



DEGENERATIVE  
SPINAL DISORDERS

# AESCULAP® Modulift® S

## VERTEBRAL BODY REPLACEMENT SYSTEM

SURGICAL TECHNIQUE

# DEGENERATIVE SPINAL DISORDERS

## PROTECTING AND PRESERVING SPINAL STABILITY

Modern life style has resulted in increasing physical inactivity among people all over the world. Of the many medical problems associated with this, spinal disorders are among the most critical. This is even more significant as the spinal column is one of the most important structures in the human body. It supports and stabilizes the upper body and is the center of our musculoskeletal system, which gives the body movement.

Our work in the field of degenerative spinal disorders is dedicated to protecting the spinal column and preserving its stability. We support spine surgeons with durable, reliable products and partner services for safe procedures and good clinical outcomes.<sup>1-6</sup> Our philosophy of sharing expertise with healthcare professionals and patients allows us to develop innovative implant and instrument systems that help to preserve stability and stabilize the cervical and thoracolumbar spine.<sup>2-4,6</sup>

<sup>1</sup> MacDonald J. Management of spondylolisthesis. *European Musculoskeletal Review*. 2006;1-4.

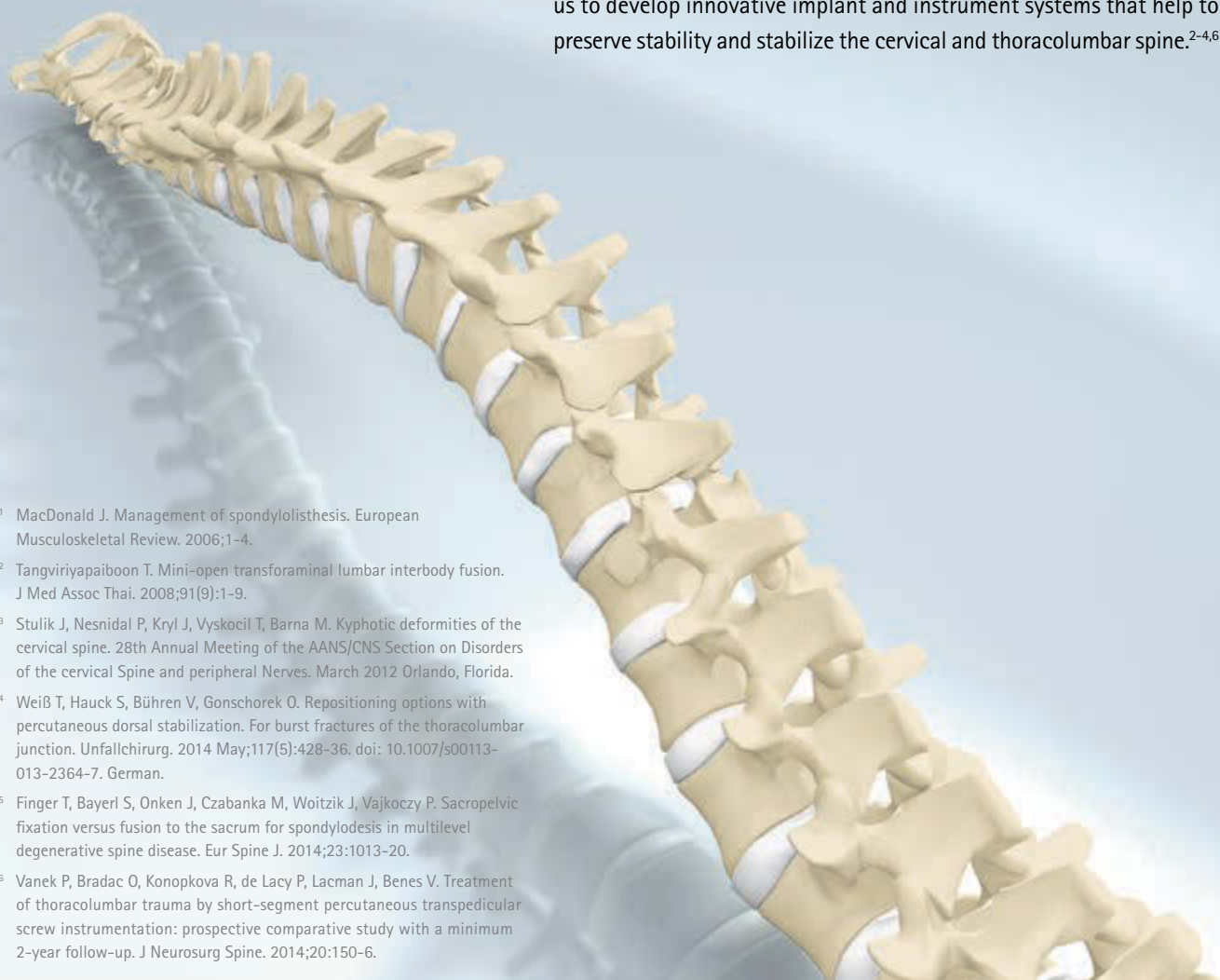
<sup>2</sup> Tangviriyapaiboon T. Mini-open transforaminal lumbar interbody fusion. *J Med Assoc Thai*. 2008;91(9):1-9.

