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MYSPINE CASE REPORT

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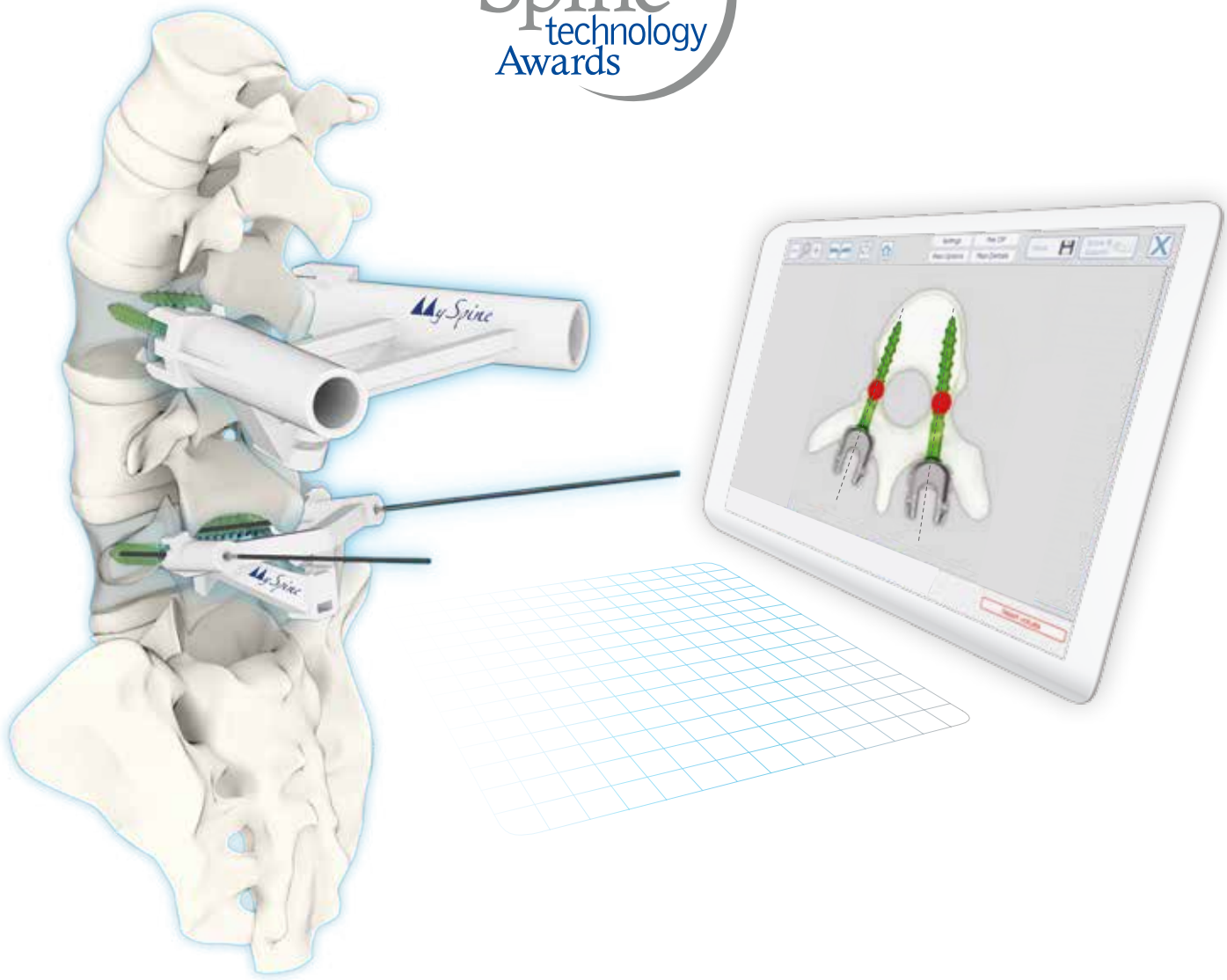
MySpine Screw Placement Guides in Deformity cases

PROF. CLAUDIO LAMARTINA, DR. RICCARDO CECCHINATO

MySpine
PATIENT MATCHED TECHNOLOGY
IN SPINE SURGERY

2014 Orthopedics This Week Spine technology Awards



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MySpine Screw Placement Guides in Deformity cases: A case report.

