



**VANE™** 4CIS® VANE introduces  
you the reliable pedicle screw

*The Most Reliable Spinal Solution*

- Non-slip threaded joint
- Ergonomic design
- Wedge trapezoid thread
- Superior locking mechanism

  
**Solco**  
Biomedical  
[www.solco.co.kr](http://www.solco.co.kr)

**SEOUL OFFICE**  
13F, #505-14, Gasan-dong, Geumcheon-gu, Seoul 158-803 Korea  
Tel. 82-2-2082-7700 Fax. 82-2-2082-7701

**HEAD OFFICE**  
#34-6, Keumam-ri, Seotan-myeon, Pyeongtaek, Gyeonggi-do 451-852 Korea  
Tel. 82-31-664-4101 Fax. 82-31-663-6520

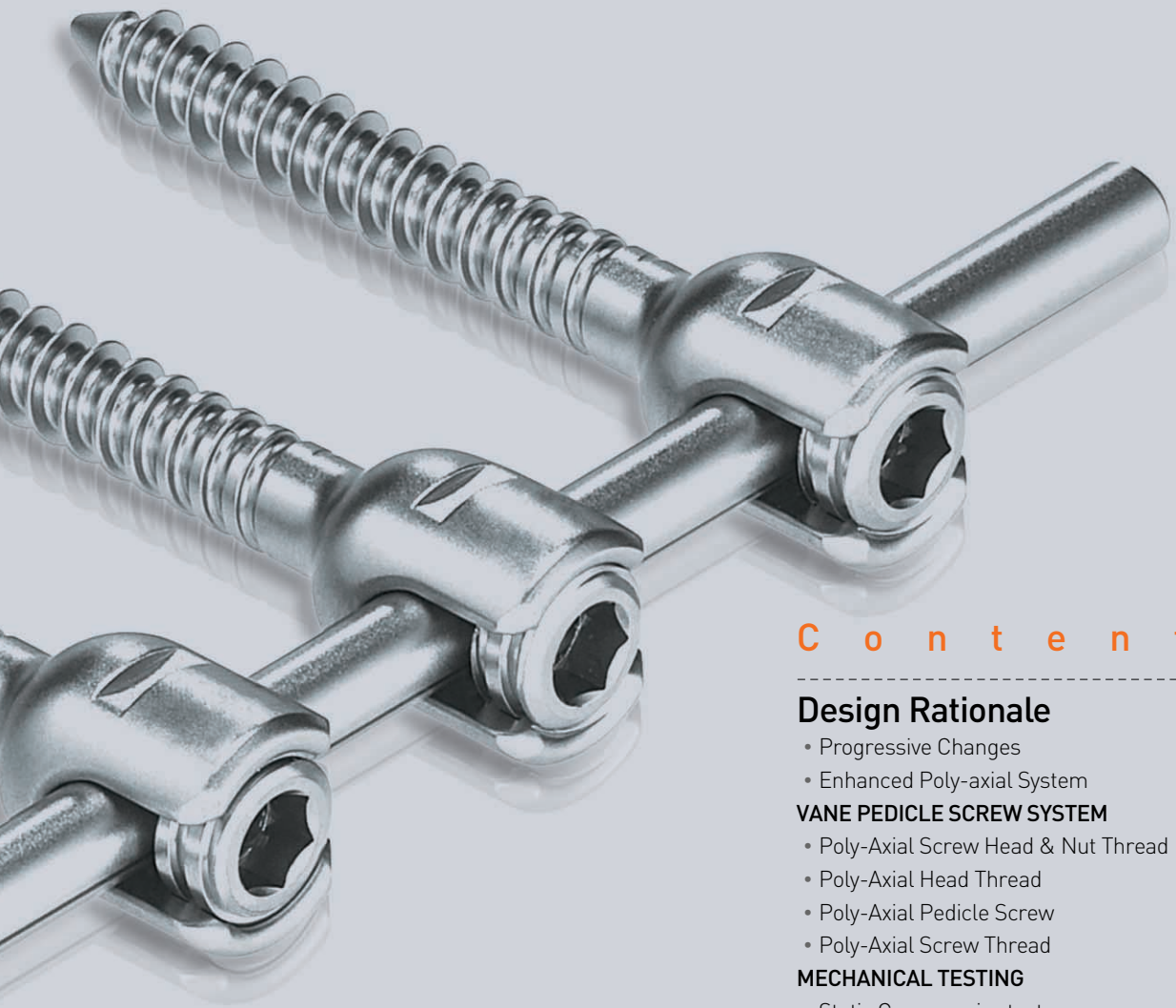


# 4CIS<sup>®</sup> Vane Spine System

The 4CIS<sup>®</sup> VANE Spine System is indicated for temporary or permanent correction and stabilization of the vertebral column from the thoracic to the sacrum with the aim of helping consolidation or bone fusion.

It is designed for both posterior, sacral and anterior fixation.





## C o n t e n t s

### Design Rationale

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- Progressive Changes
- Enhanced Poly-axial System

#### VANE PEDICLE SCREW SYSTEM

- Poly-Axial Screw Head & Nut Thread
- Poly-Axial Head Thread
- Poly-Axial Pedicle Screw
- Poly-Axial Screw Thread

#### MECHANICAL TESTING

- Static Compressive test
- Static Tensional test
- Static Torsional test
- Dynamic Compressive test

### Surgical Technique

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- Pedicle Identification
- Pedicle Preparation
- Screw Insertion
- Rod Insertion
- Nut Application
- Compression / Distraction
- Final Tightening
- Cross Link Technique

### Case Studies

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- Preoperation & Postoperation

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- Implants Specifications
- Instruments Specifications



# Design Rationale

Progressive Changes  
Enhanced Poly-Axial System

#### VANE PEDICLE SCREW SYSTEM

Poly-Axial Screw Head & Nut Thread  
Poly-Axial Head Thread  
Poly-Axial Pedicle Screw  
Poly-Axial Screw Thread

#### MECHANICAL TESTING

Static Compressive test  
Static Tensional test  
Static Torsional test  
Dynamic Compressive test

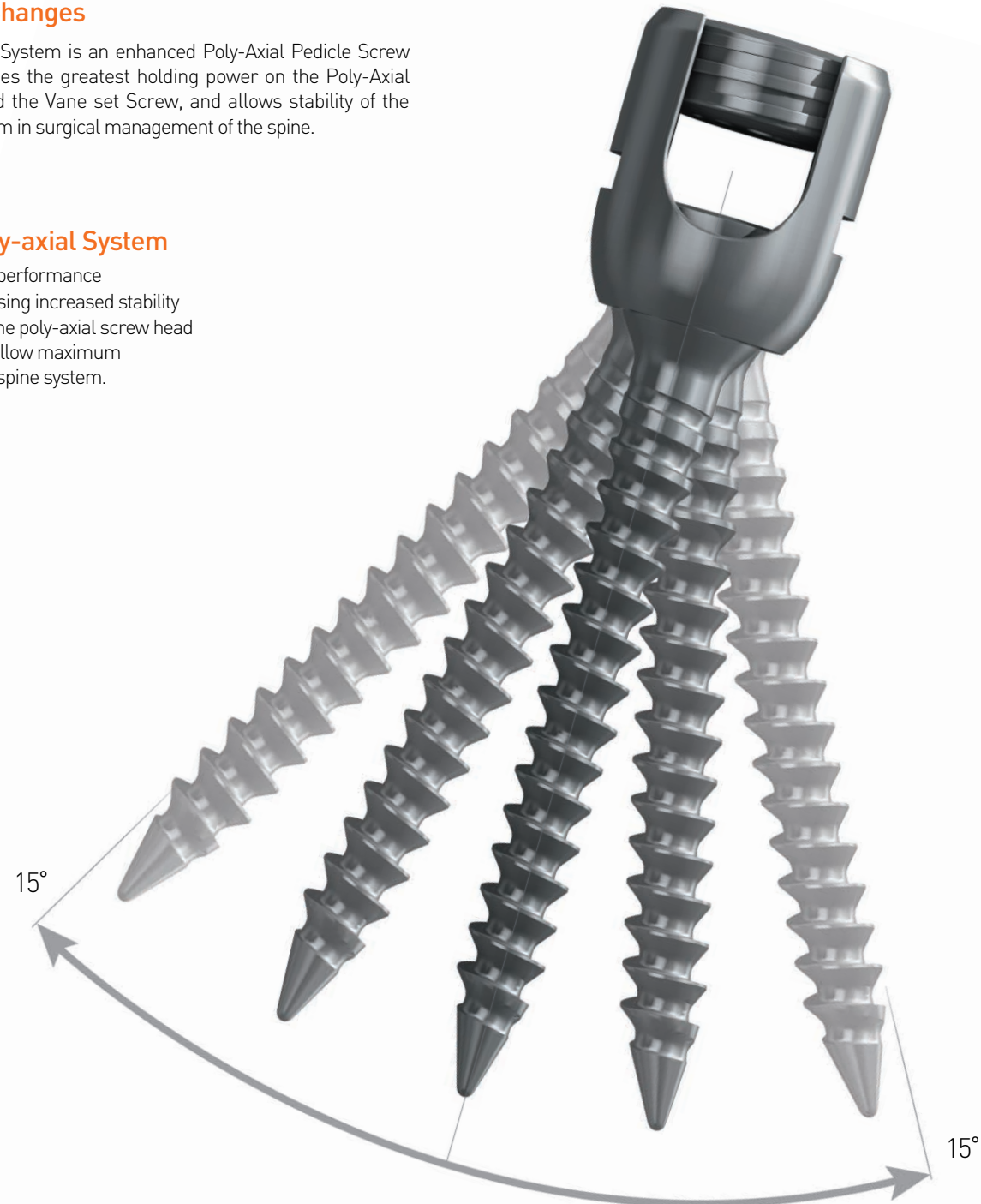
# Design Rationale

## Progressive Changes

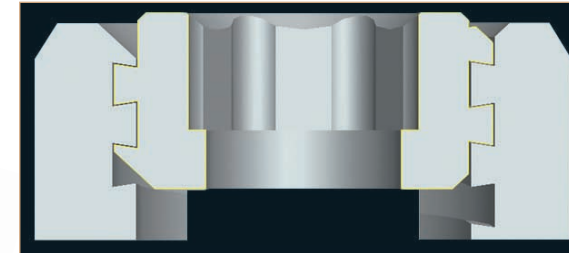
4CIS® VANE Spine System is an enhanced Poly-Axial Pedicle Screw System that provides the greatest holding power on the Poly-Axial Screw housing and the Vane set Screw, and allows stability of the spinal fixation system in surgical management of the spine.

