

# Stratégie de correction des troubles de l'équilibre sagittal



Nicolas AUROUER







Dynamique



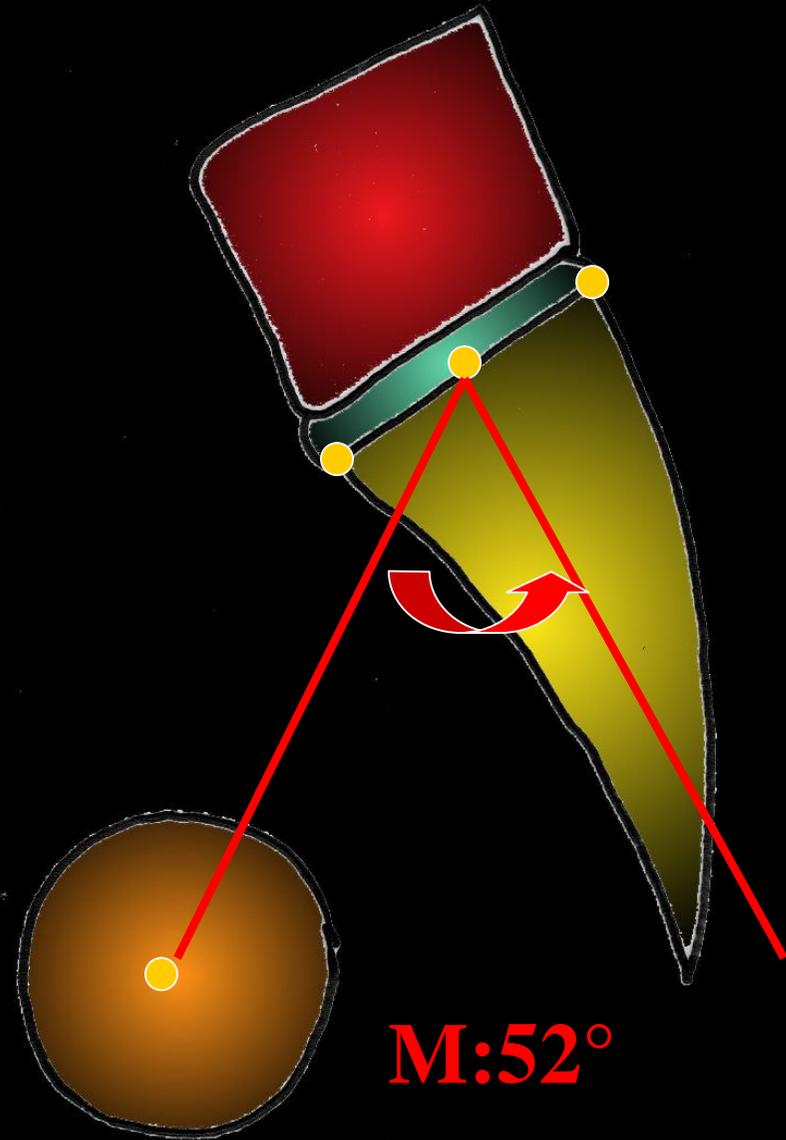
Statique



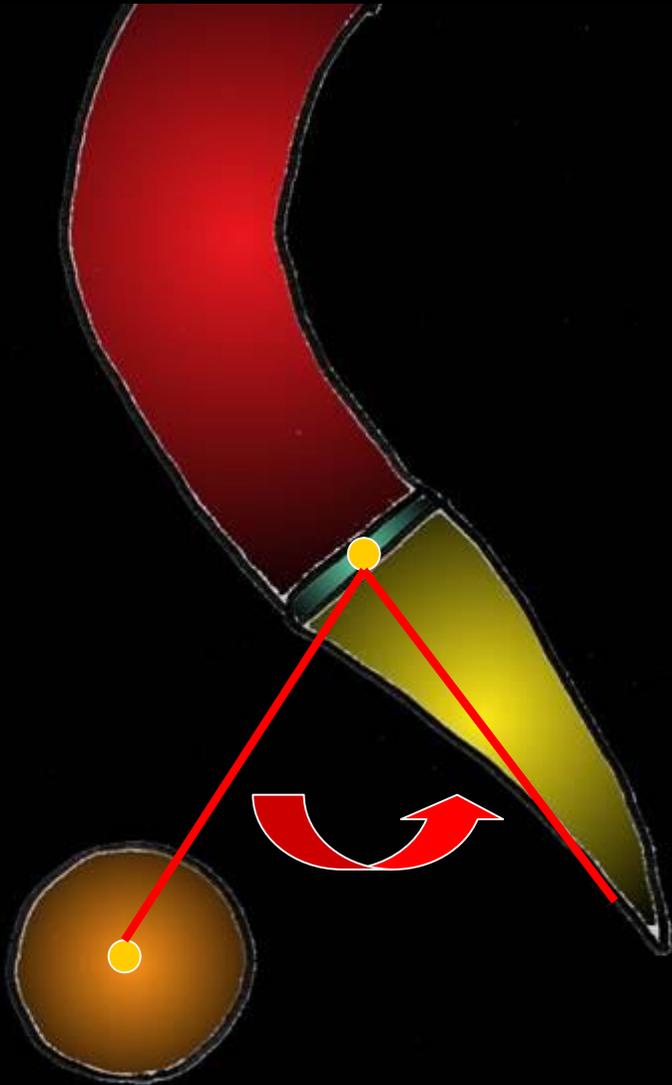
DELMAS



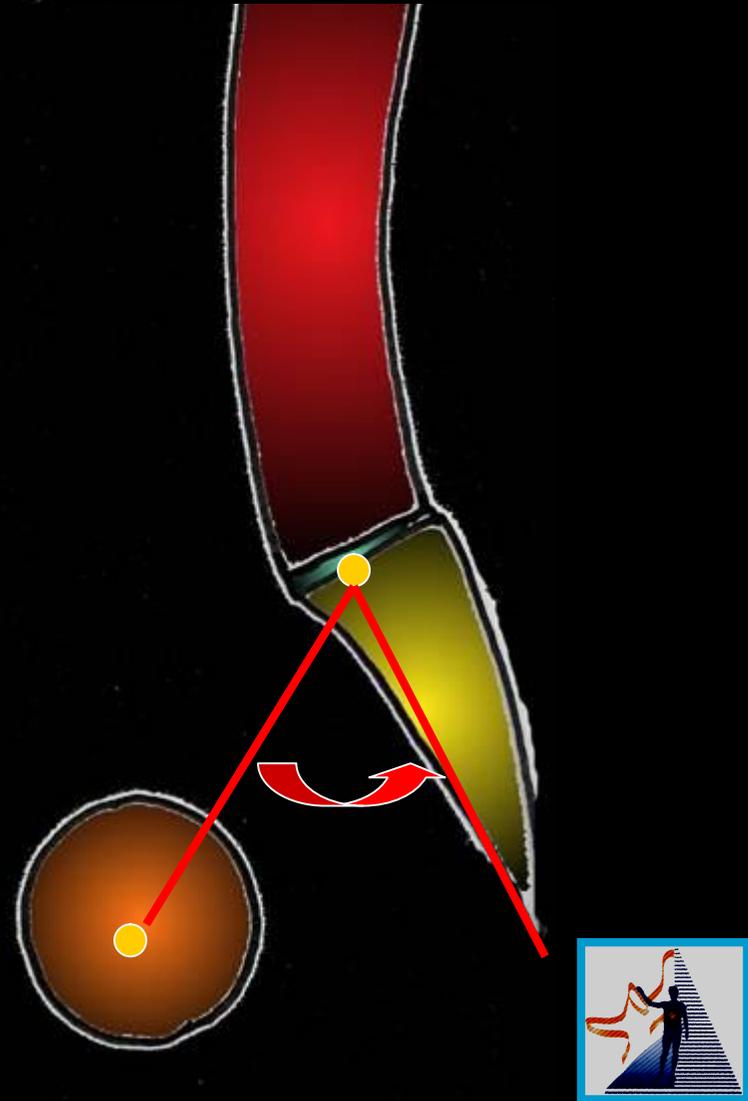
# INCIDENCE PELVIENNE



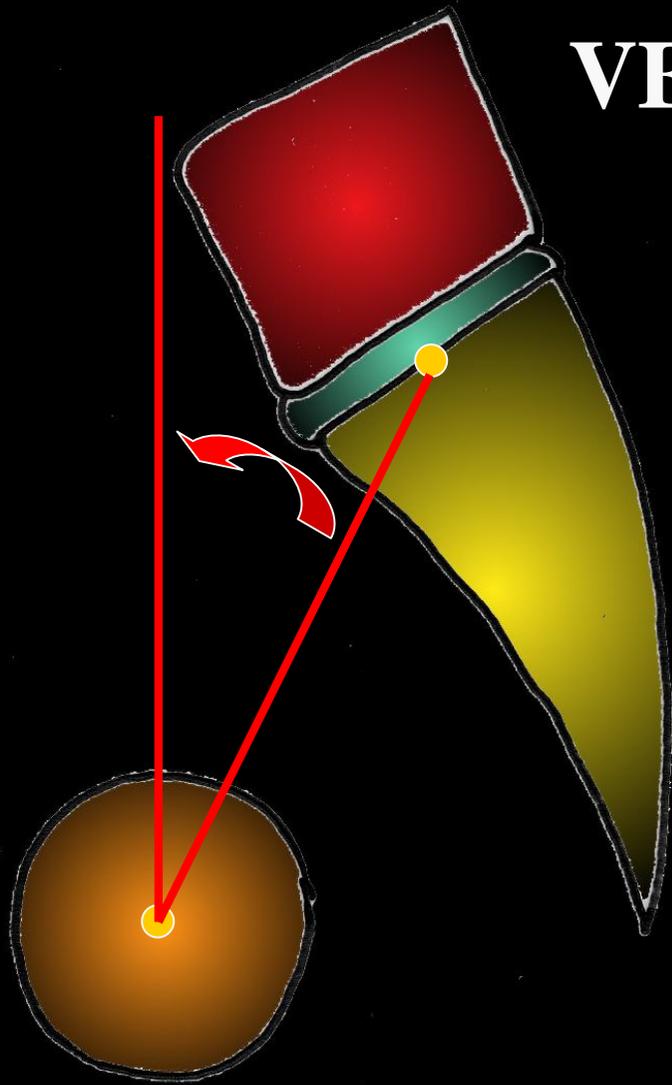
# DYNAMIQUE



# STATIQUE



# VERSION PELVIENNE



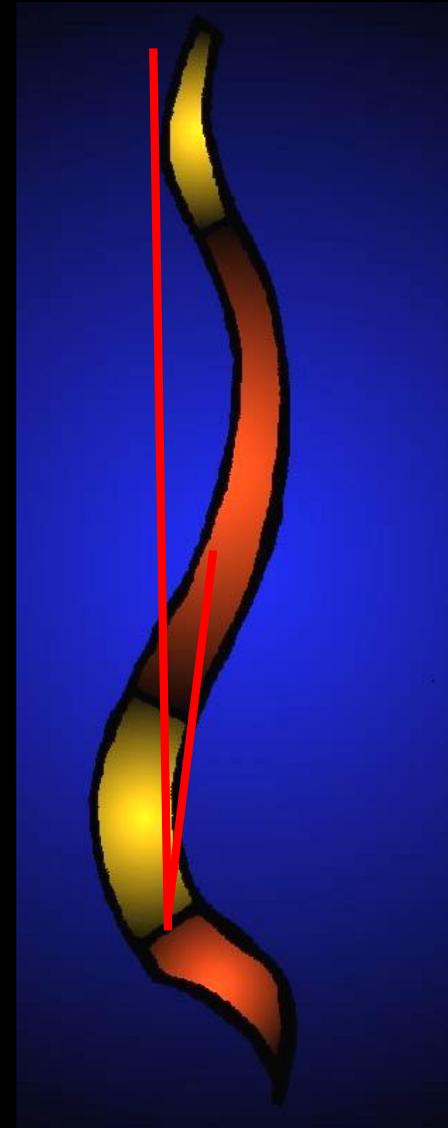
**Moyenne : 12°**



# GITE SAGITTALE

EN T9

**Moyenne : 11°**





# ANGLE FEMORO-TIBIAL

**Normal: 0°**





**APLOMB de C7**

**ANGLE de  
BASCULE DU RACHIS  
(ROUSSOULY)**



