CT-guided percutaneous pedicle screw fixation followed by cementoplasty in the treatment of metastatic spinal disease

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Introduction

- **Treatment of bone metastases:**

✓ pain relief

✓ ambulatory functions

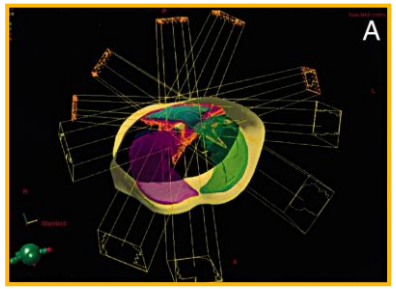
- **Therapeutic options:**

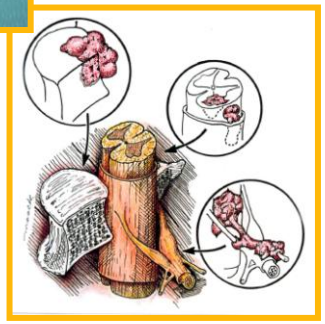
Chemotherapy, hormone-therapy, bisphosphonates

Radiotherapy

Surgery

Analgesics - opioids





Aim of this retospective study

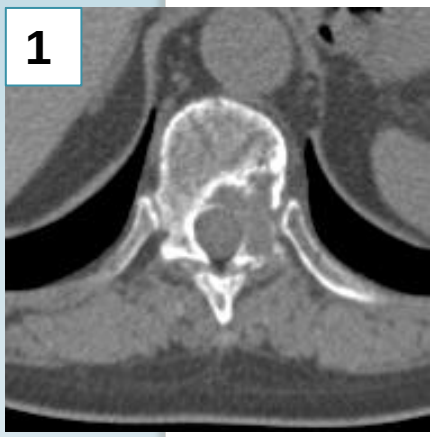
- evaluate the feasibility and effectiveness of CT-guided percutaneous screw fixation plus cementoplasty (PSFPC) in patients with painful vertebral metastases with fractures or to prevent pathological fracture.

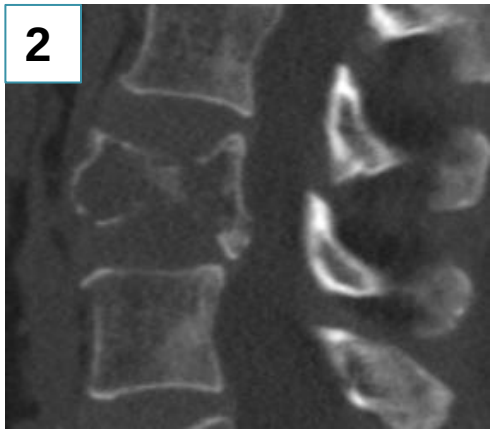
Rational use of PSFPC

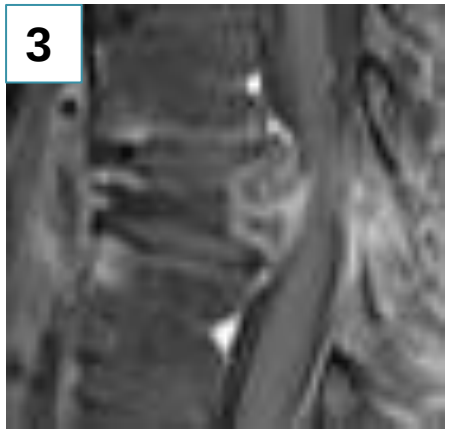
- to stabilize the pathological vertebral fractures in patients unfit for open surgery,
- strengthen the metastatic bone,
- achieve pain relief and preserve or improve functional outcome according to the evolution of walking ability.

Patients selected:

1. lesions located in the pedicles,
2. fractures of the vertebral body with large bone defect,
3. painful severe vertebral collapse (vertebra plana)







Methods

- VAS score before and after treatment

- Evaluation of ambulation before and after treatment by using the “Functional Mobility Score System” (4 grades).

Grade 1= normal deambulation

Grade 2 = limited ambulation pain

Grade 3 = using a wheelchair

Grade 4 = bedridden patient

Methods

20 Patients treated
(7 men – 13 women, median age 52 years)

24 lesions treated
(4 patients with 2 lesions treated)

7 patients - 2 screws
(with bilateral approach)

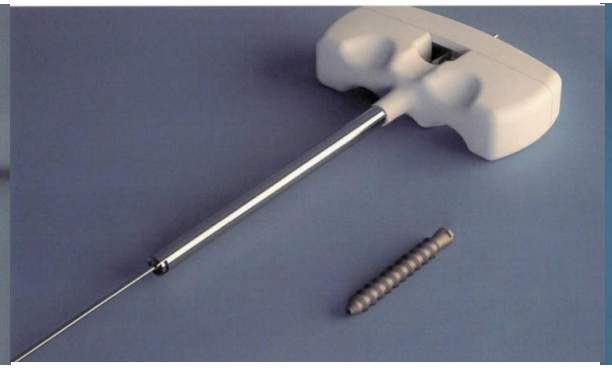
- CT – fluoroscopic guidance
- Local anaesthesia
- Mild conscious sedation

Average Pain was **7.4**
(VAS from 4 to 9)

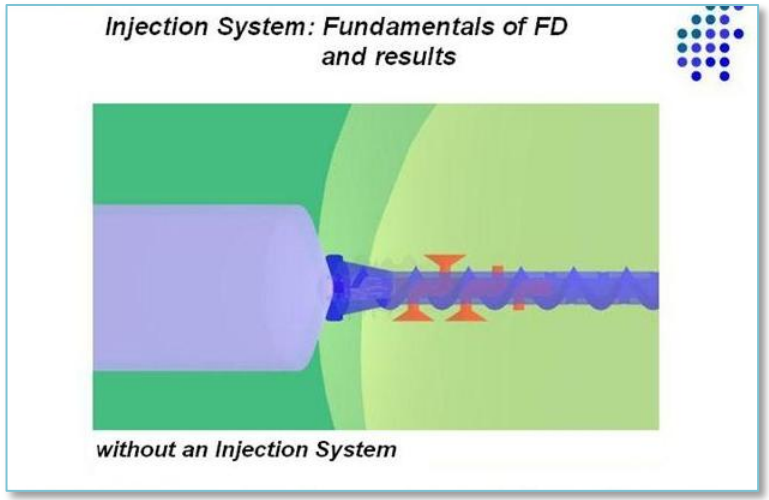
14 patients had severe limitations of walking ability (8 grade 3 – 3 grade 4)

