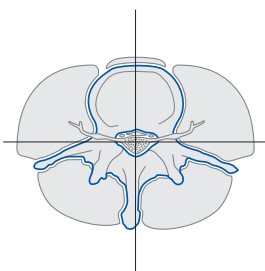
## Alignment

Balancing the spine in three dimensions



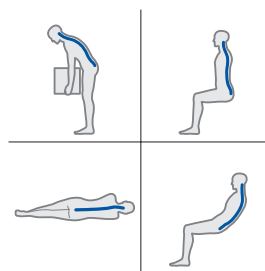
## Biology

Etiology, pathogenesis, neural protection, and tissue healing



## Function

Preservations and restoration of function to prevent disability



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<sup>1</sup> Aebi et al (1998)

<sup>2</sup> Aebi et al (2007)

# Indications

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## **Intended use**

SynMesh is a vertebral body replacement device for the cervical, thoracic and lumbar spine. Titanium implants in various footprints and heights enable the surgeon to choose the configuration that is best suited to the patient's individual pathology and anatomy. The mesh may also be trimmed for a custom fit.

The implants can be inserted anteriorly, laterally or anterolaterally.

## **Indications**

- To replace collapsed, damaged or unstable vertebral bodies due to tumour or trauma (e.g. fractures)

SynMesh has to be used with a supplemental internal fixation system.

# Round Implants

The round implants are designed to treat defects in the cervical spine.

## SynMesh, Corpectomy Device, Pure Titanium

Art. No.	Ø	height
495.341	10 mm	4 mm
495.342	10 mm	6 mm
495.343	10 mm	10 mm
495.344	10 mm	18 mm
495.441	10 mm	5 mm
495.442	10 mm	7 mm
495.443	10 mm	8 mm
495.444	10 mm	9 mm
495.445	10 mm	11 mm
495.446	10 mm	12 mm
495.346	12 mm	4 mm
495.347	12 mm	5 mm
495.348	12 mm	6 mm
495.349	12 mm	7 mm
495.351	12 mm	8 mm
495.352	12 mm	9 mm
495.353	12 mm	10 mm
495.354	12 mm	11 mm
495.355	12 mm	12 mm
495.356	12 mm	32 mm
495.357	12 mm	88 mm
495.451	12 mm	18 mm
495.361	15 mm	8 mm
495.362	15 mm	10 mm
495.363	15 mm	12 mm
495.364	15 mm	14 mm
495.365	15 mm	32 mm
495.366	15 mm	88 mm
495.455	15 mm	16 mm



Ø 10 mm



Ø 12 mm



Ø 15 mm

### End Rings, round

- Two fastening mechanisms available: press fit or with locking screw
- Angles of 0° or 2.5°
- Each end ring increases the overall height of the implant by 1.5 mm (see step 3 of the Surgical technique)

### End Rings, round, press fit\*

Art. No.	∅	Angle
495.384	10 mm	0°
495.387	10 mm	2.5°
495.385	12 mm	0°
495.388	12 mm	2.5°
495.386	15 mm	0°
495.389	15 mm	2.5°



10 mm



12 mm



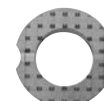
15 mm

### End Rings, round, with locking screw (convex)

Art. No.	∅	Angle
495.411	10 mm	0°
495.414	10 mm	2.5°
495.412	12 mm	0°
495.415	12 mm	2.5°
495.413	15 mm	0°
495.416	15 mm	2.5°



10 mm



12 mm



15 mm

\*No locking screw needed

# Oblong Implants

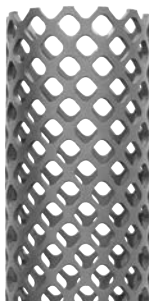
The oblong implants are designed to treat defects in the thoracic and lumbar spine.