# DISTANCE

## CAE – Tête Fémorale



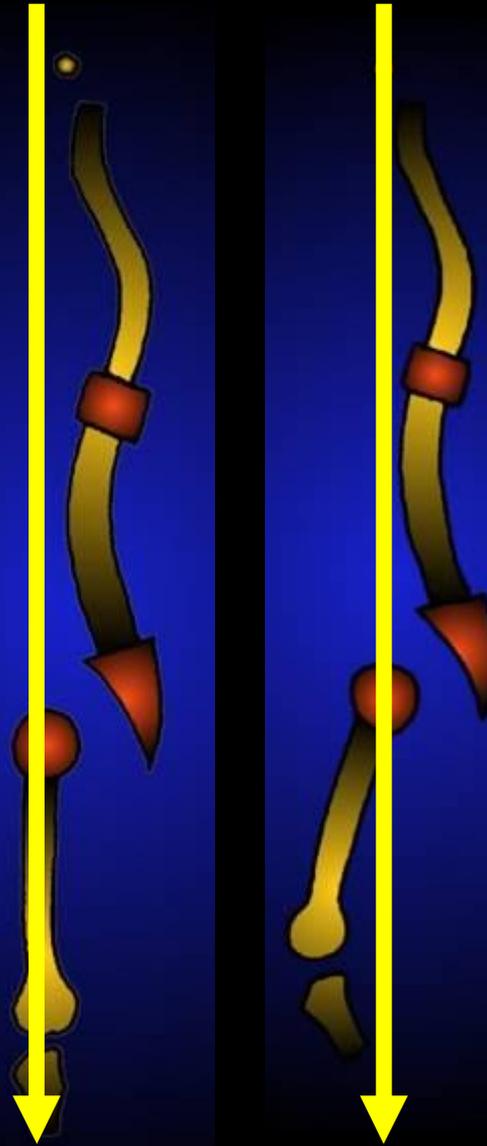
**EQUILIBRE  
IDEAL  
OU  
ECONOMIQUE**

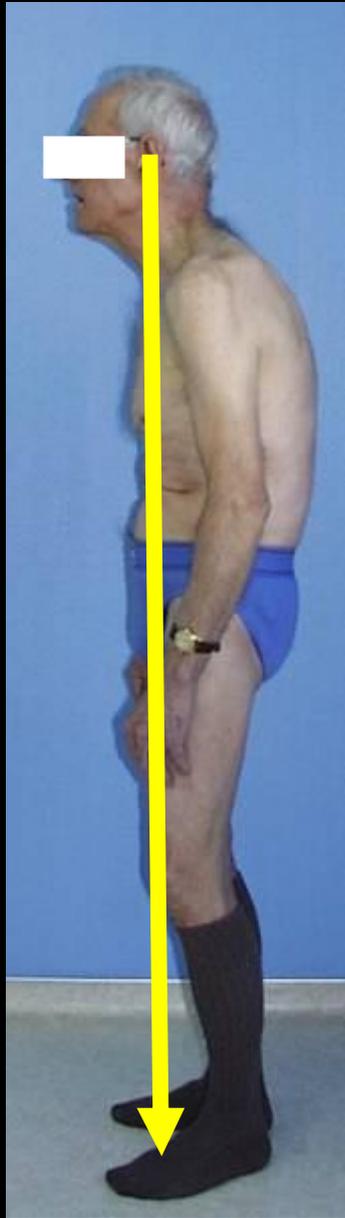


# EQUILIBRE COMPENSE

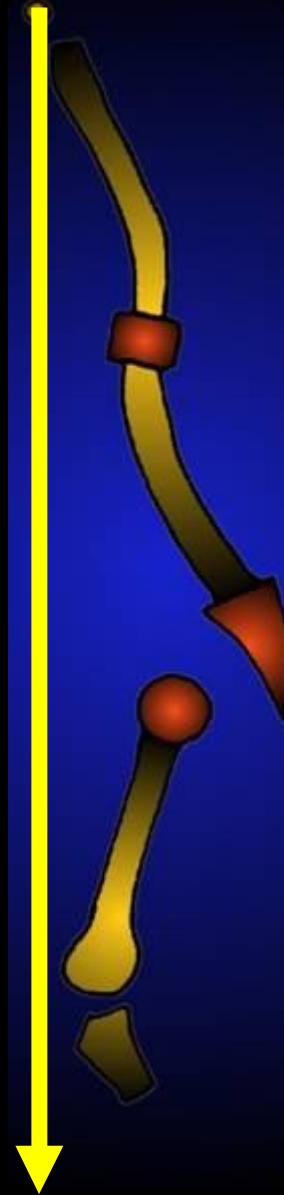
Rétroversion pelvienne

+ Flexion des genoux





# DÉSÉQUILIBRE antérieur



# OSTEOTOMIES

**POSTERIEURES:**

**SMITH-PETERSEN / PLURIETAGEES**

**SOUSTRACTION TRANSPEDICULAIRE**

**CLOSE WEDGING / EGG SHELL**

**PELVIENNE**



**TABLE III Osteotomies for Correction of Flatback Deformity and Fixed Sagittal Imbalance**

Type of Osteotomy	Correction per Segment	Benefits	Drawbacks	Relative Contraindications
Smith-Petersen	5°-20°, or 1°/mm of resection	Familiarity to surgeon; optimum for posterior-only approach when disc height maintained	Lengthens anterior column; frequent need for anterior release/fusion/osteotomy; higher reported pseudarthrosis rates	Ankylosing spondylitis; calcification of great vessels; or anterior instrumentation at same level
Pedicle subtraction	25°-35°	Sagittal and coronal correction possible; high union rates; posterior only	Greater blood loss; technically demanding; theoretical risk of devastating neurologic injury	Anterior pseudarthrosis or instrumentation at same level
Polysegmental posterior	9°-10°	Harmonious, sloping correction; posterior only	Multiple levels required for substantial correction; potential for loss of correction	Local stenosis; substantial single-level deformity; or anterior instrumentation at same level
Vertebral column resection	Variable	Greatest potential correction; sagittal and coronal correction possible; shortens spinal column, relieving neurovascular tension	Technically demanding; anterior procedure required; increased complication rates	

