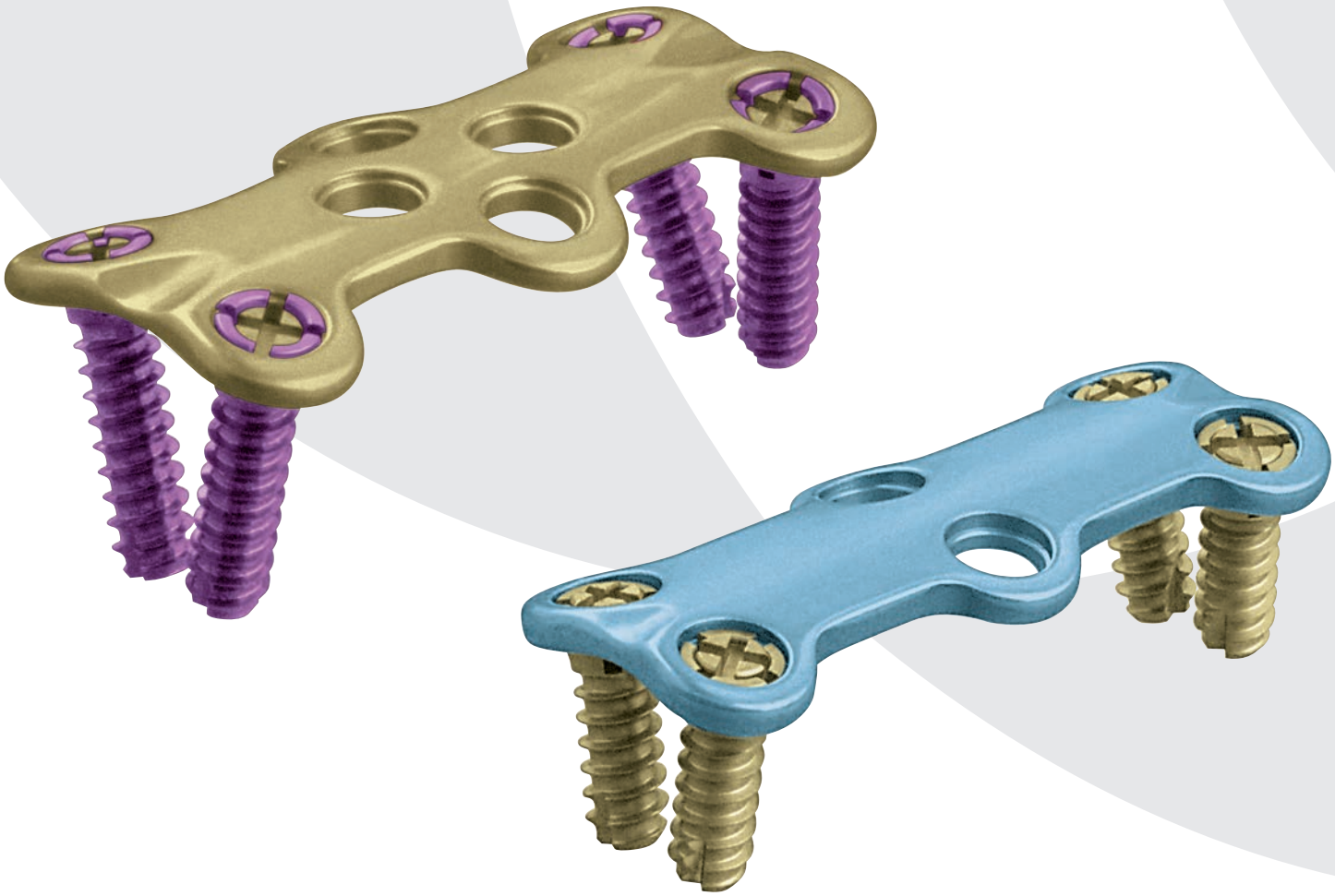
For anterior, cervical fixation

CSLP-Cervical Spine Locking Plate

Surgical Technique



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Processing, Reprocessing, Care and Maintenance
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
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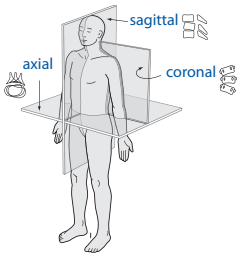
Table of Contents