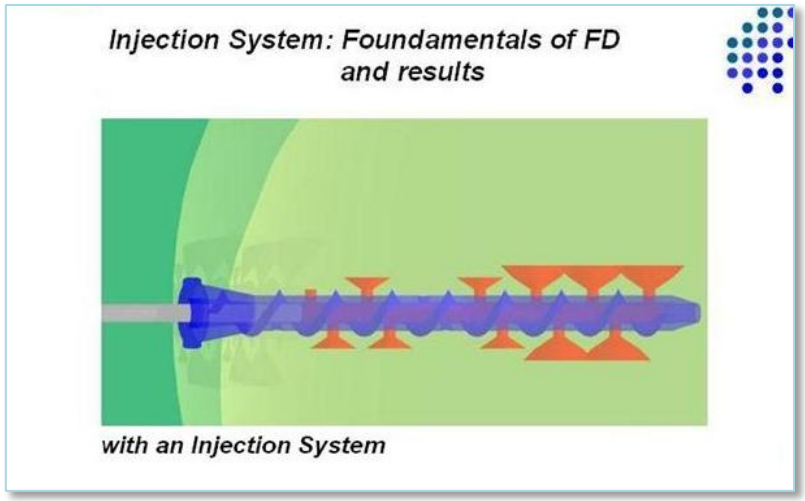
3 patients underwent MW tumor ablation before osteosynthesis.

Median F.U. 10 months (3-13).



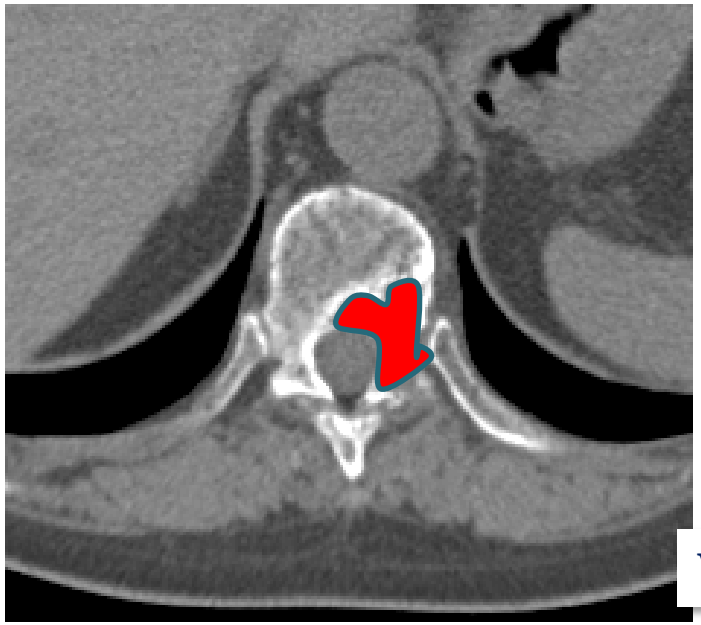
4,5 mm x 4-6 cm length





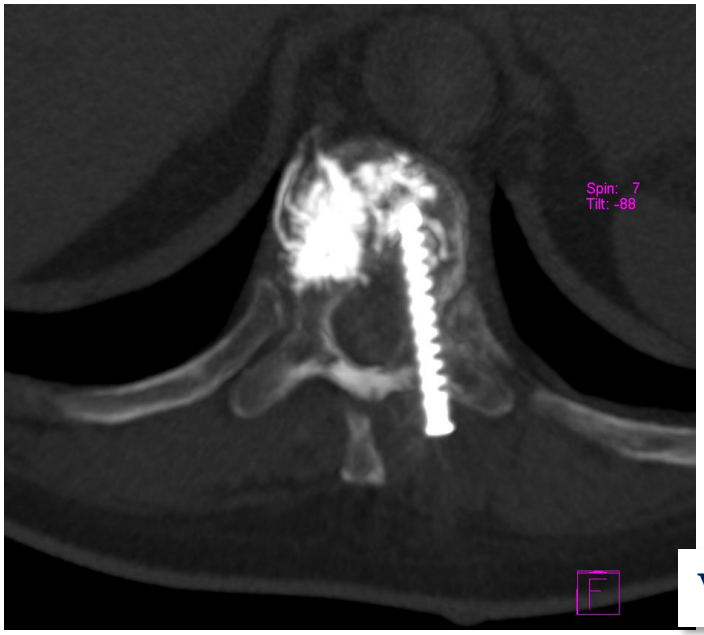
Selective injection of PMMA

Woman 68 years old,
Multiple myeloma : lysis of the vertebral body and pedicle of T10



Vas 8

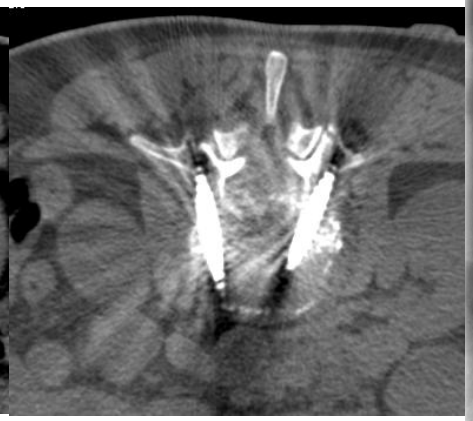
High risk of leakage of the PMMA during classic vertebroplasty!



