Luminary T-PLIF Spacer. Allograft spacer system for transforaminal posterior interbody fusion.
Warning
This description is not sufficient for an immediate application of the instrumentation. An instruction by an experienced surgeon in handling this instrumentation is highly recommended.
The Luminary T-PLIF Spacer is an osteoinductive processed human tissue device that meets the specific demands of transforaminal posterior lumbar interbody fusion (TLIF). Allograft spacers are processed by the Musculoskeletal Transplant Foundation (MTF) in the United States and facilitated through Synthes.

**Efficient and safe**
Chamfer on distal end facilitates implant insertion

Precisely machined instrument slot ensures secure fit between implant and implant holder

**Good primary and secondary stability**
Pyramidal teeth on superior and inferior surfaces minimize migration and resist expulsion

**Osteoinductive surfaces**
Demineralized surfaces expose proteins inherent to bone growth, necessary for fusion and incorporation of the implant with the vertebral bodies

**Lumen**
Large central lumen accommodates osteobiologic material packing and fusion through the implant

The dark red color (tissue stained with Safranin O) indicates demineralized regions of the surfaces.

1 Dunn 2003
Indications
Lumbar and lumbosacral pathologies for which segmental arthrodesis is indicated, for example:
– Degenerative disc diseases
– Revision procedures for post-discectomy syndrome
– Pseudarthrosis or failed spondylodesis
– Degenerative spondylolisthesis
– Isthmic spondylolisthesis

Note: The Luminary T-PLIF Spacers should only be applied in combination with posterior fixation.

Contraindications
– Vertebral body fractures
– Spinal tumours
– Major spinal instabilities
– Primary spinal deformities

AO Principles
The Luminary T-PLIF Allograft Spacers are compatible with Travios instruments designed for TLIF procedures. The Travios system of implants and instruments was developed in accordance with the AO Principles of Interbody Fusion:

– Provide adequate stability
– Restore disc height
– Restore lordosis
– Preserve the integrity of the vertebral body endplates
– Provide an optimised fusion bed
– Atraumatic technique
The surgical technique is described using the example of a transforaminal approach to L4/L5.

1
Preoperative planning

Instrument
X000068  X-Ray Template for Luminary T-PLIF Spacer

The appropriate Luminary T-PLIF Spacer height and shape must be estimated prior to surgery. Compare the X-ray template for Luminary T-PLIF (see illustration) with the adjacent intervertebral discs on a lateral radiograph. With the segment fully distracted, the implant must fit tightly and accurately between the end plates.

The final choice of height and shape will be made with the help of a trial implant during surgery (see step 8). To achieve maximal segment stability, it is essential to implant the largest possible spacer.

2
Position the patient

In transforaminal lumbar surgery, the patient is positioned in restored physiological lordosis.
3
Make incision and insert fixation screws

Make incision after viewing radiograph of the segment. Retract the muscle layer and insert Click’X, VAS, Pangea or USS screws.

Click’X screws are used in this example (see illustration).
4

Distract intervertebral disc space

Alternative 1: Distractor

**Instrument**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>388.414</td>
<td>Distractor for Click’X, VAS, Pangea and USS screws</td>
</tr>
</tbody>
</table>

Position the distractor between the fixation screw heads on the appropriate side, with the instrument handle oriented away from the spine.

Ensure that the distractor tips are correctly positioned below the screw heads (see illustration) to prevent slipping.

Apply distraction.

**Alternative 2: Lamina spreader**

**Instrument**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>389.265</td>
<td>Travios Lamina Spreader</td>
</tr>
</tbody>
</table>

Position the lamina spreader at the base of the spinous processes.

Apply distraction.

These two distraction methods open the posterior disc space and promote exposure both for decompression and delivery of the implant.
5
Cut the transforaminal window

Instruments
389.276/277  Osteotome, straight, 8 mm/12 mm

Prepare a window for transforaminal approach, using the osteotomes to remove the inferior facet of the cranial vertebra and the superior facet of the caudal vertebra.
6

Prepare disc space

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>389.278/279</td>
<td>Bone Curette, Straight/Reverse Angle</td>
</tr>
<tr>
<td>389.281/282</td>
<td>Bone Curette, Reverse Angle, Right/Left</td>
</tr>
<tr>
<td>389.283/284</td>
<td>Bone Curette, Square, Right/Left</td>
</tr>
<tr>
<td>389.285/286</td>
<td>Bone Rasp, Right/Left</td>
</tr>
</tbody>
</table>

**Optional instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>394.562</td>
<td>Cancellous Bone Funnel</td>
</tr>
<tr>
<td>394.572</td>
<td>Cancellous Bone Pusher 8 mm, for 394.562</td>
</tr>
<tr>
<td>394.579</td>
<td>Cancellous Bone Impactor</td>
</tr>
</tbody>
</table>

Access the foramen and use bone curettes to remove disc material through an incision in the annulus fibrosus as shown graphically. For simplified removal of tissue in the far lateral disc space, use the left-and right-angled bone curettes. The annulus must be preserved to provide additional support for the Luminary T-PLIF Spacer.