<sup>3</sup> Stulik J, Nesnidal P, Kryl J, Vyskocil T, Barna M. Kyphotic deformities of the cervical spine. 28th Annual Meeting of the AANS/CNS Section on Disorders of the cervical Spine and peripheral Nerves. March 2012 Orlando, Florida.

<sup>4</sup> Weib T, Hauck S, Bühren V, Gonschorek O. Repositioning options with percutaneous dorsal stabilization. For burst fractures of the thoracolumbar junction. *Unfallchirurg*. 2014 May;117(5):428-36. doi: 10.1007/s00113-013-2364-7. German.

<sup>5</sup> Finger T, Bayerl S, Onken J, Czabanka M, Woitzik J, Vajkoczy P. Sacropelvic fixation versus fusion to the sacrum for spondylosis in multilevel degenerative spine disease. *Eur Spine J*. 2014;23:1013-20.

<sup>6</sup> Vanek P, Bradac O, Konopkova R, de Lacy P, Lacman J, Benes V. Treatment of thoracolumbar trauma by short-segment percutaneous transpedicular screw instrumentation: prospective comparative study with a minimum 2-year follow-up. *J Neurosurg Spine*. 2014;20:150-6.



# AESCLAP CERVICAL SPINE

## PORTFOLIO OVERVIEW

### IMPLANT SYSTEMS

#### anterior



CeSPACE® PEEK/Titan/XP



Quintex®



Modulift® S



activC®



ABC2®



Apfelbaum / Odontoid



CASPAR Revolution

#### posterior



SecureSpan®



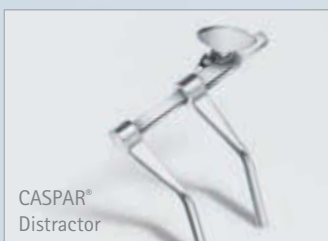
S4® Cervical



Apfelbaum / C1 / C2

### INSTRUMENT SYSTEMS

#### anterior



CASPAR® Distractor



activC® Distractor

#### anterior/posterior



CCR



CCR-XX

# AESCULAP® Modulift® S

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# AESCULAP® Modulift® S

A | SYSTEM OVERVIEW

## PRODUCT ADVANTAGES

Spikes provide initial stability.<sup>1</sup> The oval anatomic shape and waffle pattern increase surface contact while the central hole and fenestrations accommodate bone in-growth. All these features are thought to work in concert to create a positive bone modeling response for long term fusion and stability.

### ➤ EASY HANDLING

A one-piece design with built-in set screws and a state-of-the-art instrumentation system that simplifies the Modulift® VBR insertion, distraction and locking process.

### ➤ TACTILE FEEDBACK

Proprietary spindle surface treatment was designed to minimize friction of the internal moving parts which enhances tactile feedback.



<sup>1</sup> Internal Mechanical Test Report. Empirical Testing Corp. ASTM F2077, F2267, and Expulsion Testing of the Modulift Testing. Colorado Springs. 2013.

## ➤ CENTRAL DRIVE MECHANISM

Provides symmetrical expansion to accommodate visualization of both endplates.