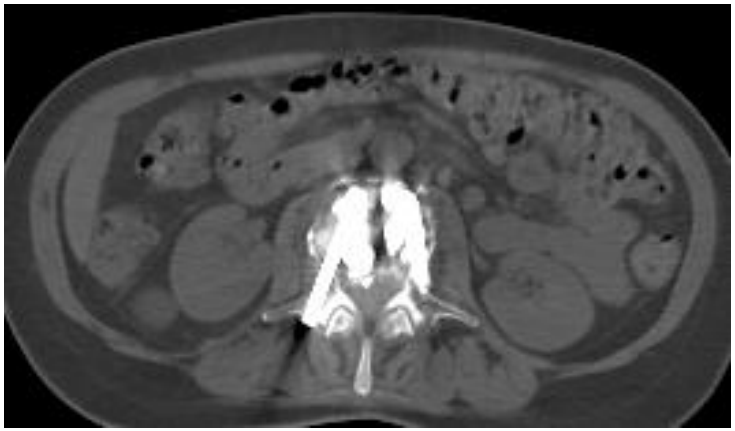
Vas 0

Screw fixation and controlateral vertebroplasty

Woman 62 years old,
Breast carcinoma: fracture with large lysis of the vertebral body of L3



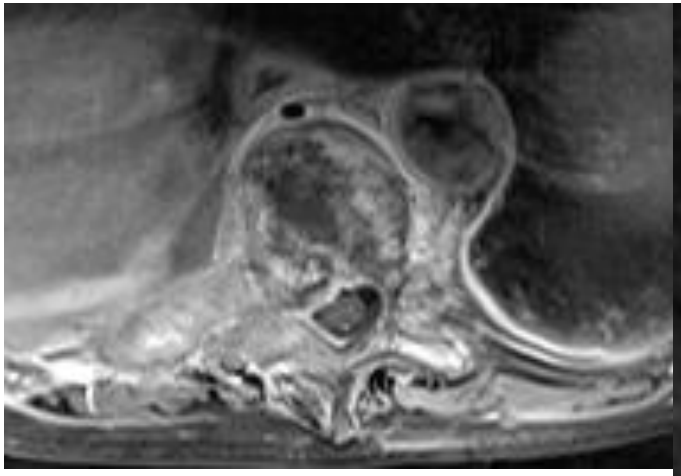
Pain relief

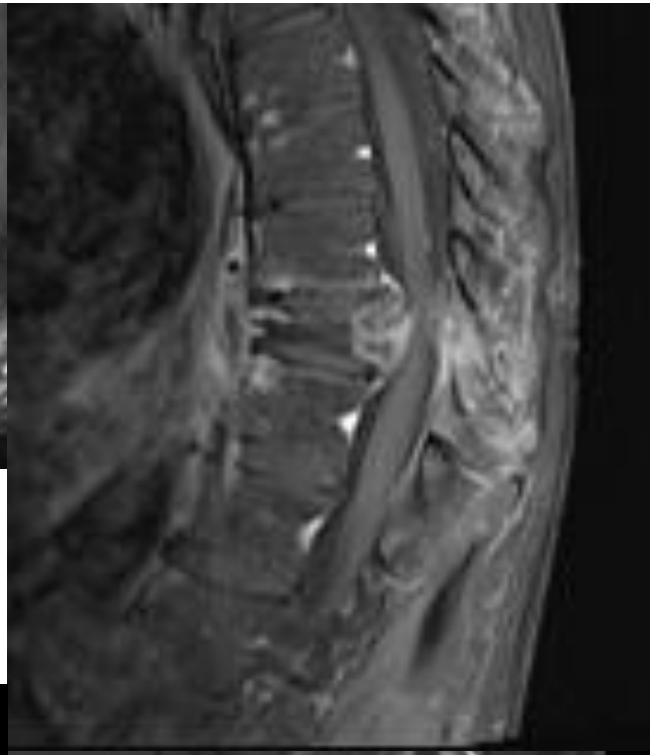


Improving of walking ability

Woman 66 years old, primary breast cancer spinal metastasis of T10

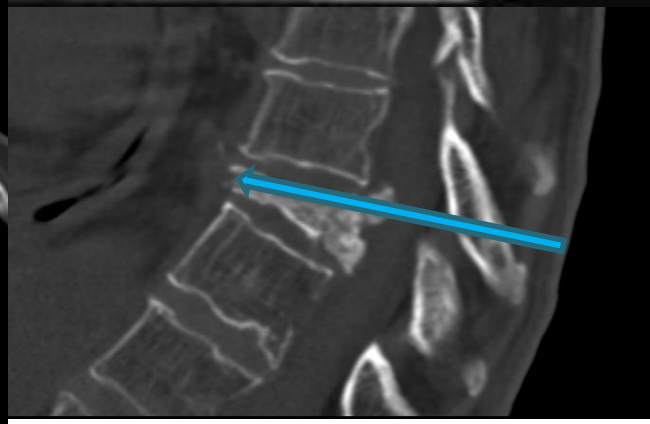
VAS 7



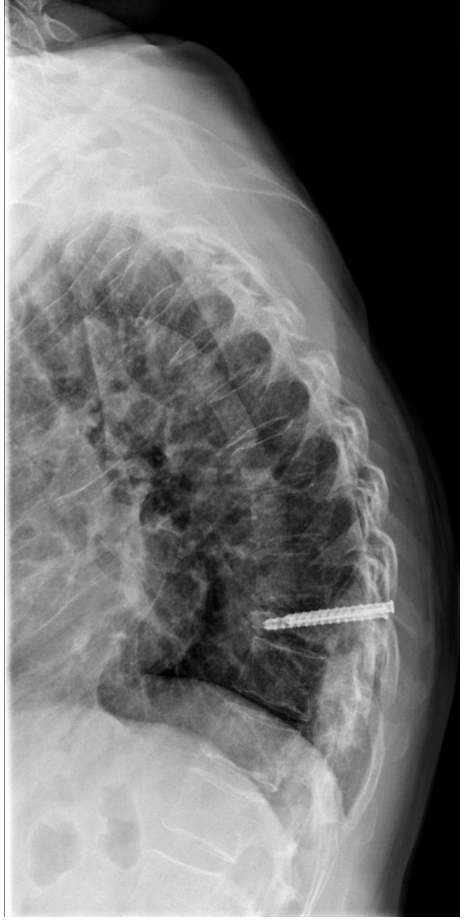


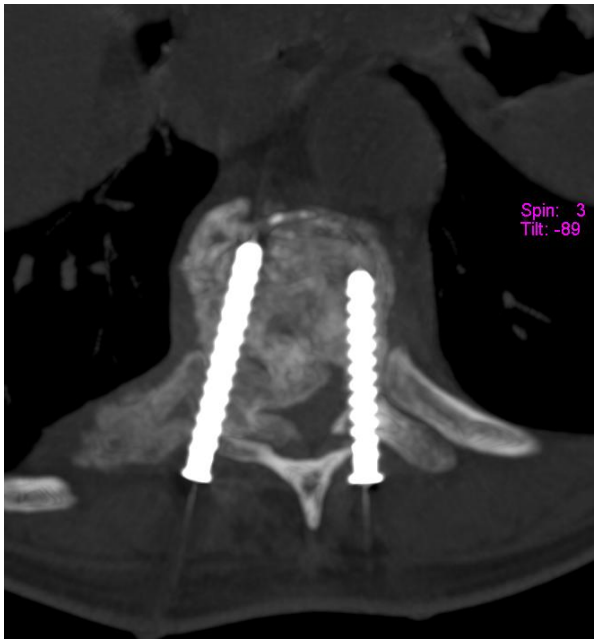
Vertebra plana

Severe collapse:
use of CT-guidance!

