

Dedicated System for Open-door Laminoplasty

ARCH Laminoplasty System

Surgical Technique

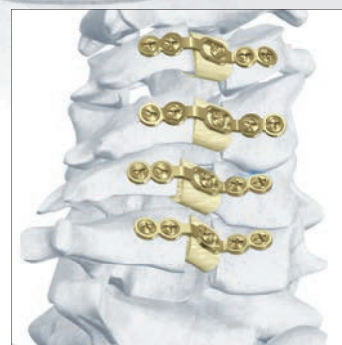


 Image intensifier control

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.depuyshnthes.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.depuyshnthes.com/hcp/reprocessing-care-maintenance>

Table of Contents

Introduction	Overview	2
	AO Spine Principles	4
	Indications and Contraindications	5

Product Information	Implants	6
	Instruments	8
	Vario Case	10

Surgical Technique	Laminotomy	11
	A. ARCH Laminoplasty without Spacer	13
	B. ARCH Laminoplasty with Spacer	16

Bibliography		20
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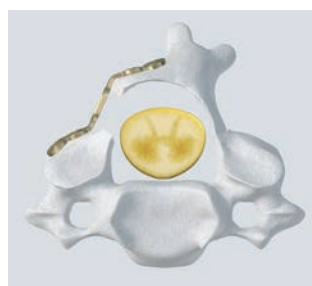
Overview

The ARCH Laminoplasty System is designed to:

- Maintain an expanded spinal canal
- Secure spinal stability
- Preserve the protective function of the spine after a laminoplasty has been performed



Before laminoplasty



After laminoplasty



After laminoplasty with spacer

Miniplates

The ARCH Laminoplasty System miniplates are:

- Pre-bent (single bend and double bend) to fit the anatomy of the dorsally elevated lamina
- Low profile designed to prevent tissue irritation
- Available in 5 sizes
- Made from pure titanium



Single bend



Double bend

Also recommended for Laminoplasty procedure:

Electric Pen Drive and Air Pen Drive*

To ease the work and decrease surgical time during laminoplasty the use of an appropriate power tool can be helpful.

- The Electric Pen Drive and Air Pen Drive are pen shaped, high-speed systems, designed to support surgeons for example in performing a laminoplasty.
- A wide range of attachments and cutting tools further facilitates working with the Electric Pen Drive and Air Pen Drive.**
- Especially appropriate for performing a laminoplasty are the angled burr attachments, with steel or diamond burrs.



* See also brochure Electric Pen Drive (036.000.800) and Air Pen Drive (036.000.503)

** See also brochure Cutting Tools for Electric Pen Drive and Air Pen Drive (DSEM/PWT/1014/0044)

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.^{1,2}

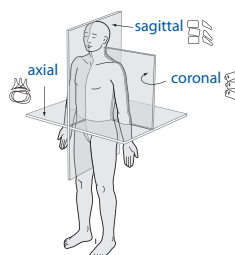
Stability

Stabilization to achieve a specific therapeutic outcome



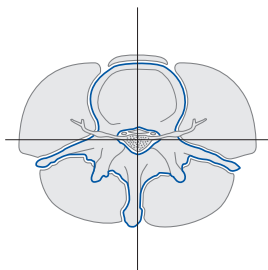
Alignment

Balancing the spine in three dimensions



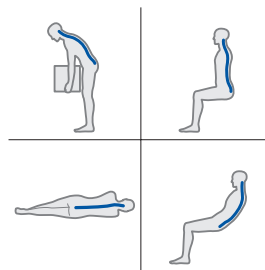
Biology

Etiology, pathogenesis, neural protection, and tissue healing



Function

Preservations and restoration of function to prevent disability



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¹ Aebi et al (1998)

² Aebi et al (2007)

Indications and Contraindications

Intended use

The ARCH Laminoplasty System is intended for use in the lower cervical and upper thoracic spine (C3–T3) after a laminotomy has been performed.

Indications

- Ossification of the posterior longitudinal ligament (OPLL) over multiple levels with maintained cervical lordosis
- Congenital canal stenosis with maintained cervical lordosis
- Multilevel cervical spondylosis with maintained cervical lordosis
- Posterior compression from ligamentous hypertrophy with maintained cervical lordosis

Contraindications

The ARCH Laminoplasty System is not to be used:

- For single- or two-level spondylosis without developmental spinal canal stenosis

The ARCH Laminoplasty System is not to be used when there is:

- Focal anterior compression
- Established absolute kyphosis
- Isolated radiculopathy
- Loss of anterior column support resulting from tumor, trauma, or infection

Implants

Miniplates

The ARCH Laminoplasty System miniplates are available single bend or double bend:

Single bend

2.0 mm Miniplates

Art. No.	Laminar gap	Overall length
443.164	4 mm	27 mm
443.166	6 mm	29 mm
443.168	8 mm	31 mm
443.170	10 mm	33 mm
443.172	12 mm	35 mm