**LENKE , J.B.J.S. , 2004**

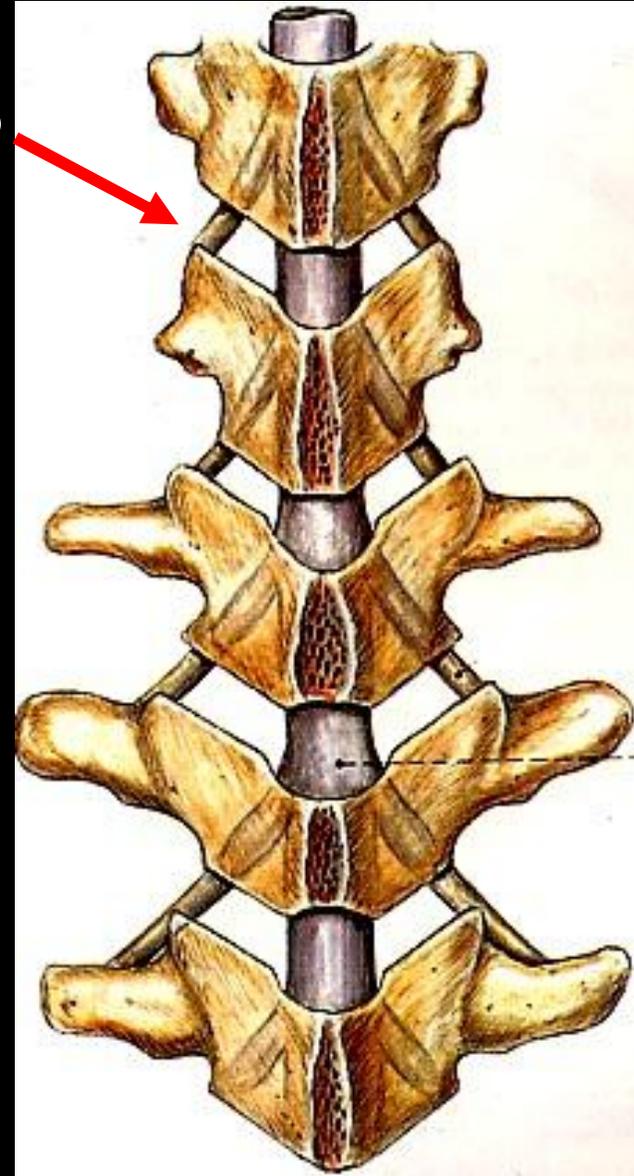


# OSTÉOTOMIES ÉTAGÉES

~ 10°

+ TLIFF

~ 15°