Remove cartilaginous layers from the surface of the vertebral end plates with a bone rasp until bleeding bone is attained. Sufficient cleaning of the end plates is essential for vascular supply to the bone graft; yet excessive cleaning could damage the denser bone layer and weaken the end plate.

**Note:** Before the Luminary T-PLIF Spacer is implanted, the anterior and lateral disc space should be filled with either DBX or chronOS Granules or autologous bone. The cancellous bone funnel with the matching cancellous bone pusher, as well as the cancellous bone impactor can be used for this procedure (see step 13).
Select the trial implant

<table>
<thead>
<tr>
<th>Instrument</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>394.951</td>
<td>Quick Release T-Handle</td>
</tr>
</tbody>
</table>

Select the trial implant corresponding to the preoperatively estimated height of the disc space and attach a T-handle.

<table>
<thead>
<tr>
<th>Height</th>
<th>Travios trial implant</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 mm</td>
<td>389.267</td>
</tr>
<tr>
<td>8 mm</td>
<td>03.806.008</td>
</tr>
<tr>
<td>9 mm</td>
<td>389.268</td>
</tr>
<tr>
<td>10 mm</td>
<td>03.806.010</td>
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<tr>
<td>11 mm</td>
<td>389.269</td>
</tr>
<tr>
<td>12 mm</td>
<td>03.806.012</td>
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<tr>
<td>13 mm</td>
<td>389.271</td>
</tr>
<tr>
<td>15 mm</td>
<td>389.272</td>
</tr>
<tr>
<td>17 mm</td>
<td>389.273</td>
</tr>
</tbody>
</table>
8

Insert a trial implant to verify size

Carefully insert the selected Travios trial implant via the transforaminal window into the disc space, applying gentle impaction.

Check the position of the trial implant under the image intensifier.

With the segment fully distracted, the trial implant must fit tightly and accurately between the end plates in order to ensure that disc height will be preserved when the distraction is released.

Using the largest possible implant maximises segment stability by creating tension on the longitudinal ligament and the annulus fibrosus.

If the trial implant does not completely fill the intervertebral space, try the next larger size. If the trial implant cannot be inserted, try the next smaller size.

When the correct Luminary T-PLIF Spacer size has been determined with selected Travios trial implant, distraction can be temporarily released.

**Note:** The trial implants are not for implantation and must be removed prior to insertion of the Luminary T-PLIF Spacer.
Select the appropriate Luminary T-PLIF Spacer and attach the implant holder

**Instrument**

| 389.266 | Travios Implant Holder |

Select a Luminary T-PLIF Spacer (see page 17) corresponding to the Travios trial implant size determined in step 8. Attach the Implant Holder for Travios to the spacer as shown graphically.

Tighten the speed nut on the handle. Ensure that the spacer is held flush against the holder neck and is attached securely in its jaws.

**Note:** The shorter jaw of the holder (the side with 3 teeth) must be placed on the concave side of the implant (see illustration).
10

Pack the Luminary T-PLIF Spacer with DBX, chronOS Granules or cancellous bone

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.804.001</td>
<td>Travios Packing Block for 6 sizes</td>
</tr>
<tr>
<td>389.288</td>
<td>Cancellous Bone Impactor for Packing Block</td>
</tr>
</tbody>
</table>

Fill the spacer with bone graft material as follows (see illustration):

1. Open the packing block and insert the spacer attached to the implant holder.
2. Remove the implant holder.
3. Close the packing block.
4. Tighten the knurled nut securely.
5. Use the cancellous bone impactor to introduce and pack the bone graft material or bone graft substitute into the spacer

The spacer must be filled completely.
Option 1: DBX
DBX is composed of the osteoinductive demineralised bone matrix (DBM) from human donors in a biocompatible carrier. The bone growth factors, present and active inside of DBX, are responsible for its osteoinductive properties. DBX is sourced by the Musculoskeletal Transplant Foundation (MTF), which is the largest non-profit musculoskeletal tissue recovery organization in the United States. It is ISO certified, AATB accredited and complies with FDA guidelines.

Option 2: chronOS
The use of β-tricalcium phosphate in the spinal column is a valuable alternative to allografts and autografts, even when large amounts are required. chronOS is a fully synthetic and resorbable bone graft substitute with a compressive strength similar to that of cancellous bone. The interconnected porous structure of chronOS acts as an osteoconductive matrix for the ingrowth of bone cells and blood vessels, which is completely remodeled into host bone within 6 to 18 months.