## Enhanced Poly-axial System

- Superior locking performance
- Conic taper housing increased stability
- Micro ridges on the poly-axial screw head and the washer allow maximum stability in VANE spine system.



# Vane Pedicle Screw System



## Poly-Axial Screw Head & Nut Thread

The design of Vane thread in the nut makes it possible to achieve firm and stable fixation between the Screw and the Nut (significantly increasing the compression strength).



## Poly-Axial Head Thread

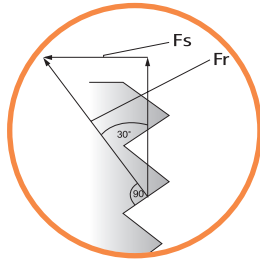
Micro ridges machined in the poly-axial screw head combined with the washer incorporates a taper lock onto the poly-axial screw head allowing maximum poly-axial system stability in VANE spine system.

# Vane Pedicle Screw System

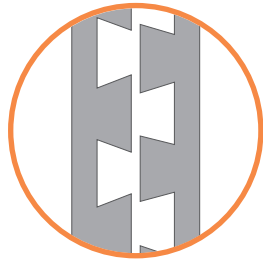
# Mechanical Testing

The mechanical test including static and cyclic fatigue test was performed in accordance with **ASTM F1717**.

General thread design



VANE thread design

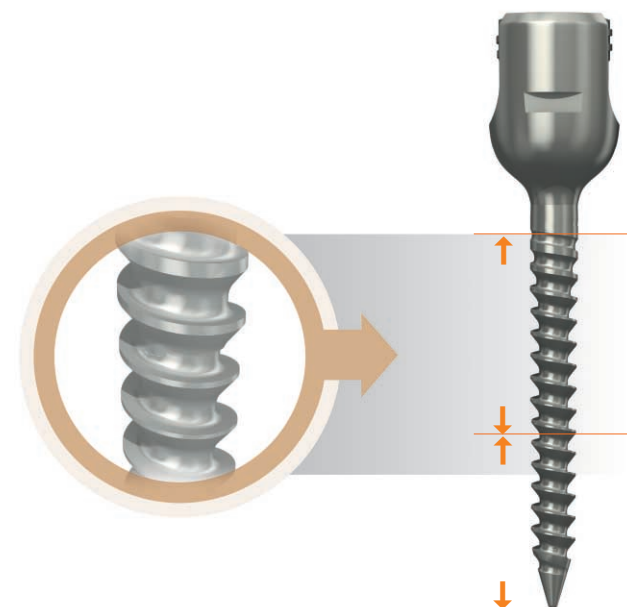
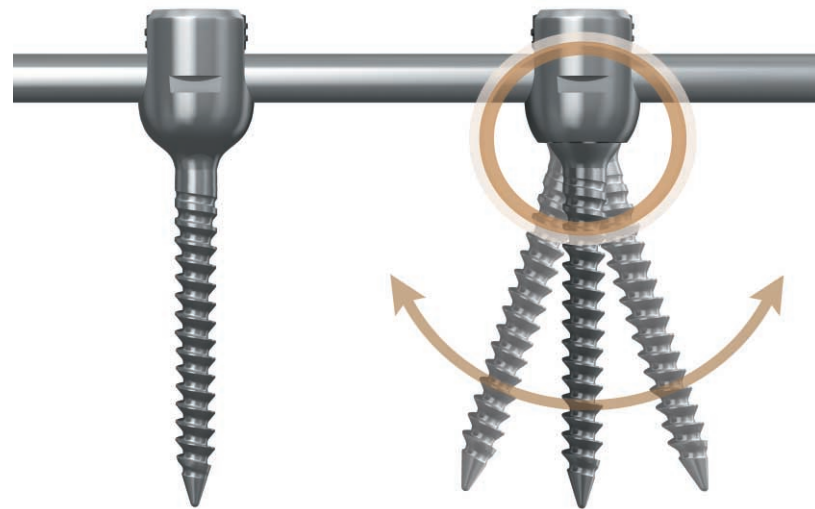


Thread Design	Area	Fs
Standard	0.61mm <sup>2</sup>	Fs=50% of Fr
<b>VANE</b>	<b>0.66mm<sup>2</sup></b>	<b>Fs=16% of Fr</b>

## Poly-Axial Pedicle Screw

Poly-Axial Pedicle Screw provides a variation of 30° in angle and ease of use while achieving best anatomic position.

Poly-Axial Screw has the same profile as mono-Axial Screw in shape, height and thickness.

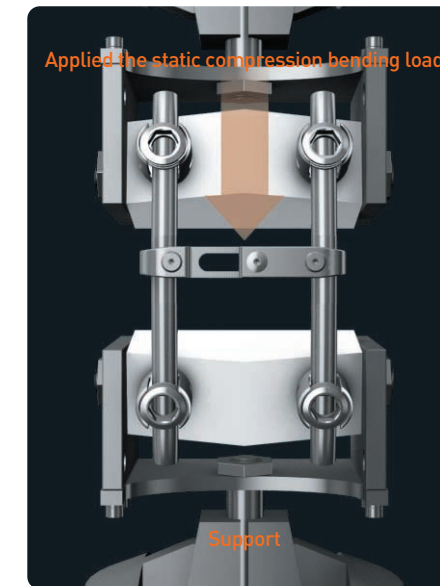


## Poly-Axial Screw Thread

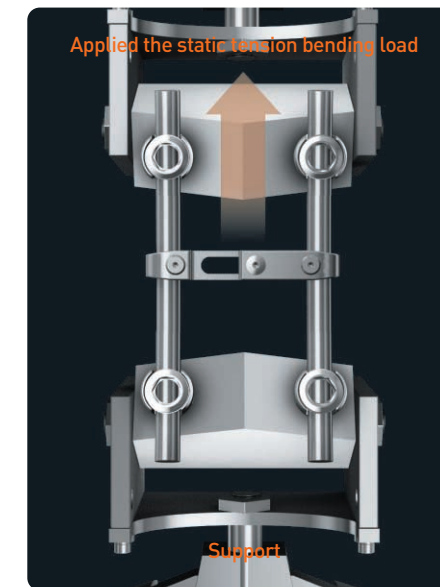
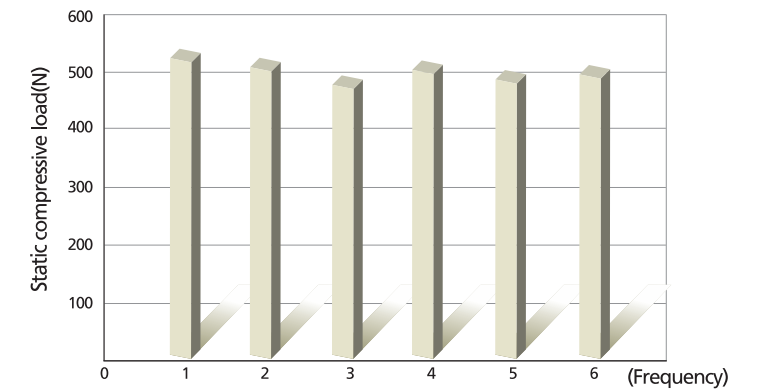
Various sizes of screws are available for perfect adaptation to the thoracic, lumbar and sacral pedicles.

- 1/3 cylinder, 2/3 cylinder and Conical
- Optimal stress distribution
- Protection from screw pullout
- Easy insertion

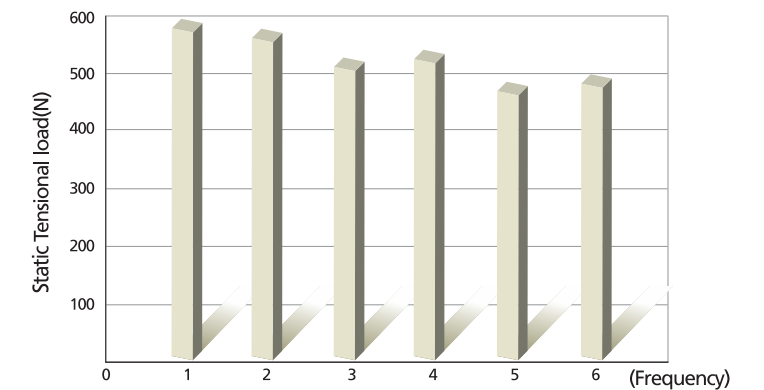
Non-self tapping to minimize any neural damage.