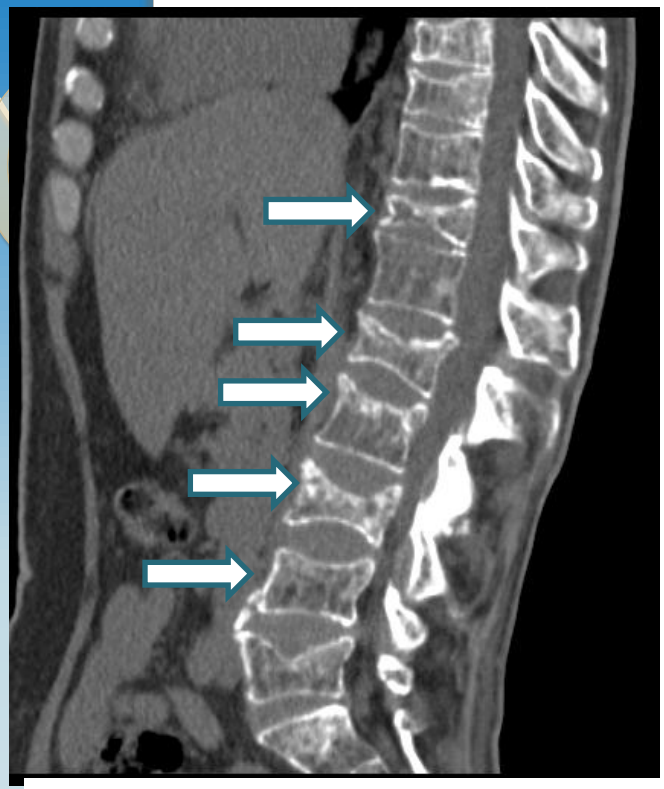


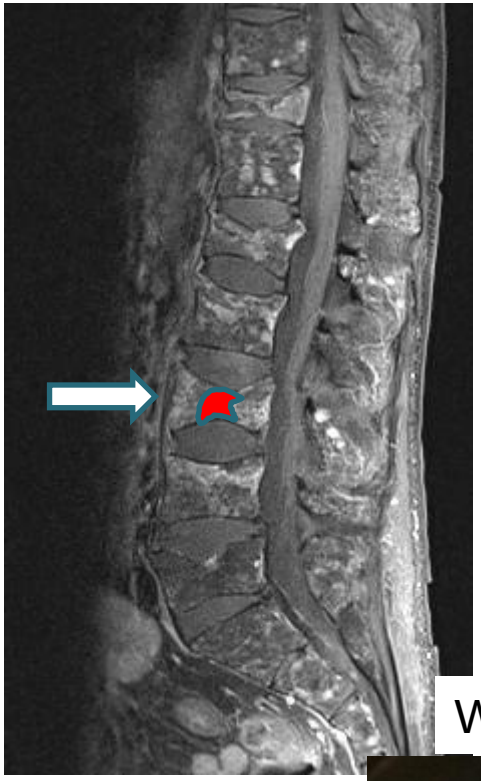
Result





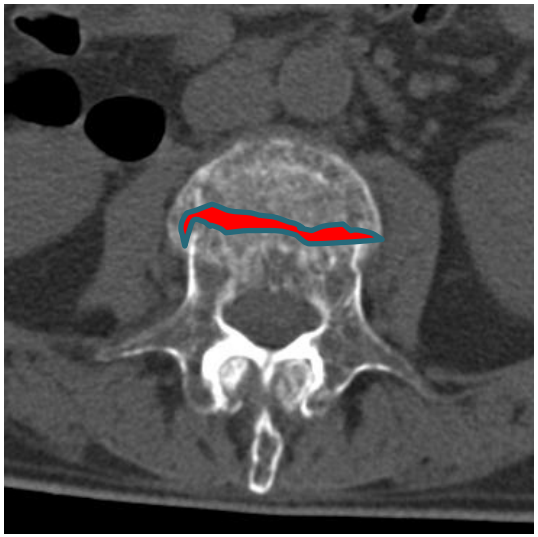
The operative strategy is based on imaging and clinical conditions