## ➤ STERILE PACKED

The Modulift® Small VBR is a one-piece device individually sterile packaged for uncompromised patient safety.

## ➤ DIFFERENT FOOTPLATES AVAILABLE

0, 5 and 10 degrees of curvature correction allow to accommodate clinical and anatomical considerations.

## ➤ ATTACHMENT POINTS

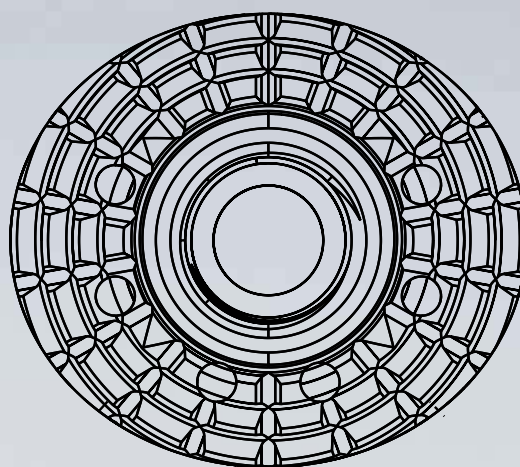
Allows for an efficient yet secure attachment point for both insertion and in-situ reattachment capability. The dovetail attachment and inserter alignment holes allow for a low-profile inserter thus allowing visualization of the dynamic expansion process.

# AESCULAP® Modulift® S

A | SYSTEM OVERVIEW

## A SIMPLE ...

... yet comprehensive cervical VBR System that was designed to provide tactile feedback, initial stability, and sagittal balance restoration.







## INDICATIONS

- The Aesculap® Modulift® VBR System is used for partial or total replacement of a collapsed, damaged or unstable vertebral body in the cervical spine (C3-C7).
- The Aesculap® Modulift® VBR System is used with supplemental spinal fixation systems.
- The Aesculap® Modulift® VBR System may be used with bone graft.

Surgically installed implants serve to support normal healing processes. They are not intended for use either as replacement for natural body parts or to bear loads over the long term in the event the healing process is incomplete or slow.

Use for the following indications:

- Fractures
- Anterior correction of spinal deformities
- Degenerative Disc Disease
- Deformities
- Degenerative instability
- Post-traumatic instability
- Spinal tumors

### Note:

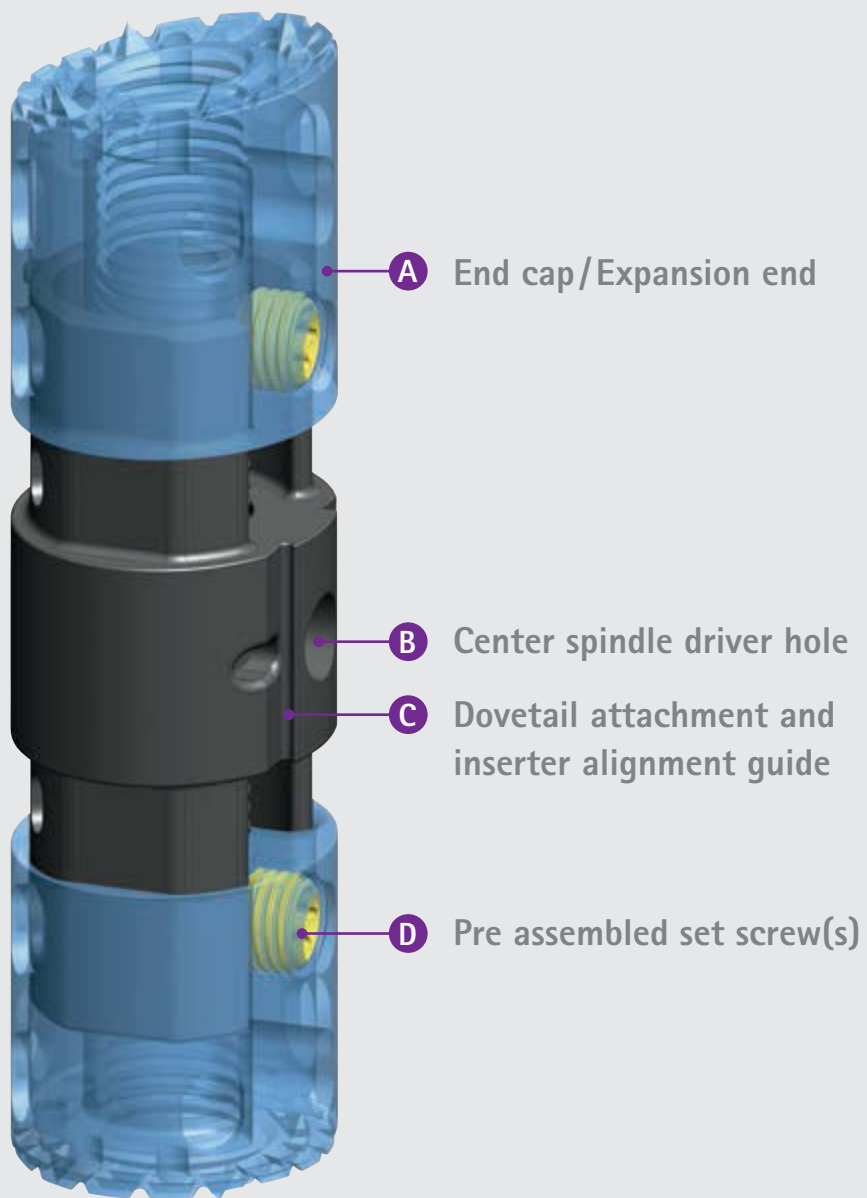
- For contraindications and further informations see instructions for use TA015036 for Modulift® General Instrument, TA015037 for Modulift® Implant Inserter and TA015038 for Modulift® Implants.

