

# EVALUATION OF PERCUTANEOUS PEDICLE SCREWS PLACEMENT USING PEDIGUARD®



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## BACKGROUND:

Percutaneous insertion of pedicle screws has been developed to achieve rigid vertebral fixation with limited muscular damage. Major drawbacks remain the risk of screw misplacement and the radiation exposure to both surgeon and patient. PediGuard® is a wireless electronic handheld pedicle screw pilot hole preparation instrument designed to continuously monitor the electrical conductivity of the tissue at its tip throughout the drilling process. **PediGuard® proved to be an accurate device for detection of pedicle perforation in open surgery.** Recently, a new sleeve has been designed to allow the use of **PediGuard® percutaneously**

## PURPOSE AND STUDY DESIGN

The aim of this **clinical prospective multicenter study** is to evaluate the efficiency of the **PediGuard®** as a method to optimize the **screw positioning** and to decrease **peroperative radiation exposure** during percutaneous pedicle screw insertion for thoracolumbar posterior fixation.

## MATERIAL AND METHODS

Between **October 2007 and May 2008**

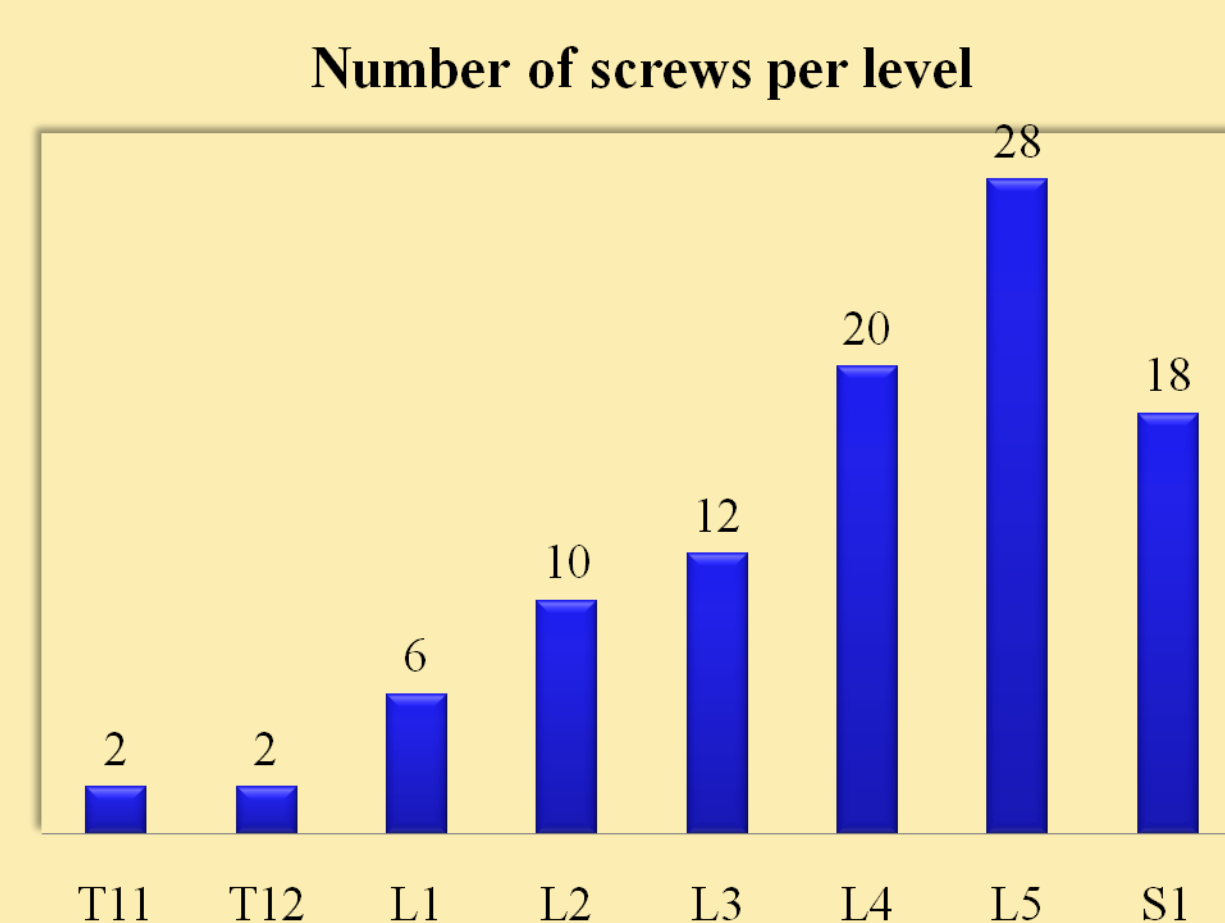
**23 patients.** Males=14, Females=9. Age= 50 years (17-84)

**Two spine centres** (Paris, Brussels)

Percutaneous posterior fixation using **PediGuard®** for screw placement

Indications trauma=7, tumor=3; degenerative=13.

