ENNOVATE® Spinal System – Open Module

Surgical Technique

Aesculap Spine

AESCULAP®
Implant Systems

ENNOVATE® Spinal System – Open Module

Surgical Technique

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I. System Overview

The ENNOVATE® Spinal System is an implant system designed to address degenerative spine indications and facilitate the biological process of spinal fusion. This system is intended for posterior use in the thoracic, lumbar and sacral areas of the spine and includes polyaxial screws of varying diameters and lengths, and rod-to-rod and cross connectors of various styles and lengths. The implants in this system are manufactured from titanium alloy (Ti-6Al-4V), conforming to ISO 5832-3.

The ENNOVATE Spinal System is a spinal rod and screw system. This system's polyaxial screws can be rigidly locked into a wide range of configurations, allowing for intraoperative flexibility to create a construct to meet the individual needs of a patient. Rods of this system may be shaped intraoperatively to correct or maintain proper spinal curvature.

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II. Indications and Contraindications

Indications and Intended Use

The ENNOVATE Spinal System is intended for anterior/ anterolateral and posterior, non-cervical pedicle and non-pedicle fixation. Fixation is limited to skeletally-mature patients and is intended to be used as an adjunct to fusion using autograft or allograft. The ENNOVATE System can be used in both an Open and Minimally Invasive Surgery (MIS). The device is indicated for treatment of the following acute and chronic instabilities or deformities.

- Degenerative disc disease (defined as discogenic back pain with degeneration of the disc confirmed by history and radiographic studies),
- Spondylolisthesis,
- Trauma (i.e., fracture or dislocation),
- Spinal Stenosis,
- Deformities or Curvatures (i.e., scoliosis, kyphosis, and/or lordosis),
- Tumor,
- Pseudoarthrosis, and
- Failed previous fusion.

Contraindications

Contraindications of the ENNOVATE Spinal System are similar to other commercially available posterior spinal fixation systems of similar design and material. Contraindications include, but are not limited to, the following:

- Use in the Cervical Spine,
- Active systemic or local infection,
- Obesity,
- Pregnancy,
- Mental illness,
- Severe osteoporosis or osteopenia,
- Metal sensitivity/ allergies to the implant material,
- Alcohol or drug abuse,
- Patients unwilling or unable to follow postoperative instructions,
- Neuromuscular diseases/disorders,
- Soft tissue deficit not allowing wound closure,
- Any medical or physical condition that would preclude the potential benefit of spinal implant surgery,
- Congenital abnormalities, tumors or other conditions that would prevent secure component fixation that has the potential to decrease the useful life of the device,
- Any medical or mental condition which would exclude the patient or put the patient at high risk from surgery of this severity,
- For pedicle screw cases, inadequate pedicles of the fifth lumbar (L5) vertebrae.

III. Warnings and Precautions

Precautions:

- Components of competitive spinal fixation systems should not be used with components of the ENNOVATE® Spinal System. Components of dissimilar material should not be used together due to the potential for accelerating the corrosion process by mixing of dissimilar materials.
- No component of the ENNOVATE Spinal System should be reused after being removed from the body. An implant should never be re-sterilized after contact with body tissues or body fluids.
- Damage to the implant can occur if the set screw is overtightened. Do not tighten the set screw without using the countering instrument, or screw head expansion can occur.
- Damage to the implant can occur when set screw is overtorqued.
- Damage to the implant can occur if the repositioning instruments are positioned too high in relation to the implant. Always apply repositioning instruments (e.g. distraction and compression forceps) below the rod at the implant.
- Overinsertion of the ENNOVATE polyaxial screws may result in contact between the polyaxial screw body and the bone surface. This contact may result in damage to the implant or instrumentation.
- The implant can be damaged by spondylolisthesis repositioning through the set screw. Always use the rod persuader for spondylolisthesis repositioning.
- The ENNOVATE System has not been evaluated for safety and compatibility in the MR environment. The ENNOVATE System has not been tested for heating or migration in the MR environment.
- The implantation of pedicle screw spinal systems should be performed only by experienced spinal surgeons with specific training in the use of this pedicle screw spinal system because this is a technically demanding procedure presenting a risk of serious injury to the patient.
- Based on the fatigue testing results, the physician/surgeon should consider the levels of implantation, patient weight, patient activity level, other patient conditions, etc. which may impact on the performance of the system.
- The ENNOVATE Spinal System should be implanted only by surgeons experienced in the use of spinal fixation systems. This system should only be used with instrumentation specifically designed for this system, and the surgeon should be familiar with the surgical technique.

Warnings:

- The safety and effectiveness of pedicle screw spinal systems have been established only for spinal conditions with significant mechanical instability or deformity requiring fusion with instrumentation. These conditions are significant mechanical instability or deformity of the thoracic, lumbar and sacral spine secondary to degenerative spondylolisthesis with objective evidence of neurological impairment, fracture, dislocation, scoliosis, kyphosis, spinal tumor and failed previous fusion (pseudarthrosis). The safety and effectiveness of these devices for any other conditions are unknown.
- The ENNOVATE Spinal System is not intended to be used without bone graft, which is required to provide additional spinal support. Use of this product without bone graft or in cases that develop into a non-union will eventually be unsuccessful. A successful result is not always achieved in every surgical case. No posterior spinal fixation system can withstand body loads without the support of bone. In the event that bone is not provided to facilitate fusion, bending, loosening, disassembling and/ or breakage of the implant will eventually occur.
- Refer to the system's surgical technique for detailed implantation/explantation information. To obtain a surgical, technique guide, please contact Aesculap Implant Systems Customer Service Department at (866) 229-3002 or your Sales Representative.
- The patients should be made aware that a successful result, as defined by reduced pain, increased function and the establishment of solid fusion, is not always achieved in every surgical case. Proper patient selection will greatly affect the results. Patients who smoke have been shown to have an increased incidence of non-union. These patients should be informed of this increased risk and counseled to discontinue tobacco use prior to and immediately after surgery. Obese, malnourished and/ or nerve paralysis patients are also poor candidates for spinal fusion.
- In addition to the above specified warnings and precautions, general surgical risks should be explained to the patient prior to surgery.

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IV. Preoperative Planning

Preoperative planning is a beneficial step to treating spinal diseases by determining the appropriate starting point and trajectory of the screw. Anterior-Posterior (AP) and lateral views indicate the approximate screw initial trajectory at various levels of the thoracolumbar and sacral spine. The table below shows the recommended starting points for screw placement[1, 2, 3]:

Level	Cephalad-Caudal Starting Point	Medial-Lateral Starting Point
T1	Midpoint transverse process	Junction transverse process and lamina
T2	Midpoint transverse process	Junction transverse process and lamina
T3	Midpoint transverse process	Junction transverse process and lamina
T4	Junction between proximal third and midpoint transverse process	Junction transverse process and lamina
T5	Proximal third transverse process	Junction transverse process and lamina
T6	Junction of proximal edge and proximal third transverse process	Junction transverse process, lamina and facet
T7	Proximal transverse process	Midpoint facet
T8	Proximal transverse process	Midpoint facet
T9	Proximal transverse process	Midpoint facet
T10	Junction of proximal edge and proximal third transverse process	Junction transverse process, lamina and facet
T11	Proximal third transverse process	Just medial to lateral pars
T12	Midpoint transverse process	At level of lateral pars
L1	Midpoint transverse process	Junction superior facet and 2 mm lateral to pars
L2	Midpoint transverse process	Junction superior facet and 2 mm lateral to pars
L3	Midpoint transverse process	Junction superior facet and 2 mm lateral to pars
L4	Midpoint transverse process	Junction superior facet and 2 mm lateral to pars
L5	Midpoint transverse process	Junction superior facet and 2 mm lateral to pars
S1	Midpoint sacral ala	Intersection sacral ala and superior facet
Iliac	Cranial to posterior superior iliac spine	Proximal to S2 foramen / Caudal to posterior superior iliac spine

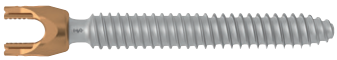
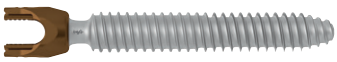
1 Rhee J, et al. Operative Techniques in Spine Surgery. Philadelphia. Lippincott Williams & Wilkins; 2013.

2 Kim D, et al. Surgical Anatomy and Techniques to the Spine. Amsterdam. Elsevier Health Sciences; 2013.

3 Patel V, et al. Spine Surgery Basics. Heidelberg: Springer Science & Business Media; 2013.

V. Implants and Instruments

ENNOVATE® PentaCore® Polyaxial Solid Screws

	4.5													
	5.5													
	6.5													
	7.5													
	8.5													
	9.5													
	10.5													
		25	30	35	40	45	50	55	60	70	80	90	100	110

All implants are supplied sterile packaged.

- *Refer to set list quantities on pages 39-43.*
- *Cannulated screws are additionally available. Refer to DOC1541 - ENNOVATE Spinal System - MIS Module Surgical Technique.*
- *Compatible with 5.5 mm diameter rods.*

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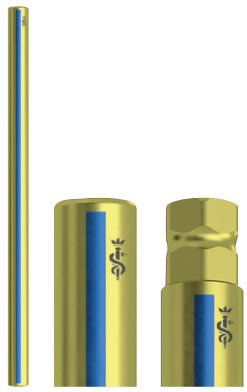
V. Implants and Instruments *(continued)*

ENNOVATE Set Screw

ENNOVATE Rods – Straight



5.5												
	30	35	40	45	50	55	60	70	80	90	100	110
5.5												
	120	130	140	150	160	170	180	190	200	300	400	500

Rods larger than 150 mm in length have a hexagonal end

ENNOVATE Rods – Curved

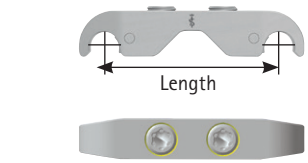
5.5												
	30	35	40	45	50	55	60	70	80	90	100	110
5.5												
	120	130	140	150								

The ENNOVATE curved rod includes licensed technology, which is covered by US Patent 8,771,318.

All implants are supplied sterile packaged.

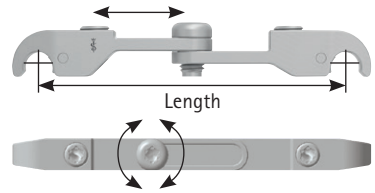
V. Implants and Instruments *(continued)*

ENNOVATE® Fixed Transconnectors*



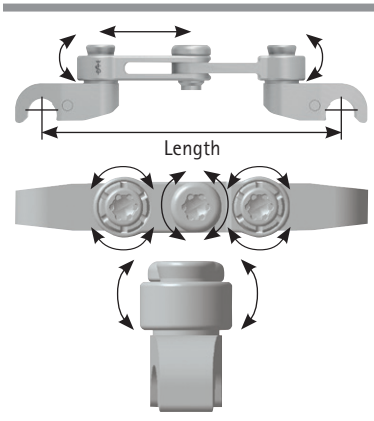
for 5.5						
	30 mm	32 mm	34 mm	36 mm	38 mm	40 mm

ENNOVATE Variable Transconnectors*



for 5.5					
42–45 mm	45–50 mm	50–60 mm	60–80 mm	80–100 mm

ENNOVATE Multiaxial Cross Connectors*



for 5.5					
26–30 mm	28–34 mm	31–37 mm	34–40 mm	39–45 mm

for 5.5			
45–58 mm	58–80 mm	80–100 mm

**Length is defined as the distance between rod centers.*
**Arrows indicate the degrees of freedom.*

All implants are supplied sterile packaged.

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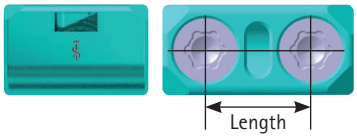
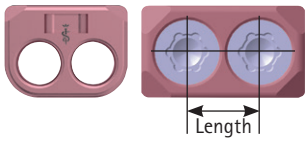
V. Implants and Instruments *(continued)*

ENNOVATE Axial Connectors



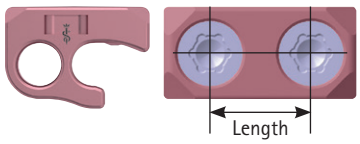
for 5.5		
	19 mm	34 mm

ENNOVATE Closed Domino Connectors



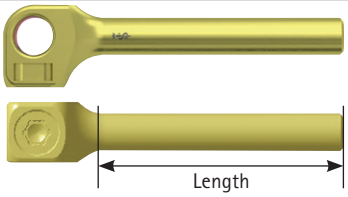
for 5.5		
	7 mm	11 mm

ENNOVATE Closed/Open Domino Connectors



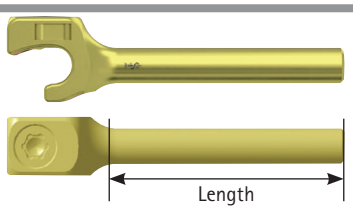
for 5.5		
	7 mm	11 mm

ENNOVATE Closed Lateral Offset Connectors



for 5.5			
	20 mm	35 mm	50 mm

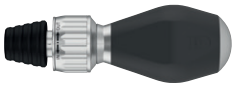
ENNOVATE Open Lateral Offset Connectors



for 5.5			
	20 mm	35 mm	50 mm

All implants are supplied sterile packaged.