# AESCULAP® Modulift® S

A | SYSTEM OVERVIEW

## CENTRAL DRIVE MECHANISM





# AESCULAP® Modulift® S

## B | SURGICAL TECHNIQUE



### PRE-OPERATIVE PLANNING

- Use the appropriate imaging techniques to determine the patient's osseous anatomy, proper size and type of the instrumentation to be used.
- Anticipate your needs with pre-operative planning to identify the implant components to be used for the assembly (implant expansion range, footplates). Changes in implant configuration may become necessary based on intra-operative findings and conditions.

### PATIENT POSITIONING

- The patient is placed in the supine position with the head slightly reclined and resting in a headrest or ring.
- Once the lordotic spine has been supported, the interscapular region may be bolstered to emphasize the reclination of the cervical spine.
- The arms are fixed along the sides of the body. Using the arm fixations, draw the shoulders down far enough to remove them from the radiation path of the segment to be fused.



MF810R  
Modulift® S Footplate Sizer

## EXPOSURE OF THE CERVICAL VERTEBRAL BODY

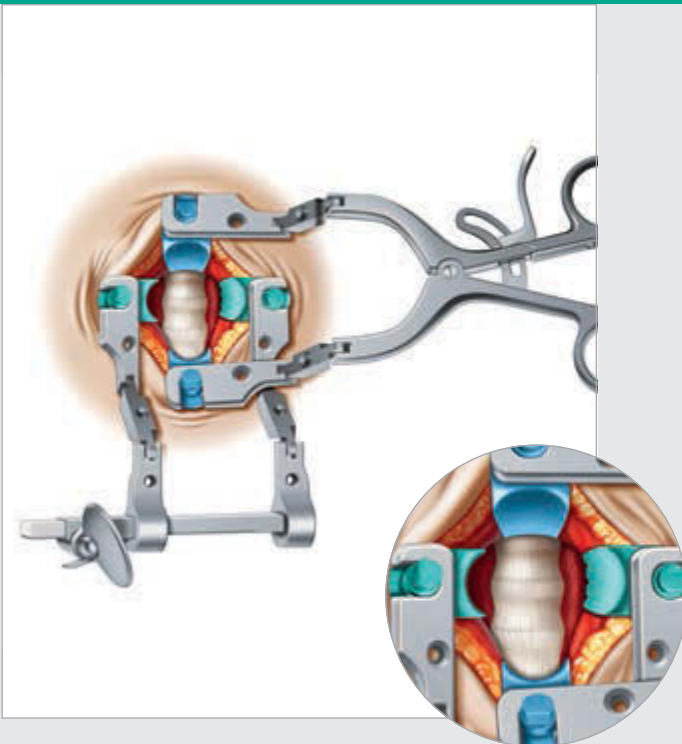
- After the skin incision and preparation, the CASPAR® Cervical Retractor is applied. The blades are available in PEEK and Titanium. A counter retractor can be used. The subcutaneous tissue is separated from the platysma cranially, caudally and medially, and the platysma is also separated following the direction of its fibers. The margins of the platysma can be held apart with the retractor or with two surgical forceps.
- Now the medial edge of the sternocleidomastoid muscle is located and prepared with the index finger in the connective tissue space over the ventral surface of the cervical spine and under lateralization of the vascular nerve bundle and medialization of the trachea, esophagus and thyroid gland.
- After the Langenbeck hooks have been inserted, the ventral surface of the cervical spine, still covered by a thin prevertebral layer of connective tissue, is revealed. This layer can now be exposed by either a blunt scissor or alternatively through bipolar coagulation in order to expand the tissue cranially and caudally using a swab.