**98 screws** from T11 to S1.



Screw placement was assessed postoperatively with **three-dimensional computed tomography**

**Screw position was rated as**

Good = no pedicle perforation

Acceptable= perforation less than 2mm

Unacceptable= perforation greater than 2mm

## SURGICAL TECHNIQUE:

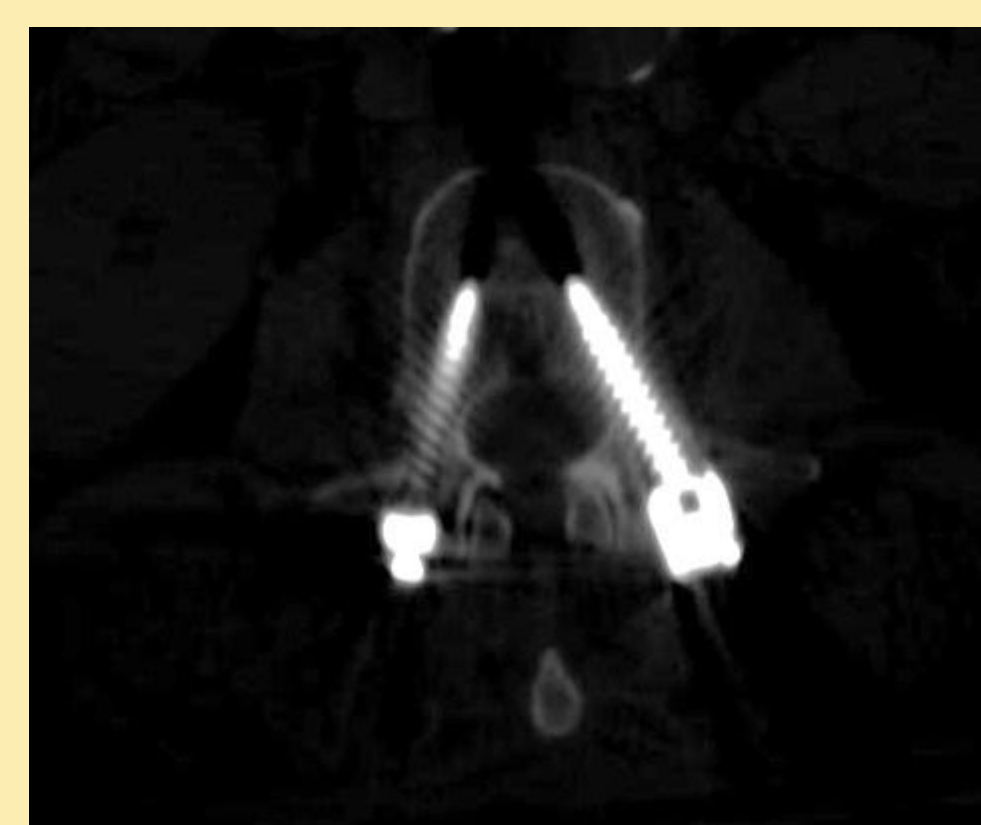
Normal operative table One AP C-arm Prone Position



Entry point located under fluoroscopy



Path into pedicle is made relying on PediGuard signal



Insertion of cannulated screws of 5.5 and 6.5mm



## RESULTS

### GENERAL

No post operative neurological deterioration  
 One patient was reoperated on for screw removal