V. Implants and Instruments *(continued)*

Implantation Instruments	Item No.	Description
	**SZ222R**	ENNOVATE® Quick Connect Ratchet Straight Handle, Medium
	**SZ224R**	ENNOVATE Quick Connect Ratchet T-Handle
	**SZ225R**	ENNOVATE Quick Connect Ratchet Handle, Drop Shape
	**SZ241R**	ENNOVATE Pedicle Awl
	**SZ242R**	ENNOVATE Lumbar Pedicle Probe, Straight
	**SZ243R**	ENNOVATE Lumbar Pedicle Probe, Curved
	**SZ244R**	ENNOVATE Thoracic Pedicle Probe, Straight
	**SZ245R**	ENNOVATE Thoracic Pedicle Probe, Curved
	**SZ263R**	ENNOVATE Lumbar Pedicle Probe Large, Straight
	**SZ264R**	ENNOVATE Thoracic Pedicle Probe Large, Straight
	**SZ246R**	ENNOVATE Pedicle Sounder, Straight
	**SZ247R**	ENNOVATE Pedicle Sounder, Curved
	**AA804R**	ENNOVATE Screw Length Scale

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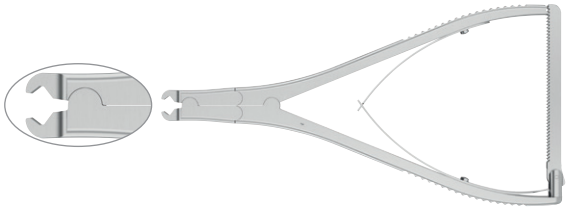
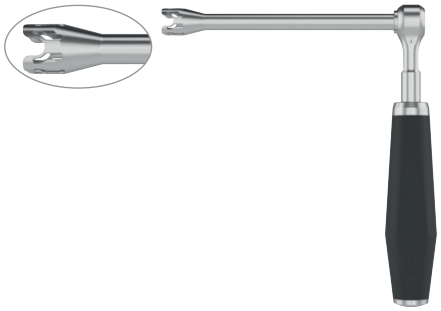
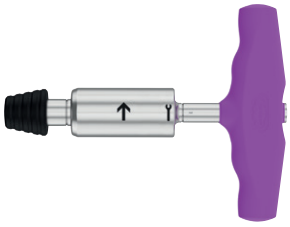
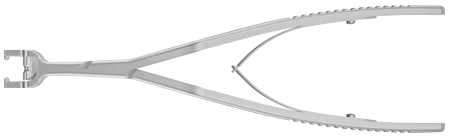
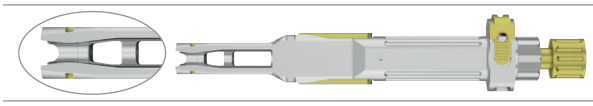
V. Implants and Instruments *(continued)*

Implantation Instruments	Item No.	Description
	**SZ254R**	ENNOVATE Screw Tap, 4.5 mm
	**SZ255R**	ENNOVATE Screw Tap, 5.5 mm
	**SZ256R**	ENNOVATE Screw Tap, 6.5 mm
	**SZ257R**	ENNOVATE Screw Tap, 7.5 mm
	**SZ258R**	ENNOVATE Screw Tap, 8.5 mm
	**SZ259R**	ENNOVATE Screw Tap, 9.5 mm
	**SZ260R**	ENNOVATE Screw Tap, 10.5 mm
	**SZ248R**	ENNOVATE Pedicle Marker, Dual Band
	**SZ249R**	ENNOVATE Pedicle Marker, Single Band
	**SZ262R**	ENNOVATE Screwdriver
	**SZ265R**	ENNOVATE Screw Body Manipulator
	SZ267SU	ENNOVATE Rod Template, 300 mm
	**SZ272R**	ENNOVATE Rod Holding Forceps

V. Implants and Instruments *(continued)*

Manipulation Instruments	Item No.	Description
	**SZ273R**	ENNOVATE® Rod Pusher
	**SZ280R**	ENNOVATE Set Screwdriver
	**SZ391R**	ENNOVATE Set Screwdriver, Short
	**SZ282R**	ENNOVATE Counter Torque L-Handle
	**SZ228R**	ENNOVATE Torque Wrench Handle, 10 Nm
	**FW692R**	Cleaning Device
	**SZ275R**	ENNOVATE Fork Rocker, Curved
	**SZ277R**	ENNOVATE Rod Persuader
	**SZ276R**	ENNOVATE Counter Torque Handle for Persuader
	**SZ283R**	ENNOVATE Torque Wrench Shaft, 10 Nm
	**SZ393R**	ENNOVATE PolyBlocker *(Designed to lock the screw head from polyaxial to monoaxial)*
	**SZ270R**	French Rod Bender

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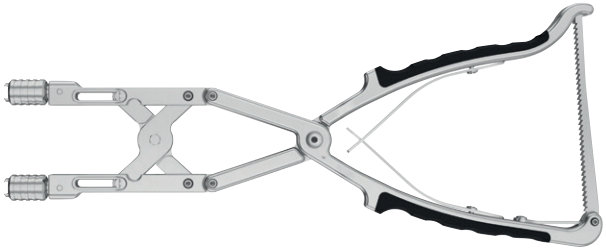
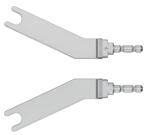
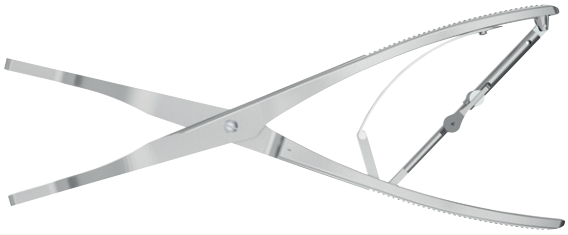
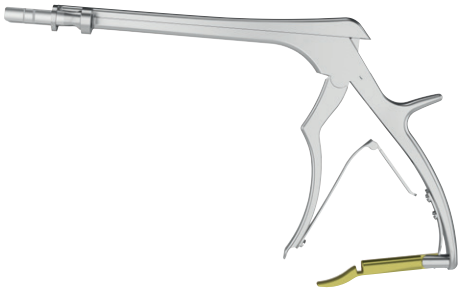
V. Implants and Instruments *(continued)*

Manipulation Instruments	Item No.	Description
	**SZ233R**	ENNOVATE Open Parallel Distractor Forceps
	**SZ234R**	ENNOVATE Open Parallel Compressor Forceps
	**SZ252R**	ENNOVATE Open Parallel Tips
	**SZ253R**	ENNOVATE Open Offset Tips
	**FW210R**	ENNOVATE / S4® Compression Forceps

V. Implants and Instruments *(continued)*

Connector Instruments	Item No.	Description
	**FW181R**	ENNOVATE® / S4® Distraction Forceps
	**FW023R**	ENNOVATE / SSE / S4 Distraction Forceps, Small
	**SZ229R**	ENNOVATE Torque Wrench Handle, 5 Nm
	**SZ290R**	ENNOVATE Cross Connector Holder
	**SZ291R**	ENNOVATE Cross Connector Caliper

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V. Implants and Instruments *(continued)*

Connector Instruments	Item No.	Description
	**SZ292R**	ENNOVATE Counter Torque Handle, Cross Connectors
	**SZ295R**	ENNOVATE Rod-to-Rod Holder
	**SZ297R**	ENNOVATE Torque Wrench Shaft for Connectors, 5 Nm

VI. Surgical Technique

Fig. 1

Fig. 2

A. Pedicle Preparation

1. Identify the appropriate spinal landmarks for initiating cortex perforation for screw placement. Create the perforation of the cortex with the Pedicle Awl (SZ241R) or burr, according to surgeons preference. (Fig. 1)
2. The perforation is followed by a Pedicle Probe to open the pedicle canal.
   - The Pedicle Probes are available as straight or curved Lumbar Probes (SZ242R or SZ243R) and straight or curved Thoracic Probes (SZ244R or SZ245R). (Fig. 2)
   - The Pedicle Probes have ruled markings to determine the advancement into the pedicle canal.
3. If necessary, Pedicle Markers (SZ248R or SZ249R) can be used as a placeholder during pedicle preparation or to identify proper anatomic location on the intraoperative imaging.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VI. Surgical Technique *(continued)*

Fig. 3

Fig. 4

A. Pedicle Preparation *(continued)*

4. Utilize the Pedicle Sounder (SZ246R or SZ247R) to palpate for any perforation in order to confirm the integrity of the pedicle and vertebral body cortex. (Fig. 3).
5. The ENNOVATE pedicle screws are fully-threaded self-tapping screws with a tapered tip. Screw taps are available for surgeon preference.
   - To tap, attach the desired handle to the appropriately sized Screw Tap (SZ254R-SZ260R) based on the screw diameter. **The Taps are undersized by 0.5 mm of the final screw diameter.** Ensure that the ratchet is set to **"IN"** for tapping. To remove the instrument, set the ratchet to **"OUT"**. (Fig. 4)

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VI. Surgical Technique *(continued)*

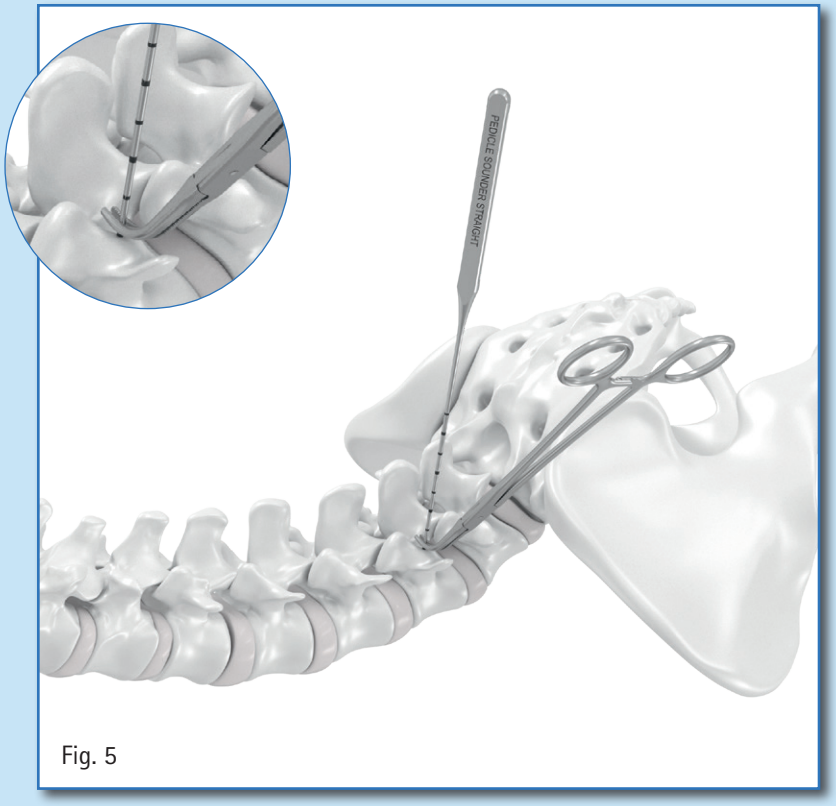

Fig. 5

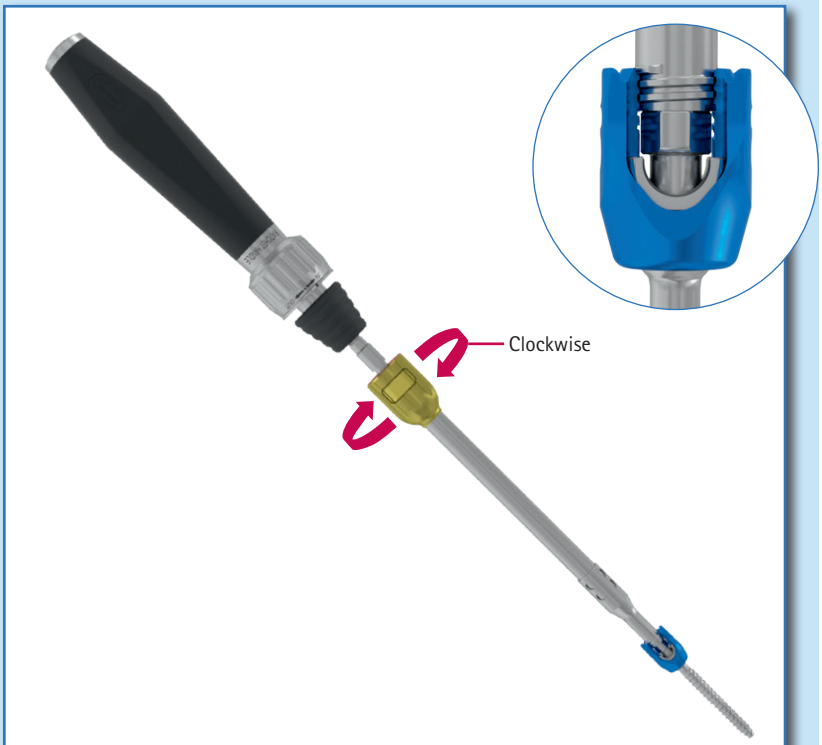

Fig. 6

B. Screw Placement

1. To determine the appropriate screw length, palpate the prepared pedicle canal with a Pedicle Sounder. Clamp a hemostat to the exposed Pedicle Sounder, and measure the length of the hole using the Screw Length Scale (AA804R). Select the appropriate screw diameter and length based on preoperative planning and intraoperative measuring. (Fig. 5)
2. Screw Inserter Assembly
   - Attach the desired handle to the Screwdriver (SZ262R).
   - Place the tip of the Screwdriver assembly into the body of the selected screw.
   - Press the gold button of the Screwdriver, and push the outer shaft of the screw inserter down until it mates with the head of the screw.
   - Turn the gold knob clockwise until the Screwdriver is fully secured to the screw.
   - Press the gold button and pull the gold knob toward the handle until a tactile click is felt (Fig. 6).