Static Compressive Load(N) According to ASTM F 1717 Standard

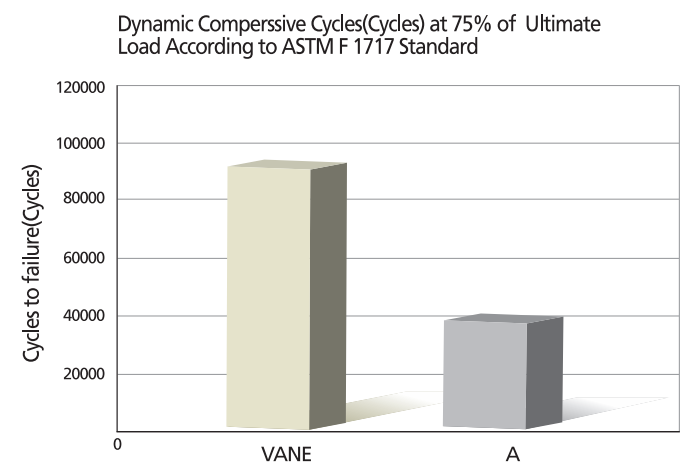
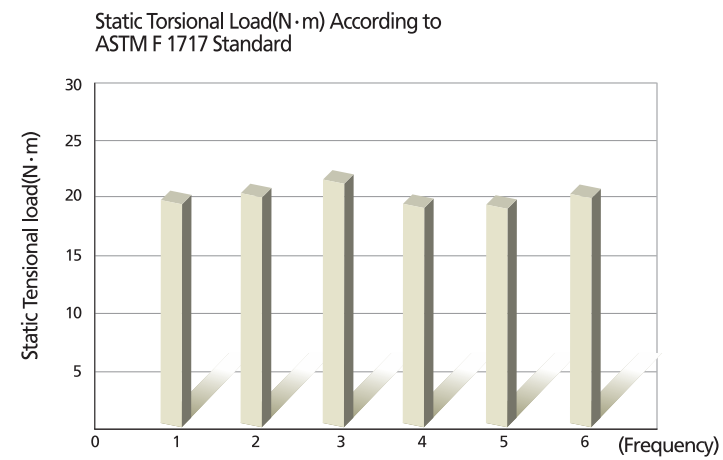
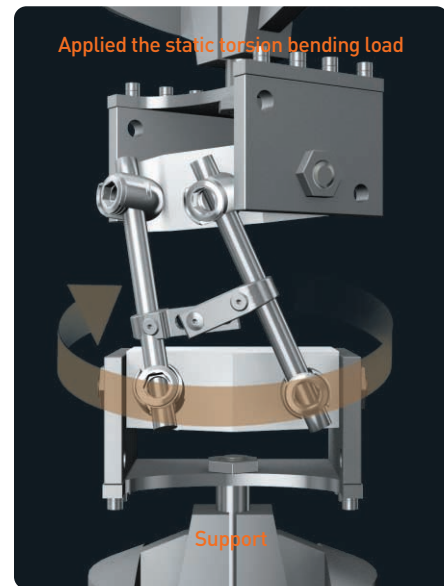


Static Tensional Load(N) According to ASTM F 1717 Standard



# Mechanical Testing

The mechanical test including static and cyclic fatigue test was performed in accordance with **ASTM F1717**.



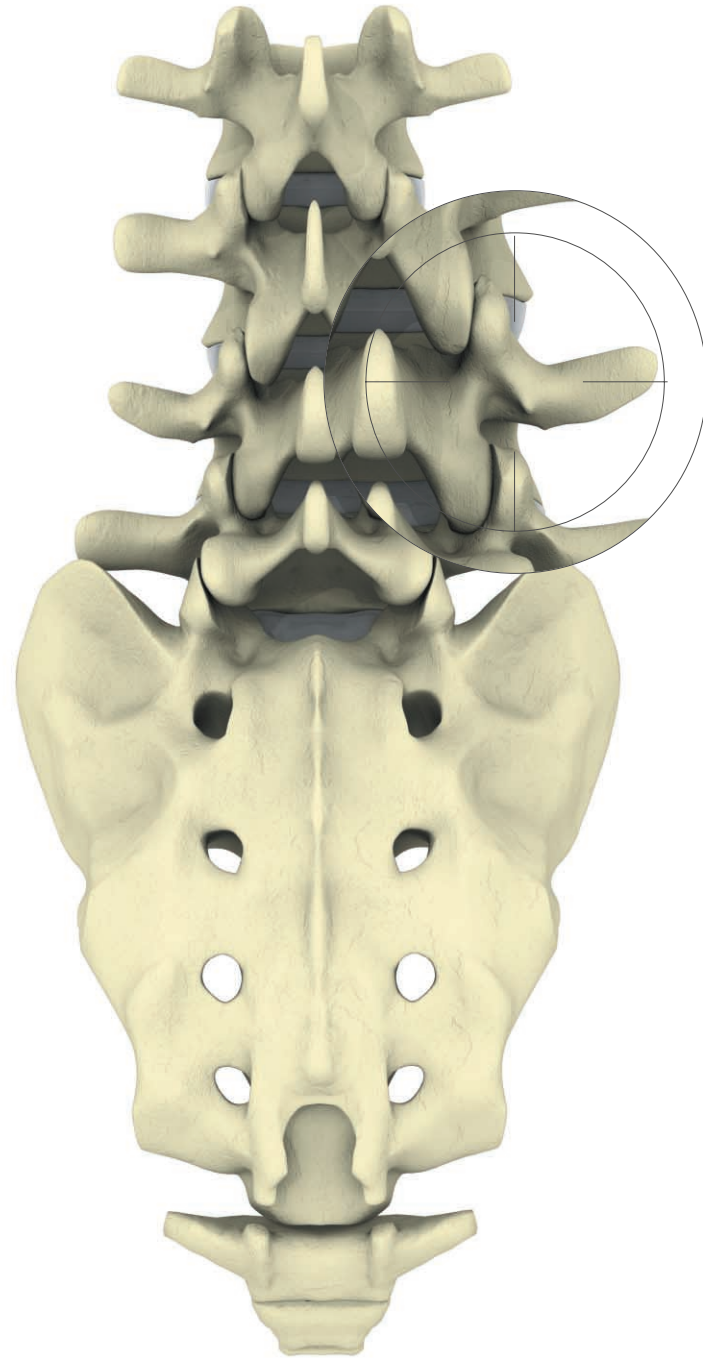
## Surgical Technique

- Pedicle Identification
- Pedicle Preparation
- Screw Insertion
- Rod Insertion
- Nut Application
- Compression / Distraction
- Final Tightening
- Cross Link Technique

# Surgical Technique Step 1

## Pedicle Identification

The pedicle entry point depends on the intersection techniques. It involves drawing a line from the lateral aspect of the facet joint, which intersects a line that bisects the transverse process at a spot overlying the pedicle. However, because of the high variability in pedicle dimensions on each level of vertebra, intraoperative radiograph is checked to determine the exact position of the entry in the anteroposterior and lateral projection after inserting guide pins.

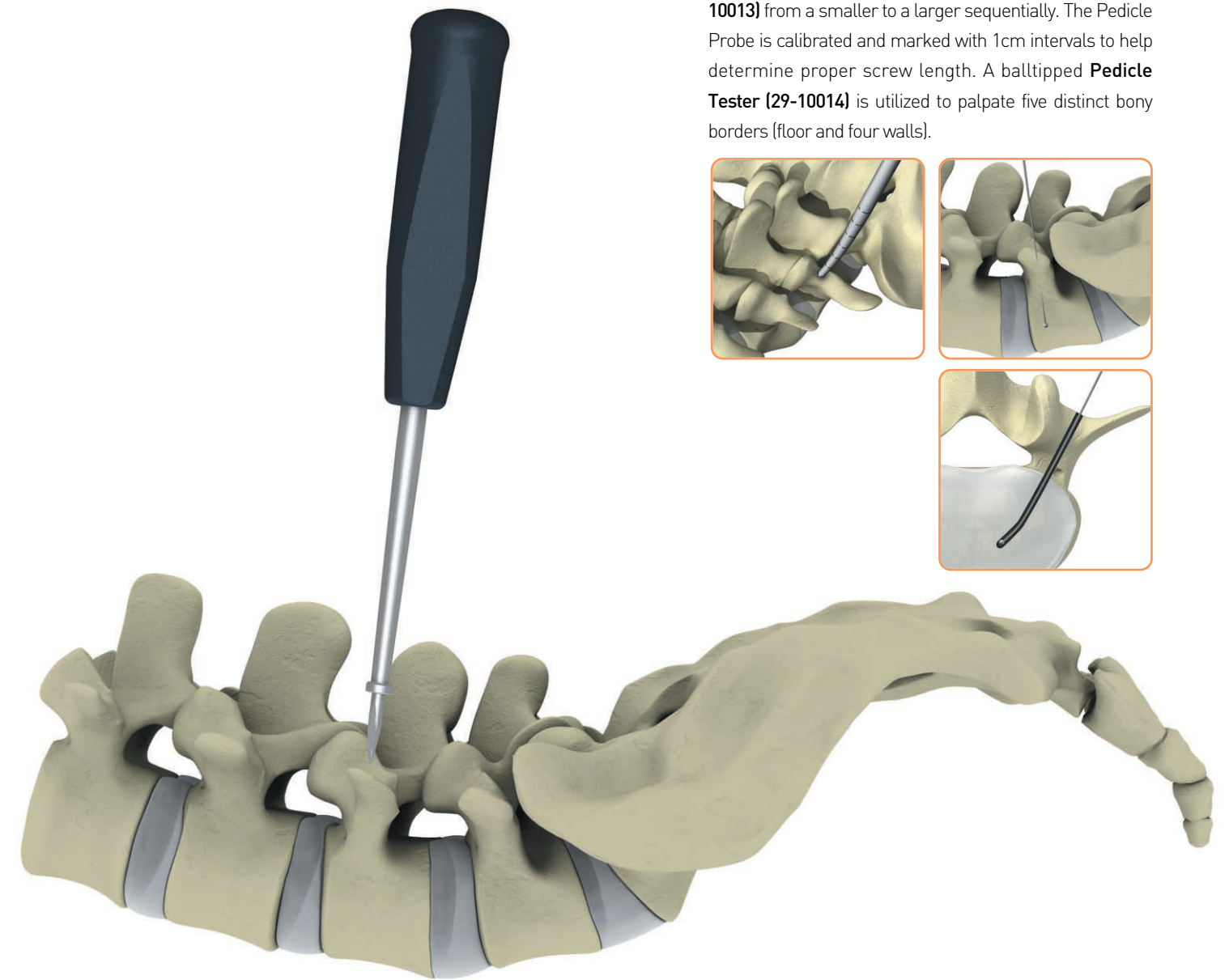


# Surgical Technique Step 2

## Pedicle Preparation

After the determination of the pedicle entry point, the entry hole is prepared by **Awl (4901-5036)**.