AO Spine Principles

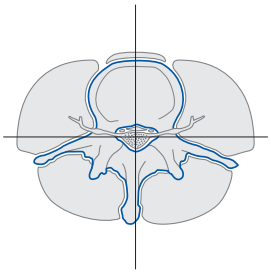
The four principles to be considered as the foundation for proper spine patient management underpin the design and delivery of the Curriculum: Stability – Alignment – Biology – Function.[1,2]

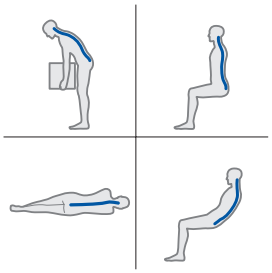
Stability
Stabilization to achieve a specific therapeutic outcome



Alignment
Balancing the spine in three dimensions

Biology
Etiology, pathogenesis, neural protection, and tissue healing





Function
Preservations and restoration of function to prevent disability

[1] Aebi et al (1998)
[2] Aebi et al (2007)

Indications and Contraindications

Intended Use
The CSLP is used in anterior plating of the cervical spine (C2-T2) for the internal fixation in the treatment of instabilities associated with fractures/dislocations, degenerative diseases, tumours and partial or total spondylectomy.

Indications
The CSLP is used in anterior plating of the cervical spine (C2–T2) for the internal fixation in the treatment of instabilities associated with:

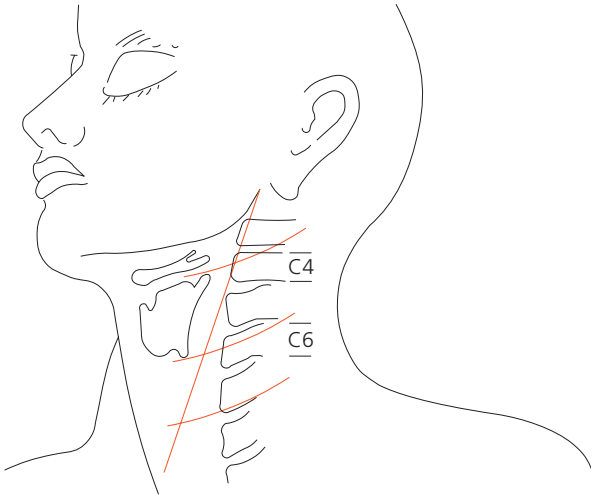
- fractures/dislocations
- degenerative diseases
- tumours
- partial or total spondylectomy

Contraindications
- Severe osteoporosis and indications not listed above
- Any indication where fusion is not required

1. Patient Positioning and Approach

The approach described by Southwick and Robinson is chosen for plating the mid and lower cervical spine through T2. The patient is in supine position, with his/her head turned slightly away from the operator. If the plating is to extend over several segments, it is advisable to make a long incision along the anterior border of the M. sternocleidomastoideus. The approach to the spine is medial to this muscle and the neurovascular bundle, and lateral to the thyroid, trachea, and oesophagus. The A. thyroidea inferior must be ligated as a rule.

When preparing the vertebral body, it is important to only remove or incise the anterior longitudinal ligament where the intervertebral disc is to be bridged by the fusion. Under no circumstances is the anterior longitudinal ligament to be traumatised in the neighbouring segments not involved in the fusion.