Note: *Ensure that the ratchet is set to "IN" for screw insertion.*

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

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VI. Surgical Technique *(continued)*

Fig. 7

Fig. 8

B. Screw Placement *(continued)*

3. Slowly advance the screw into the prepared pedicle to allow for viscoelastic expansion of the bone. The sleeve is designed to rotate freely and can be held firmly to help maintain the desired trajectory. (Fig. 7)

   Upon full seating of the screw, remove the Screwdriver.

   - Press the gold button of the Screwdriver, and push down the outer shaft of the Screwdriver until it is fully seated.

   Note: *The laser line should be at the level of the distal aspect of the Screwdriver.*

   - Turn the gold knob counterclockwise until the Screwdriver is removed from the screw.

4. If desired, align and position the screw bodies using the Screw Body Manipulator (SZ265R). (Fig. 8)

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VI. Surgical Technique *(continued)*

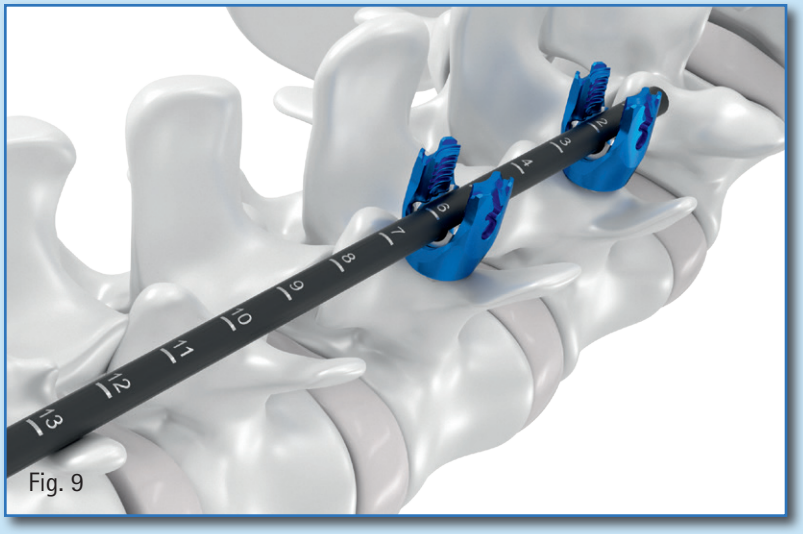
Fig. 9


Fig. 10

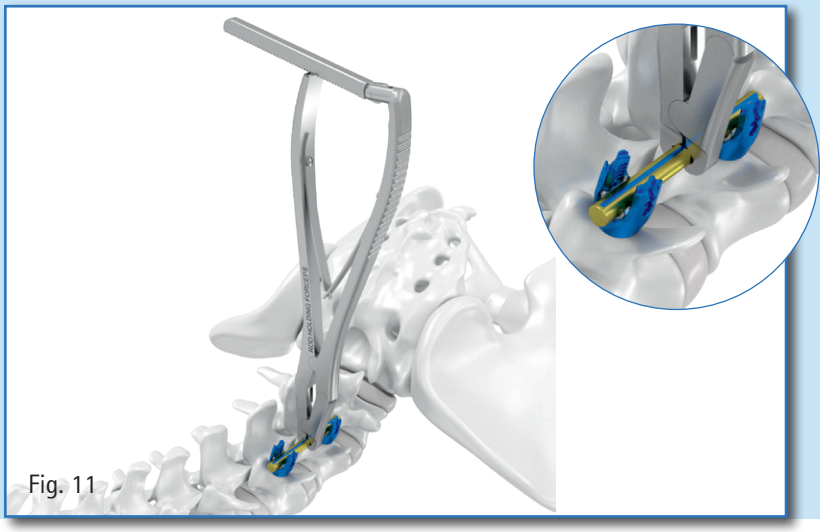
Fig. 11

C. Rod Contouring and Placement

1. After screw placement, the flexible Rod Template (SZ267SU) can be used to determine the required rod length for the construct. The Rod Template may also be used as a guide for sagittal and coronal contouring of the Rod. (Fig. 9)
2. All Rods may be contoured using the French Rod Bender (SZ270R).
   - To contour the Rod, place the Rod in the Bender and squeeze the handle until the desired curvature is achieved. The Rods have an orientation line that serves as a reference during contouring.
   - Clamping the Rod with Rod Holding Forceps (SZ272R) at both ends will help to avoid a possible rod rotation during contouring. (Fig. 10)
3. Use the Rod Holding Forceps to place the Rod into the screw heads. (Fig. 11)

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

ENNOVATE® Spinal System – Open Module

Surgical Technique

VI. Surgical Technique *(continued)*

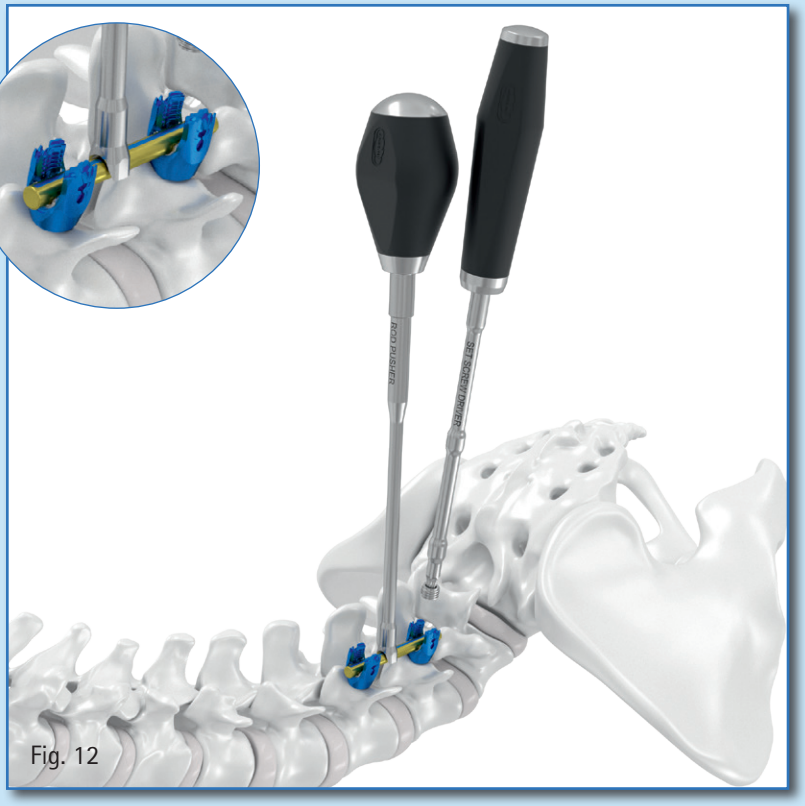

Fig. 12

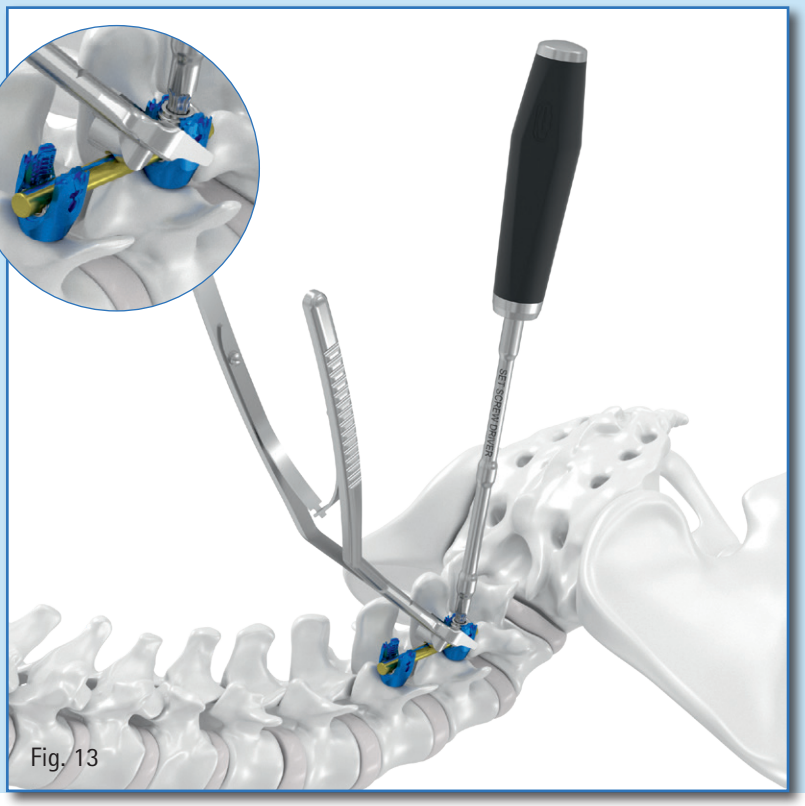

Fig. 13

D. Rod Reduction

Reduction with Rod Pusher

1. Place the Rod Pusher (SZ273R) on the Rod, and push the Rod manually into the screw head.
2. Attach the Set Screw to the Set Screwdriver (SZ280R), and place the Set Screw in the screw head. Provisionally tighten the Set Screw into the screw head. (Fig. 12)

Reduction with Fork Rocker

For minor vertical adjustments to seat the Rod into the screw head, the Fork Rocker (SZ275R) may be used.

1. Grasp the sides of the screw body with the rocker pins above the Rod, and then lever the Fork Rocker backward toward the Rod, levering the Rod into the screw head.
2. Attach the Set Screw to the Set Screwdriver (SZ280R), and place the Set Screw in the screw head. Provisionally tighten the Set Screw. (Fig. 13)

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VI. Surgical Technique *(continued)*

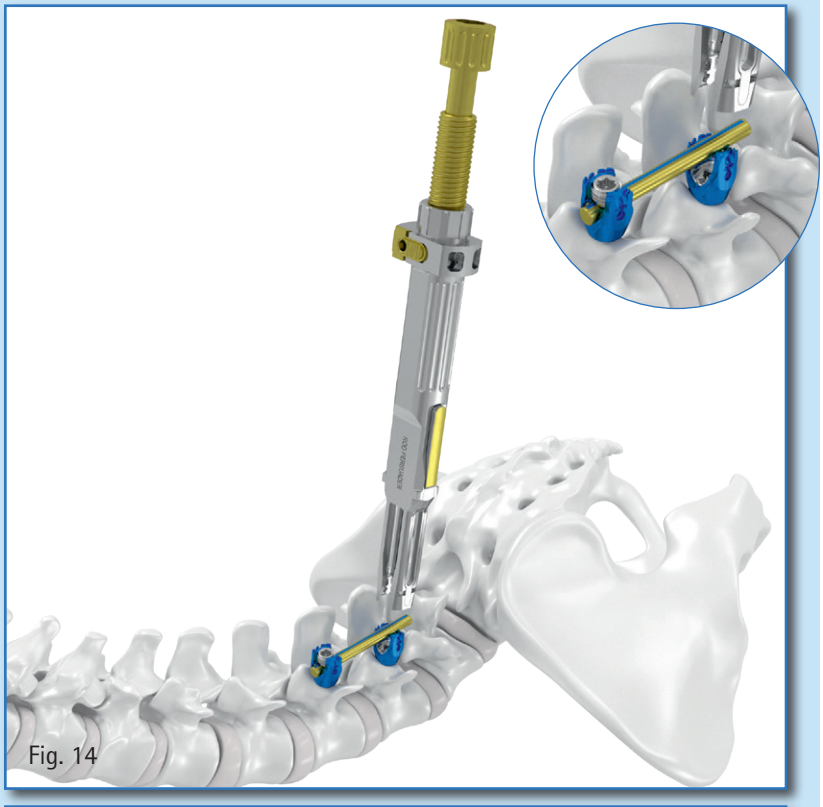

Fig. 14

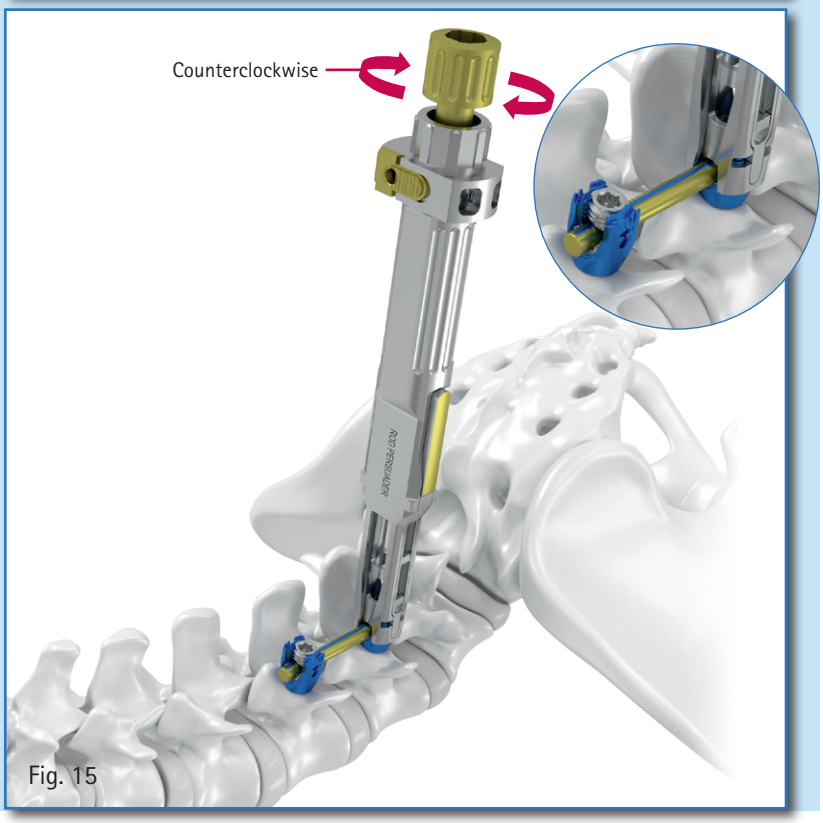

Fig. 15

Reduction with Rod Persuader

For situations where a higher vertical adjustment is needed, the Rod Persuader (SZ277R) may be used to gradually seat the Rod into the screw body.