Single bend

Double bend

2.0 mm Miniplates

Art. No.	Laminar gap	Overall length
443.174	4 mm	27 mm
443.176	6 mm	29 mm
443.178	8 mm	31 mm
443.180	10 mm	33 mm
443.182	12 mm	35 mm



Double bend

Additional available:

2.0 mm Adaption plate

Art. No.	Holes	Overall length
447.100.99	20	99.8 mm



Screws with PlusDrive recess

- Enhanced screw retention
- Flat head
- Provides ease of pick up

The PlusDrive screws are available as self-tapping or self-drilling cortex screws:

Self-tapping, Ø 2.0 mm

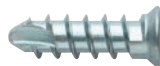
Art. No.	Length
401.041.99	4 mm
401.043.99	6 mm
401.044.99	8 mm
401.045.99	10 mm
401.046.99	12 mm

**Self-drilling, Ø 2.0 mm**






Art. No.	Length
401.061.99	4 mm
401.063.99	6 mm
401.065.99	8 mm





**Emergency, self-tapping, Ø 2.4 mm**

Art. No.	Length
401.792.99	6 mm
401.794.99	8 mm
401.795.99	10 mm
401.796.99	12 mm



Instruments

388.173	Curette, small, angled To clean the laminotomy site and, if needed, elevate the lamina.	
388.170	Lamina Elevator To elevate the lamina dorsally and decompress the spinal cord.	
396.466– 396.472	Trial Implants, parallel, 4–12 mm To determine the appropriate miniplate size or spacer size and shape (parallel).	
388.172	Holder for Miniplate For controlled placement of the miniplate.	
391.965	Combination Bending/Cutting Pliers To contour and cut the plates as needed.	

388.174– 388.178	Drill Bits Ø 1.5 mm with Stop, drilling depths 4–12 mm To prevent over-drilling. Used with Handle with Mini-Quick Coupling 311.030.	
311.030	Handle with Mini Quick Coupling Used with drill bits 388.174–388.178.	
313.252	Screwdriver Shaft PlusDrive 1.5/2.0, long, self-holding, for Hexagonal Coupling For 2.0 mm and 2.4 mm PlusDrive screws.	
311.005	Handle, small, with Hexagonal Coupling For Screwdriver Shaft PlusDrive 313.252.	
396.474– 396.482	Trial Implants, angled, 4–12 mm To determine the appropriate spacer size and shape (angled). The trial im- plants are dual-sided to help determine the spacer needed, based on the side (right or left) of the patient on which the procedure is being done.	
388.171	Graft Holder For controlled placement of a spacer at the laminoplasty site.	

Vario Case

68.614.000 Vario Case for ARCH Laminoplasty System

68.614.002 Insert for Additional Instruments,
for Vario Case No. 68.614.000

Laminotomy

1. Surgical approach

The patient is positioned prone in head pins with the neck slightly flexed and posteriorly translated. The head of the bed should be raised to provide a level aspect to the surgical site.

A standard midline approach should be used to expose the laminae and the facets at the desired level. Care should be taken to preserve the facet capsules, soft tissue attachments to the facet joints, the spinous processes and the interspinous ligaments.

2. Perform laminotomy

After adequate exposure, transect the lamina by creating a cut as thin as possible, 1 cm lateral from the midline. Avoid contact with the underlying dura. On the contralateral side, decorticate the lamina by scoring, then cut a half-thickness trough, 1 cm lateral from the midline. Release the ligamentum flavum and bridging vessels, as required.

Option

To facilitate performing a laminotomy a power tool might be used, e.g. Electric Pen Drive or Air Pen Drive with Burr Attachment and steel or diamond burr.

Optional instrument

388.173	Curette, small, angled
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To clean the laminotomy site the small Curette can be used.



3. Lamina expansion

Required instrument

388.170 Lamina Elevator

Place the tines of one side of the Lamina Elevator under the ventral surface of the completely transected lamina without disturbing the underlying dura. Place the opposite set of tines on the center of the contralateral, or hinged, lamina so that it will not slip off during lamina expansion. Firmly grasp the lamina with the Lamina Elevator and expand the gap.

Note: Lack of lamina movement may indicate that deeper scoring is required at the hinge site.

Optional instrument

388.173 Curette, small, angled

Alternatively, the small Curette can be used to elevate the lamina.



For the use of the ARCH Laminoplasty System without spacer see page 13.

For the use of the ARCH Laminoplasty System with spacer see page 16.

A. ARCH Laminoplasty without Spacer

1. Determine miniplate size

Required instrument

396.466–396.472	Trial Implants 4–12 mm
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With the lamina in expanded position the appropriate miniplate size can be determined by inserting the Trial Implants into the laminal gap.

The size of the Trial Implant corresponds to the size of the miniplate.



2. Select miniplate

Required instrument

388.172	Holder for Miniplate
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Select a single or double bend miniplate by placing the plates on the laminal expansion using the Holder for Miniplate and determining the best anatomical fit.

