Continuously Expandable Vertebral Body Replacement for Tumour Cases

ECD – Expandable Corpectomy Device

Surgical Technique
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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ECD – Expandable Corpectomy Device

ECD is a vertebral body replacement for the cervical and upper thoracic spine. Its expansion mechanism is designed to allow smooth, continuous expansion in situ. Radiolucent PEEK implants with different heights and endplate angulations are designed to enable the surgeon to choose the specific configuration suited to the individual pathology and anatomical condition.

Fast surgical procedure
Only one instrument for holding and expanding the implant
Compatible with proven Synthes products

**Cervical Retractor System**
- Enables a clear layout of the operative field

**Cervical Spine Locking Plates (CSLP)**
- For rigid anterior fixation

**Axon**
- For posterior fixation

**Electric/Air Pen Drive**
- Facilitates bone removal

**Vectra/Vectra-T**
- For dynamic anterior fixation

**Continuous expansion mechanism, expandable in situ**

**Anatomical shaped endplates**

**Locking clip, secures the expanded implant to prevent micro movements**
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.¹,²

<table>
<thead>
<tr>
<th><strong>Stability</strong></th>
<th><strong>Alignment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stabilization to achieve a specific therapeutic outcome</td>
<td>Balancing the spine in three dimensions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Biology</strong></th>
<th><strong>Function</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Etiology, pathogenesis, neural protection, and tissue healing</td>
<td>Preservations and restoration of function to prevent disability</td>
</tr>
</tbody>
</table>

¹ Aebi et al (1998)  
² Aebi et al (2007)
**Indications and Contraindications**

**Intended use**
ECD is a vertebral body replacement for the stabilization of the cervical (C3 to C7) and upper thoracic (T1 to T2) spine.

Depending on anatomical and pathological requirements, ECD can be used in the replacement of one, two or three adjacent vertebral bodies.

**Indications**
- Primary or secondary tumours of the cervical or upper thoracic spine.

**Note:** Always combine ECD with an additional, stable internal anterior, posterior or a combined (anterior/posterior) fixation system to bear tensile forces as well as torsion, flexion and extension moments.

**Contraindications**
- Severe osteoporosis
- Reconstruction of more than three adjacent vertebral bodies
Implants

**ECD – Expandable Corpectomy Device, PEEK, sterile**

- Various endplate angles and heights
- Overlapping sizes
- Radiolucent material (PEEK)

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Height</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>891.3005</td>
<td>17–22 mm</td>
<td>4.5°</td>
</tr>
<tr>
<td>891.301S</td>
<td>20–27 mm</td>
<td>4.5°</td>
</tr>
<tr>
<td>891.302S</td>
<td>24–33 mm</td>
<td>6°</td>
</tr>
<tr>
<td>891.303S</td>
<td>30–39 mm</td>
<td>6°</td>
</tr>
<tr>
<td>891.304S</td>
<td>36–47 mm</td>
<td>7°</td>
</tr>
<tr>
<td>891.305S</td>
<td>43–59 mm</td>
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</tr>
<tr>
<td>891.306S</td>
<td>54–70 mm</td>
<td>7°</td>
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</table>

**ECD Locking Clip, PEEK, sterile**

- Secures the expanded implant to prevent micro movements

<table>
<thead>
<tr>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>890.005S</td>
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</table>

**Set**

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>687.005</td>
<td>Vario Case for ECD, with lid, without contents</td>
</tr>
</tbody>
</table>
# Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>397.127</td>
<td>Holding and Distraction Instrument, for ECD</td>
<td><img src="image1.png" alt="Holding and Distraction Instrument" /></td>
</tr>
<tr>
<td>397.129</td>
<td>Holder for ECD Locking Clip</td>
<td><img src="image2.png" alt="Holder for ECD Locking Clip" /></td>
</tr>
<tr>
<td>324.060</td>
<td>Calliper for Corpectomy, short, Stainless Steel</td>
<td><img src="image3.png" alt="Calliper for Corpectomy" /></td>
</tr>
<tr>
<td>X000012</td>
<td>X-Ray Template for ECD in PEEK</td>
<td><img src="image4.png" alt="X-Ray Template for ECD in PEEK" /></td>
</tr>
</tbody>
</table>
1. Estimate implant height

Required instrument

X000012  X-Ray Template for ECD in PEEK

The X-Ray Template may be used to estimate the implant height. Place the template on the AP or lateral X-ray of the vertebrae to be bridged. Use the adjacent endplates as measuring points. Select the appropriate implant.
1. Position the patient

Place the patient in a supine position.