## SynMesh, Corpectomy Device, Pure Titanium

Art. No.	Dimensions	height
495.371	17 × 22 mm	8 mm
495.372	17 × 22 mm	12 mm
495.373	17 × 22 mm	32 mm
495.374	17 × 22 mm	88 mm
495.461	17 × 22 mm	6 mm
495.462	17 × 22 mm	10 mm
495.463	17 × 22 mm	14 mm
495.464	17 × 22 mm	20 mm
495.465	17 × 22 mm	22 mm
495.466	17 × 22 mm	24 mm
495.467	17 × 22 mm	26 mm
495.468	17 × 22 mm	28 mm
495.469	17 × 22 mm	52 mm
495.376	22 × 28 mm	8 mm
495.377	22 × 28 mm	12 mm
495.378	22 × 28 mm	64 mm
495.379	22 × 28 mm	88 mm
495.471	22 × 28 mm	6 mm
495.472	22 × 28 mm	10 mm
495.473	22 × 28 mm	14 mm
495.474	22 × 28 mm	28 mm
495.475	22 × 28 mm	30 mm
495.476	22 × 28 mm	32 mm
495.477	22 × 28 mm	34 mm
495.478	22 × 28 mm	36 mm
495.479	22 × 28 mm	52 mm
495.381	26 × 33 mm	64 mm
495.382	26 × 33 mm	88 mm
495.481	26 × 33 mm	6 mm
495.482	26 × 33 mm	8 mm
495.483	26 × 33 mm	10 mm
495.484	26 × 33 mm	12 mm
495.485	26 × 33 mm	14 mm
495.486	26 × 33 mm	44 mm
495.487	26 × 33 mm	46 mm
495.488	26 × 33 mm	48 mm
495.489	26 × 33 mm	50 mm
495.490	26 × 33 mm	52 mm



17 × 22 mm



22 × 28 mm



26 × 33 mm



### End Rings, oblong

- Two fastening mechanisms available: press fit or with locking screw
- Angles of 0° or 5°
- Different configurations feature slots for anterolateral, lateral or anterior insertion under distraction
- Each end ring increases the overall height of the implant by 3.5 mm (see step 3 of the Surgical technique)

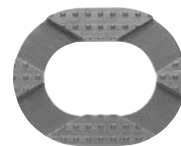
### End Rings, oblong, press fit\*

#### Anterolateral end rings

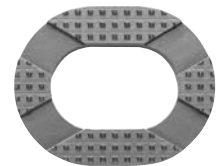
Art. No.	Dimensions	Angle
495.391	17 × 22 mm	0°
495.393	17 × 22 mm	5°
495.395	22 × 28 mm	0°
495.397	22 × 28 mm	5°
495.399	26 × 33 mm	0°
495.402	26 × 33 mm	5°



17 × 22 mm



22 × 28 mm



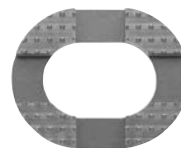
26 × 33 mm

#### Lateral or anterior end rings

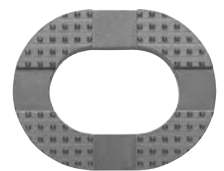
Art. No.	Dimensions	Angle
495.392	17 × 22 mm	0°
495.394	17 × 22 mm	5°
495.396	22 × 28 mm	0°
495.398	22 × 28 mm	5°
495.401	26 × 33 mm	0°
495.403	26 × 33 mm	5°



17 × 22 mm



22 × 28 mm



26 × 33 mm

\*No locking screw needed

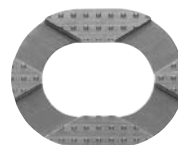
**End Rings, oblong, with locking screw (convex)**

**Anterolateral end rings**

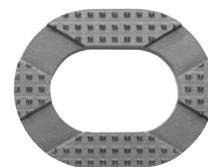
Art. No.	Dimensions	Angle
495.421	17 × 22 mm	0°
495.423	17 × 22 mm	5°
495.427	22 × 28 mm	0°
495.429	22 × 28 mm	5°
495.433	26 × 33 mm	0°
495.435	26 × 33 mm	5°



17 × 22 mm



22 × 28 mm



26 × 33 mm

**Lateral or anterior end rings**

Art. No.	Dimensions	Angle
495.422	17 × 22 mm	0°
495.424	17 × 22 mm	5°
495.428	22 × 28 mm	0°
495.430	22 × 28 mm	5°
495.434	26 × 33 mm	0°
495.436	26 × 33 mm	5°



17 × 22 mm



22 × 28 mm



26 × 33 mm

**Standard Rings**

The standard rings fit inside the oblong mesh and are secured using two M3 locking screws (495.491). They are designed to provide added stability, particularly for long implants.