Optional instrument

391.965	Combination Bending/Cutting Pliers
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Alternatively to pre-bent miniplates the adaption plate can be used and contoured with the Combination Bending/Cutting Pliers.

Note: Plates are weakened when being bent back and forth.



3. Secure miniplate

Required instruments

311.030	Handle with Mini-Quick Coupling
388.174– 388.178	Drill Bits \varnothing 1.5 mm with Stop, 4–12 mm
311.005	Handle, small, with Hexagonal Coupling
313.252	Screwdriver Shaft PlusDrive 1.5/2.0, long, self-holding, for Hexagonal Coupling

A variety of screws (self-tapping and self-drilling) are available to secure the miniplate.

For insertion of self-tapping screws please follow steps a, b and c.

For insertion of self-drilling screws please follow steps b and c.

- Attach the appropriate drill bit with built-in stop to the Handle with Mini-Quick Coupling. Drill to the stop through the desired plate hole.
- Attach the Screwdriver Shaft PlusDrive with the Handle with Hexagonal Coupling.
- The first screw of proper size should be placed immediately lateral to the gap. Centering the screw site on the lamina helps to prevent screw breakout along the laminar edges.

Note: A 2.4 mm bone screw may be used if the primary screw has less than desired fixation.



4. Insert remaining screws

Place two screws on each side of the gap.



5. Insert remaining miniplates

Insert remaining miniplates according to steps 1 to 4.



B. ARCH Laminoplasty with Spacer

1. Determine the spacer size

Required instruments

396.466–396.472	Trial Implants, parallel, 4–12 mm
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396.474–396.482	Trial Implants, angled, 4–12 mm
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With the lamina in expanded position, determine the appropriate spacer size and shape by inserting the Trial Implants into the laminar gap created. The choice of spacers is surgeon's preference.



2. Select miniplate

Required instruments

388.172	Holder for Miniplate
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311.005	Handle, small, with Hexagonal Coupling
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313.252	Screwdriver Shaft PlusDrive 1.5/2.0, long, self-holding, for Hexagonal Coupling
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According to the spacer size choose the corresponding single or double bend miniplate. Assemble the plate and the spacer at the center screw site.



Optional instrument

391.965	Combination Bending/Cutting Pliers
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Alternatively to pre-bent miniplates the adaption plate can be used and contoured with the Combination Bending/Cutting Pliers.

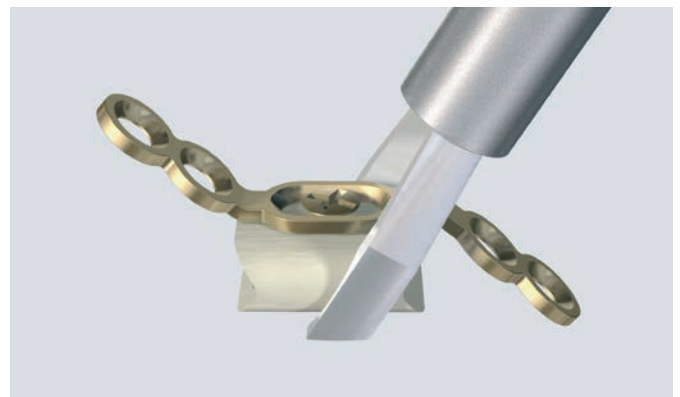
Note: Plates are weakened when being bent back and forth.

3. Place spacer

Required instrument

388.171	Graft Holder
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Once the spacer and miniplate construct is complete, use the Graft Holder to place the construct at the site. Avoid disturbing the underlying dura. Remove the Graft Holder once the construct is securely held between the laminar edges.



4. Secure miniplate

Required instruments

311.030	Handle with Mini-Quick Coupling
388.174– 388.178	Drill Bit Ø 1.5 mm with Stop, 4–12 mm
311.005	Handle, small, with Hexagonal Coupling
313.252	Screwdriver Shaft PlusDrive 1.5/2.0, long, self-holding, for Hexagonal Coupling

A variety of screws (self-tapping and self-drilling) are available to secure the miniplate.

For insertion of self-tapping screws please follow steps a, b and c.

For insertion of self-drilling screws please follow steps b and c.

- Attach the appropriate drill bit with built-in stop to the Handle with Mini-Quick Coupling. Drill to the stop through the desired plate hole.
- Attach the Screwdriver Shaft PlusDrive with the Handle with Hexagonal Coupling.
- The first screw of proper size should be placed immediately lateral to the gap. Centering the screw site on the lamina helps to prevent screw breakout along the laminar edges.

Note: A 2.4 mm bone screw may be used if the primary screw has less than desired fixation.



5. Insert remaining screws

Place two screws on each side of the gap.



6. Insert remaining miniplates

Insert remaining miniplates according to steps 1 to 5.



Bibliography

Aebi M, Thalgott J S and Webb J (1998) AO ASIF Principles in Spinal Surgery, c. 5.2 Transarticular Screw Fixation, Springer, Berlin

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