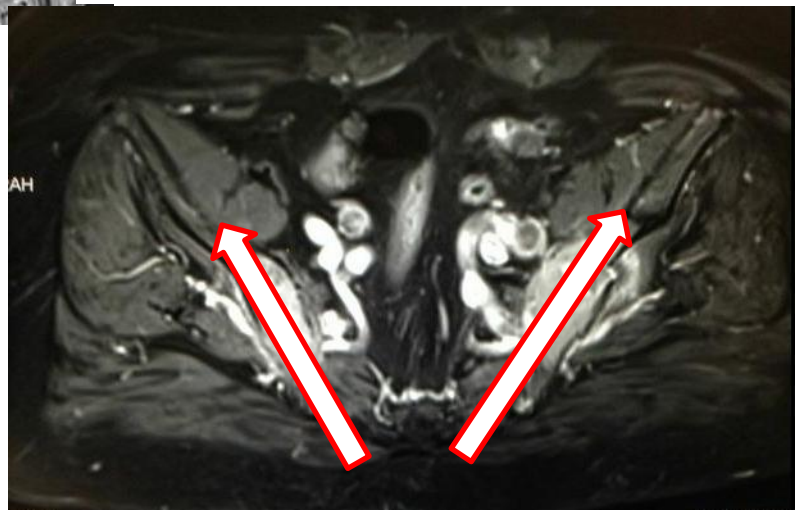


Vertebroplasty of T11 and L1-L2-L3-L4

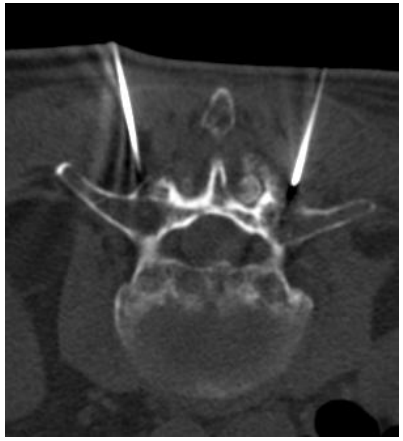
Screw fixation – L3



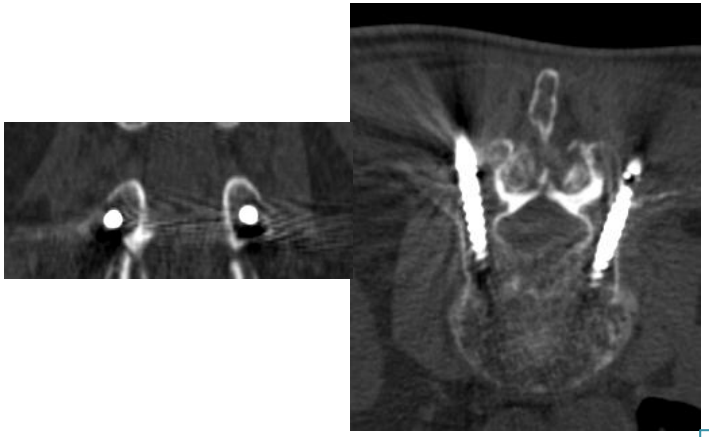
Walking ability compromised!



Screw fixation of the pelvis (bilateral)