1. Before placing the Rod Persuader over the screw body, ensure that the gold reduction spindle is fully extended. Place the Rod Persuader over the screw head, and press down firmly until the tips engage with the head of the implant. (Fig. 14)
2. Press down on the gold reduction spindle until the reduction sleeve is seated on the Rod. Further reduction can be performed by pushing the spindle down or by turning the gold reduction spindle clockwise until the Rod is fully reduced into the screw head. (Fig. 15)
3. Attach the Set Screw to the Set Screwdriver (SZ280R), and place the Set Screw through the Rod Persuader into the screw body. Provisionally tighten the Set Screw.
4. To remove the Rod Persuader from the screw head, simultaneously press the proximal gold button, and completely pull up the gold knob.

> **Note:** *It may be necessary to turn the gold knob counterclockwise to relieve pressure on the distal aspect of the instrument.*

5. Simultaneously press the lateral gold buttons on the distal end of the Rod Persuader, and pull the entire instrument off of the screw head.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VI. Surgical Technique *(continued)*

Fig. 16

Fig. 17

E. Final Tightening, Standard

1. Assemble the Torque Wrench by attaching the Torque Wrench Handle 10Nm (SZ228R) to the Torque Wrench Shaft 10Nm (SZ283R).
2. Engage the Counter Torque Handle (SZ282R) onto the screw head.
3. Insert the assembled Torque Wrench Assembly into the Counter Torque Handle, and fully seat the tip of the Torque Wrench into the Set Screw. (Fig. 16)
4. Turn the Torque Wrench clockwise while firmly holding the Counter Torque Handle until a click is heard. The click is an indicator that the final tightening of 10Nm has been achieved.

F. Alternate Final Tightening

1. Assemble the Torque Wrench by attaching the Torque Wrench Handle 10Nm (SZ228R) to the Torque Wrench Shaft 10Nm (SZ283R).
2. Engage the Counter Torque Handle for Persuader (SZ276R) with the Rod Persuader (SZ277R).
3. Insert the Torque Wrench through the tube of the Rod Persuader.
4. Fully seat the tip of the Torque Wrench into the socket of the Set Screw. (Fig. 17)
5. Turn the Torque Wrench clockwise while firmly holding the Counter Torque Handle until a click is heard. The click is an indicator that the final tightening of 10Nm has been achieved.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VII. Distraction and Compression

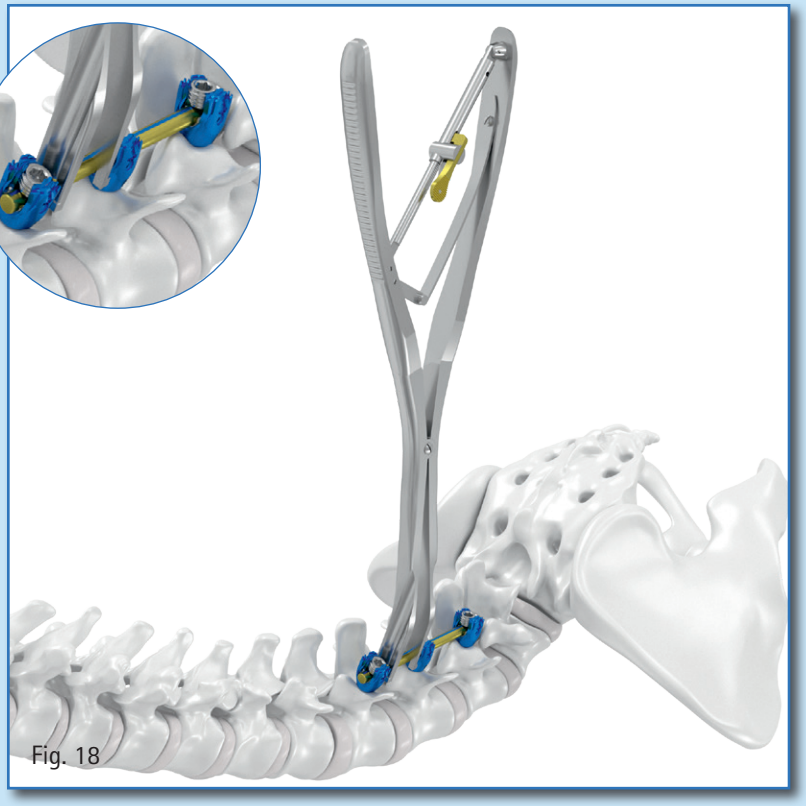

Fig. 18

A. Distraction

Standard Distraction Maneuver

Use the Parallel Distractor Forceps (SZ233R) with the appropriate Tips (SZ252R / SZ253R) or Distraction Forceps (FW181R / FW023R) to distract the construct.

1. Select the starting point for the distraction maneuver.
2. Loosen the adjacent Set Screw for distraction force transmission.
3. Place the distractor forceps between the screw bodies and perform the distraction maneuver. (Fig. 18)
4. Once the desired distraction is achieved, perform final tightening of the Set Screw.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

ENNOVATE® Spinal System – Open Module

Surgical Technique

VII. Distraction and Compression *(continued)*

Fig. 19

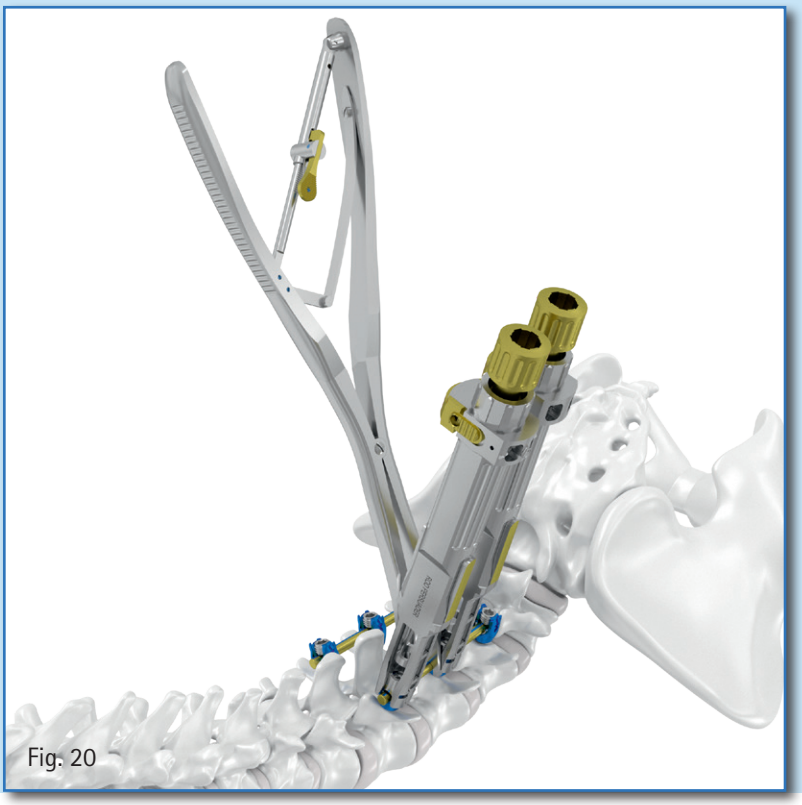

Fig. 20

A. Distraction *(continued)*

Parallel Distraction Maneuver with Rod Persuaders

After rod reduction, parallel distraction can be applied on the spinal segments. Use the Parallel Distractor Forceps (SZ233R) with the appropriate Tips (SZ252R / SZ253R) or the Distraction Forceps (FW023R / FW181R) with the Rod Persuader to distract the construct. For the parallel distraction, the Rod Persuaders need to be attached to the corresponding screws.

1. Select the starting point for the distraction maneuver.

Optional use of PolyLock instrumentation to convert the pedicle screw to a monoaxial condition.

- The PolyLock can be activated by connecting the Torque Wrench Handle 10Nm (SZ228R) to the PolyBlocker (SZ393R) and placing the assembly into the upper portion of the gold reduction spindle. Attach the Counter Torque Handle for Rod Persuader (SZ276R) to the Rod Persuader (SZ277R), and turn the Torque Wrench clockwise while firmly holding the Rod Persuader until a click is heard. The click is an indicator that the PolyLock has been activated. (Fig. 19)

2. If not using the optional PolyLock instrument, make sure the Rod Persuader is engaged and the rod is fully reduced into the screw body. Fully tighten the Set Screw to create a fixed starting point for distraction.
3. Loosen the adjacent Set Screw for distraction force transmission, and activate the PolyLock.
4. Place the Parallel Distractor Forceps between the Rod Persuaders, and perform the distraction maneuver. (Fig. 20)
5. Once the desired distance has been achieved, perform final tightening of the Set Screw.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VII. Distraction and Compression *(continued)*

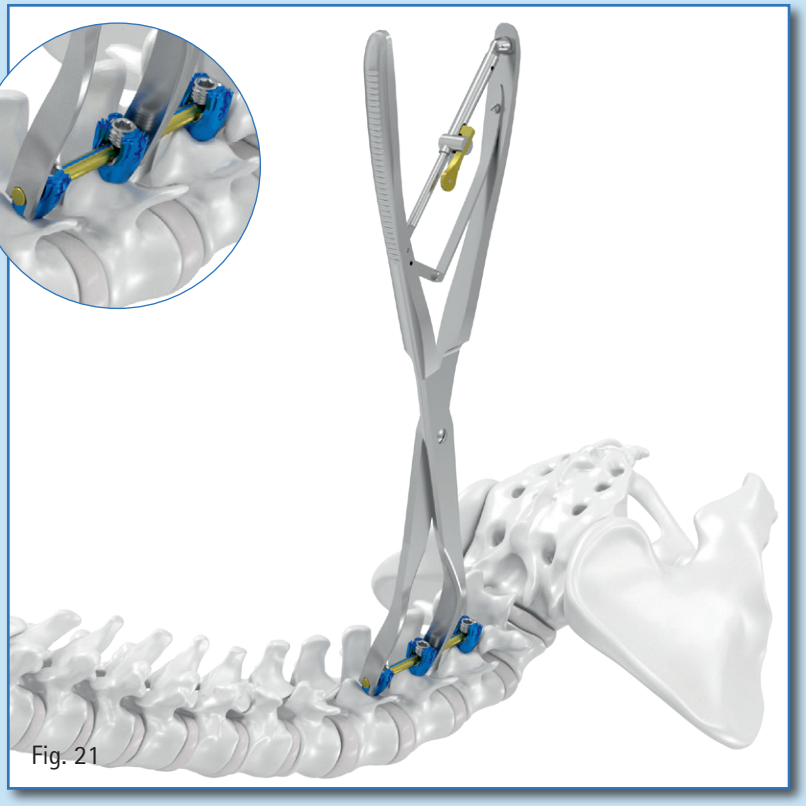

Fig. 21

B. Compression

Standard Compression Maneuver

Use the Parallel Compressor Forceps (SZ234R) with the appropriate Tips (SZ252R / SZ253R) or the Compression Forceps (FW210R) to compress the construct. (Fig. 21)

1. Select the starting point for the compression maneuver.
2. Loosen the adjacent Set Screw for compression force transmission.
3. Place the Parallel Compressor Forceps next to the screw bodies, and perform the compression maneuver.
4. Once the desired compression is achieved, perform final tightening of the Set Screw.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

ENNOVATE® Spinal System – Open Module

Surgical Technique

VII. Distraction and Compression *(continued)*

Fig. 22

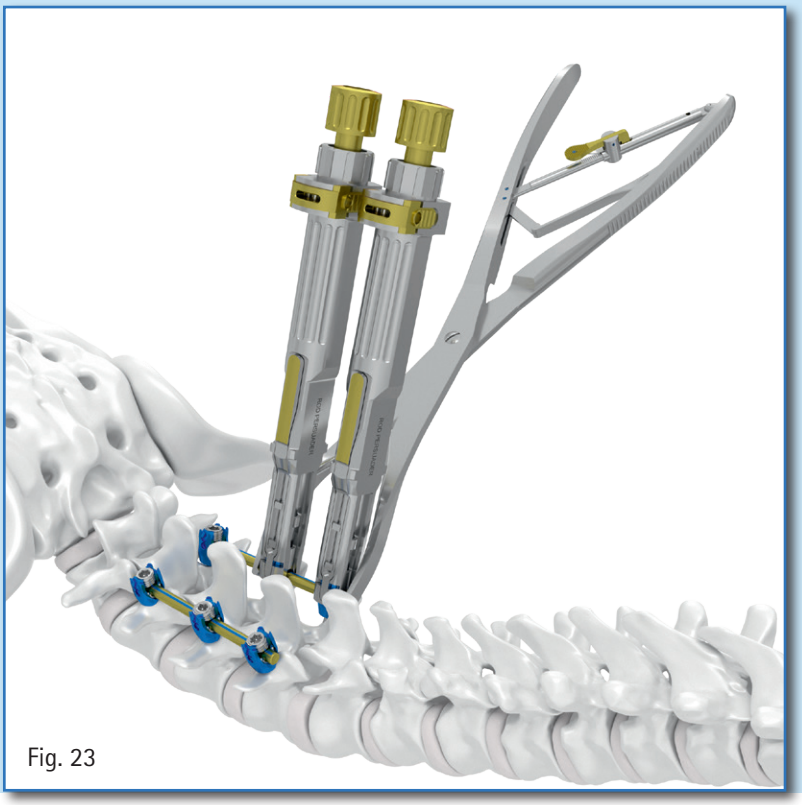

Fig. 23

B. Compression *(continued)*

Parallel Compression Maneuver with Rod Persuaders

After rod reduction, parallel compression can be applied on the spinal segments. Use the Parallel Compressor Forceps (SZ234R) with the appropriate Tips (SZ252R / SZ253R) or the Compression Forceps (FW210R) with the Rod Persuader to compress the construct. For parallel compression, the Rod Persuader must be attached to the corresponding screws.