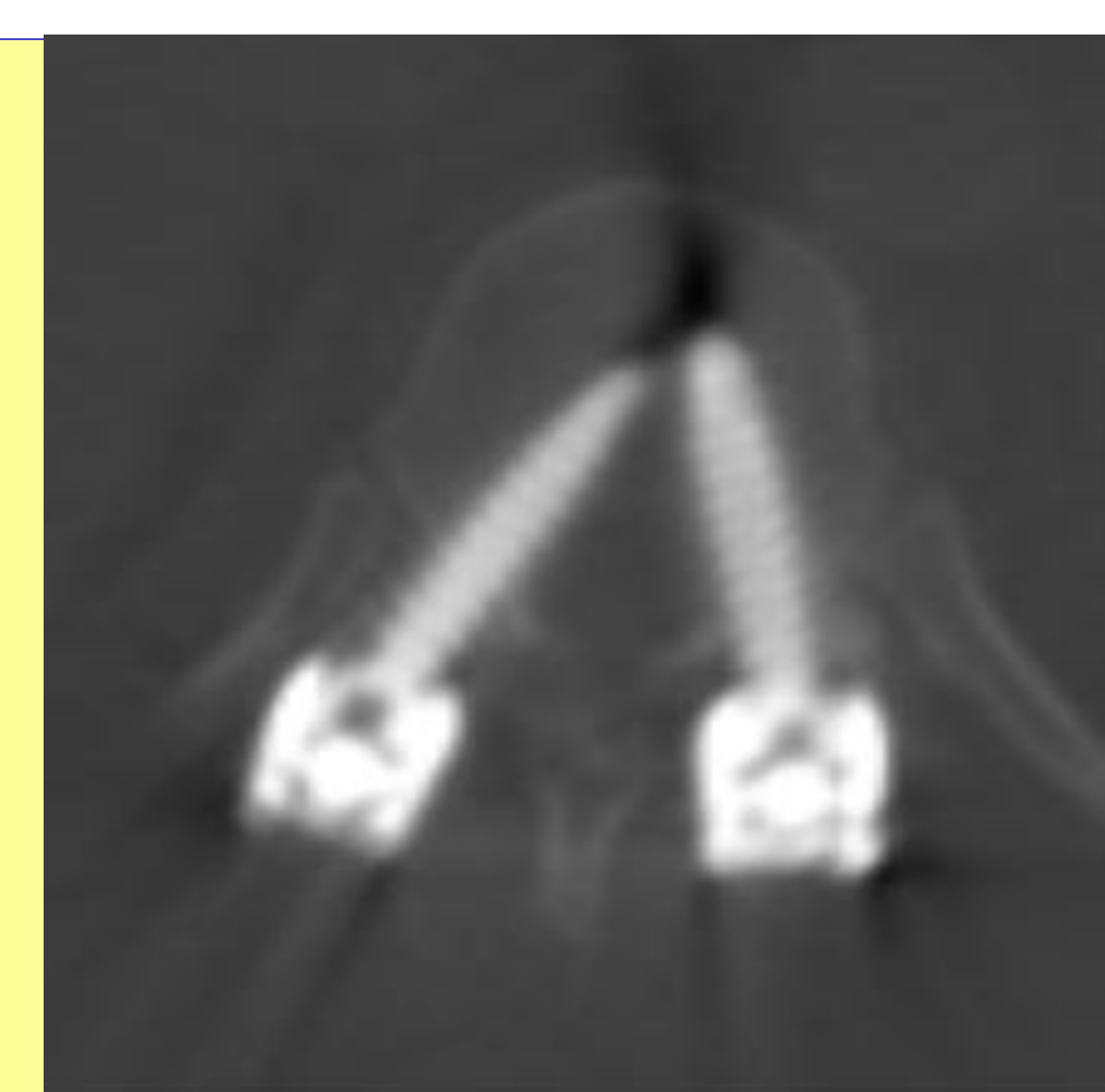
### SCREWS POSITION

18 patients had no pedicle perforation.  
 Five screws in 5 patients presented pedicle violation  
 Screws position rating  
**Good= 93 (94.9%)**  
**Acceptable= 4 (4.1%)**  
**Unacceptable= 1 (1%)**

### PERFORATIONS

5 pedicle violation  
 4 violations were medial and less than 2mm

In one patient there was a superior pedicle perforation of 4mm. This screw was removed



## DISCUSSION

Wiesner (cadaveric study) 8% and 13% of cortical effraction in comparing two techniques of percutaneous pedicle screw insertion  
 Powers 2006: 0.35% of screw misplacement on 287 patients with different pathologies  
 Ringel 87% with no breach and 3% rated unacceptable  
 Schizas 23% of screw misplacement and one S1 radiculopathy

## CONCLUSION

Using **PediGuard®** for percutaneous pedicle screw placement gives good results

This technique is safe

This technique reduces radiation exposure