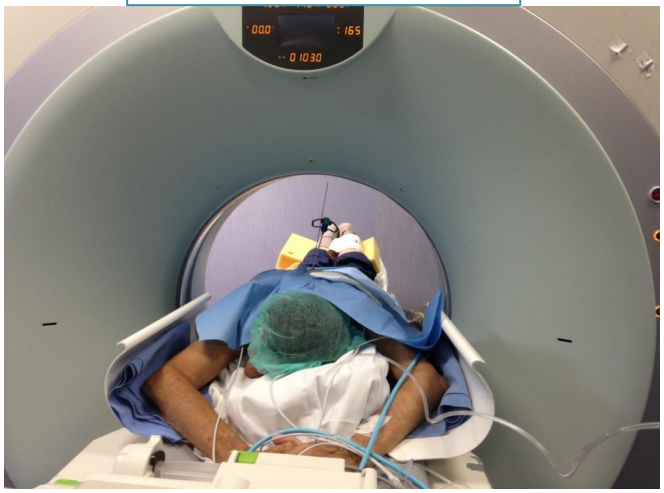


K-Wire

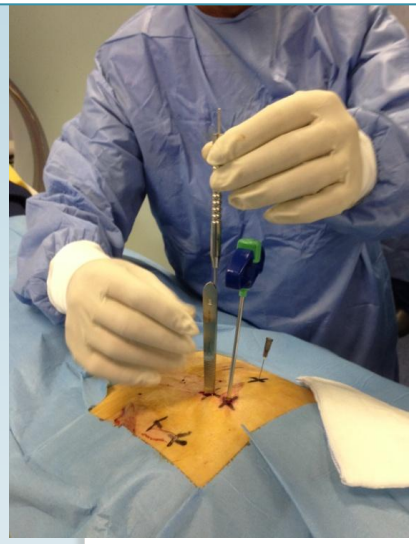


Screw fixation

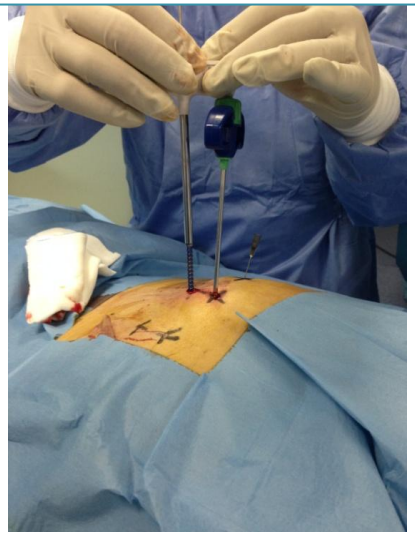
Prone position

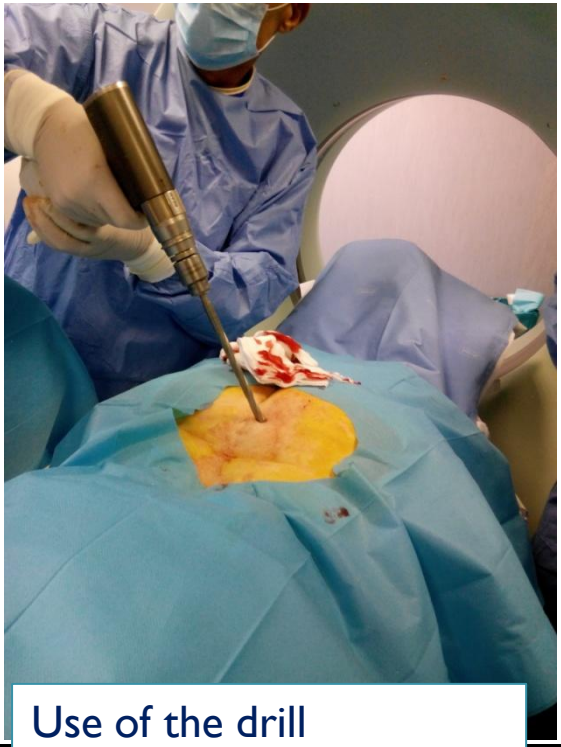


Dilation of the tissues

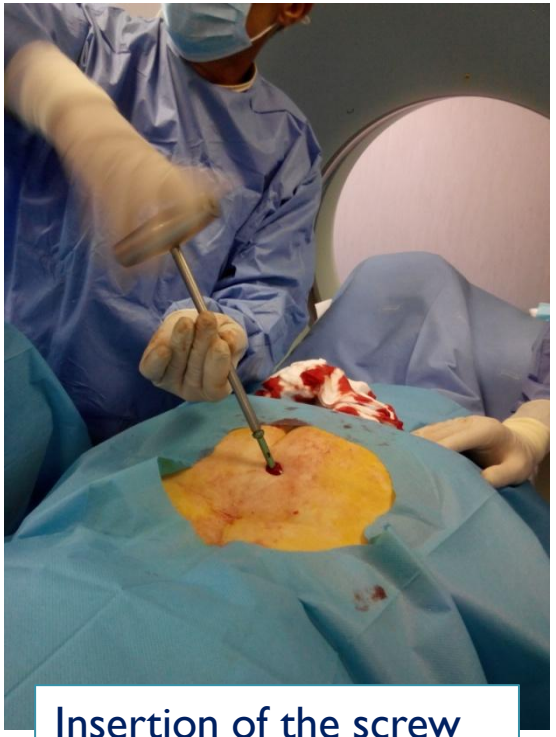


Insertion of the screw



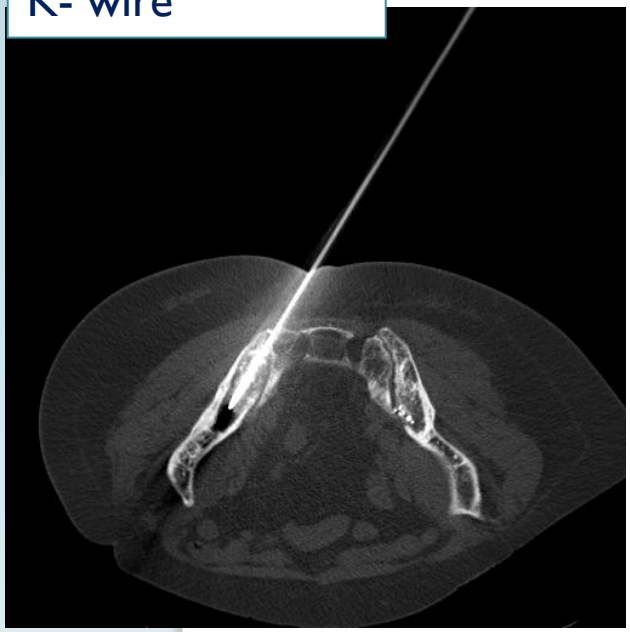


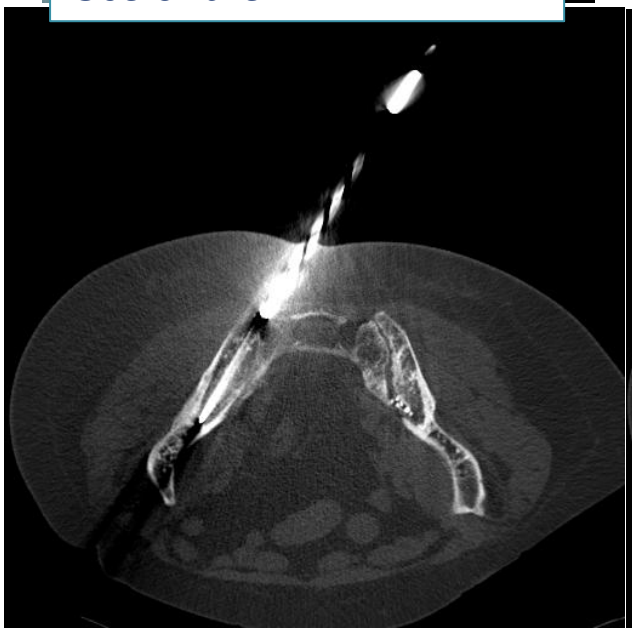
Use of the drill

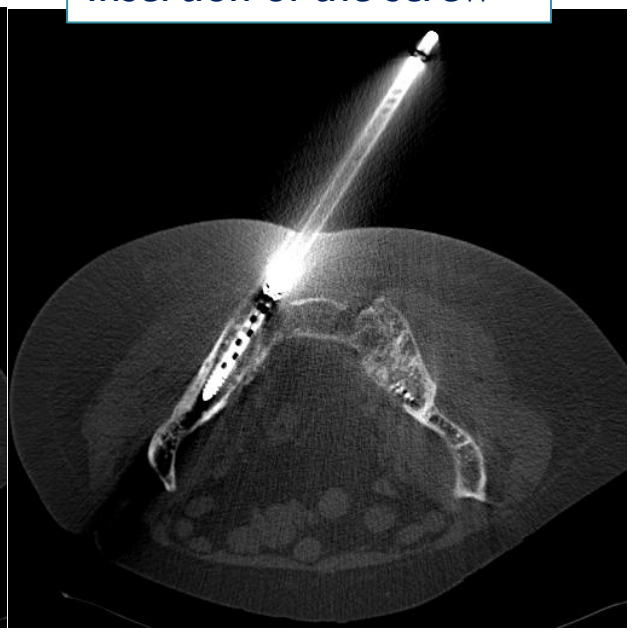