1. Select the starting point for the compression maneuver.

Optional use of PolyLock instrumentation to convert the pedicle screw to a monoaxial condition.

- The PolyLock can be activated by connecting the Torque Wrench Handle 10Nm (SZ228R) to the PolyBlocker (SZ393R) and placing the assembly into the upper portion of the gold reduction spindle. Attach the Counter Torque Handle for Rod Persuader (SZ276R) to the Rod Persuader and turn the Torque Wrench clockwise while firmly holding the Rod Persuader until a click is heard. The click is an indicator that the PolyLock has been activated. (Fig. 22)

2. If not using the optional PolyLock instrument, make sure the Rod Persuader is engaged and the rod is fully reduced into the screw body. Fully tighten the Set Screw to create a fixed starting point for compression.
3. Loosen the adjacent Set Screw for compression force transmission and activate the PolyLock.
4. Place the Parallel Compression Forceps between the Rod Persuaders, and perform the compression maneuver. (Fig. 23)
5. Once the desired distance has been achieved, perform final tightening of the Set Screw.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

VIII. Cross Connector Placement

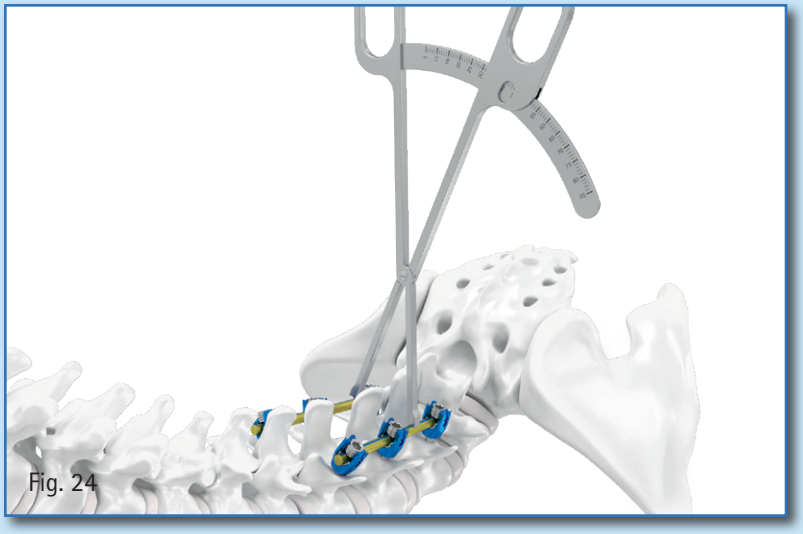

Fig. 24

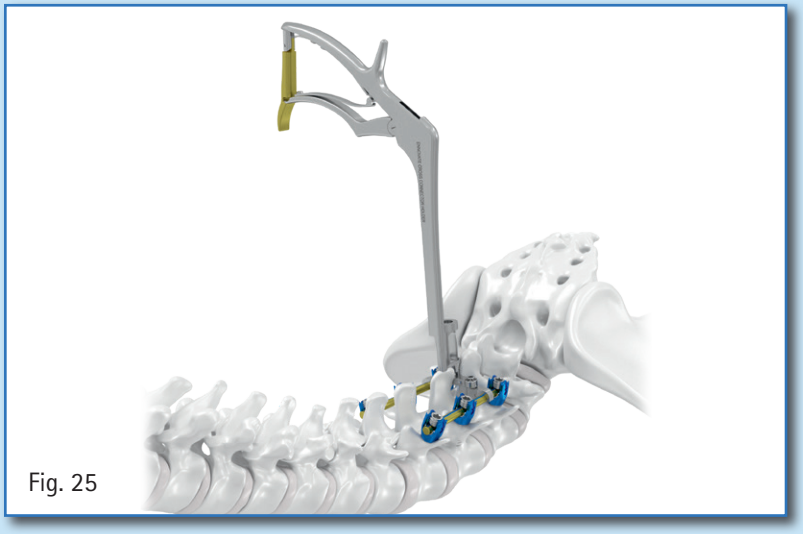

Fig. 25

Fig. 26

Once final tightening of the pedicle screws is completed, Cross Connectors may be used to provide additional rotational stability to the construct.

1. Determine the appropriate length using the Cross Connector Caliper (SZ291R). (Fig. 24)
2. Choose the desired Cross Connector type based on the measured length and patient anatomy. Verify there are no obstructions before placing the Cross Connector. Prior to placement, ensure that the Cross Connector set screws are backed out to prevent damage to the implants.
3. Insert the Cross Connector by using the Cross Connector Holder (SZ290R). (Fig. 25)
4. If the Cross Connector fits properly and is fully seated onto both rods, final tightening can be accomplished.
   - Assemble the Torque Wrench by attaching the Torque Wrench Handle 5Nm (SZ229R) to the Torque Wrench Shaft 5Nm (SZ297R).
   - Insert the torque wrench through the tube of the Counter Torque Handle (SZ292R) so the tip is exposed.
   - Fully seat the tip of the Torque Wrench into the socket of the Set Screw. (Fig. 26)
   - Engage the Counter Torque Handle with the Cross Connector.
   - Turn the torque wrench clockwise while firmly holding the Counter Torque Handle until a click is heard. The click is an indicator that the final tightening of 5Nm has been achieved.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

ENNOVATE® Spinal System – Open Module

Surgical Technique

IX. Construct Extension

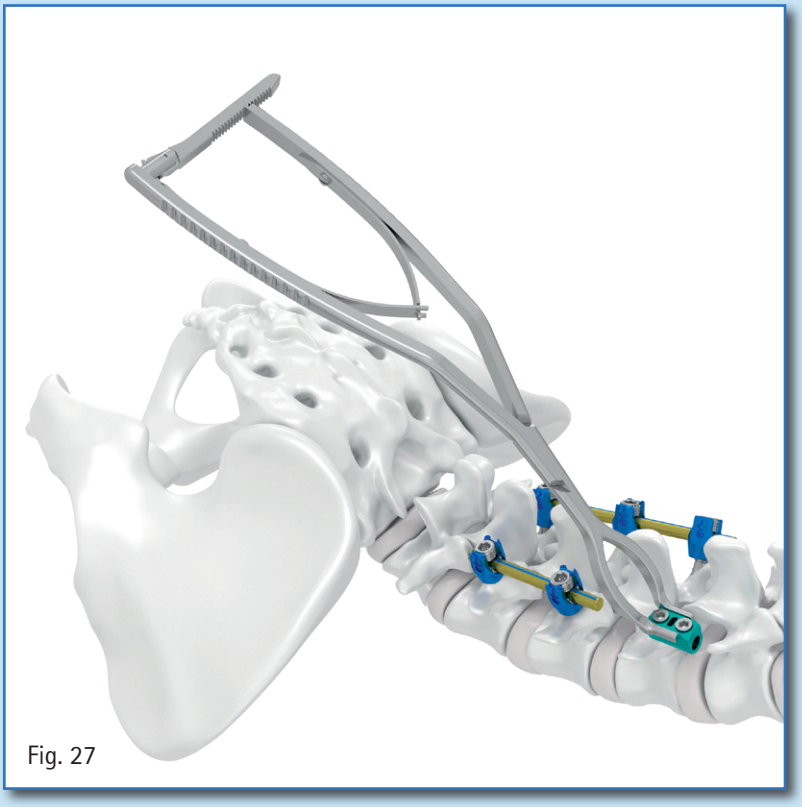

Fig. 27

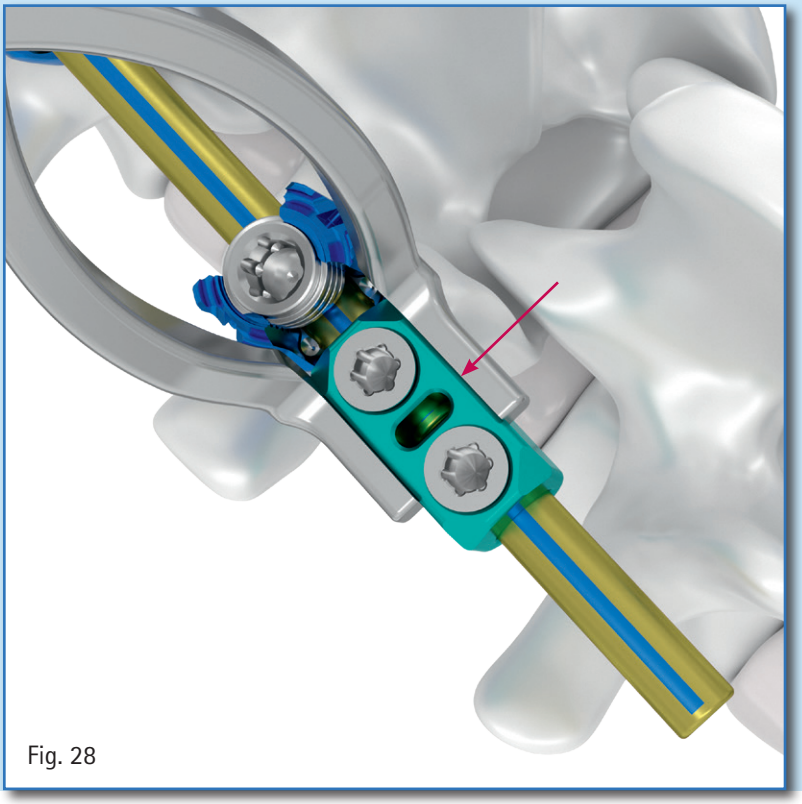

Fig. 28

A Rod-to-Rod Connector may be used to extend an existing construct in the event of a revision surgery, for a new multilevel construct or to connect to an offset screw. For the respective cases, a variety of Rod-to-Rod-Connector designs are offered.

Determine the appropriate length using either the flexible Rod Template (SZ267SU) or the Caliper (SZ291R).

Choose the desired Rod-to-Rod Connector type based on the measured length and patient anatomy. Verify there are no obstructions before placing the Rod-to-Rod Connector. Prior to placement, ensure that the Rod-to-Rod Connector set screws are backed out to prevent damage to the implants.

A. Axial Rod-to-Rod Connector Application

1. Engage the Rod-to-Rod Holder (SZ295R) to the desired Axial Rod-to-Rod Connector, and fully seat the rod of the existing construct inside the connector and tighten the set screw provisionally. (Fig. 27)
2. After the placement of all implants, the extension rod can be placed inside the Connector, and the set screw can be tightened provisionally. Confirm adequate rod placement using the window on the Connector.
3. If the Rod-to-Rod Connector fits properly and is fully seated on both rods, final tightening can be accomplished. (Fig. 28)

Note: *Refer to Provisional and Final Tightening of Construct Extension on page 33.*

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

IX. Construct Extension *(continued)*

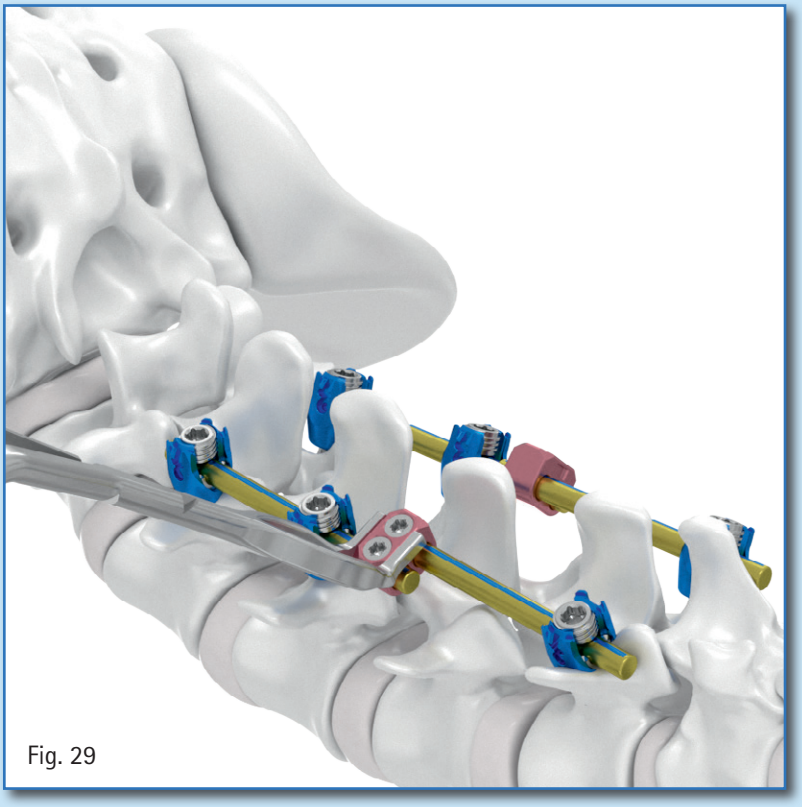

Fig. 29

B. Domino Rod-to-Rod Connector Application

1. Engage the Rod-to-Rod Holder (SZ295R) to the desired Domino Rod-to-Rod connector.
   a. For Closed/Open Connectors: Slide the rod of the existing construct inside the closed hole, and then connect to the other rod using the open hole.
   b. For Closed Connectors: Slide both rods into the closed holes prior to placing the rods into the pedicle screw bodies. (Fig. 29)
2. Tighten the set screw provisionally, and confirm adequate Connector placement.
3. If the Rod-to-Rod Connector fits properly and is fully seated on both rods, final tightening can be accomplished.