## PERFORM CORPECTOMY

- Please perform a discectomy and corpectomy of the respective vertebral body to be replaced.
- The endplates of both adjacent vertebral bodies should be cleaned with a curette to help ensure a secure bony connection to the implant.

## FOOTPLATE SIZING

- Utilize the footplate sizer to determine the appropriate implant endplate size, cranially and caudally. Ensure adequate coverage of the vertebral body endplate.
- The Modulift® S Footplate Sizer is color coded to match the footprint of the VBR.



Modulift® S Footplate Sizer

# AESCULAP® Modulift® S

## B | SURGICAL TECHNIQUE



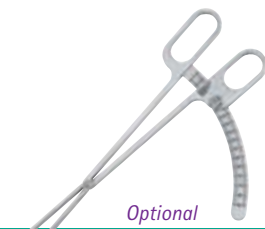
### EXPANSION RANGE SIZING

- The trial sizer replicates the retracted height of the VBR with footplates. Lordotic curvature correction can be determined by using the modular trial footplate attachments.
- Assemble the trial footplate to the trial implant body by lightly squeezing the body spring mechanism. Use of imaging is recommended at this time to evaluate the anatomy.
- The Modulift® VBR size range incorporates overlap in expansion range capability. It is recommended to avoid selecting a VBR at the end of its expansion range.
- As an optionally available tool – a caliper can be used to measure the vertebral body space.

#### Note:

- Orientation of the footplate trials to the trial implant base is provided by matching alignment lines on both trial implant components.

Article No.	Description
MF811T	Modulift® S Trial Implant Body 19-23 mm
MF812T	Modulift® S Trial Implant Body 21-27 mm
MF813T	Modulift® S Trial Implant Body 25-35 mm
MF814T	Modulift® S Trial Implant Body 30-45 mm
MF815T	Modulift® S Trial Implant Body 38-57 mm
MF816T	Modulift® S Trial Implant Body 48-74 mm
MF808T	Modulift® S Trial Implant Body 34-49 mm
MF795T	Modulift® S Footplate Trial 0°
MF796T	Modulift® S Footplate Trial 5°
MF797T	Modulift® S Footplate Trial 10°
MF817R	Modulift® S Handle for Trial Implant
MF807R	Modulift® S Caliper (optional)



Optional  
MF807R  
Modulift® S Caliper



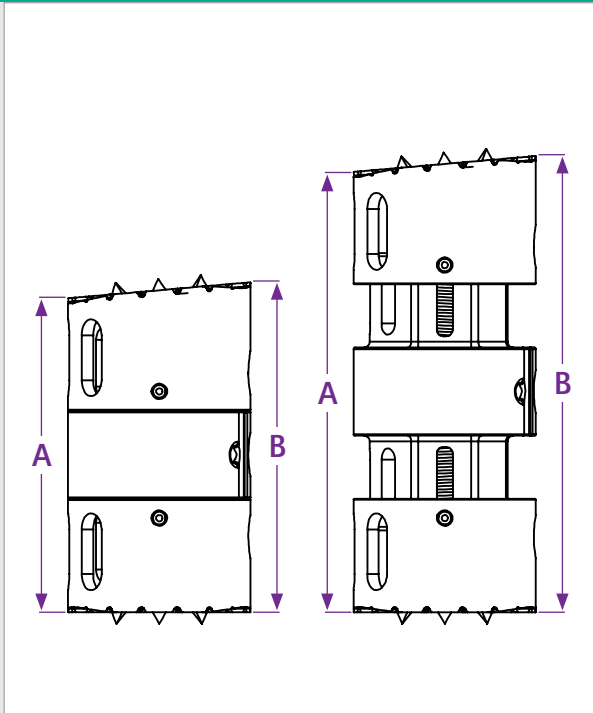
MF817R  
Modulift® S Handle for Trial Implant