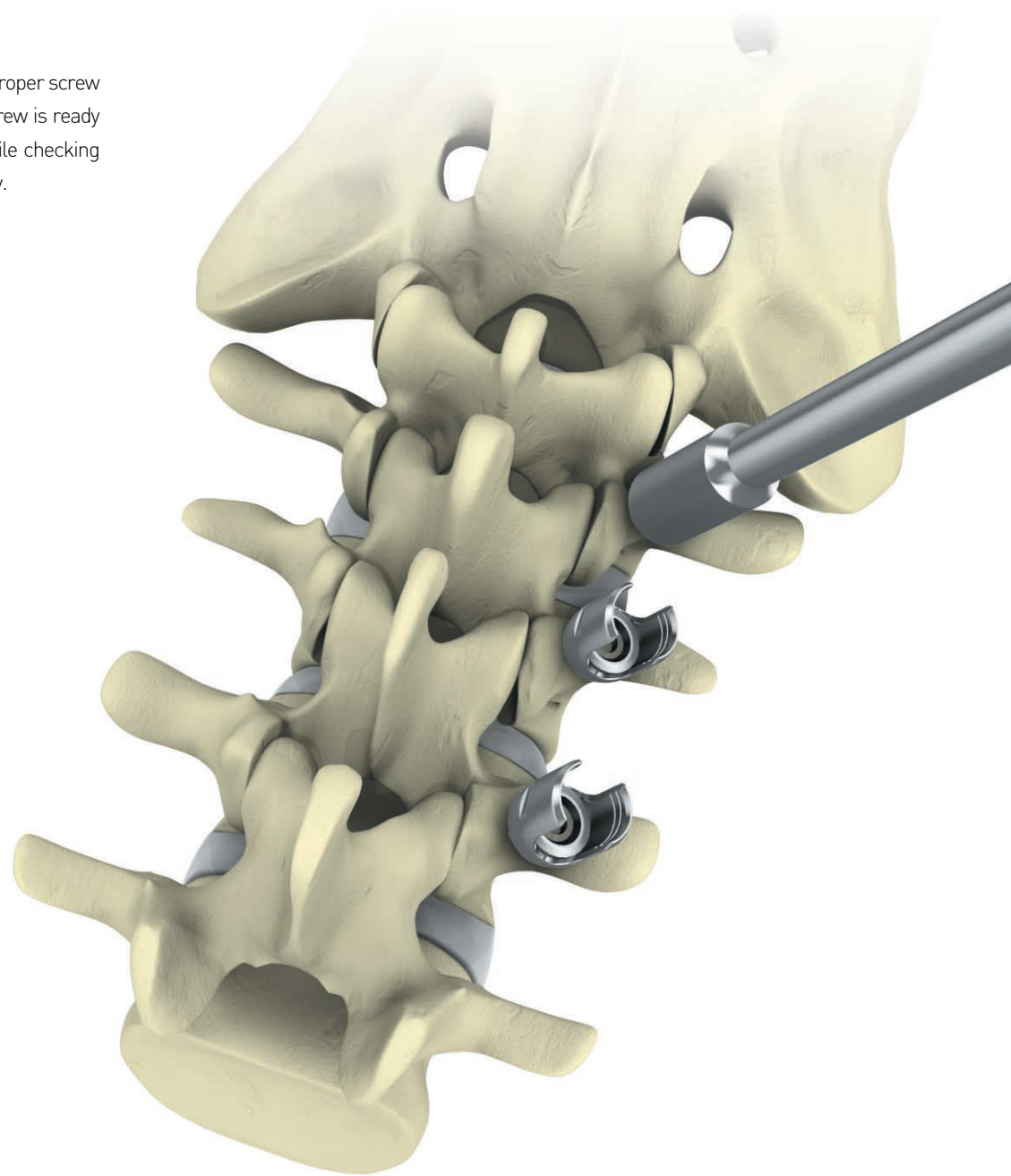
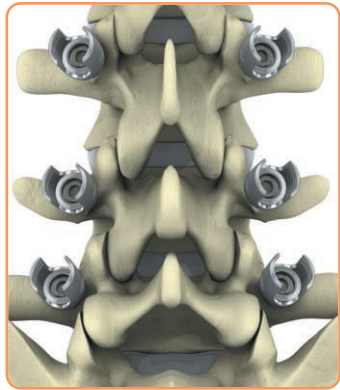
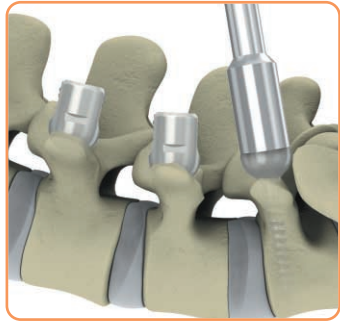
A pathway is then opened up with a **Pedicle Probe (29-10013)** from a smaller to a larger sequentially. The Pedicle Probe is calibrated and marked with 1cm intervals to help determine proper screw length. A balltipped **Pedicle Tester (29-10014)** is utilized to palpate five distinct bony borders (floor and four walls).



# Surgical Technique Step 3

## Screw Insertion

With the pedicle pathway prepared and proper screw length and diameter determined, the screw is ready for insertion. Place the screw slowly while checking proper trajectory using fluoroscopic x-ray.

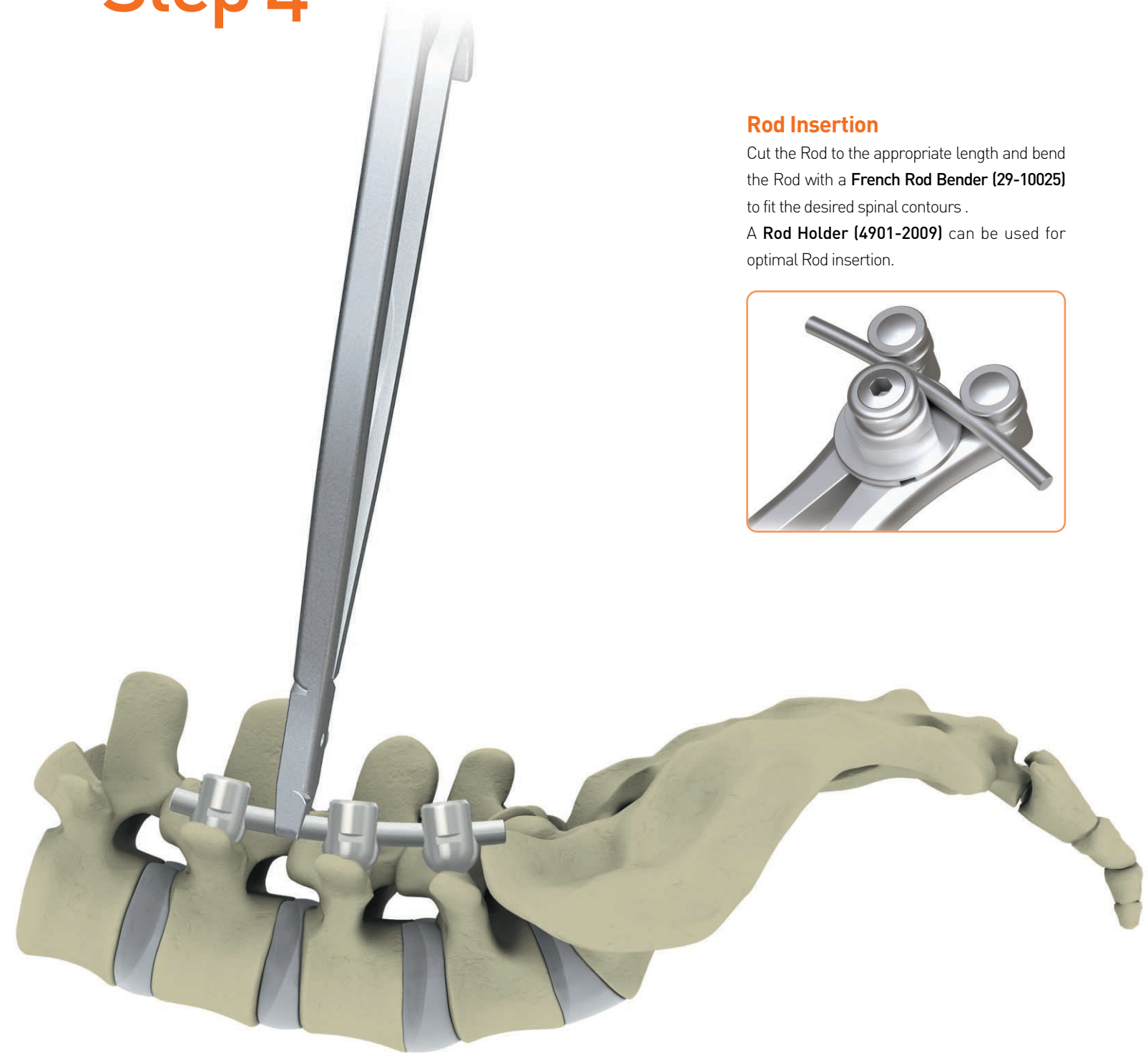


# Surgical Technique Step 4

## Rod Insertion

Cut the Rod to the appropriate length and bend the Rod with a **French Rod Bender (29-10025)** to fit the desired spinal contours.