Option 3: Bone graft harvesting set
The use of the bone graft harvesting set is recommended for obtaining bone graft from the iliac crest or vertebra through a minimally invasive access. It permits one-step removal of autologous bone to fill out the central lumen of the spacer. Using the bone graft harvesting set reduces donor site morbidity.

1 Muschik et al. 2001
2 Goulet et al. 1997
3 McKay et al. 2002
11 Implant the Luminary T-PLIF Spacer

When the spacer is ready for implantation, distract the segment again.

Use the cancellous bone graft funnel to fill the anterior disc space with DBX, chronOS Granules or cancellous bone.

Ensure that the orientation of the implant is correct (see illustration) and then insert the spacer into the intervertebral disc space.

Slight impaction on the implant holder may be necessary.

12 Position the Luminary T-PLIF Spacer

**Instruments**

| 389.274/275 | Impactor for Travios, Straight/Curved |

Remove the implant holder and use the impactors (389.274, 389.275) to nudge the spacer into the correct position.

The optimal placement of the spacer is in the anterior half of the intervertebral space.

Depending on the size of the vertebrae, the anterior rim of the spacer will be 6–8 mm posterior to the anterior edges of adjacent vertebral bodies.

Use image intensification to verify the AP position of the spacer relative to the vertebral bodies (see planning template).
13
Fill the posterior space

Use the cancellous bone graft funnel to fill the posterior disc space with additional DBX, chronOS Granules or cancellous bone.

14
Remove instruments

Remove the funnel.

Carefully loosen and remove the distraction instrument.
**Posterior fixation**

Additional posterior fixation with transpedicular screws (Click’X, VAS, Pangea or USS) considerably enhances the biomechanical stability of the motion segment as well as the stability of the Luminary T-PLIF Spacer, and is therefore recommended.

The final steps of the fixation procedure (e.g. rod insertion, tightening, compression) are completed after implantation of the spacer.

(In this example, Click’X is used).

**Postoperative management**

The patient must be warned against activities that place excessive strain on the operated spinal area.

Physical activities and trauma with adverse effects on the affected vertebrae could lead to loosening of the implant, end plate fracture and failure of the surgical measure.

1 See the Technique Guide for Click’X (036.000.072).
Implants
The Luminary T-PLIF Spacers are available in 9 heights. The Luminary T-PLIF Spacers have osteoinductive surfaces. Central lumen may accommodate osteobiologic material such as DBX, chronOS Granules or autologous bone to promote fusion through the implant.

The Travios instrument system contains a dedicated trial implant for each Luminary T-PLIF implant height (including the teeth).

**Luminary T-PLIF Spacers (10 × 30 mm)**

<table>
<thead>
<tr>
<th>Height</th>
<th>Allograft Implant</th>
<th>Trial implant</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 mm</td>
<td>MTF-014707</td>
<td>389.267</td>
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<tr>
<td>8 mm</td>
<td>MTF-014708</td>
<td>03.806.008</td>
</tr>
<tr>
<td>9 mm</td>
<td>MTF-014709</td>
<td>389.268</td>
</tr>
<tr>
<td>10 mm</td>
<td>MTF-014710</td>
<td>03.806.010</td>
</tr>
<tr>
<td>11 mm</td>
<td>MTF-014711</td>
<td>389.269</td>
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<tr>
<td>12 mm</td>
<td>MTF-014712</td>
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</tr>
<tr>
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<td>MTF-014713</td>
<td>389.271</td>
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<tr>
<td>15 mm</td>
<td>MTF-014715</td>
<td>389.272</td>
</tr>
<tr>
<td>17 mm</td>
<td>MTF-014717</td>
<td>389.273</td>
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</table>
### Recommended supplementary instruments and implants

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBX-038010–DBX-038100</td>
<td>DBX Putty</td>
</tr>
<tr>
<td>DBX-058025–DBX-058200</td>
<td>DBX Mix</td>
</tr>
<tr>
<td>710.002S–710.021S</td>
<td>chronOS Granules</td>
</tr>
<tr>
<td>177.300</td>
<td>Set for Bone Graft Harvesting in SynCase</td>
</tr>
</tbody>
</table>

An efficient tool for the harvesting of autologous bone from the iliac crest when using the Luminary T-PLIF Spacers.
Notes on Rehydration

- The Luminary T-PLIF Spacers are aseptically processed and supplied freeze-dried.
- To obtain the best clinical results and prevent spacer failure, a rehydration procedure is recommended. The freeze-dried spacer must be rehydrated in an acceptable sterile irrigant (i.e. normal saline or Lactated Ringers Solution) for at least 30 minutes prior to use.
- Consult the package insert for further information.
Dunn MG (2003) Evaluation of osteoinductivity of surface demineralized cortical allograft in the athymic mouse intramuscular model. Study funded by MTF.