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PATIENT HISTORY

Age	39 years
Sex	Male
BMI	30 (80kg,163cm)
Smoker	Yes
Diagnosis	Congenital scoliosis at 10 years old
Treatment	Conservative treatment

39 year-old man with progressive thoracic and low back pain, he was diagnosed at the age of 10 with a congenital scoliosis (*Figure 1*).

Patient's physical examination revealed a thoracolumbar kyphosis with a right hump and asymmetry of the trunk. No neurological deficits were observed.

Figure 1. Clinical and radiographic images of a 39 year-old man demonstrating a thoracolumbar deformity

PRE-OP INFORMATION

Pre-operative full-standing x-rays examination (*Figure 1*) showed a thoracolumbar scoliosis with apex in L2 of 62 degrees and a thoracolumbar kyphosis of 49 degrees. A CT scan of the thoracolumbar region demonstrated a congenital deformity with L1 hemivertebra and L2 malformation (*Figure 2*).

Figure 2. Coronal CT of the thoracolumbar junction (on the left) showing a L1 congenital hemivertebra. The 3D reconstruction on the right highlights the deformity and the associated L2 malformation.

SURGICAL STRATEGY

Posterior T9-L4 fusion with MySpine screw placement guides and Medacta MUST polyaxial pedicle screws. An L1-L2 asymmetric pedicle subtraction osteotomy (PSO) was performed to remove the hemivertebra and allow a correction of the coronal and sagittal deformity.

To preserve post-operative lower lumbar movement, in the absence of L4-S1 disc degeneration, the chosen lower instrumented vertebra was L4.
After the procedure, the surgical bed was folded in lordosis to restore a flat thoracolumbar junction through the closure of the osteotomy.

Titanium 5.5mm rods were then connected to screws to correct the spine shape on both planes.
MySpine patient-technology is based on a pre-operative low-dose CT scan and a 3D reconstruction method.

Through accurate 3D pre-operative planning, the surgeon can set all of the pedicle screw positioning parameters and decide which will be the final target according to the selected surgical strategy (*Figure 3*).

Peri-operatively awls, pedicle probes and screwdrivers are guided into the corresponding pedicles using the MySpine.