A **Rod Holder (4901-2009)** can be used for optimal Rod insertion.





# Surgical Technique Step 5

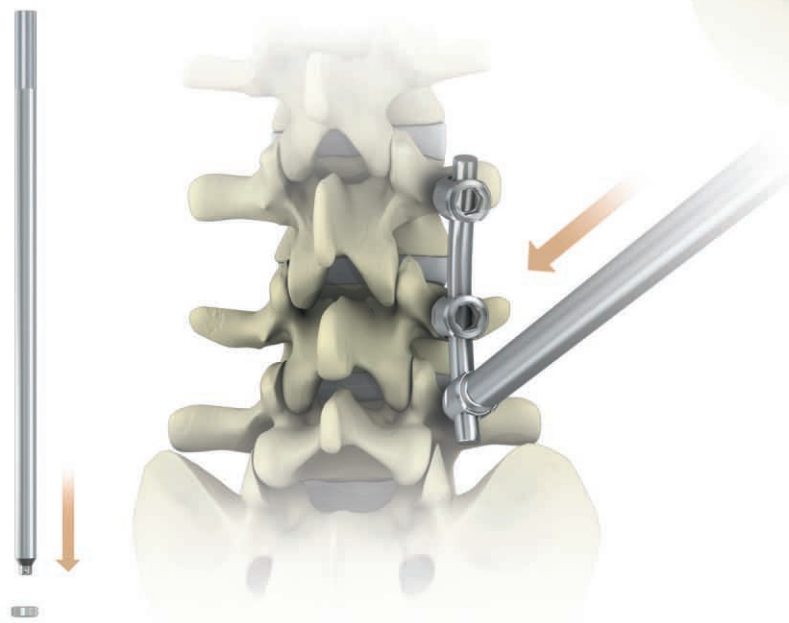
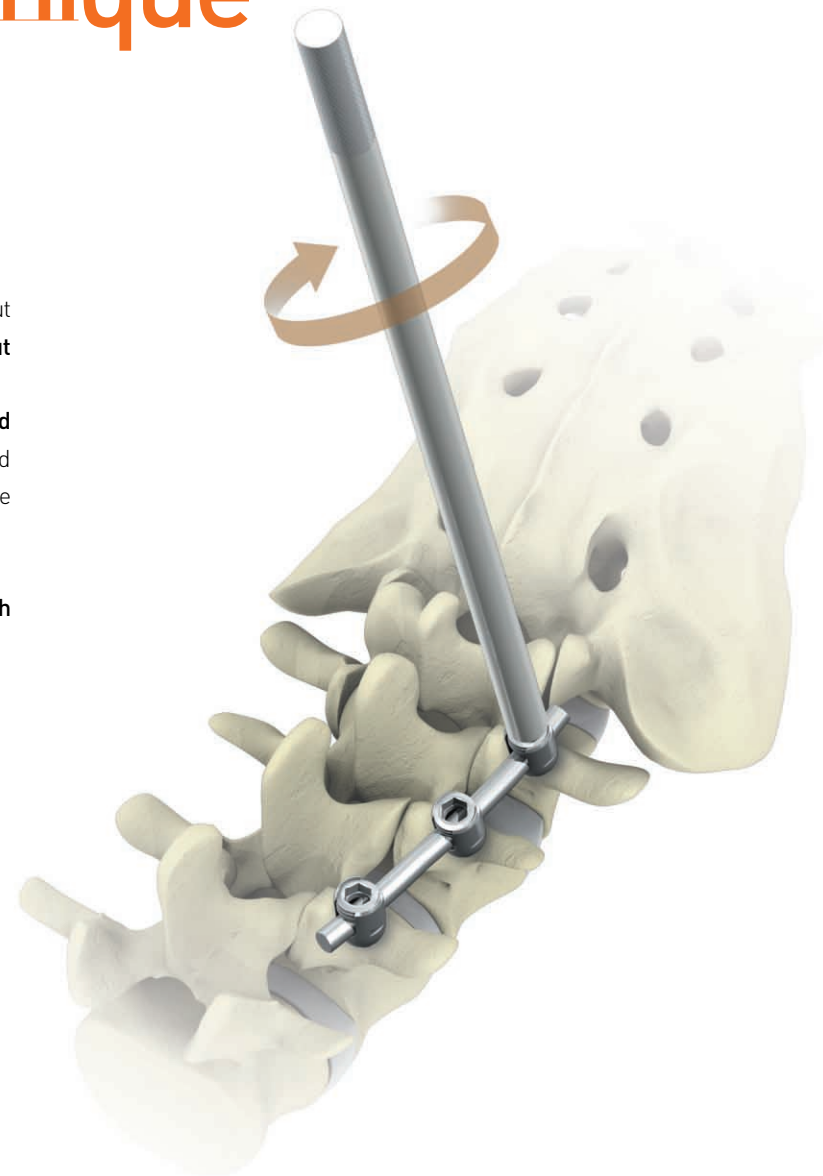
## Nut Application

After the Rod is loaded into the bottom of the screw head, the Nut may be seated onto the top of the screw head using the **Nut Starter (4901-5037)**.

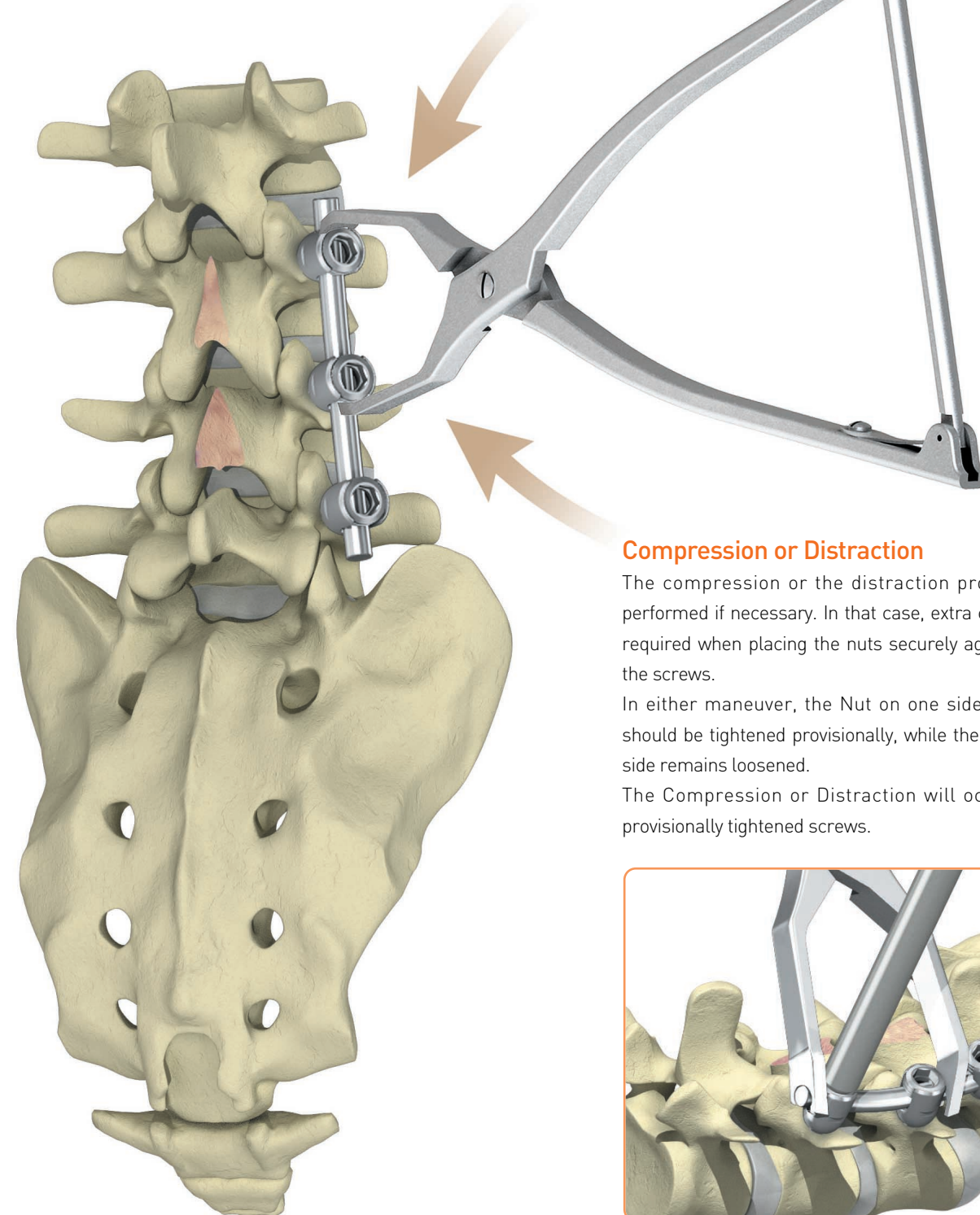
When the rod is not fully seated into the head of the screw, the **Rod Introducer (29-10027)** is preferred for reduction. The Rod Introducer is then rotated clockwise levering the Rod inside of the screw head.

The Nut Starter is then used to insert the Nut.

If necessary, the **Rod Pusher (29-10026)** or **Anti Torque Wrench (4901-2006)** is used to hold the Rod inside of screw head.



# Surgical Technique Step 6



## Compression or Distraction

The compression or the distraction procedure may be performed if necessary. In that case, extra caution should be required when placing the nuts securely against the head of the screws.

In either maneuver, the Nut on one side of the segment should be tightened provisionally, while the Nut on the other side remains loosened.

The Compression or Distraction will occur against the provisionally tightened screws.