MF811T - MF816T, MF808T  
Modulift® S Trial Implant Bodies



MF795T - MF797T  
Modulift® S Footplate Trials



Based on preoperative plan, endplate size, curvature correction and expansion range needed – select the appropriate sized expansion body and footplate configuration from the implant tray.

Curvature correction footplates add to the vertical dimension of the VBR. See chart below for complete critical dimensional information.

### Modulift® S – CRITICAL DIMENSIONS

Article No.	Modulift® S Description	Article No.	Modulift® S Description	Retracted		Expanded	
				A (mm)	B (mm)	A (mm)	B (mm)
		MF633T	14 x 16, 19-23 mm, 0°	19		23	
		MF634T	14 x 16, 21-27 mm, 0°	21		27	
		MF635T	14 x 16, 25-35 mm, 0°	25		35	
		MF636T	14 x 16, 30-45 mm, 0°	30		45	
MF622T	12 x 14, 19-23 mm, 5°	MF638T	14 x 16, 19-23 mm, 5°	19	20.1	23	24.1
MF623T	12 x 14, 21-27 mm, 5°	MF639T	14 x 16, 21-27 mm, 5°	21	22.1	27	28.1
MF624T	12 x 14, 25-35 mm, 5°	MF640T	14 x 16, 25-35 mm, 5°	25	26.1	35	36.1
MF625T	12 x 14, 30-45 mm, 5°	MF641T	14 x 16, 30-45 mm, 5°	30	31.1	45	46.1
MF626T	12 x 14, 38-57 mm, 5°	MF642T	14 x 16, 38-57 mm, 5°	38	39.1	57	58.1
MF627T	12 x 14, 48-74 mm, 5°	MF643T	14 x 16, 48-74 mm, 5°	48	49.1	74	75.1
		MF645T	14 x 16, 25-35 mm, 10°	25	27.2	35	37.2
		MF646T	14 x 16, 34-49 mm, 10°	34	36.2	49	51.2
		MF647T	14 x 16, 48-74 mm, 10°	48	50.2	74	76.2

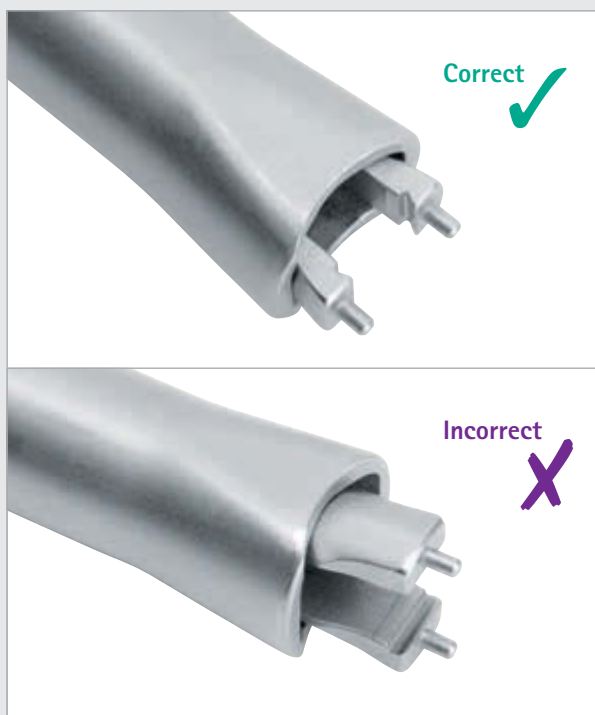
# AESCULAP® Modulift® S

## B | SURGICAL TECHNIQUE



### INSERTER ASSEMBLY

- Assemble the three inserter components by inserting the clamp mechanism (A) through the barrel of the handle (B). Engage the threads of the clamp by turning the thumb knob (D, circled below) clockwise one or two turns.
- Insert the „handle control knob“ (C) into the bottom of the handle. Before twisting the knob in the handle clockwise until it fully engages, the handle can be rotated to enhance the working ergonomics and X-ray image capability.