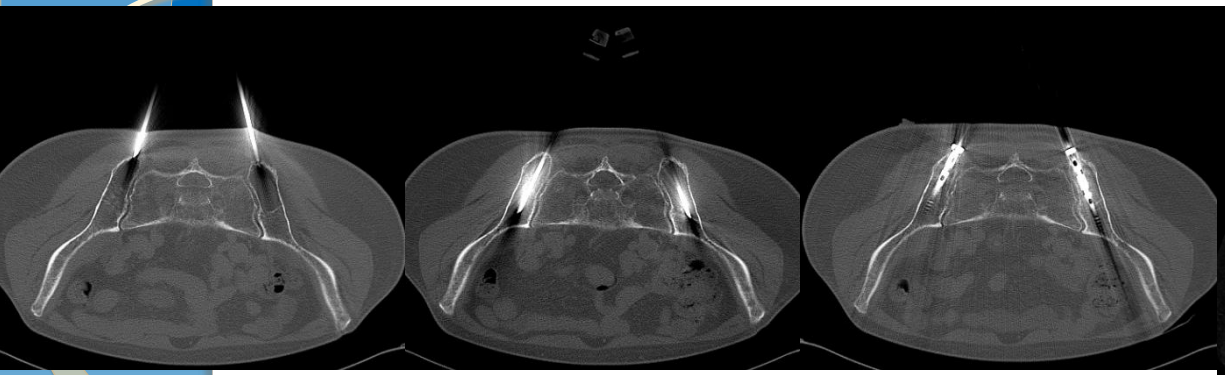
Insertion of the screw

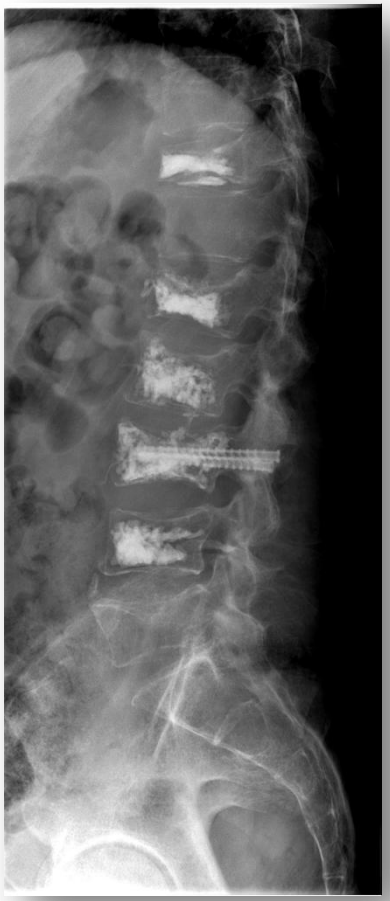
K- wire

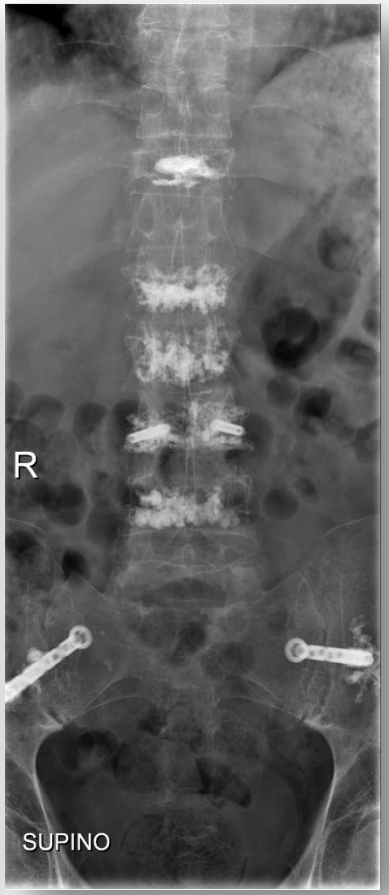






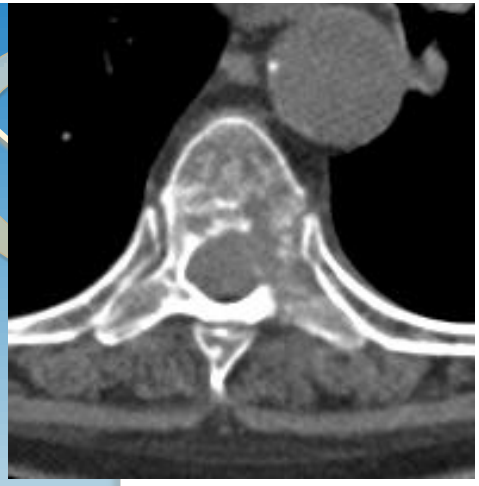


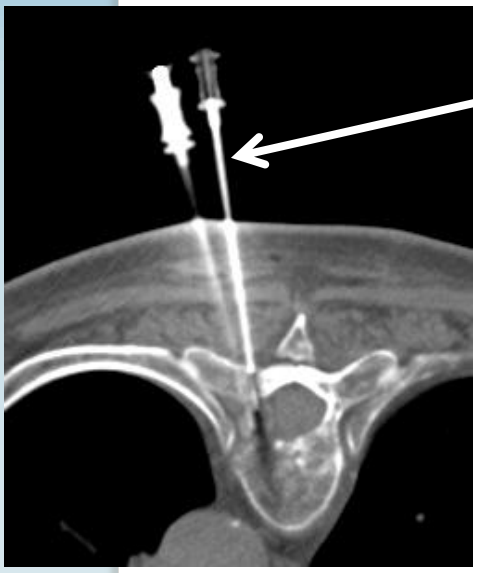


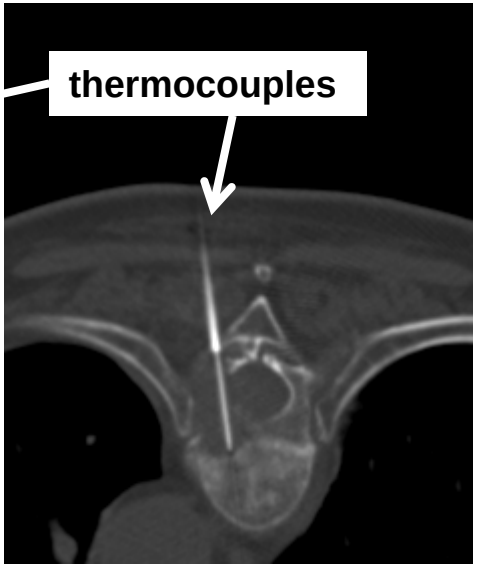


Final result

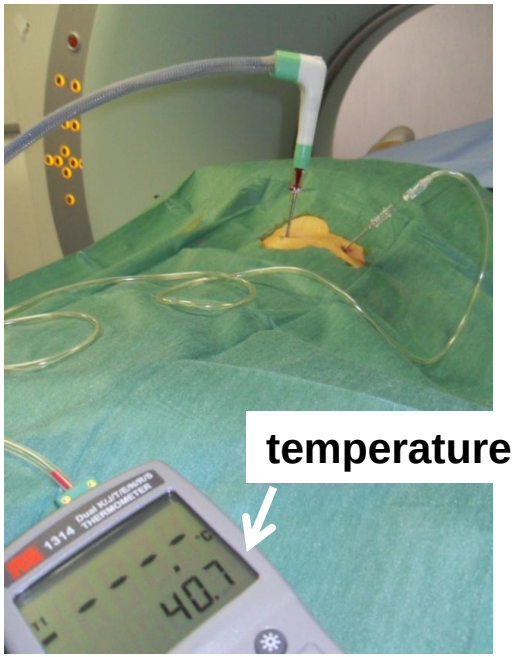
M/65, breast mts which involved the pedicle and the vertebral body of T7 and T8