# Surgical Technique Step 7

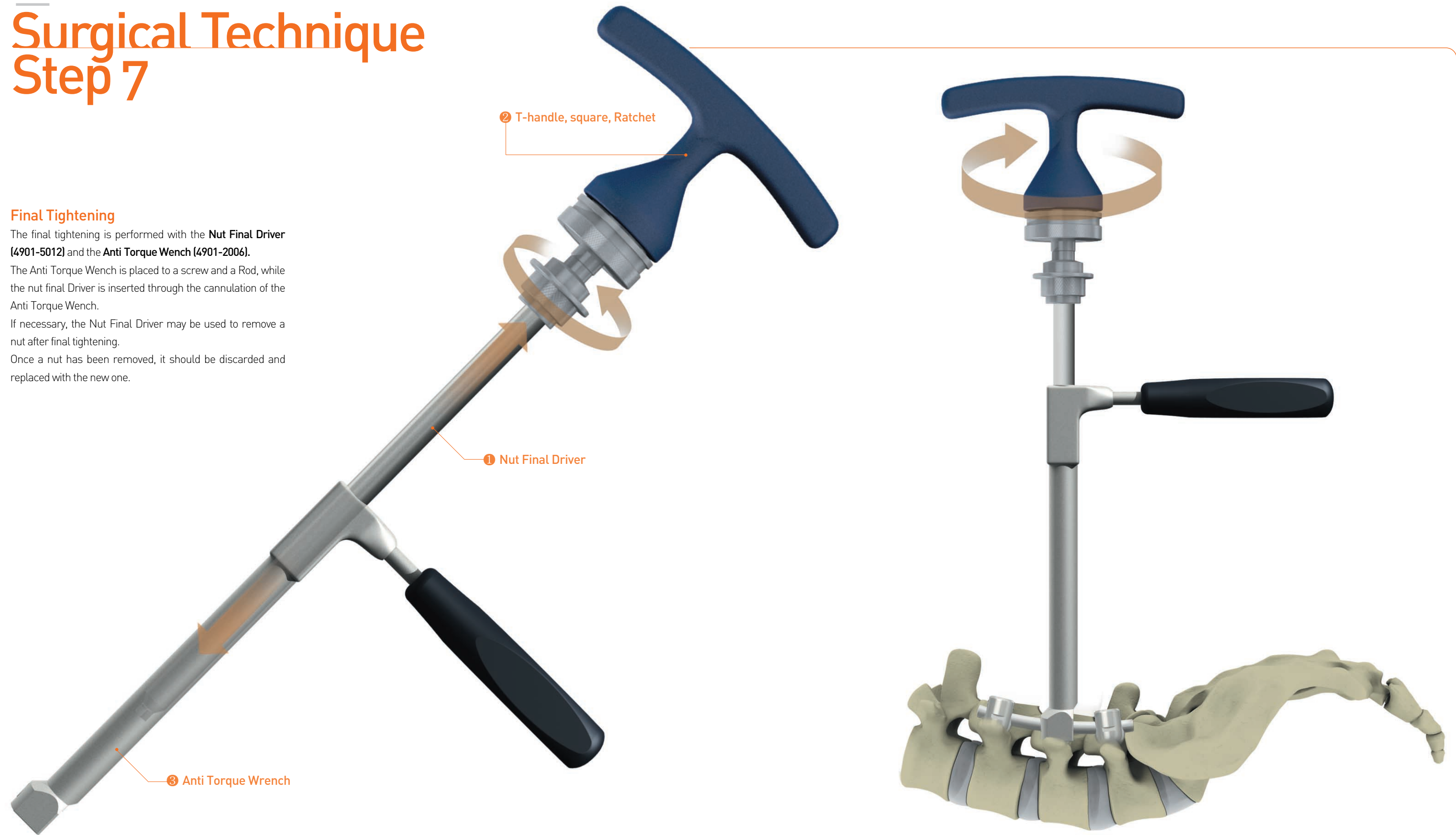
## Final Tightening

The final tightening is performed with the **Nut Final Driver (4901-5012)** and the **Anti Torque Wench (4901-2006)**.

The Anti Torque Wench is placed to a screw and a Rod, while the nut final Driver is inserted through the cannulation of the Anti Torque Wench.

If necessary, the Nut Final Driver may be used to remove a nut after final tightening.

Once a nut has been removed, it should be discarded and replaced with the new one.

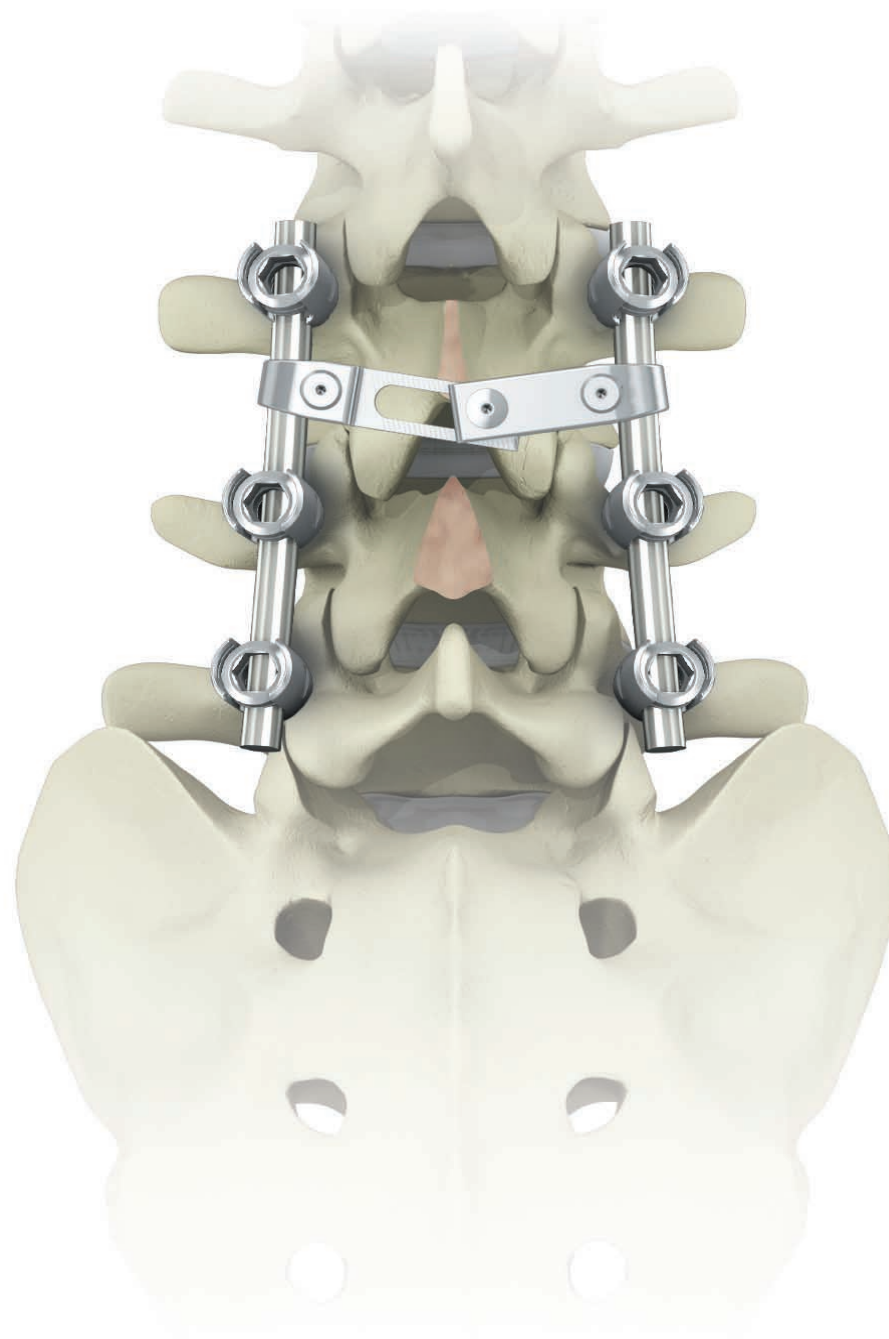


# Surgical Technique Step 8

## Cross Link Technique

After selection of cross link that corresponds in proper size for the distance between rods, the cross link is applied to the rods and tightened with two tightening screws.

If the size of cross link doesn't fit exactly, **Compressor (29-10028)** or **Distractor (29-10029)** can be used accordingly to adjust the distance between rods before final fixation.



## Case Studies - Preoperation & Postoperation

L5 Stenosis HIDV Isthmic Type  
L3-L5 Stenosis Isthmic Type  
L2 Fracture Isthmic Type

The **4CIS® VANE Spine System** is a pedicle screw system indicated for the treatment of severe Spondylolisthesis (Grade 3 and 4) of the L5-S1 vertebra in skeletally mature patients receiving fusion by autogenous bone graft having implants attached to the lumbar and sacral spine (L3 to sacrum) with removal of the implants after the attainment of a solid fusion.