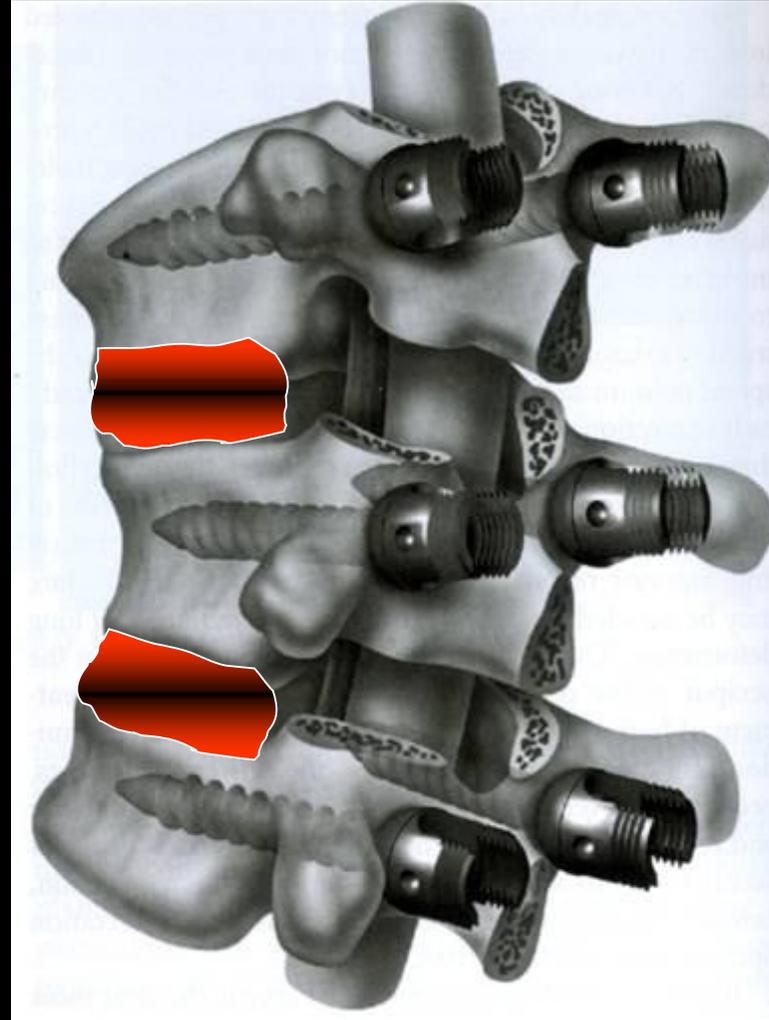
+ TLIF



Pseudarthrose

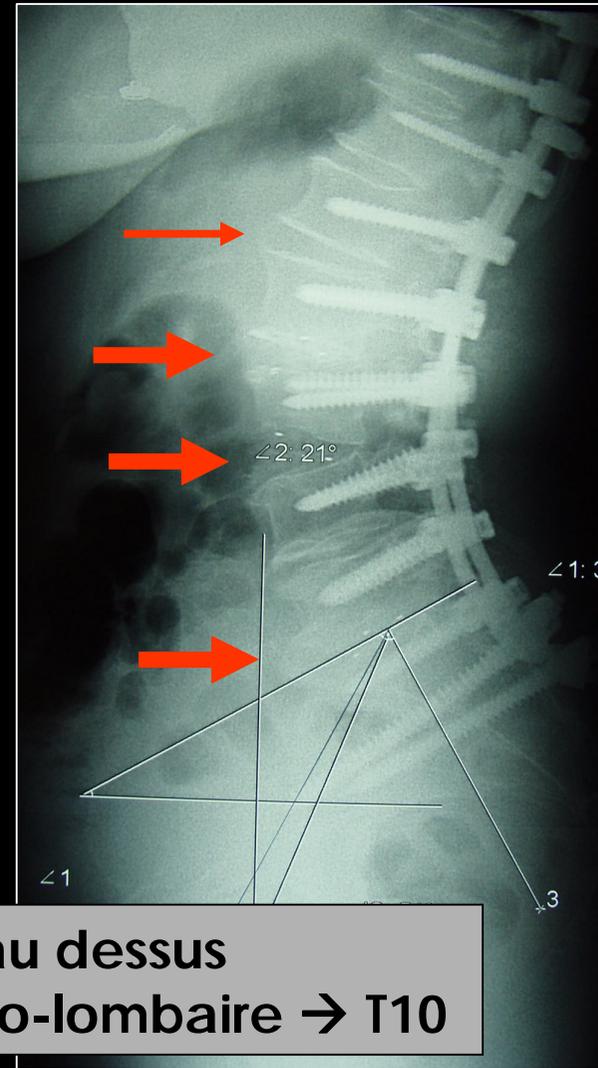
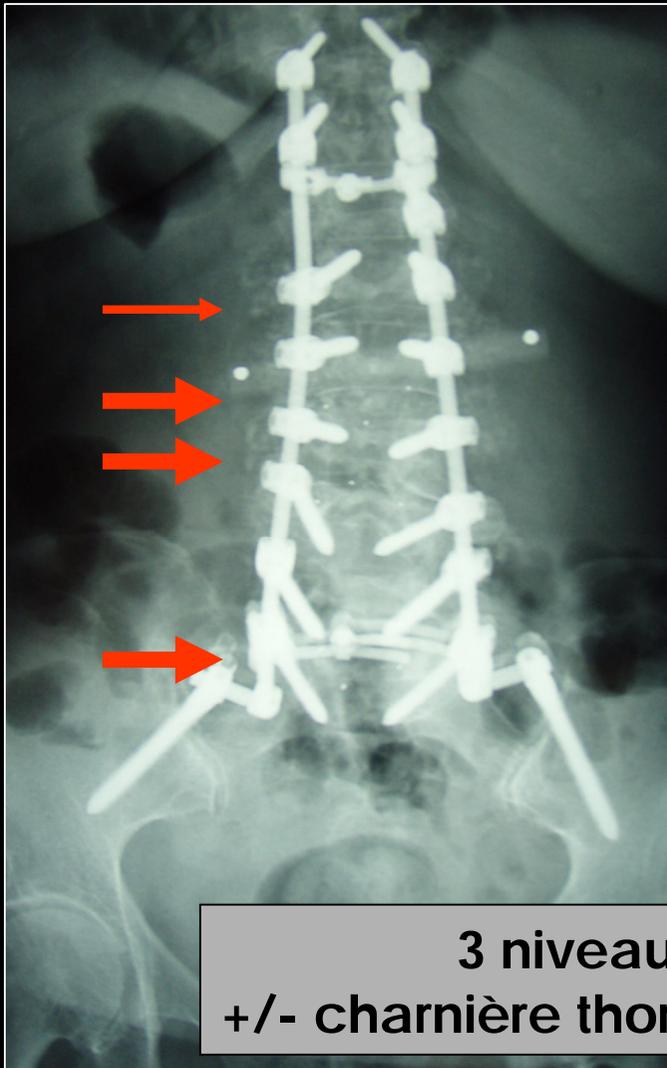