**Standard Rings**

Art. No.	Dimensions
495.405	17 × 22 mm
495.406	22 × 28 mm
495.407	26 × 33 mm



17 × 22 mm



22 × 28 mm



26 × 33 mm

# Locking Screws

---

End rings with locking screw are fixed with one screw only.

## For round end rings with locking screw:

- Locking Screw M2, low profile (495.410), for  $\varnothing$  10 mm und 12 mm end rings
- Locking Screw M3, low profile (495.491), for  $\varnothing$  15 mm end rings



## Matching screwdrivers:

- Screwdriver Shaft 2.0, cruciform, with Holding Sleeve and Mini Quick Coupling (314.672) and Handle, small, with Mini Quick Coupling (311.011) for locking screws M2
- Screwdriver, hexagonal (314.250) for locking screws M3



---

## For oblong end rings with locking screw and for standard rings:

- Locking Screw M3, low profile (495.491)



## Matching screwdriver:

- Screwdriver, hexagonal (314.250) for locking screws M3



# Surgical Technique

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## 1. Select approach

SynMesh can be inserted anteriorly, laterally or antero-laterally, depending on the spinal level involved.

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## 2. Perform corpectomy and prepare endplates

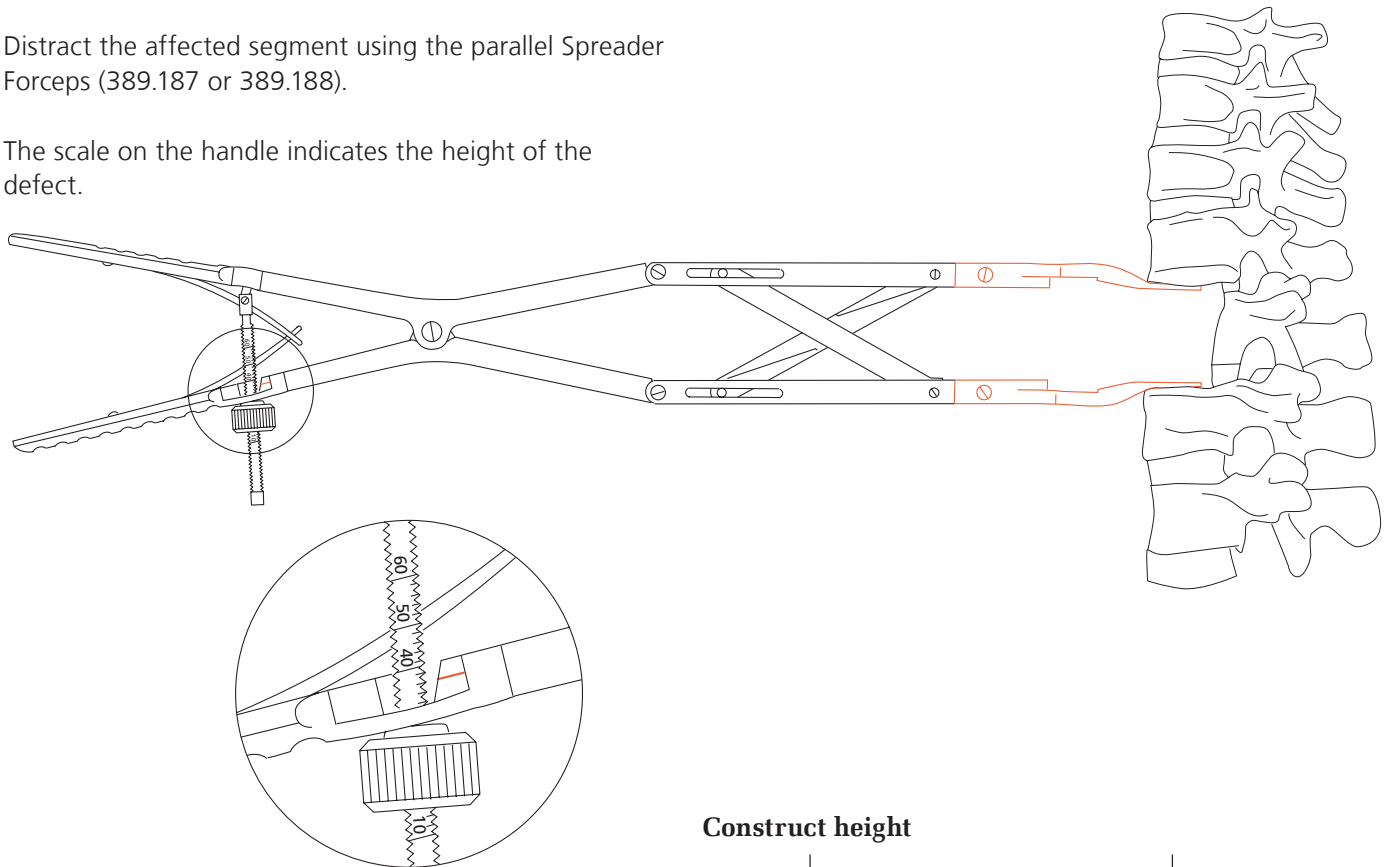
Perform a partial or complete corpectomy depending on the patient's pathology. Remove the superficial layers of the cartilaginous endplates until bleeding bone is exposed.