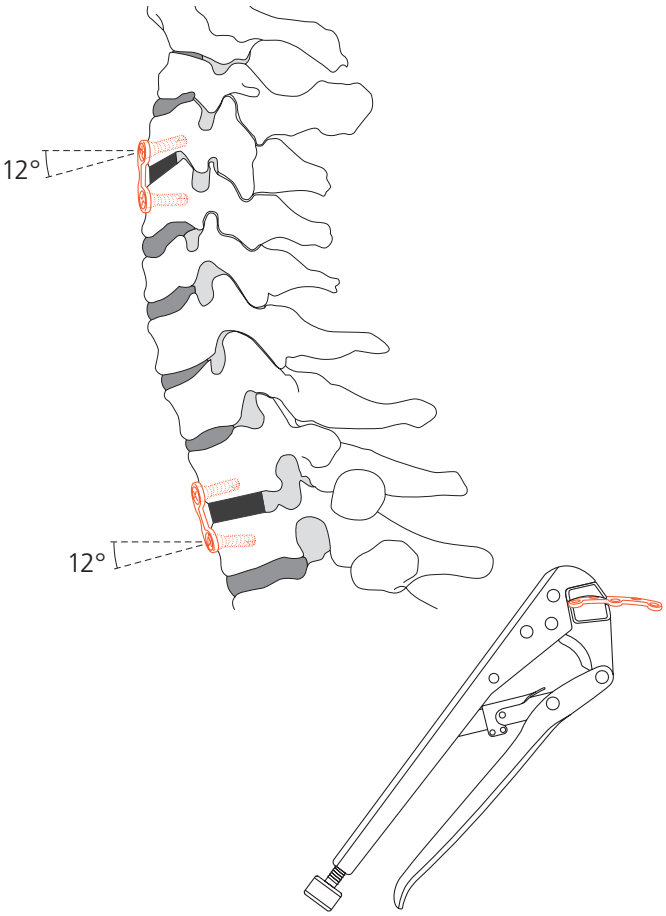
2. Select Plate

When choosing the suitable plate size, it must be considered that the intervertebral discs in the neck region are slightly inclined from anterocaudal to posterocranial. Ensure that the screws will remain totally in the vertebral body and will not penetrate the intervertebral discs. Make sure there will be enough space between the intact adjacent intervertebral discs and the screws.

Once the correct plate size has been chosen, the alignment of the plate is determinded. The 12° angled screw holes are, as a rule, positioned cranially to allow access to the cranial vertebrae. When directed caudally, the angled holes make instrumentation of T2 possible (possible insertion of screw in T2).

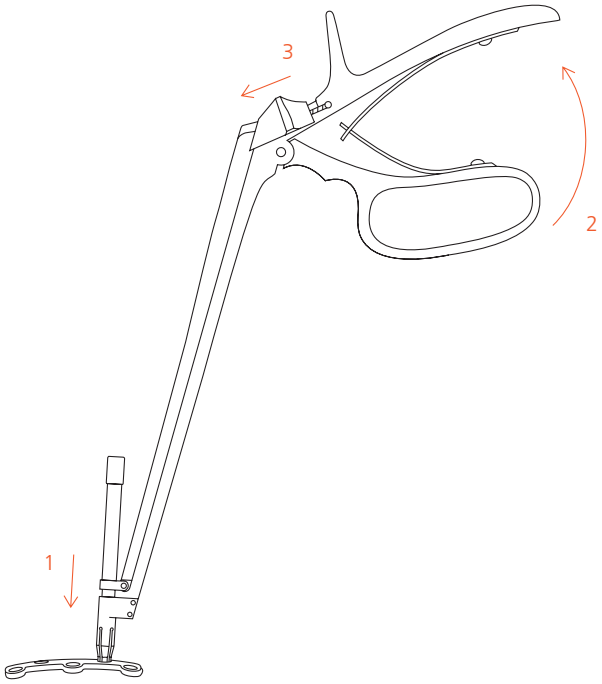
If the plate requires contouring, ensure that the holes remain unaltered. Distorted holes cannot be used for expansionhead screws. The Bending Pliers (324.065) is recommended to give the Cervical Spine Locking Plate its correct lordotic curvature.

Note: **The plate must not be bent backward and forward as this has a weakening effect.**



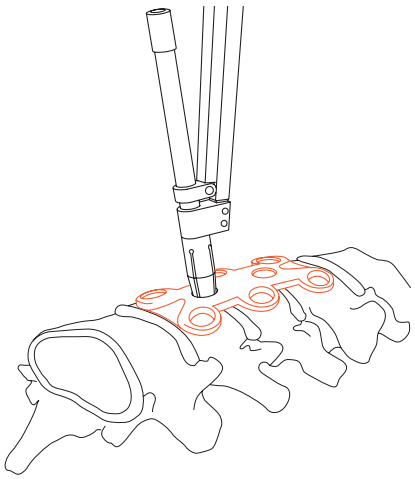
3. Insert Drill Guide

Insert the Drill Guide 3.0 (387.201) into a middle plate hole (1). Choose the correct alignment to hold the plate, press the handle to attach the plate to the drill guide (2) and slide the catch forward to lock the drill guide in its position (3).