Post OP X-ray



# Product Information

Implants Specifications  
Instruments Specifications

V A N E S P I N E S Y S T E M

## Case Studies - Preoperation & Postoperation



Case1. L5 Stenosis HIDV Isthmic Type

Pre OP MRI

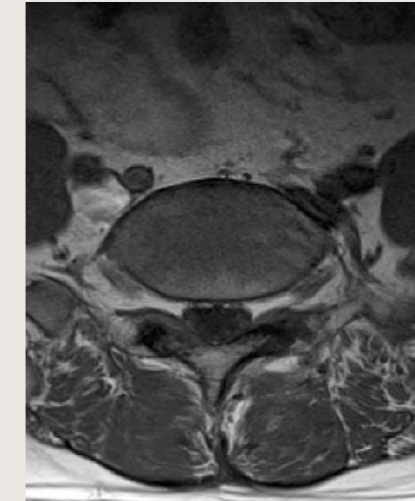


Pre OP X-ray



Post OP X-ray

## Case Studies - Preoperation & Postoperation

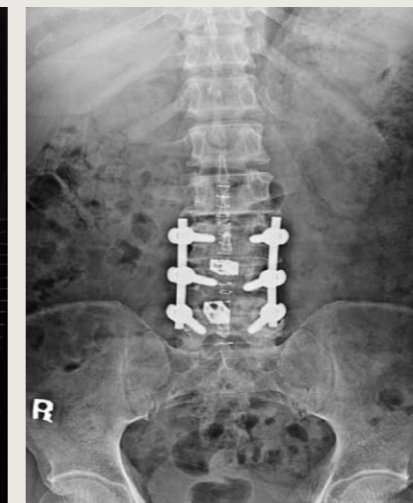


Case2. L3-L5 Stenosis Isthmic Type

Pre OP MRI



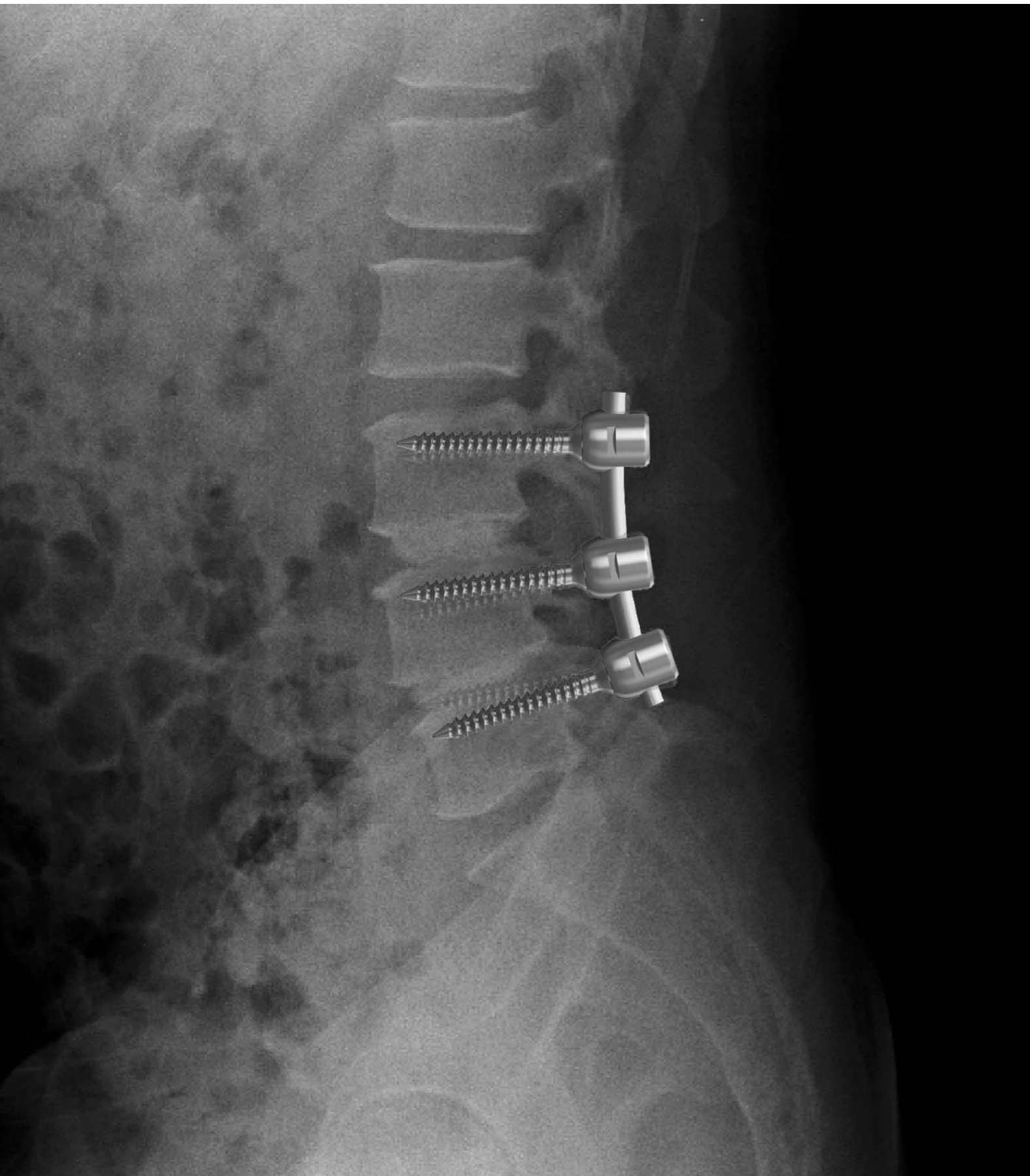
Pre OP X-ray



Post OP X-ray

The **4CIS® VANE Spine System**, a pedicle screw system, treats degenerative disc disease of the thoracic and lumbar spine, which is defined as back pain of discogenic origin with degeneration of the disc confirmed by history and radiographic studies, Spondylolisthesis, fracture, spinal stenosis, spinal deformities such as scoliosis, Kyphosis, Lordosis, tumor, Pseudarthrosis or revision of failed fusion attempts.

### Post OP X-ray



## Case Studies - Preoperation & Postoperation

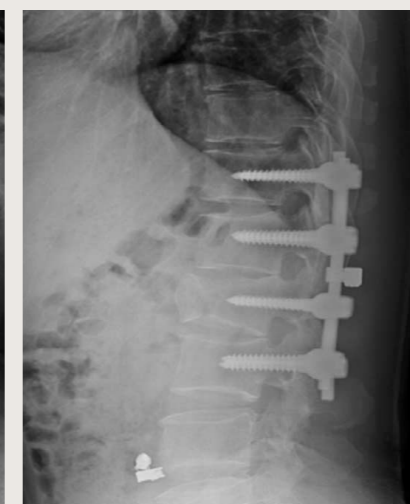


Case3. L2 Fracture Isthmic Type

Pre OP MRI



Pre OP X-ray



Post OP X-ray



### VANE Pedicle Screw (Mono)

4002-4025	Mono-Axial Pedicle Screw	4.0x25mm
4002-4030	Mono-Axial Pedicle Screw	4.0x30mm
4002-4525	Mono-Axial Pedicle Screw	4.5x25mm
4002-4530	Mono-Axial Pedicle Screw	4.5x30mm
4002-4535	Mono-Axial Pedicle Screw	4.5x35mm
4002-4540	Mono-Axial Pedicle Screw	4.5x40mm
4002-4545	Mono-Axial Pedicle Screw	4.5x45mm
4002-4550	Mono-Axial Pedicle Screw	4.5x50mm
4002-5525	Mono-Axial Pedicle Screw	5.5x25mm
4002-5530	Mono-Axial Pedicle Screw	5.5x30mm
4002-5535	Mono-Axial Pedicle Screw	5.5x35mm
4002-5540	Mono-Axial Pedicle Screw	5.5x40mm
4002-5545	Mono-Axial Pedicle Screw	5.5x45mm
4002-5550	Mono-Axial Pedicle Screw	5.5x50mm
4002-6530	Mono-Axial Pedicle Screw	6.5x30mm
4002-6535	Mono-Axial Pedicle Screw	6.5x35mm
4002-6540	Mono-Axial Pedicle Screw	6.5x40mm
4002-6545	Mono-Axial Pedicle Screw	6.5x45mm
4002-6550	Mono-Axial Pedicle Screw	6.5x50mm
4002-6555	Mono-Axial Pedicle Screw	6.5x55mm
4002-6560	Mono-Axial Pedicle Screw	6.5x60mm
4002-7530	Mono-Axial Pedicle Screw	7.5x30mm
4002-7535	Mono-Axial Pedicle Screw	7.5x35mm
4002-7540	Mono-Axial Pedicle Screw	7.5x40mm
4002-7545	Mono-Axial Pedicle Screw	7.5x45mm
4002-7550	Mono-Axial Pedicle Screw	7.5x50mm
4002-7555	Mono-Axial Pedicle Screw	7.5x55mm
4002-7560	Mono-Axial Pedicle Screw	7.5x60mm
4002-8030	Mono-Axial Pedicle Screw	8.0x30mm
4002-8035	Mono-Axial Pedicle Screw	8.0x35mm
4002-8040	Mono-Axial Pedicle Screw	8.0x40mm
4002-8045	Mono-Axial Pedicle Screw	8.0x45mm
4002-8050	Mono-Axial Pedicle Screw	8.0x50mm
4002-8055	Mono-Axial Pedicle Screw	8.0x55mm
4002-8060	Mono-Axial Pedicle Screw	8.0x60mm
4002-8530	Mono-Axial Pedicle Screw	8.5x30mm
4002-8535	Mono-Axial Pedicle Screw	8.5x35mm
4002-8540	Mono-Axial Pedicle Screw	8.5x40mm
4002-8545	Mono-Axial Pedicle Screw	8.5x45mm
4002-8550	Mono-Axial Pedicle Screw	8.5x50mm
4002-8555	Mono-Axial Pedicle Screw	8.5x55mm
4002-8560	Mono-Axial Pedicle Screw	8.5x60mm