**Precaution:** Excessive removal of subchondral bone may weaken the vertebral endplates. If the entire endplate is removed, subsidence into the adjacent vertebrae and a loss of segmental stability may result.

### 3. Determine implant size

Distract the affected segment using the parallel Spreader Forceps (389.187 or 389.188).

The scale on the handle indicates the height of the defect.

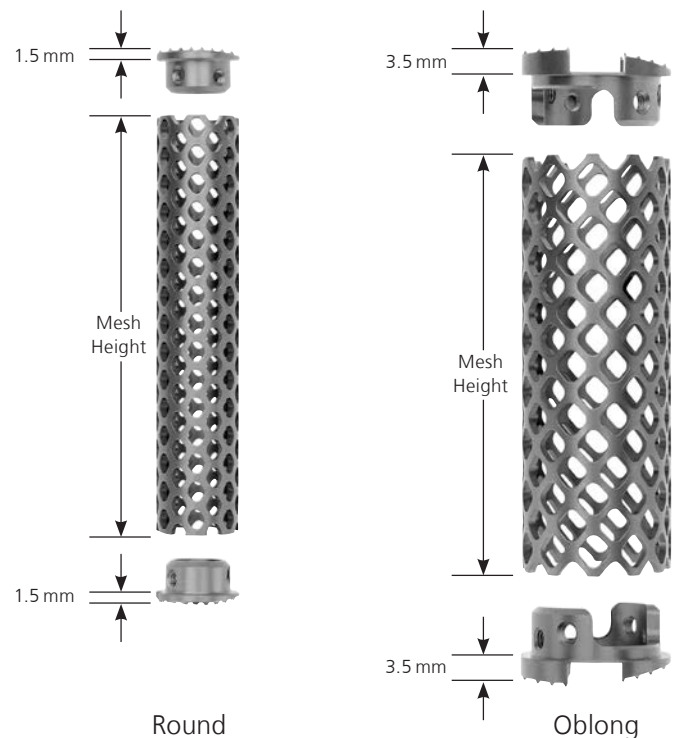


Alternatively, the Calliper for Corpectomy (389.186) can be used to determine the height of the defect.

When determining the implant size:

- Add a total of 3 mm to the mesh height if using round end rings
- Add a total of 7 mm to the mesh height if using oblong end rings

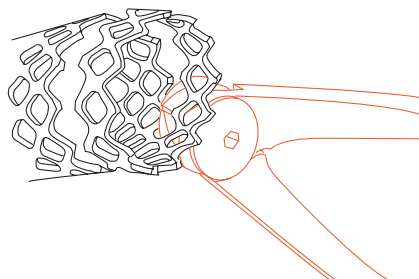
#### Construct height



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## 4. Cut mesh (optional)

If necessary, use the SynMesh Cutter (397.091) to trim the mesh to the appropriate height.



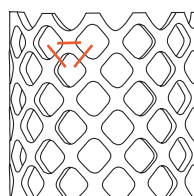
### a. Mesh, round, $\varnothing$ 10 mm and 12 mm

Make diagonal cuts.