Note: *Refer to Provisional and Final Tightening of Construct Extension on page 33.*

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

ENNOVATE® Spinal System – Open Module

Surgical Technique

IX. Construct Extension *(continued)*

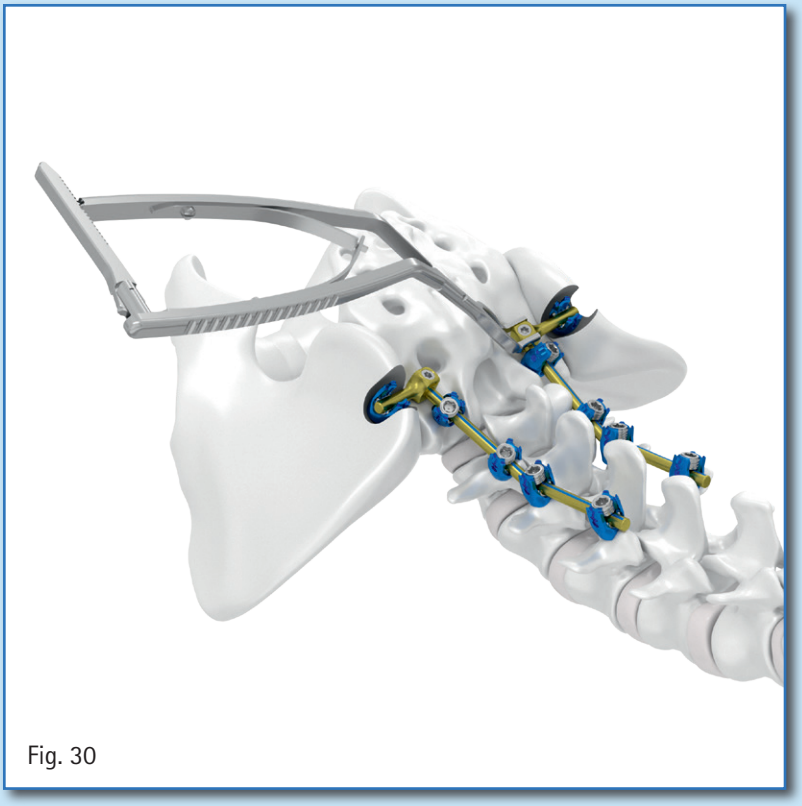

Fig. 30

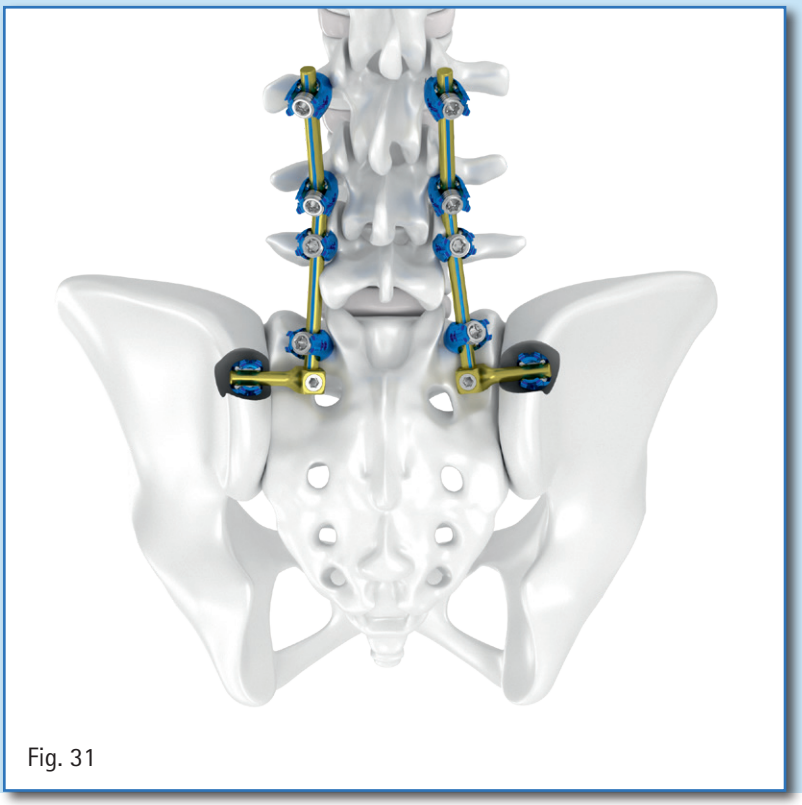

Fig. 31

C. Lateral Offset Connector

Determine the appropriate length of the Lateral Offset Connector by following the placement and alignment of the cranially-placed instrumentation with the objective of being in line with the rod, so that only sagittal plane bending is required.

1. Determine the appropriate length using either the flexible Rod Template (SZ267SU) or the Caliper (SZ291R).
2. Choose the desired Lateral Offset Connector type based on the measured length and patient anatomy. Verify there are no obstructions before placing the Connector. Prior to placement, ensure that the Offset Connector Set Screws are backed out to prevent damage to the implants. (Fig. 30)
3. Place the rod of the cranial construct into the head of the Lateral Offset Connector.
4. Cantilever the rod portion of the Lateral Offset Connector into the head of the Iliac Screw. Tighten the Set Screw of the Lateral Offset Connector by using the Torque Wrench.
5. If the Rod Connector fits properly and is fully seated, perform final tightening of the Lateral Offset cConnector. (Fig. 31)

> **Note:** *Refer to Provisional and Final Tightening of Construct Extension on page 33.*

6. Place a Set Screw into the iliac screw head by attaching the Set Screw to the Set Screwdriver, and provisionally tighten the Set Screw. Perform final tightening of the iliac screw. Refer to page 24 for proper final tightening of the Set Screw.

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

IX. Construct Extension *(continued)*

Fig. 32

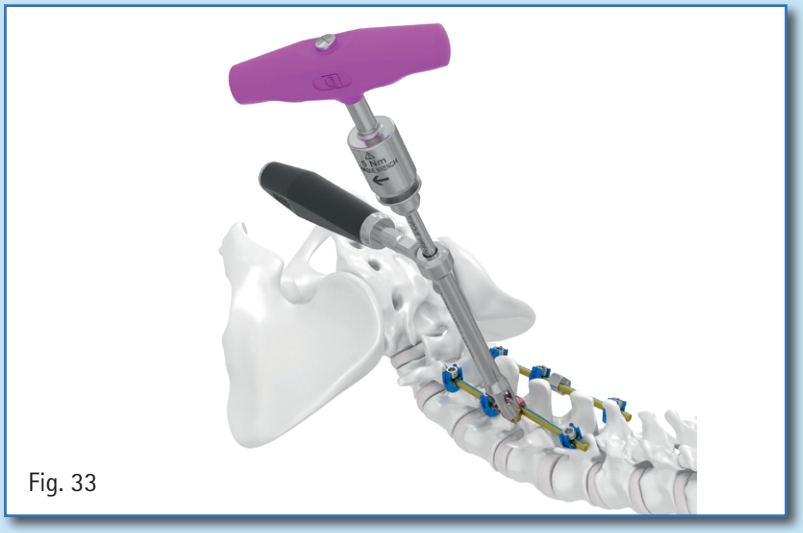

Fig. 33

Fig. 34

D. Provisional and Final Tightening of Construct Extensions

1. Assemble the Torque Wrench by attaching the Torque Wrench Handle 5 Nm (SZ229R) to the Torque Wrench Shaft 5 Nm (SZ297R) by sliding the square shaped portion of the shaft into the coupling until the stop. (Fig. 32)
2. Insert the Torque Wrench through the cannulation of the Counter Torque Handle (SZ292R) so the tip is exposed. Fully seat the tip of the Torque Wrench into the socket of the Set Screw. Engage the distal tip of the Counter Torque Handle with the Rod Connector. (Fig. 33)
3. Turn the Torque Wrench clockwise while firmly holding the Counter Torque Handle to provisionally tighten or perform final tightening of the set screw until a click is heard. The click is an indicator that the final tightening of 5 Nm has been achieved. (Fig. 34)

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

ENNOVATE® Spinal System – Open Module

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X. Removal of Implants

Fig. 35

Fig. 36

Set Screws

To remove a set screw from the pedicle screw construct, engage the Set Screwdriver (SZ280R) with any of the non-torque limiting ENNOVATE Quick Connect Handles. Then, remove the set screw from the pedicle screw with the Set Screwdriver.

Rod-to-Rod Connectors and Cross Connectors

To remove the Rod-to-Rod Connectors or Cross Connectors, attach the Torque Wrench Shaft, 5Nm (SZ297R) to a Quick Connect Ratchet T-Handle (SZ222R, SZ224R, SZ225R). Remove the set screws of the Connectors until all are disengaged from the rod. Remove the Connectors with either the Rod-to-Rod Holder (SZ295R) or the Cross Connector Holder (SZ290R) depending on the implant. (Fig. 35)

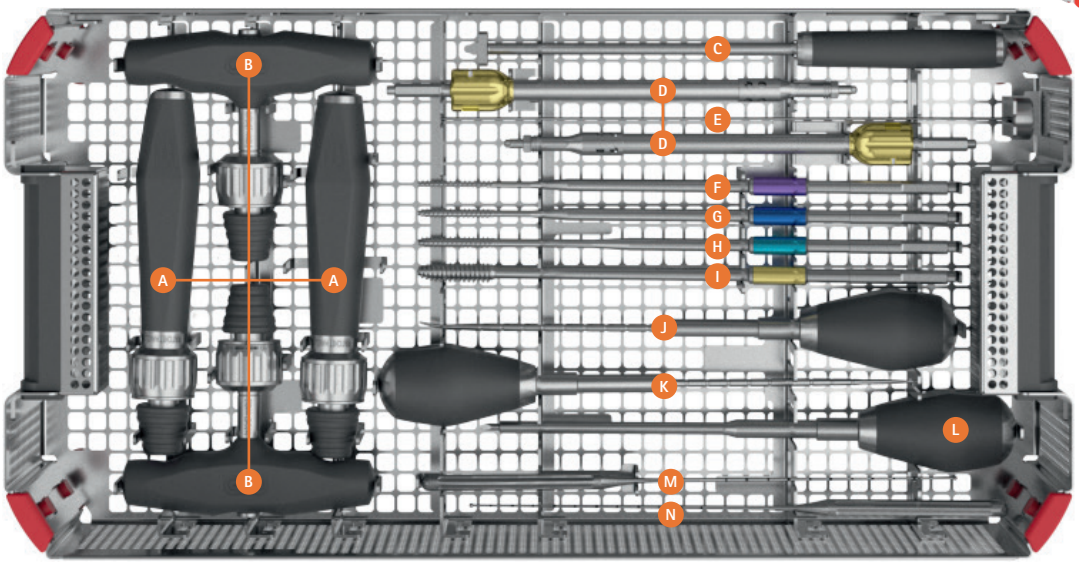
Pedicle Screws

To remove a pedicle screw from the patient, attach the Screwdriver (SZ262R) to any of the non-torque limiting ENNOVATE Quick Connect Handles and set the ratchet setting to "OUT". Engage the Screwdriver with the pedicle screw as described in Step 2 of SCREW PLACEMENT on page 19. Remove the pedicle screw out of the pedicle. (Fig. 36)

Precaution: *No component of the ENNOVATE Spinal System should be reused after removal from the body.*

See pages 7-16 for illustrations and descriptions of each implant and instrument listed here.