### Note:

- The flat surfaces of the clamp mechanism and barrel of the handle assembly must be on the same plane.





MF800R  
Modulift® S Implant Inserter

## ATTACHMENT OF THE INSERTION HANDLE TO THE VBR

- For proper alignment and expansion function, ensure that the two male ends on the inserter match the female VBR alignment holes.
- Twist the thumb knob (D) until the indicator (F) lines up with the "OPEN" position marked on the tube of the insertion instrument.
- The clamp mechanism on the inserter should be open enough to grasp the dove tail attachment of the VBR. This will ensure the VBR is in the correct position relative to the clamp and expansion driver function.



- Rotate the thumb knob (D) clockwise to close the jaws. Check that the indicator (F) lines up with the "CLAMPED" position marked on the tube of the insertion instrument. Verify the security of the attachment. Use the thumb knob (D) and rotate counterclockwise to loosen the jaws.

### Note:

- Do not overtighten the clamp mechanism. Finger tighten the thumb knob (D) by turning in clockwise direction to secure the Modulift® VBR implant to the insertion handle.

# AESCULAP® Modulift® S

B | SURGICAL TECHNIQUE



- By loosening the „handle control knob“ (circled) you can improve the ergonomics and image technique by rotating the handle around the barrel of the inserter. Be sure to re-tighten once the optimal handle position is selected.



## BONE PACKING (OPTIONAL)

- Using the bench block, graft funnel, and bone tamp, it is possible to add bone graft or other media into the central column of the chosen implant.
- It is up to the operating surgeon whether or not to add bone graft to the implant.



## INSERTION AND EXPANSION

- Carefully slide the expansion driver instrument (MF801R) into the inserter to engage the expansion gear drive located on the internal assembly of the VBR.
- There will be an audible click when the expansion driver is properly engaged.
- The dual geometry expansion driver provides a smaller handle (A) for quicker expansion and a larger handle (B) for greater mechanical advantage. Both options provide optional tactile feedback of the spinal anatomy.
- Once the expansion driver is properly engaged with the VBR, rotate the expansion knob clockwise. This will ensure the VBR expands as desired. Return the VBR to the retracted height prior to insertion.

### Note:

- One full rotation of the expansion driver yields a change in vertical height of 0.4 mm.
- Insert the VBR and insure your position is appropriate relative to the patient's anatomic situation, overall stability and bone quality.
- Expand the VBR to fit the prepared space.



# AESCULAP® Modulift® S

B | SURGICAL TECHNIQUE



- Once a satisfactory position has been found – commence final expansion under flourescopic conditions.
- If a less than satisfactory result is achieved, rotate the expansion knob counterclockwise to collapse the VBR in a controlled manner, reposition and re-expand.



## FINAL IMPLANT VERIFICATION

- Once final seating and positioning is confirmed, remove only the expansion driver (circled). The inserter will remain and function as your counter torque.
- There is a implant tamp available for minor adjustments of the VBR position.



Modulift® S Set Screw Driver and  
Modulift® S Torque Limit Handle 1.2 NM

- Lock both set screws utilizing the appropriate torque limited driver. Because of the patented dual-expansion mechanism, two locking screws are provided for added security. The pre-positioned locking screw is already a part of the VBR construct. Use the set screw torque driver to lock the set screws by turning clockwise until the torque limit is reached and the handle clicks. Use the insertion handle for maintaining stability and counter torque.



## IMPLANT REMOVAL


- Clear all soft tissue and bony in-growth around the VBR.
- For counter torque attach the inserter if possible, then insert the expansion driver.
- Unscrew both lock mechanisms with the appropriate set screw removal driver (MF827R).
- Rotate the driver counterclockwise to retract the VBR.
- Continue removal of all soft tissue and bony in-growth until the VBR is loose and able to be removed with minimal force.