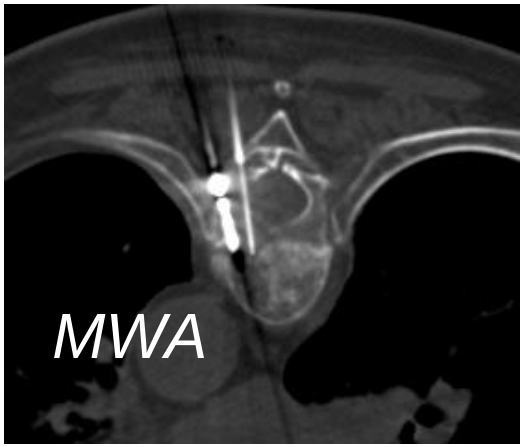




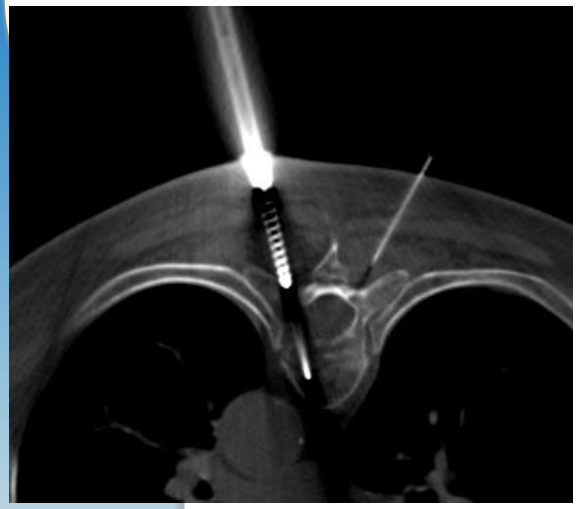


Technical aspects: Protection with positioning of thermocouples

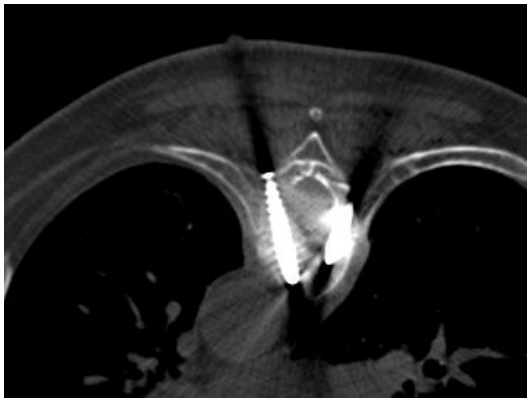


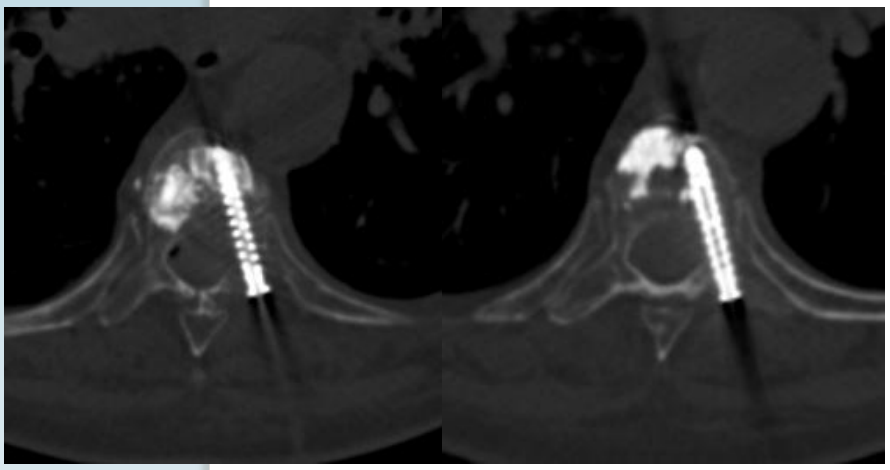


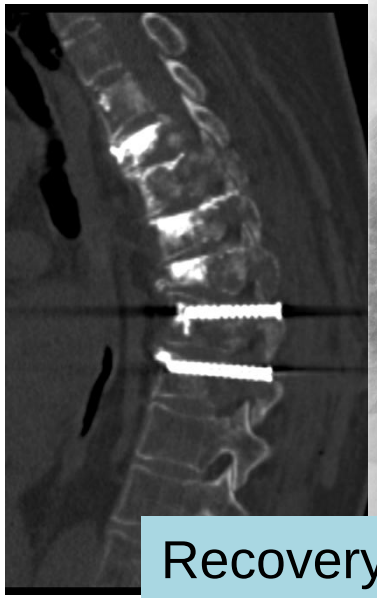
Screw insertion

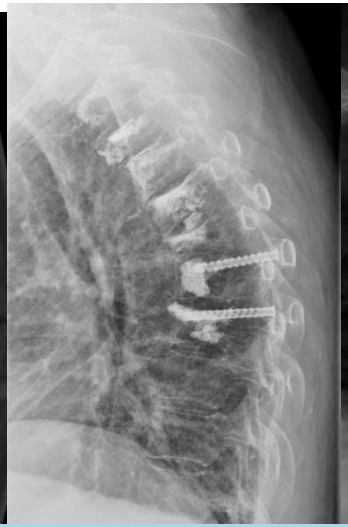


Controlateral vertebroplasty









Recovery of walking ability

Results:

- All sessions were completed and all procedures were well tolerated.
- There were no complications related to infections, incorrect positioning or loosening of the screws or leakage of cement.
- All patients improved their walking capacity at six months.
- VAS score decreased from 7.4 (range, 4-9) before treatment to 1.2 (range, 0-3) 6 months after.
- No new bone fracture occurred during a median follow-up of 10 months.

Limitations:

- Small patient sample
- Lack of a control group (standard osteoplasty)
- Lack of a randomized prospective study

Other limitation

Lack of biomechanical laboratory proof concerning the superiority of screw fixation plus cementoplasty compared to standard osteoplasty or surgery.

Conclusions

- PSFPC is a safe and effective procedure which allows us to strengthen the vertebrae, especially in the osteolysis of the pedicles, stabilize the fracture and prevent pathological fractures with significant pain relief and good recovery of walking ability.

- PSFPC seems to be a promising alternative for patients who are not candidates for surgery.

Thanks

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