### b. Mesh, round, $\varnothing$ 15 mm and all oblong meshes

Make diagonal or horizontal cuts.



To determine if the tabs of the mesh need to be adjusted with the Universal Bending Pliers (391.963) line up the desired end rings with the mesh and adjust tabs as necessary.

**Note:** If an end ring with locking screw is used, the mesh has to be cut on the horizontal.

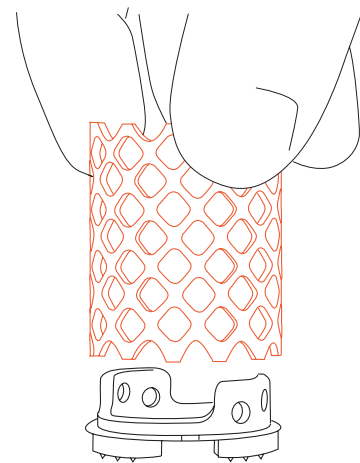
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The following section describes the securing technique for end rings with locking screw. Alternatively, press fit end rings may be used.

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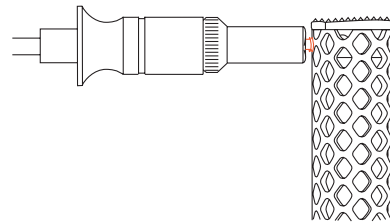
## 5. Attach first end ring

Attach desired end ring to mesh.



### a. SynMesh, round, Ø 10 mm and 12 mm

Secure end ring with a locking screw M2 (495.410) using the Cruciform Screwdriver Shaft 2.0 (314.672) and handle with Mini Quick Coupling (311.011).



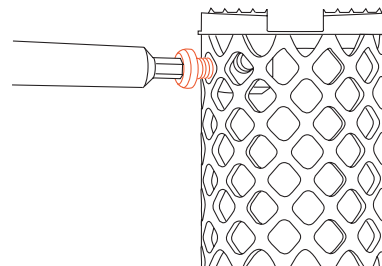
### b. SynMesh, round, Ø 15 mm and all oblong SynMesh implants

Secure end ring with a locking screw M3 (495.491) using the hexagonal screwdriver (314.250).

**Note:** Check to ensure that end rings are correctly secured. The locking screw can only be inserted correctly through one hole. If the screw is inserted in the wrong hole, a gap will remain between the end ring and the mesh. In this case, remove the screw and secure it in the correct hole.

### Option:

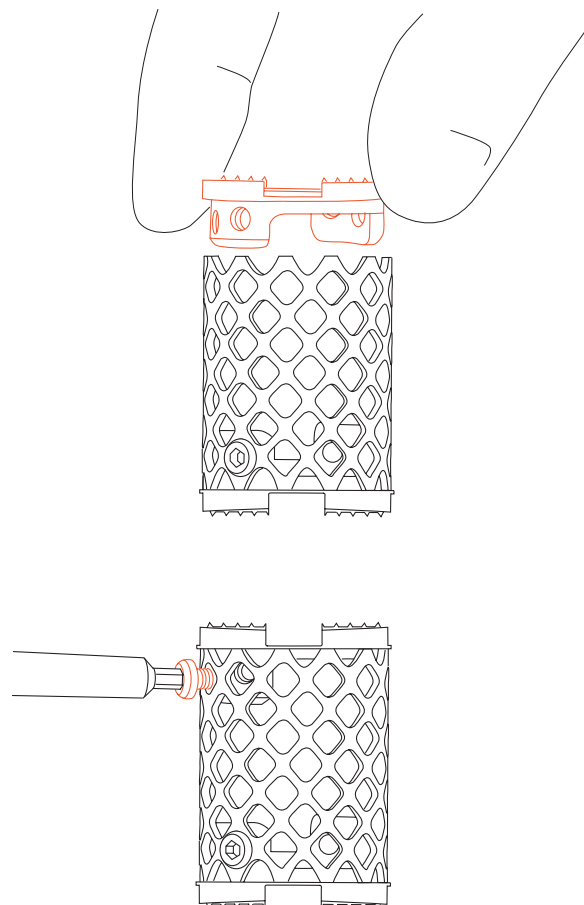
Fill SynMesh with bone graft or a bone substitute material such as chronOS.