### Note:

- Do not remove the VBR by force. Patient injury will occur.
- A previously locked Modulift® S Implant cannot be reused, as the spindle of the VBR is deformed by the locking screw.

# AESCU LAP® Modulift® S

C | SET PROPOSAL

IMPLANTS	Article No.	Description	Set Proposal	Optional
	MF633T	Modulift® S, 14x16, 19-23 mm, 0°	1	—
	MF634T	Modulift® S, 14x16, 21-27 mm, 0°	1	—
	MF635T	Modulift® S, 14x16, 25-35 mm, 0°	1	—
	MF636T	Modulift® S, 14x16, 30-45 mm, 0°	1	—
	MF638T	Modulift® S, 14x16, 19-23 mm, 5°	1	—
	MF639T	Modulift® S, 14x16, 21-27 mm, 5°	1	—
	MF640T	Modulift® S, 14x16, 25-35 mm, 5°	1	—
	MF641T	Modulift® S, 14x16, 30-45 mm, 5°	1	—
	MF642T	Modulift® S, 14x16, 38-57 mm, 5°	1	—
	MF643T	Modulift® S, 14x16, 48-74 mm, 5°	1	—
	MF645T	Modulift® S, 14x16, 25-35 mm, 10°	1	—
	MF646T	Modulift® S, 14x16, 34-49 mm, 10°	1	—
	MF647T	Modulift® S, 14x16, 48-74 mm, 10°	1	—

## IMPLANTS








Article No.	Description	Set Proposal	Optional
MF622T	Modulift® S, 12x14, 19-23 mm, 5°	1	—
MF623T	Modulift® S, 12x14, 21-27 mm, 5°	1	—
MF624T	Modulift® S, 12x14, 25-35 mm, 5°	1	—
MF625T	Modulift® S, 12x14, 30-45 mm, 5°	1	—
MF626T	Modulift® S, 12x14, 38-57 mm, 5°	1	—
MF627T	Modulift® S, 12x14, 48-74 mm, 5°	1	—











Other sizes available for order

# AESCULAP® Modulift® S

C | SET PROPOSAL

INSTRUMENTS	Article No.	Description	Set Proposal	Optional
	MF807R	Modulift® S Caliper	–	1
	MF810R	Modulift® S Footplate Sizer	1	–
	MF811T	Modulift® S Trial Implant Body 19-23 mm	1	–
	MF812T	Modulift® S Trial Implant Body 21-27 mm	1	–
	MF813T	Modulift® S Trial Implant Body 25-35 mm	1	–
	MF814T	Modulift® S Trial Implant Body 30-45 mm	1	–
	MF815T	Modulift® S Trial Implant Body 38-57 mm	1	–
	MF816T	Modulift® S Trial Implant Body 48-74 mm	1	–
	MF808T	Modulift® S Trial Implant Body 34-49 mm	1	–
	MF795T	Modulift® S Footplate Trial 0°	1	–
	MF796T	Modulift® S Footplate Trial 5°	1	–
	MF797T	Modulift® S Footplate Trial 10°	1	–
	MF817R	Modulift® S Handle for Trial Implant	2	–



INSTRUMENTS & TRAY	Article No.	Description	Set Proposal	Optional
	MF800R	Modulift® S Implant Inserter	1	—
	MF801R	Modulift® S Expansion Driver	2	—
	MF809P	Modulift® S Bench Block	—	1
	MF708R	Modulift® S/M Bone Tamp	—	1
	MF709R	Modulift® S/M Graft Funnel	—	1
	MF802R	Modulift® S Set Screw Driver	1	—
 <i>Alternatively:</i> 	MF828R  <i>WS-19-985- RAL5023</i>	Modulift® S Torque Limit Handle 1.2 NM  <i>Alternatively: Torque Limit Handle 1.2 NM</i>	1  —	—  1
	MF806R	Modulift® S Implant Tamp	—	1
	MF827R	Modulift® S Set Screw Removal Driver	1	—
	MF832	Modulift® S Instrument Tray	1	—
	MF833	Modulift® S Lid for Instrument Tray	1	—

# AESCULAP® – a B. Braun brand

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