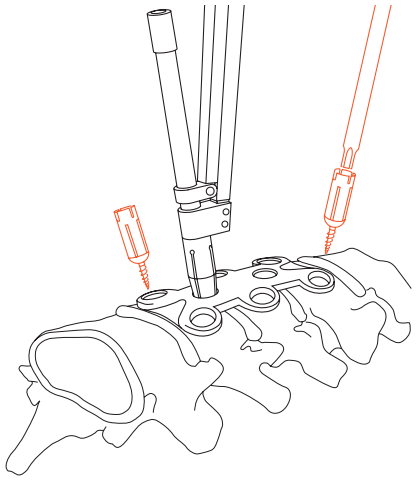
4. Position the Plate

The plate thus attached to the drill guide is inserted into the operating area and aligned. Ensure that the screws will remain totally in the vertebral body and will not penetrate the intervertebral discs. Make sure there will be enough space between the intact adjacent intervertebral discs and the screws.



5. Insert Fixation Pins

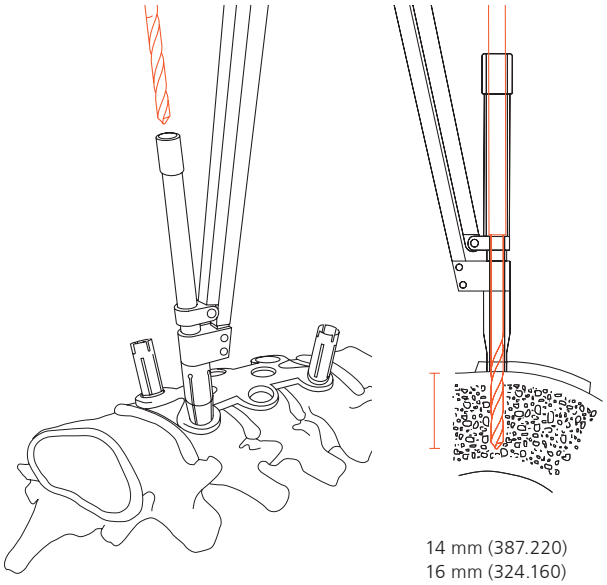
Using the self-holding Screwdriver Shaft 4.0/4.35/4.5 (387.281) and Handle (311.430), a Fixation Pin (387.595) is taken from the rack and inserted into one of the cranial plate holes. The proximal end of the handle may be tapped on to facilitate the penetration of the pin into the cortex. Screw the pin into the vertebral body. Insert a second fixation pin into the diagonally opposite plate hole and remove screwdriver and drill guide (additional temporary fixation pins may be inserted if desired). An image intensifier may be used for a lateral view of the position of the fixation pins to indicate the potential positions of the screws.



6. Drill Holes for Expansionhead Screws

For Expansionhead Screws of 14 mm of length, Drill Bit ∅ 3.0 mm with Stop (387.220) and Drill Guide 3.0 are used to drill the holes no deeper than 14 mm. For this purpose insert Drill Guide 3.0 in the empty caudal hole. The drill guide must sit correctly in the plate hole so the screw head can later be fully sunk into the plate. For 16 mm colour-coded screws use the purple colour-marked Drill Bit with Stop (324.160) to drill the holes no deeper than 16 mm.