---

## 6. Attach second end ring

Attach second end ring as described in the previous step.



**Note:** If using a longer construct, a standard ring may be inserted for added stability. Place the standard ring inside the mesh at the desired location. Using the hexagonal screwdriver, insert two locking screws M3 through the mesh and into the standard ring to secure it in place.

**Note:** Pack additional bone graft or bone substitute inside the end rings as needed.



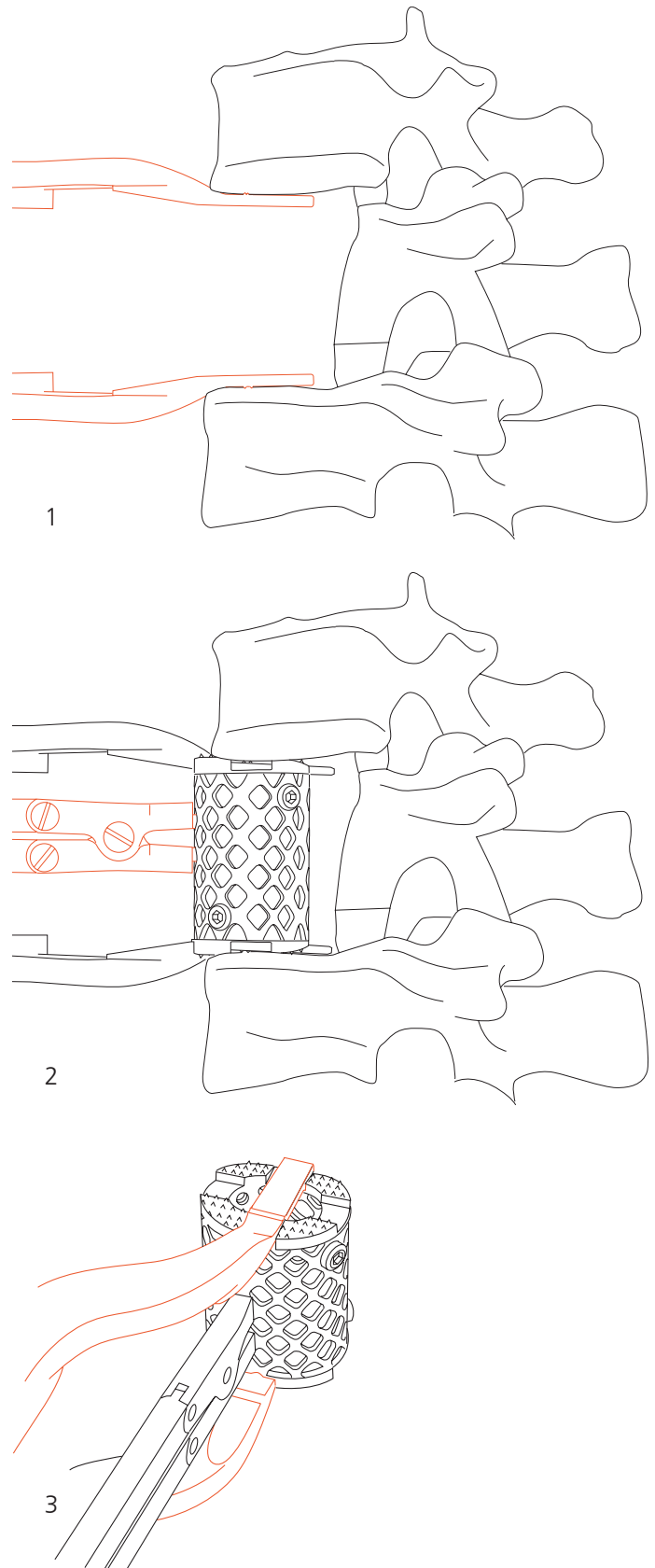
## 7. Distract and insert implant

Using the parallel spreader forceps, distract the affected segment until the desired spinal alignment is achieved (1). While under distraction, insert the SynMesh implant using the appropriate implant holder (396.388, 396.389) (2).

**Note:** When using oblong end rings, ensure that the blades of the spreader forceps align with the slots in the end rings (3). When using round meshes the spreader forceps must be removed before implantation.