XI. ENNOVATE® Spinal System – Open Module Trays

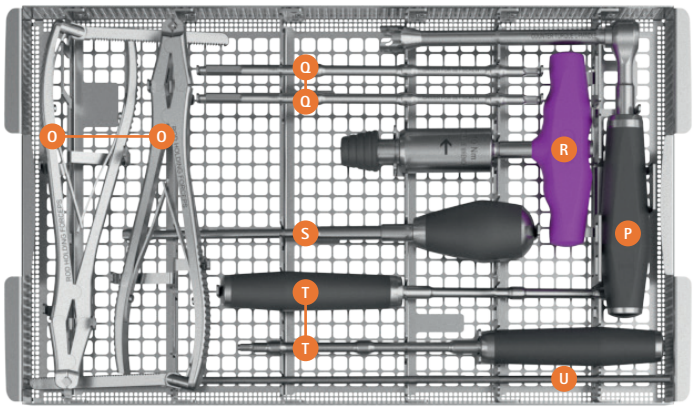


ST0701 – ENNOVATE Open Instrument Set I

Index	Item No.	Description	Set Qty.
	SZ201R	ENNOVATE Tray Open Implantation	1
	JA455R	Lid for Aesculap OrthoTray® DIN without Handle	1

Instruments – Lower Layer

Index	Item No.	Description	Set Qty.
A	SZ222R	ENNOVATE Quick Connect Ratchet Straight Handle, Medium	2
B	SZ224R	ENNOVATE Quick Connect Ratchet T-Handle	2
C	SZ265R	ENNOVATE Screw Body Manipulator	1
D	SZ262R	ENNOVATE Screwdriver	2
E	FW692R	S4® Cleaning Device	1
F	SZ254R	ENNOVATE Screw Tap, 4.5 mm	1
G	SZ255R	ENNOVATE Screw Tap, 5.5 mm	1
H	SZ256R	ENNOVATE Screw Tap, 6.5 mm	1
I	SZ257R	ENNOVATE Screw Tap, 7.5 mm	1
J	SZ242R	ENNOVATE Lumbar Pedicle Probe, Straight	1
K	SZ243R	ENNOVATE Lumbar Pedicle Probe, Curved	1
L	SZ241R	ENNOVATE Pedicle Awl	1
M	SZ246R	ENNOVATE Pedicle Sounder, Straight	1
N	SZ247R	ENNOVATE Pedicle Sounder, Curved	1



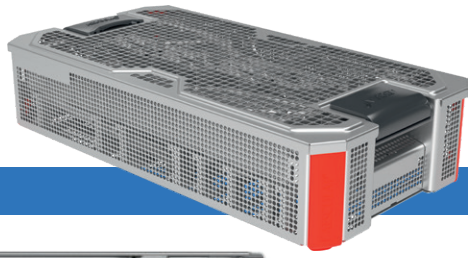
ST0701 – ENNOVATE Open Instrument Set I

Instruments – Upper Layer

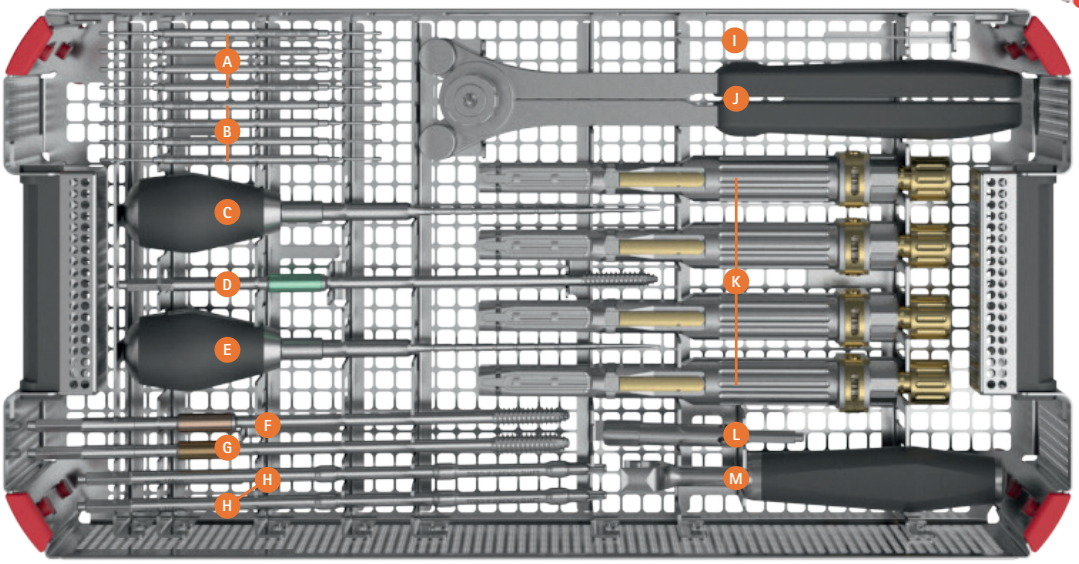
Index	Item No.	Description	Set Qty.
O	SZ272R	ENNOVATE Rod Holding Forceps	2
P	SZ282R	ENNOVATE Counter Torque L-Handle	1
Q	SZ391R	ENNOVATE Set Screwdriver, Short	2
R	SZ228R	ENNOVATE Torque Wrench Handle, 10 Nm	1
S	SZ273R	ENNOVATE Rod Pusher	1
T	SZ280R	ENNOVATE Set Screwdriver	2
U	SZ267SU	ENNOVATE Rod Template, 300 mm	2

ENNOVATE® Spinal System – Open Module

Surgical Technique



XI. ENNOVATE Spinal System – Open Module Trays *(continued)*



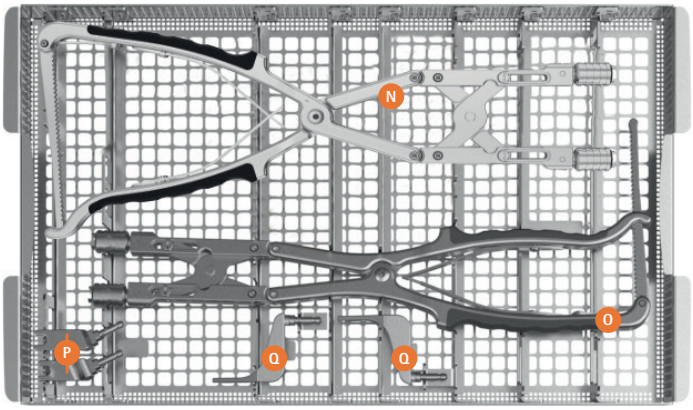
ST0702 – ENNOVATE Open Manipulation/Optional Instrument Set II

Trays / Container

Index	Item No.	Description	Set Qty.
	SZ251R	ENNOVATE Tray Open Manipulation/Optional	1
	JA455R	Lid for Aesculap OrthoTray® DIN without Handle	1

Instruments – Lower Layer

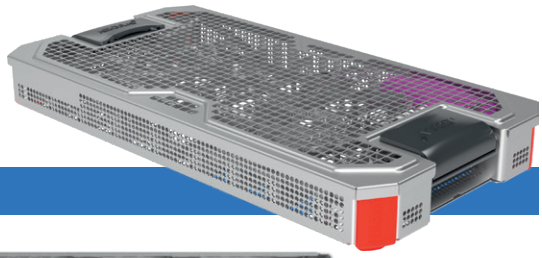
Index	Item No.	Description	Set Qty.
A	SZ248R	ENNOVATE Pedicle Marker, Dual Band	4
B	SZ249R	ENNOVATE Pedicle Marker, Single Band	4
C	SZ244R	ENNOVATE Thoracic Pedicle Probe, Straight	1
D	SZ258R	ENNOVATE Screw Tap, 8.5 mm	1
E	SZ245R	ENNOVATE Thoracic Pedicle Probe, Curved	1
F	SZ259R	ENNOVATE Screw Tap, 9.5 mm	1
G	SZ260R	ENNOVATE Screw Tap, 10.5 mm	1
H	SZ283R	ENNOVATE Torque Wrench Shaft, 10 Nm	2
I	AA804R	ENNOVATE Screw Length Scale	1
J	SZ270R	ENNOVATE French Rod Bender	1
K	SZ277R	ENNOVATE Rod Persuader	4
L	SZ393R	ENNOVATE PolyBlocker	1
M	SZ276R	ENNOVATE Rod Persuader Counter Torque Handle	1



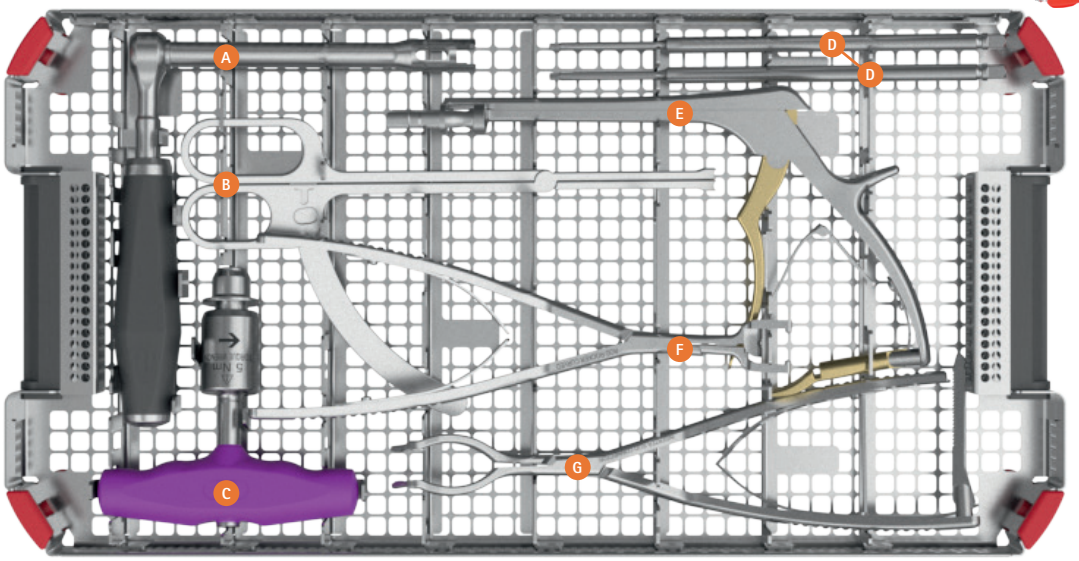
ST0702 – ENNOVATE Open Manipulation/Optional Instrument Set II

Instruments – Upper Layer

Index	Item No.	Description	Set Qty.
N	SZ234R	ENNOVATE Open Compressor Forceps	1
O	SZ233R	ENNOVATE Open Distraction Forceps	1
P	SZ252R	ENNOVATE Open Parallel Tips	2
Q	SZ253R	ENNOVATE Open Offset Tips	2



XI. ENNOVATE® Spinal System – Open Module Trays *(continued)*



ST0703 – ENNOVATE Open Connector Instrument Set III

Index	Item No.	Description	Set Qty.
	SZ206R	ENNOVATE Tray Open Connector Application	1
	JA455R	Lid for Aesculap OrthoTray® DIN without Handle	1

Graphic Template / Packing Stencil

Instruments

Index	Item No.	Description	Set Qty.
A	SZ292R	ENNOVATE Counter Torque Handle, Cross Connectors	1
B	SZ291R	ENNOVATE Cross Connector Caliper	1
C	SZ229R	ENNOVATE Torque Wrench Handle, 5 Nm	1
D	SZ297R	ENNOVATE Torque Wrench Shaft Connectors, 5 Nm	2
E	SZ290R	ENNOVATE Cross Connector Holder	1
F	SZ275R	ENNOVATE Rod Rocker, Curved	1
G	SZ295R	ENNOVATE Rod-to-Rod Holder	1

ENNOVATE® Spinal System – Open Module

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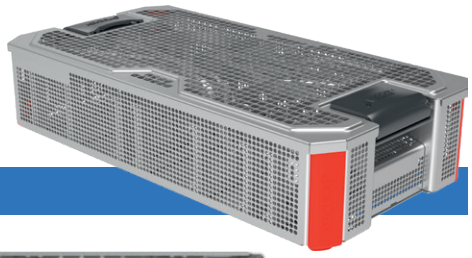
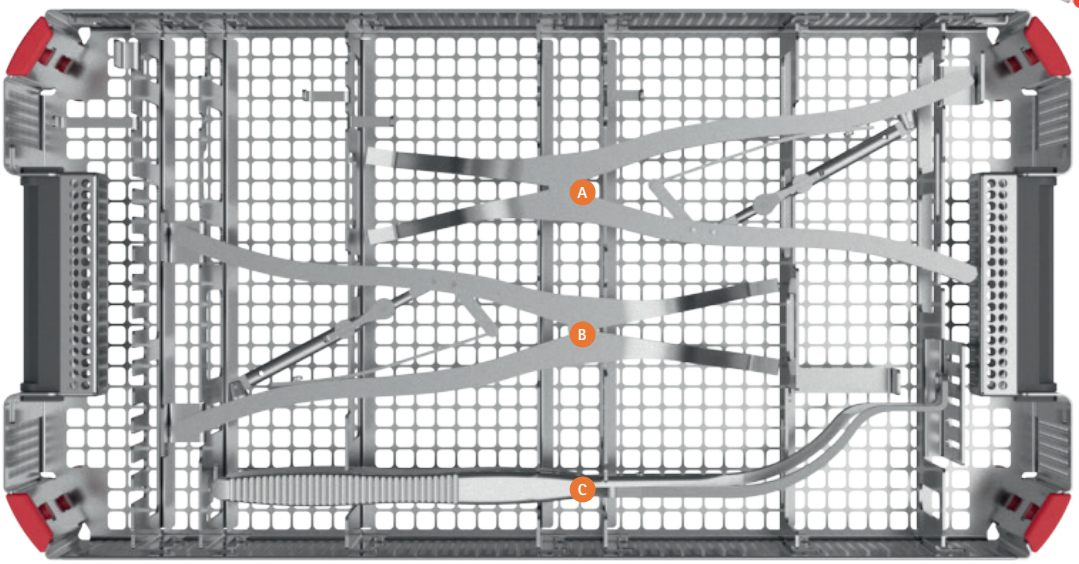


XI. ENNOVATE Spinal System – Open Module Trays *(continued)*



ST0704 – ENNOVATE Open Auxiliary Instrument Set IV

Index	Item No.	Description	Set Qty.
	SZ221R	ENNOVATE Tray Open S⁴® Instruments	1
	JA455R	Lid for Aesculap OrthoTray® DIN without Handle	1