Proper positioning should be confirmed with a radiograph prior to draping.  

Note: Physiological alignment cannot always be achieved. Always use caution when positioning the patient.

2. Approach

Recommended set

| 187.796 | Cervical Retractors |

Expose the vertebral bodies through a corresponding approach to the cervical spine.

To have a clear layout of the operative field the Synthes Cervical Retractor System can be used.
1. Perform corpectomy and prepare endplates

Perform a partial or complete corpectomy as required by the pathology. Observe the following points:

Excise the disc material and the superficial layers of the cartilaginous parts of the adjacent endplates. Adequate cleaning of the endplate – especially in the peripheral parts – is important for the vascular supply. However, excessive tissue debridement and removal of dense bone may weaken the endplate and therefore impair the seating of ECD. In order to maintain the mechanical strength of the adjacent vertebral body endplates, avoid using chisels and resecting bony parts.

2. Distract segment

Distract segment to restore anatomical height.
3. Determine implant size

Required instrument

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Use the Calliper for Corpectomy to determine the size of the resulting spinal defect, taking the desired correction into account.

Determine the appropriate implant size. The height of the implant in its neutral position should be less than the height of the defect. The implant height when expanded should exceed the height of the defect, including the desired amount of anchorage.

**Note:** The optimal range of application for the implant is between its neutral position and 2/3 of its stroke.
4. Pick up implant

Required instrument

<table>
<thead>
<tr>
<th>Item</th>
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<tr>
<td>397.127</td>
<td>Holding and Distraction Instrument, for ECD</td>
</tr>
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</table>

Pick up the implant using the Holding and Distraction Instrument: Pull back the locking sleeve (1) (UNLOCK). Place the holding prongs into the notches of the implant (2). Release the locking sleeve. The force of the spring returns the mechanism to its original position so that the implant is securely attached to the instrument.

**Note:** When picking-up the implant, make sure that the cranially pointing arrows on the implant match the instrument side marked “CRANIAL”.

5. Implantation

Insert ECD into the resected part of the spinal column and align it in the sagittal and frontal plane.

The optimal position for ECD is in the centre of the vertebral endplate. To allow bony fusion, maintain some space around the implant endplates.

Verify the position of ECD in relation to the vertebral bodies in the frontal and sagittal planes under the image intensifier. Three X-ray markers in each implant endplate serve to control the position of the PEEK implant.
6. Expand implant

Required instrument

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Expand ECD in situ using the Holding and Distraction Instrument. Turn the rotary handle (1) in the direction indicated on the instrument (“expand”) until the desired height and anchorage is achieved.

**Note:** As soon as the implant endplates touch the vertebral endplates push the instrument slightly caudally in order to guarantee a desired function of the expansion mechanism.

To release the implant, pull back the locking sleeve (UNLOCK) (2).

**Important:**
- A visual indicator (3) on the implant shows the maximum expansion position. Additional expansion, once this stroke limitation is reached may destroy the implant.
- Expansion must remain in the physiological range. Once the stroke limitation is reached, do not further expand. If the implant size is too small, remove the implant and replace it with a larger implant.

Verify the final position of ECD in relation to the vertebral bodies in the frontal and sagittal plane under the image intensifier.
7. Secure implant with clip

**Required instrument**

| 397.129 | Holder for ECD Locking Clip |

Place the pins of the Holding Instrument into the Locking Clip.

Insert the clip into the caudal notches of the implant.

Lift the instrument in a cranial direction to remove it from the clip.

**Note:** If necessary, the locking clip can be removed in the same way.
8. Add bone chips or chronOS

Fill the area around the ECD, especially the anterior part, with bone chips or chronOS*.

9. Additional fixation

Additional anterior, posterior or combined anterior/posterior fixation is necessary, e.g. with Vectra.

* See chronOS VIVIFY PREFORMS and chronOS GRANULES BONE VOID FILLER (036.001.338, DSEM/BIO/1015/0040).