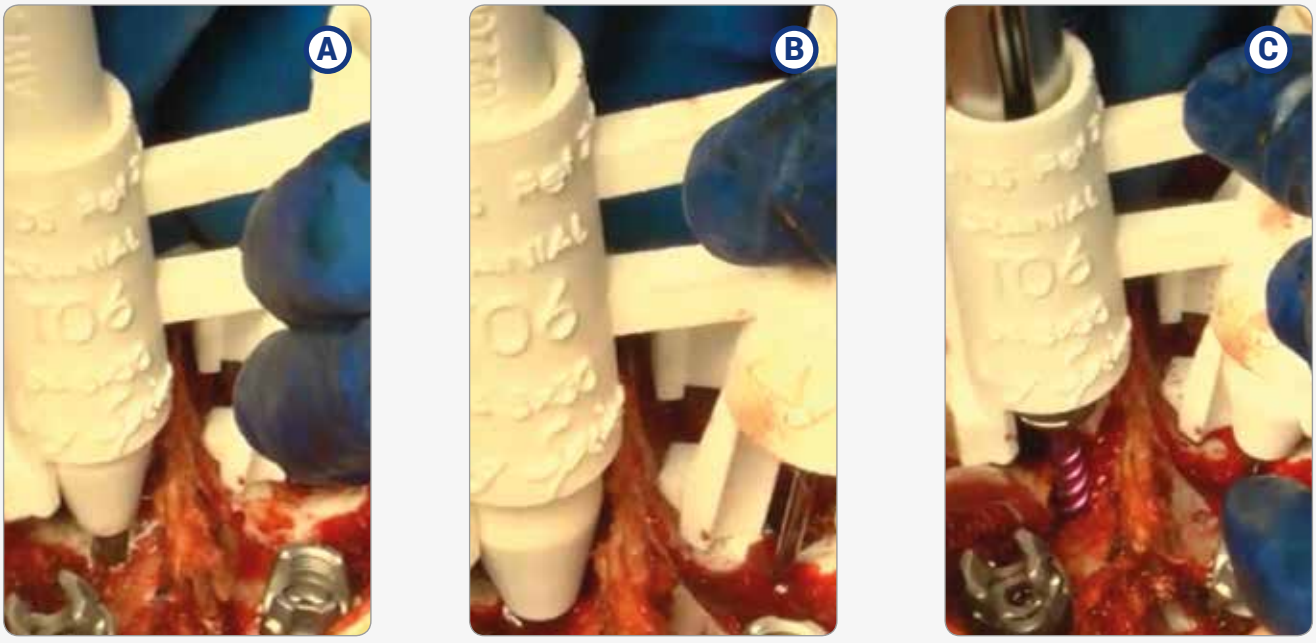


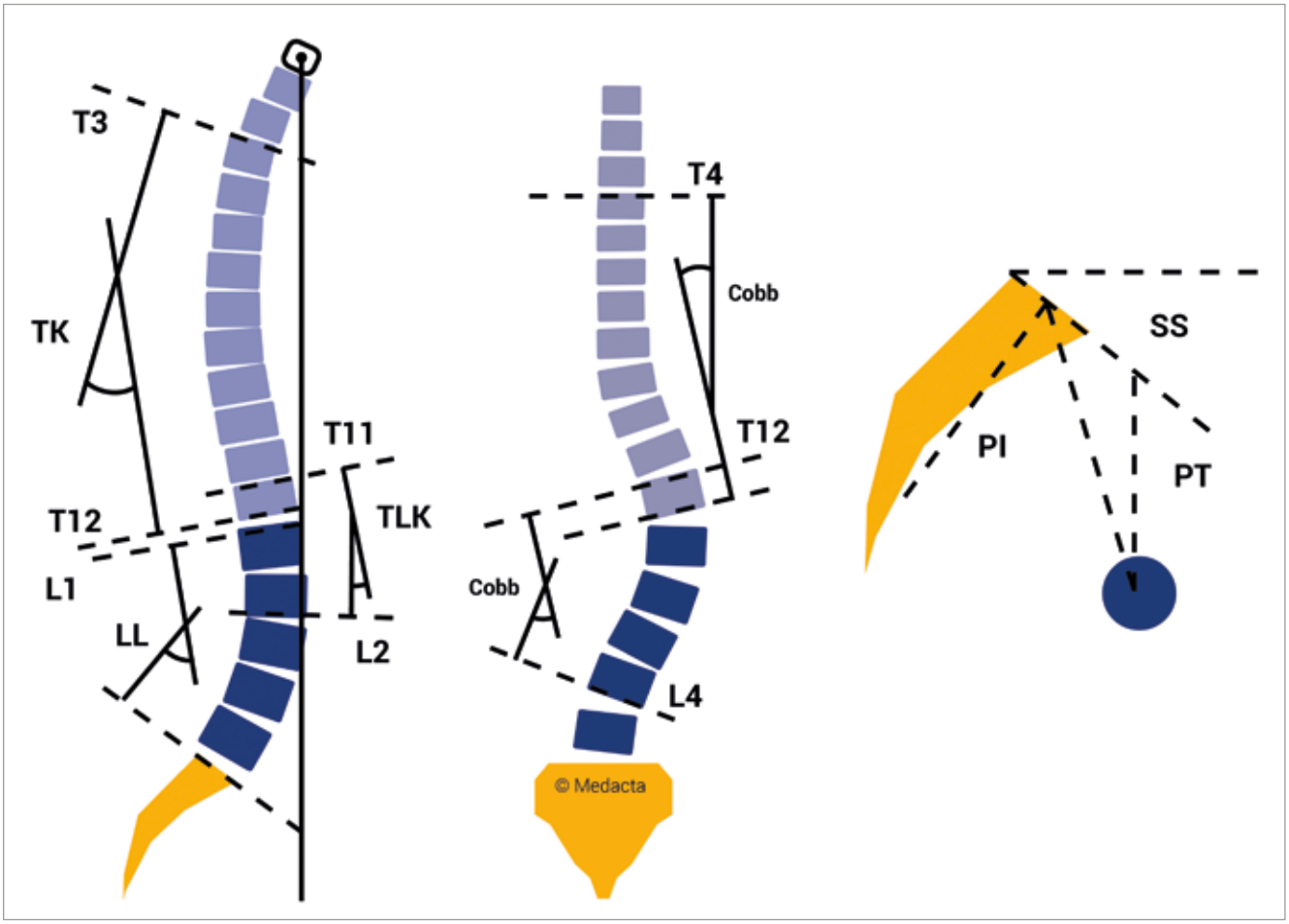
Figure 3. MySpine pedicle screw placement guides. A) Awl insertion, B) probe insertion, C) Pedicle screw positioning through the guides.