Lordose





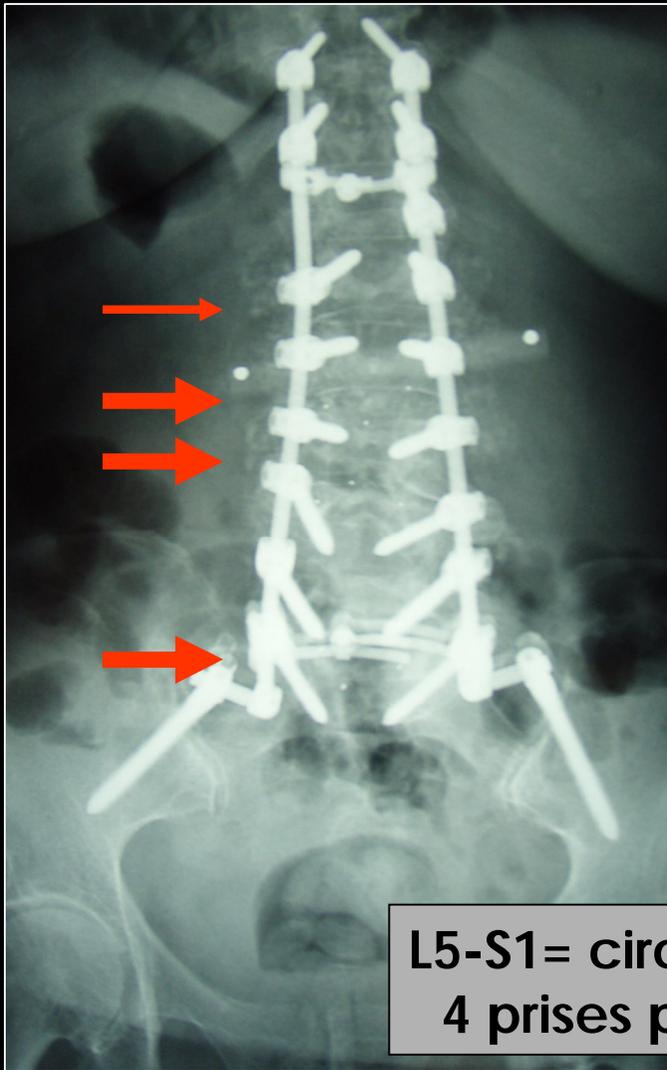
# Planification



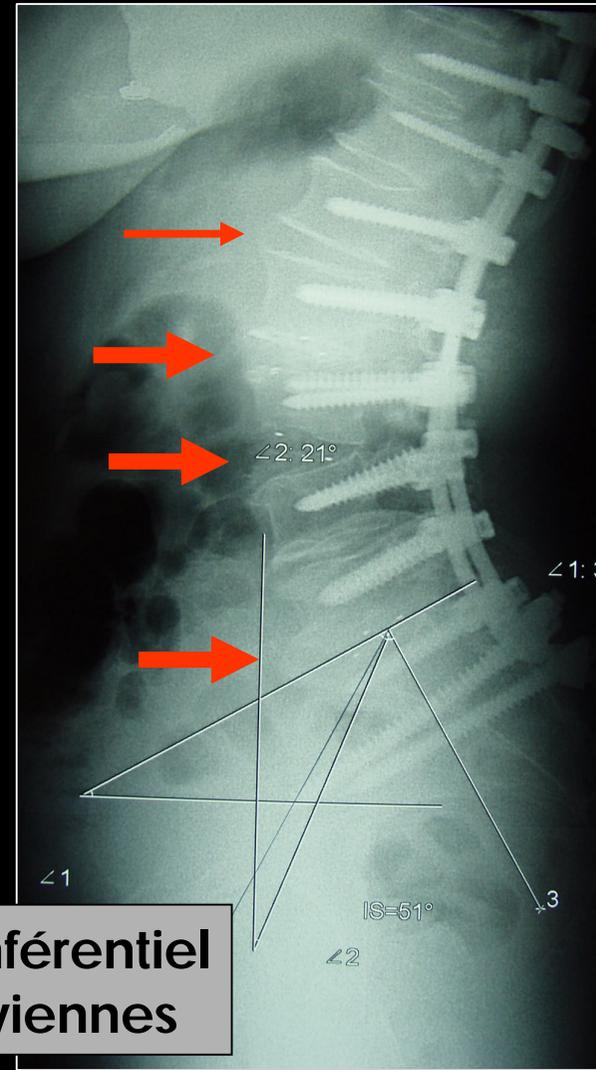
3 niveaux au dessus  
+/- charnière thoraco-lombaire → T10



# Planification



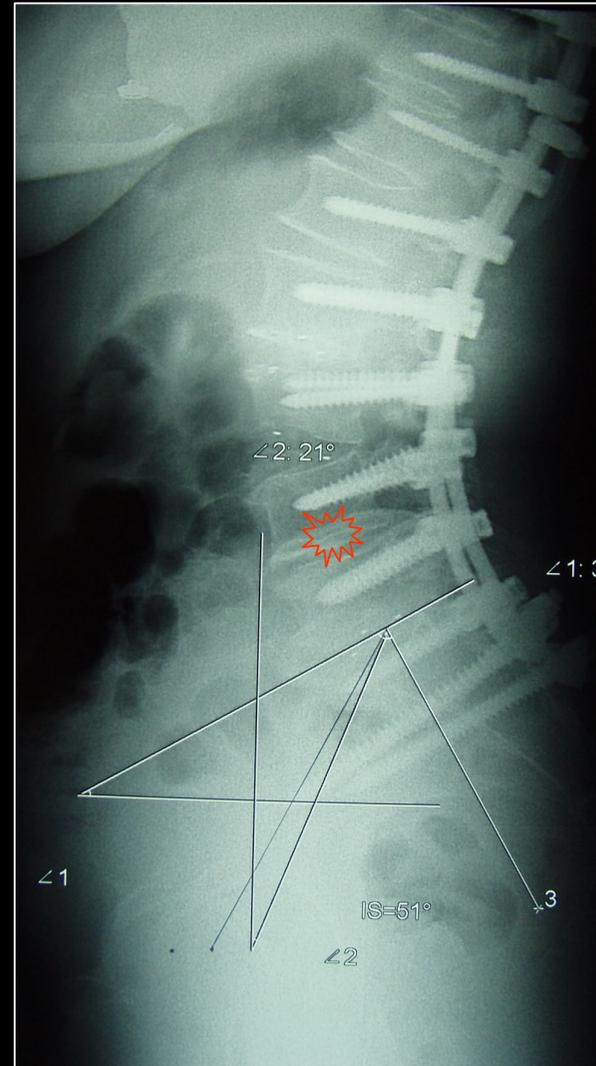
**L5-S1= circonférentiel  
4 prises pelviennes**