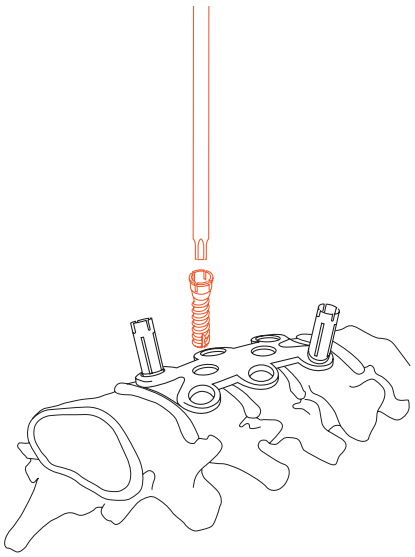
Note: **During drilling the drill guide must sit accurately in the plate hole and the handle has to be pressed to achieve a firm hold between the plate and the drill guide.**



14 mm (387.220)
16 mm (324.160)

7. Insert the First Expansionhead Screw

A self-tapping expansion head screw appropriate in length and diameter is taken from the screw rack by means of the self-holding Screwdriver Shaft 4.0/4.35/4.5 (387.281) and inserted at the given angle. The screw must not be fully tightened at first as this could cause the opposite side of the plate to tilt.



Cervical Spine Expansion Head Screws, self-tapping*

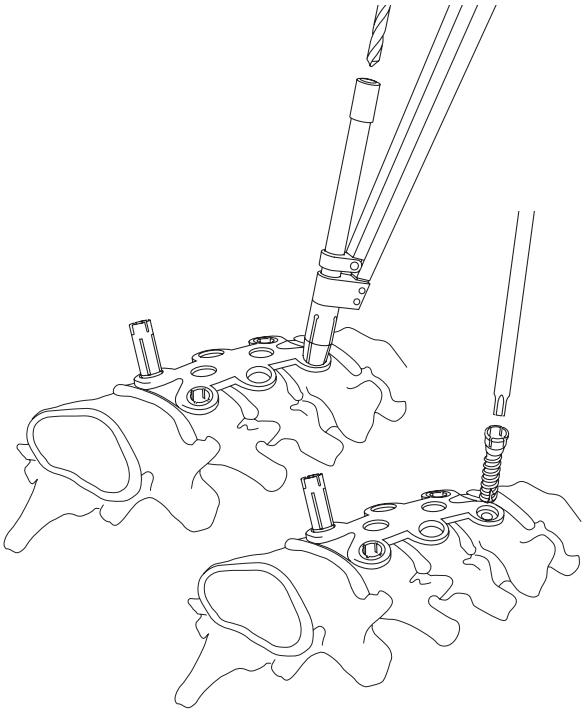
∅ 4.0 mm	14 mm	gold	(487.044)	
∅ 4.0 mm	16 mm	violet	(487.046)	
∅ 4.35 mm	14 mm	gold	(487.054)	
∅ 4.35 mm	16 mm	violet	(487.056)	

* All implants are also available sterile packed.
Add suffix "S" to article number.

Warning: **For long spans or poor bone quality: The surgeon is urged to consider the nature of such cases. The treatment may require the use of longer screws (16 mm), and/or posterior fixation for this kind of inherently unstable cases. The 4.35 mm screw may be used as an emergency screw in cases where the 4.0 mm screw has stripped the bone and a larger screw thread is required.**

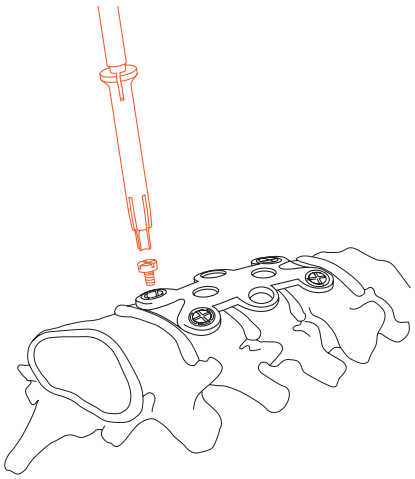
8. Insert Remaining Screws

The remaining screws are then inserted likewise, starting with the screw diagonally opposite the first one. The screw holes are prepared as in step 6. Once the second screw is inserted the fixation pins are removed. Finally, all screws must be tightened so that the screw heads render a flush plate surface.