Instruments – Lower Layer

Index	Item No.	Description	Set Qty.
A	FW210R	ENNOVATE/S⁴ Compression Forceps New Version	1
B	FW023R	ENNOVATE/SSE/S⁴ Distraction Forceps Small	1
C	FW181R	ENNOVATE/S⁴ Distraction Forceps	1

Additionally Available

Index	Item No.	Description	Set Qty.
	SZ225R	ENNOVATE Quick Connect Ratchet Handle Drop Shape	0
	SZ233R	ENNOVATE Open Parallel Distractor Forceps	0
	SZ234R	ENNOVATE Open Parallel Compressor Forceps	0
	SZ263R	ENNOVATE Lumbar Pedicle Probe Large, Straight	0
	SZ264R	ENNOVATE Thoracic Pedicle Probe Large, Straight	0
	SZ267SU	ENNOVATE Rod Template, 300 mm	0
	SZ369S	ENNOVATE MIS K-Wire Short	0
	SZ376R	ENNOVATE MIS Lumbar Pedicle Probe	0

XII. Implant Sets

ST0707 ENNOVATE® Solid Standard Implant Set

Item No.	Description	Set Qty.
SY001TS	Set Screw	20
SY120TS	Polyaxial Solid Ø 5.5mm 25	2
SY121TS	Polyaxial Solid Ø 5.5mm 30	6
SY122TS	Polyaxial Solid Ø 5.5mm 35	8
SY123TS	Polyaxial Solid Ø 5.5mm 40	10
SY124TS	Polyaxial Solid Ø 5.5mm 45	10
SY125TS	Polyaxial Solid Ø 5.5mm 50	8
SY131TS	Polyaxial Solid Ø 6.5mm 30	6
SY132TS	Polyaxial Solid Ø 6.5mm 35	8
SY133TS	Polyaxial Solid Ø 6.5mm 40	10
SY134TS	Polyaxial Solid Ø 6.5mm 45	12
SY135TS	Polyaxial Solid Ø 6.5mm 50	10
SY136TS	Polyaxial Solid Ø 6.5mm 55	10
SY137TS	Polyaxial Solid Ø 6.5mm 60	8
SY138TS	Polyaxial Solid Ø 6.5mm 70	2
SY141TS	Polyaxial Solid Ø 7.5mm 30	6
SY142TS	Polyaxial Solid Ø 7.5mm 35	8
SY143TS	Polyaxial Solid Ø 7.5mm 40	10
SY144TS	Polyaxial Solid Ø 7.5mm 45	10
SY145TS	Polyaxial Solid Ø 7.5mm 50	10
SY146TS	Polyaxial Solid Ø 7.5mm 55	10
SY147TS	Polyaxial Solid Ø 7.5mm 60	8
SY148TS	Polyaxial Solid Ø 7.5mm 70	2
SY430TS	Open Curved Ø 5.5mm 30	2
SY431TS	Open Curved Ø 5.5mm 35	4
SY432TS	Open Curved Ø 5.5mm 40	4
SY433TS	Open Curved Ø 5.5mm 45	4
SY434TS	Open Curved Ø 5.5mm 50	4
SY435TS	Open Curved Ø 5.5mm 55	4
SY436TS	Open Curved Ø 5.5mm 60	4
SY437TS	Open Curved Ø 5.5mm 70	4
SY438TS	Open Curved Ø 5.5mm 80	4
SY439TS	Open Curved Ø 5.5mm 90	2
SY440TS	Open Curved Ø 5.5mm 100	2
SX942TS	Transconnector 30	1
SX943TS	Transconnector 32	1
SX944TS	Transconnector 34	1
SX945TS	Transconnector 36	1
SX946TS	Transconnector 38	1
SX947TS	Transconnector 40	1
SX948TS	Transconnector 42-45	1
SX949TS	Transconnector 45-50	1
SX950TS	Transconnector 50-60	1
SX951TS	Transconnector 60-80	1
SX952TS	Transconnector 80-100	1

ENNOVATE® Spinal System – Open Module

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XII. Implant Sets *(continued)*

ST0708 ENNOVATE Solid Complex Implant Set

Item No.	Description	Set Qty.
SY001TS	Set Screw	30
SY110TS	Polyaxial Solid Ø 4.5mm 25	4
SY111TS	Polyaxial Solid Ø 4.5mm 30	4
SY112TS	Polyaxial Solid Ø 4.5mm 35	4
SY113TS	Polyaxial Solid Ø 4.5mm 40	4
SY114TS	Polyaxial Solid Ø 4.5mm 45	4
SY115TS	Polyaxial Solid Ø 4.5mm 50	4
SY120TS	Polyaxial Solid Ø 5.5mm 25	4
SY121TS	Polyaxial Solid Ø 5.5mm 30	4
SY122TS	Polyaxial Solid Ø 5.5mm 35	4
SY123TS	Polyaxial Solid Ø 5.5mm 40	6
SY124TS	Polyaxial Solid Ø 5.5mm 45	6
SY125TS	Polyaxial Solid Ø 5.5mm 50	6
SY130TS	Polyaxial Solid Ø 6.5mm 25	4
SY131TS	Polyaxial Solid Ø 6.5mm 30	4
SY132TS	Polyaxial Solid Ø 6.5mm 35	4
SY133TS	Polyaxial Solid Ø 6.5mm 40	6
SY134TS	Polyaxial Solid Ø 6.5mm 45	6
SY135TS	Polyaxial Solid Ø 6.5mm 50	6
SY136TS	Polyaxial Solid Ø 6.5mm 55	6
SY137TS	Polyaxial Solid Ø 6.5mm 60	4
SY138TS	Polyaxial Solid Ø 6.5mm 70	2
SY139TS	Polyaxial Solid Ø 6.5mm 80	2
SY140TS	Polyaxial Solid Ø 7.5mm 25	4
SY141TS	Polyaxial Solid Ø 7.5mm 30	4
SY142TS	Polyaxial Solid Ø 7.5mm 35	4
SY143TS	Polyaxial Solid Ø 7.5mm 40	6
SY144TS	Polyaxial Solid Ø 7.5mm 45	6
SY145TS	Polyaxial Solid Ø 7.5mm 50	6
SY146TS	Polyaxial Solid Ø 7.5mm 55	6
SY147TS	Polyaxial Solid Ø 7.5mm 60	4
SY148TS	Polyaxial Solid Ø 7.5mm 70	2
SY149TS	Polyaxial Solid Ø 7.5mm 80	2
SY188TS	Polyaxial Solid Ø 7.5mm 90	2
SY189TS	Polyaxial Solid Ø 7.5mm 100	2
SY190TS	Polyaxial Solid Ø 7.5mm 110	2
SY151TS	Polyaxial Solid Ø 8.5mm 30	2
SY152TS	Polyaxial Solid Ø 8.5mm 35	2
SY153TS	Polyaxial Solid Ø 8.5mm 40	4
SY154TS	Polyaxial Solid Ø 8.5mm 45	4
SY155TS	Polyaxial Solid Ø 8.5mm 50	4
SY156TS	Polyaxial Solid Ø 8.5mm 55	2
SY157TS	Polyaxial Solid Ø 8.5mm 60	2
SY158TS	Polyaxial Solid Ø 8.5mm 70	2
SY159TS	Polyaxial Solid Ø 8.5mm 80	2

XII. Implant Sets *(continued)*

ST0708 ENNOVATE Solid Complex Implant Set *(continued)*

Item No.	Description	Set Qty.
SY191TS	Polyaxial Solid Ø 8.5mm 90	2
SY192TS	Polyaxial Solid Ø 8.5mm 100	2
SY193TS	Polyaxial Solid Ø 8.5mm 110	2
SY162TS	Polyaxial Solid Ø 9.5mm 35	2
SY163TS	Polyaxial Solid Ø 9.5mm 40	2
SY164TS	Polyaxial Solid Ø 9.5mm 45	2
SY165TS	Polyaxial Solid Ø 9.5mm 50	2
SY166TS	Polyaxial Solid Ø 9.5mm 55	2
SY167TS	Polyaxial Solid Ø 9.5mm 60	2
SY168TS	Polyaxial Solid Ø 9.5mm 70	2
SY169TS	Polyaxial Solid Ø 9.5mm 80	2
SY194TS	Polyaxial Solid Ø 9.5mm 90	2
SY195TS	Polyaxial Solid Ø 9.5mm 100	2
SY196TS	Polyaxial Solid Ø 9.5mm 110	2
SY172TS	Polyaxial Solid Ø 10.5mm 35	2
SY173TS	Polyaxial Solid Ø 10.5mm 40	2
SY174TS	Polyaxial Solid Ø 10.5mm 45	2
SY175TS	Polyaxial Solid Ø 10.5mm 50	2
SY176TS	Polyaxial Solid Ø 10.5mm 55	2
SY177TS	Polyaxial Solid Ø 10.5mm 60	2
SY178TS	Polyaxial Solid Ø 10.5mm 70	2
SY179TS	Polyaxial Solid Ø 10.5mm 80	2
SY197TS	Polyaxial Solid Ø 10.5mm 90	2
SY198TS	Polyaxial Solid Ø 10.5mm 100	2
SY199TS	Polyaxial Solid Ø 10.5mm 110	2
SY400TS	Open Straight Ø 5.5mm 30	2
SY401TS	Open Straight Ø 5.5mm 35	2
SY402TS	Open Straight Ø 5.5mm 40	2
SY403TS	Open Straight Ø 5.5mm 45	2
SY404TS	Open Straight Ø 5.5mm 50	2
SY405TS	Open Straight Ø 5.5mm 55	2
SY406TS	Open Straight Ø 5.5mm 60	2
SY407TS	Open Straight Ø 5.5mm 70	2
SY408TS	Open Straight Ø 5.5mm 80	2
SY409TS	Open Straight Ø 5.5mm 90	2
SY410TS	Open Straight Ø 5.5mm 100	2
SY411TS	Open Straight Ø 5.5mm 110	2
SY412TS	Open Straight Ø 5.5mm 120	2
SY413TS	Open Straight Ø 5.5mm 130	2
SY414TS	Open Straight Ø 5.5mm 140	2
SY415TS	Open Straight Ø 5.5mm 150	2
SY416TS	Open Straight Ø 5.5mm 160	2
SY417TS	Open Straight Ø 5.5mm 170	2
SY418TS	Open Straight Ø 5.5mm 180	2
SY419TS	Open Straight Ø 5.5mm 190	2

ENNOVATE® Spinal System – Open Module

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XII. Implant Sets *(continued)*

ST0708 ENNOVATE Solid Complex Implant Set *(continued)*

Item No.	Description	Set Qty.
SY420TS	Open Straight Ø 5.5mm 200	2
SY421TS	Open Straight Ø 5.5mm 300	2
SY422TS	Open Straight Ø 5.5mm 400	2
SY423TS	Open Straight Ø 5.5mm 500	2
SY430TS	Open Curved Ø 5.5mm 30	2
SY431TS	Open Curved Ø 5.5mm 35	2
SY432TS	Open Curved Ø 5.5mm 40	2
SY433TS	Open Curved Ø 5.5mm 45	2
SY434TS	Open Curved Ø 5.5mm 50	2
SY435TS	Open Curved Ø 5.5mm 55	2
SY436TS	Open Curved Ø 5.5mm 60	2
SY437TS	Open Curved Ø 5.5mm 70	2
SY438TS	Open Curved Ø 5.5mm 80	2
SY439TS	Open Curved Ø 5.5mm 90	2
SY440TS	Open Curved Ø 5.5mm 100	2
SY441TS	Open Curved Ø 5.5mm 110	2
SY442TS	Open Curved Ø 5.5mm 120	2
SY443TS	Open Curved Ø 5.5mm 130	2
SY444TS	Open Curved Ø 5.5mm 140	2
SY445TS	Open Curved Ø 5.5mm 150	2
SY701TS	Straight Axial Connector 19	4
SY702TS	Straight Axial Connector 34	4
SY703TS	Closed Domino Connector 7	4
SY704TS	Closed Domino Connector 11	4
SY705TS	Closed / Open Domino Connector 7	4
SY706TS	Closed / Open Domino Connector 11	4
SY711TS	Closed Offset Connector 20	4
SY712TS	Closed Offset Connector 35	4
SY713TS	Closed Offset Connector 50	4
SY716TS	Open Offset Connector 20	4
SY717TS	Open Offset Connector 35	4
SY718TS	Open Offset Connector 50	4
SX932TS	Multiaxial 26-30	2
SX933TS	Multiaxial 28-34	2
SX934TS	Multiaxial 31-37	2
SX935TS	Multiaxial 34-40	2
SX936TS	Multiaxial 39-45	2
SX937TS	Multiaxial 45-58	2
SX938TS	Multiaxial 58-80	2
SX939TS	Multiaxial 80-100	2
SX942TS	Transconnector 30	2
SX943TS	Transconnector 32	2
SX944TS	Transconnector 34	2
SX945TS	Transconnector 36	2

XII. Implant Sets *(continued)*

ST0708 ENNOVATE Solid Complex Implant Set *(continued)*

Item No.	Description	Set Qty.
SX946TS	Transconnector 38	2
SX947TS	Transconnector 40	2
SX948TS	Transconnector 42-45	2
SX949TS	Transconnector 45-50	2
SX950TS	Transconnector 50-60	2
SX951TS	Transconnector 60-80	2
SX952TS	Transconnector 80-100	2

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