### VANE Pedicle Screw (Poly)

4012-5525	Poly-Axial Pedicle Screw	5.5x25mm
4012-5530	Poly-Axial Pedicle Screw	5.5x30mm
4012-5535	Poly-Axial Pedicle Screw	5.5x35mm
4012-5540	Poly-Axial Pedicle Screw	5.5x40mm
4012-5545	Poly-Axial Pedicle Screw	5.5x45mm
4012-5550	Poly-Axial Pedicle Screw	5.5x50mm
4012-5555	Poly-Axial Pedicle Screw	5.5x55mm
4012-6530	Poly-Axial Pedicle Screw	6.5x30mm
4012-6535	Poly-Axial Pedicle Screw	6.5x35mm
4012-6540	Poly-Axial Pedicle Screw	6.5x40mm
4012-6545	Poly-Axial Pedicle Screw	6.5x45mm
4012-6550	Poly-Axial Pedicle Screw	6.5x50mm
4012-6555	Poly-Axial Pedicle Screw	6.5x55mm
4012-6560	Poly-Axial Pedicle Screw	6.5x60mm
4012-7530	Poly-Axial Pedicle Screw	7.5x30mm
4012-7535	Poly-Axial Pedicle Screw	7.5x35mm
4012-7540	Poly-Axial Pedicle Screw	7.5x40mm
4012-7545	Poly-Axial Pedicle Screw	7.5x45mm
4012-7550	Poly-Axial Pedicle Screw	7.5x50mm
4012-7555	Poly-Axial Pedicle Screw	7.5x55mm
4012-7560	Poly-Axial Pedicle Screw	7.5x60mm



### VANE Nut

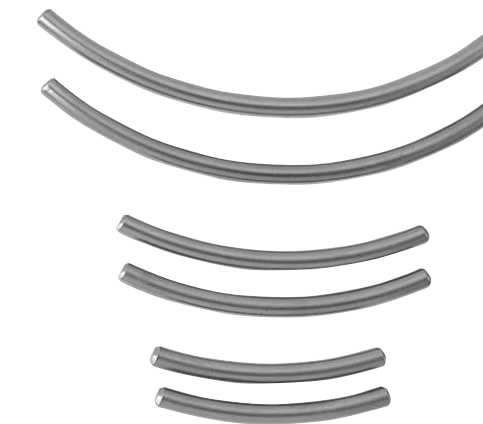
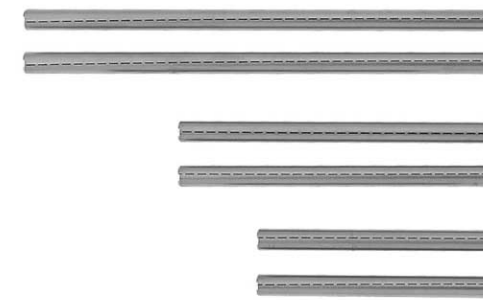
4242-0001	Nut
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### VANE Cross - Link

4412-3034	Cross - Link	30/34mm
4412-3442	Cross - Link	34/42mm
4412-4053	Cross - Link	40/53mm
4412-5070	Cross - Link	50/70mm

### VANE Smooth Rod

4302-5804	Smooth Rod	5.7 x 40mm
4302-5805	Smooth Rod	5.7 x 50mm
4302-5806	Smooth Rod	5.7 x 60mm
4302-5807	Smooth Rod	5.7 x 70mm
4302-5808	Smooth Rod	5.7 x 80mm
4302-5809	Smooth Rod	5.7 x 90mm
4302-5810	Smooth Rod	5.7 x 100mm
4302-5812	Smooth Rod	5.7 x 120mm
4302-5814	Smooth Rod	5.7 x 140mm
4302-5816	Smooth Rod	5.7 x 160mm
4302-5818	Smooth Rod	5.7 x 180mm
4302-5820	Smooth Rod	5.7 x 200mm
4302-5825	Smooth Rod	5.7 x 250mm
4302-5830	Smooth Rod	5.7 x 300mm
4302-5835	Smooth Rod	5.7 x 350mm
4302-5840	Smooth Rod	5.7 x 400mm
4302-5845	Smooth Rod	5.7 x 450mm
4302-5850	Smooth Rod	5.7 x 500mm



### VANE Curved Rod

4332-5804	Curved Rod	5.7 x 40mm
4332-5805	Curved Rod	5.7 x 50mm
4332-5806	Curved Rod	5.7 x 60mm
4332-5807	Curved Rod	5.7 x 70mm
4332-5808	Curved Rod	5.7 x 80mm
4332-5809	Curved Rod	5.7 x 90mm
4332-5810	Curved Rod	5.7 x 100mm
4332-5812	Curved Rod	5.7 x 120mm
4332-5814	Curved Rod	5.7 x 140mm
4332-5816	Curved Rod	5.7 x 160mm
4332-5818	Curved Rod	5.7 x 180mm
4332-5820	Curved Rod	5.7 x 200mm

## Instruments



**Awl**  
Coed No. 4901-5036



**Pedicule Probe for 5.5mm Screw, STR.**  
Coed No. 29-10012



**Pedicule Probe for 6.5mm Screw, STR.**  
Coed No. 29-10013



**Pedicule Probe for 6.5mm Screw, CVD.**  
Coed No. 4901-0041



**Pedicule Tester, STR.**  
coed no. 29-10014



**Pedicule Tester, CVD.**  
coed no. 4901-5004



**Rod Pusher**  
Coed No. 29-10026

## Instruments



**Rod Introducer**  
Coed No. 29-10027



**Cross Link Screw Driver**  
Coed No. 4901-0030



**Guide Pin (Triangle)**  
Coed No. 29-10015



**Guide Pin (Ellipse)**  
Coed No. 29-10016



**Tap for 5.5mm**  
Coed No. 4901-5006



**Tap for 6.5mm**  
Coed No. 4901-5007



**Tap for 7.5mm**  
Coed No. 4901-5014



**Nut Starter**  
Coed No. 4901-5037



**Nut Final Driver**  
Coed No. 4901-5012



**Poly Axial Bone Screw Final Driver**  
Coed No. 4901-5015



## Instruments



**Mono Axial Screw Driver**  
Coed No. 4901-5010



**Poly Axial Screw Driver**  
Coed No. 4901-5013



**Poly Axial Screw Driver**  
Coed No. 4901-5033



**Torque Wrench (12N Torque Limiter)**  
Coed No. 4901-2012



**Poly Axial Screw Aligner**  
Coed No. 4901-5038



**In-line handle, square, Ratchet**  
Coed No. 4901-5034



**T-handle, square, Ratchet**  
Coed No. 4901-5035

## Instruments



**French Rod Bender**  
Coed No. 29-10025



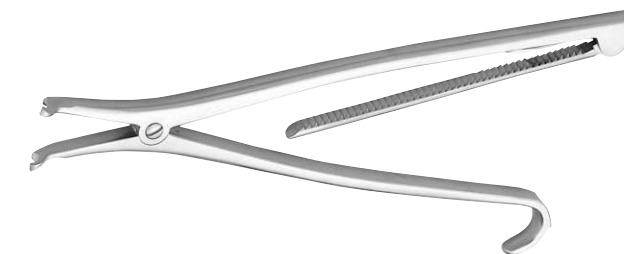
**Rod Gripper**  
Coed No. 29-10022



**Rod Holder**  
Coed No. 4901-2009



**Screw Compressor**  
Coed No. 29-10028



**Screw Distractor**  
Coed No. 29-10029

## Instruments



Anti Torque Wrench  
Coed No. 29-10131



Anti Torque Wrench  
Coed No. 4901-2006



Nut Guide  
Coed No. 4901-2008

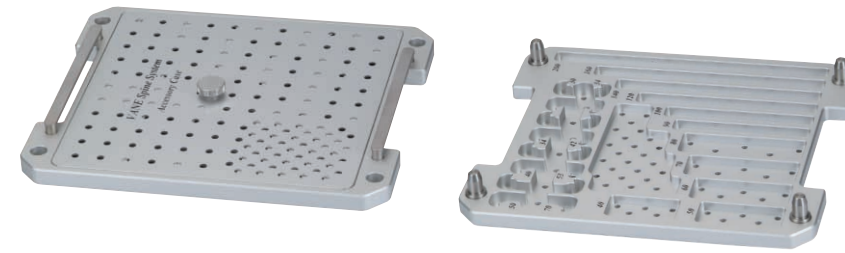


Persuader  
Coed No. 4901-5005

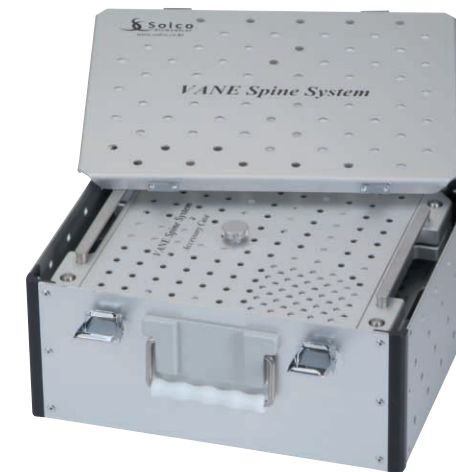
## Implants / Instruments Container



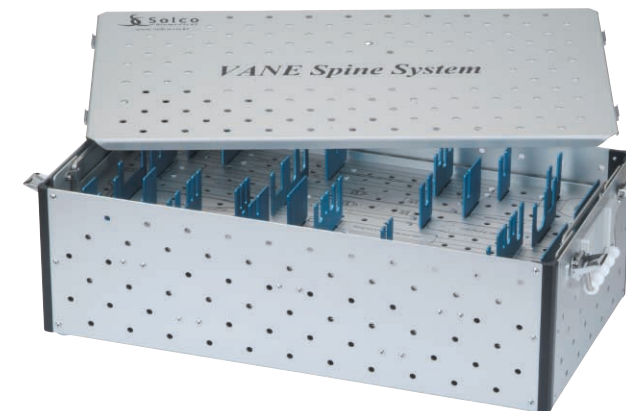
Screw Tray  
Coed No. 9901-4020



Accessory Case  
Coed No. 9901-4021



Implants Container  
Coed No. 9901-4022



Instruments Container  
Coed No. 9901-4023