Final seating of the implant may be accomplished by gently tapping the implant holder. Once the implant is in place, carefully remove the implant holder and spreader forceps. Appropriate impactors may be used if necessary to achieve final seating of the implant.

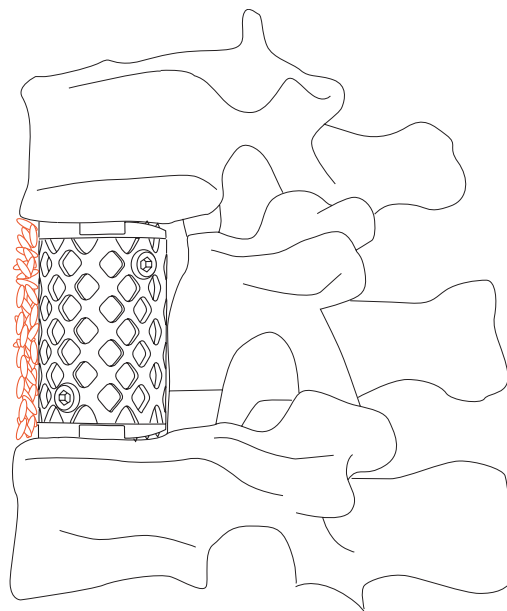
- ① Verify the position of SynMesh in relation to the vertebral bodies in the frontal and sagittal planes intraoperatively using an image intensifier.



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## 8. Apply bone material

The area around SynMesh close to the vascularised tissue is the area most likely to fuse and provide stability later on. Therefore fill this area with the largest possible amount of bone graft, especially the anterior part of the instrumented zone.



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## 9. Apply supplemental fixation

As with all vertebral body replacement devices, SynMesh must be combined with a supplemental internal fixation system – e.g. TeleFix, CSLP or USS II – which is designed for absorbing tensile forces as well as torsional, flexion and extension moments.

---

### Implant Removal

SynMesh implants are not intended to be removed. If removal is required, spreader forceps and implant holder may be used to remove SynMesh implant.

# Instruments

311.011 Handle, small, with Mini Quick Coupling



314.250 Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove, length 250 mm



314.672 Screwdriver Shaft 2.0, cruciform, with Holding Sleeve, length 66 mm, with Mini Quick Coupling



389.186 Calliper for Corpectomy, Stainless Steel



389.187 Spreader Forceps, parallel, distraction width 0 to 70 mm, Stainless Steel

389.188 Spreader Forceps, parallel, distraction width 30 to 95 mm, Stainless Steel



391.963 Universal Bending Pliers, length 165 mm



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396.388 SynMesh Implant Holder,  
with small tips, Stainless Steel



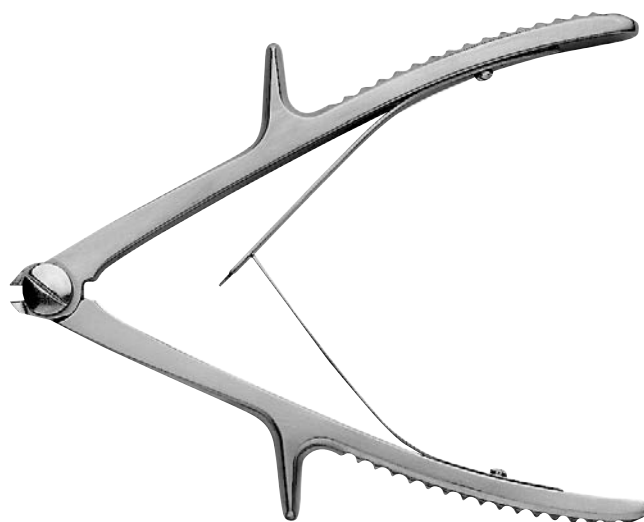
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396.389 SynMesh Implant Holder,  
with large tips, Stainless Steel



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397.091 SynMesh Cutter, Stainless Steel



# Bibliography

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Aebi M, Thalgott JS, Webb JK (1998): AO ASIF Principles in Spine Surgery. Berlin: Springer.

Aebi M, Arlet V, Webb JK (2007): AOSPINE Manual (2 vols), Stuttgart, New York: Thieme.