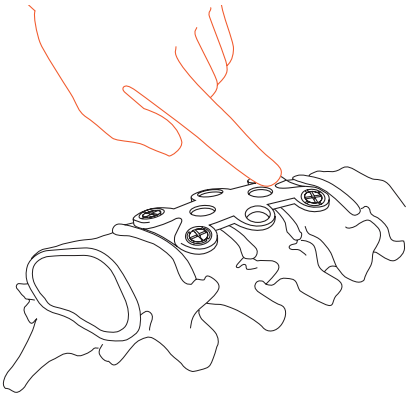
9. Insert Locking Screws

The Locking Screws ∅ 1.8 mm (497.780) are then inserted. Using Screwdriver Shaft 1.8 (387.310) and Holding Sleeve (387.320), one locking screw after the other is taken from the screw rack, carefully inserted into the screw heads and firmly tightened.



10. Check Plate Surface

Before closing the incision check with your finger tip that all screws are fully sunk into the plate. A flush surface prevents the soft tissue from being damaged (oesophagus!).



Implant Removal

Implant Removal

For implant removal:

- Firstly remove locking screw using Screwdriver Shaft 1.8 (387.310).
- Then remove screw using Screwdriver Shaft 4.0/4.35/4.5 (387.281).
- Repeat this for all screws.
- Remove plate.

Implants

Plates

CSLP Plate

One-level plates

Art. No.	Plate length mm
450.114	22
450.116	24
450.118	26
450.120	28
450.122	30
450.124	32
450.126	34

Two-level plates

Art. No.	Plate length mm
450.228	36
450.231	39
450.234	42
450.237	45
450.240	48
450.243	51
450.246	54

Three-level plates

Art. No.	Plate length mm
450.345	53
450.348	56
450.351	59
450.354	62
450.357	65
450.360	68
450.363	71
450.366	74
450.369	77

Four-level plates

Art. No.	Plate length mm
450.460	68
450.464	72
450.468	76
450.472	80
450.476	84
450.480	88
450.484	92

CSLP narrow plates*

One-level plates

Art. No.	Plate length mm
487.212	20
487.213	22
487.214	24
487.215	26
487.222	28
487.223	30
487.224	32
487.225	34

Two-level plates

Art. No.	Plate length mm
487.216	34
487.217	36
487.218	38
487.226	40
487.227	42
487.228	45
487.236	48
487.237	51
487.238	54

Three-level plates

Art. No.	Plate length mm
487.339	47
487.342	50
487.345	53
487.348	56
487.351	59
487.354	62

* All implants are also available sterile packed. Add suffix "S" to article number.

Screws*		
487.044	Cervical Spine Expansion Head Screw ∅ 4.0 mm, self-tapping, length 14 mm, Pure Titanium	
487.046	Cervical Spine Expansion Head Screw ∅ 4.0 mm, self-tapping, length 16 mm, Pure Titanium, violet	
487.054	Cervical Spine Expansion Head Screw ∅ 4.35 mm, self-tapping, length 14 mm, Pure Titanium	
487.056	Cervical Spine Expansion Head Screw ∅ 4.35 mm, self-tapping, length 16 mm, Pure Titanium, violet	
497.780	Locking Screw ∅ 1.8 mm, Pure Titanium	

* All screws are also available sterile packed. Add suffix "S" to article number.

Instruments

311.430	Handle with Quick Coupling, length 110 mm	
324.065	Bending Pliers for Cervical Spine Locking Plates	
324.160	Drill Bit ∅ 3.0 mm with Stop, length 190/45 mm, drilling depth 16 mm, 2-flute, for Quick Coupling	
387.201	Drill Guide 3.0, self-holding, for Cervical Spine Locking Plates	
387.220	Drill Bit ∅ 3.0 mm with Stop, length 180/45 mm, drilling depth 14 mm, 2-flute, for Quick Coupling	
387.281	Screwdriver Shaft 4.0/4.35/4.5, cruciform, self-holding, length 180 mm	
387.310	Screwdriver Shaft 1.8, cruciform, length 180 mm	
387.320	Holding Sleeve, for No. 387.310	
387.595	Fixation Pin for Cervical Spine Locking Plates, for temporary use	

Bibliography

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

Aebi M, Thalgott JS, Webb JK (1998): AO ASIF Principles in Spine Surgery. Berlin: Springer

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