OUTCOMES

Post-operative, full-standing x-rays showed a complete coronal and sagittal correction of the deformity (Figure 4). The thoracolumbar pre-operative kyphosis of 67° was reduced to a value of 6°, with a complete disappearance of the thoracolumbar hump. With the reduction of the deformity, the compensating lumbar hyper-lordosis also decreased to a value of -39° and the thoracic region increased its kyphosis to 18° (Tab 2). Lumbar lordosis decreased postoperatively because the patient had no more need to compensate the pre-operative thoracolumbar junction kyphosis. The position of the hardware was checked post-operatively with a low dose CT scan, and no screw malpositioning was observed. The patient was walking on the second post-operative day and is pain free at 1 year follow-up.

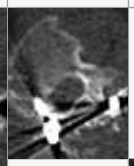
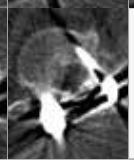
Figure 4. Post-operative clinical (anteroposterior and lateral view) and full-standing x-ray (anteroposterior and lateral radiographs) showing the T9-L4 instrumentation performed by the MySpine technique.

PRE-OPERATIVE AND POST-OPERATIVE SPINOPELVIC PARAMETERS - TAB 1



	Pre-op	Postop
PI (Pelvic Incidence) [°]	35	35
PT (Pelvic Tilt) [°]	7	6
SS (Sacral Slope) [°]	28	29
LL (Lumbar Lordosis L1-5) [°]	-83	-39
TLK (Thoracolumbar kyphosis) [°]	67	6
TK (Thoracic Kyphosis T3-12) [°]	-3	18
Cobb (T4-T12) [°]	65	38
Cobb (T12-L4) [°]	25	14

CT IMAGE OF PEDICLE SCREW POSITIONING BY MYSPINE - TAB 2

LEVEL / IMAGE	T9	T10	T11	T12	L1	L2	L3	L4
1								
2								

AUTHORS' DISCUSSION

Complex deformity surgeries are demanding procedures that often require spinal osteotomies. Screw malpositioning in this kind of surgery can be very common reaching up to 30% of misplaced screws, being a potential source of severe complications for the patient. Vessel damage and neurological lesions due to improper screw positioning are widely described in literature. Some papers underline that the complexity of the surgery and the experience of the surgeon can impact on the accuracy of pedicle screws implants [1-3]. In this case, to reduce the risk of misplaced pedicle screws, Medacta MySpine patient-matched technology has been selected to help the surgeon in the critical step of pedicle screw implantation using tailored guides [4,5], especially in the apical region of the deformity. The pre-operative CT scan was used to craft guides for each level and that also allow correct implantation in the pedicles adjacent to the osteotomy. This technology can be a valid aid for surgeons in complex cases where posterior instrumentation and fusion are required, as for extreme vertebral rotation in adolescent scoliosis cases or abnormal anatomy in congenital cases. Through the dedicated low-dose CT scan protocol and very limited intra-operative fluoroscopies, MySpine represents a safe alternative for both patients and OR staff in comparison with the free-hand technique and conventional navigated technologies. Correct implantation of the hardware can obviously decrease the rate of related complications, improving the outcomes of these complex surgeries.

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