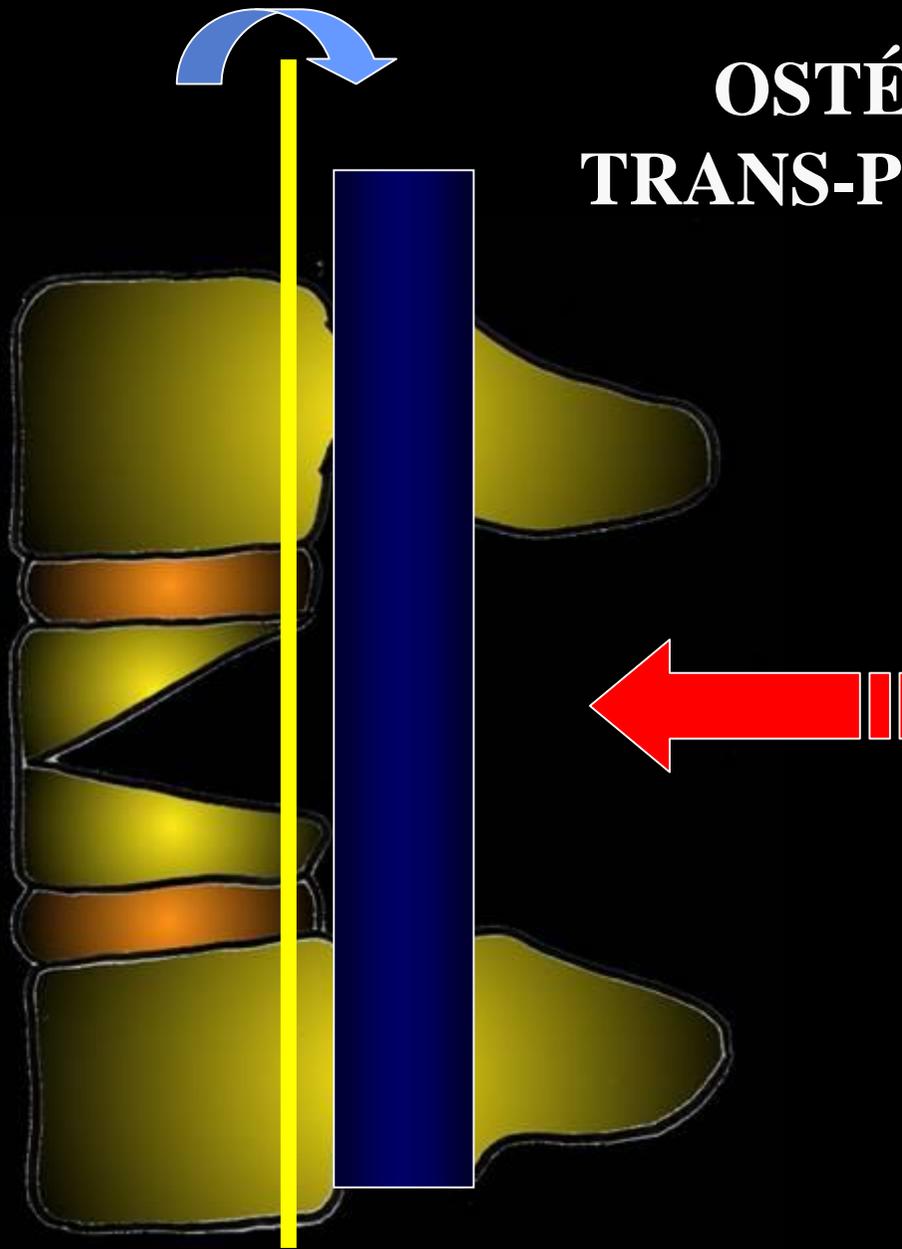
# Planification



Fusion antérieure



# OSTÉOTOMIE TRANS-PÉDICULAIRE

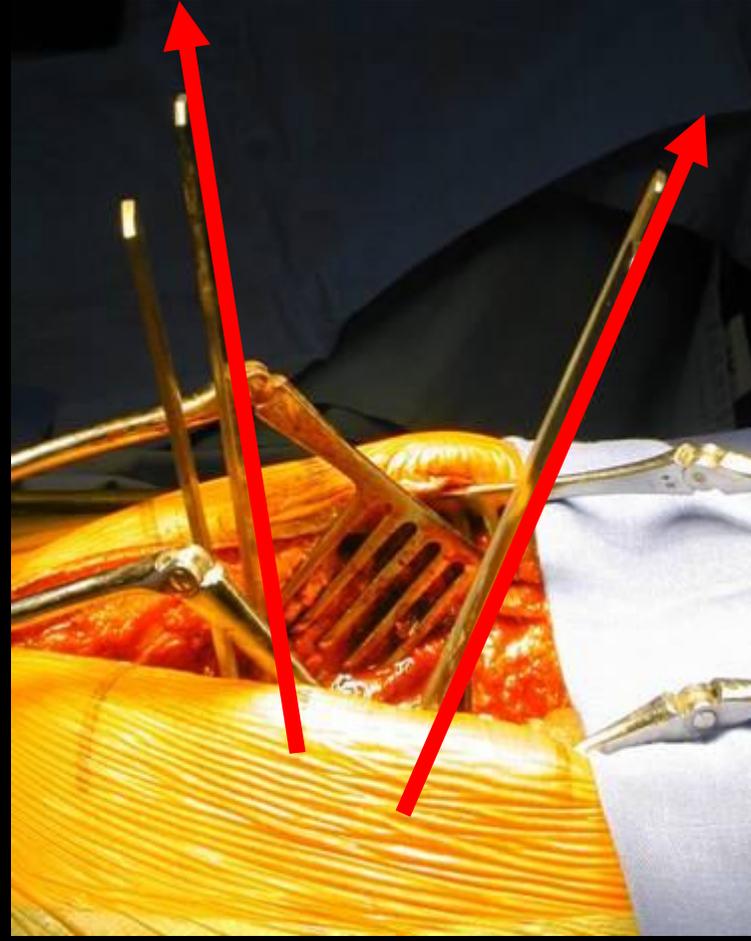
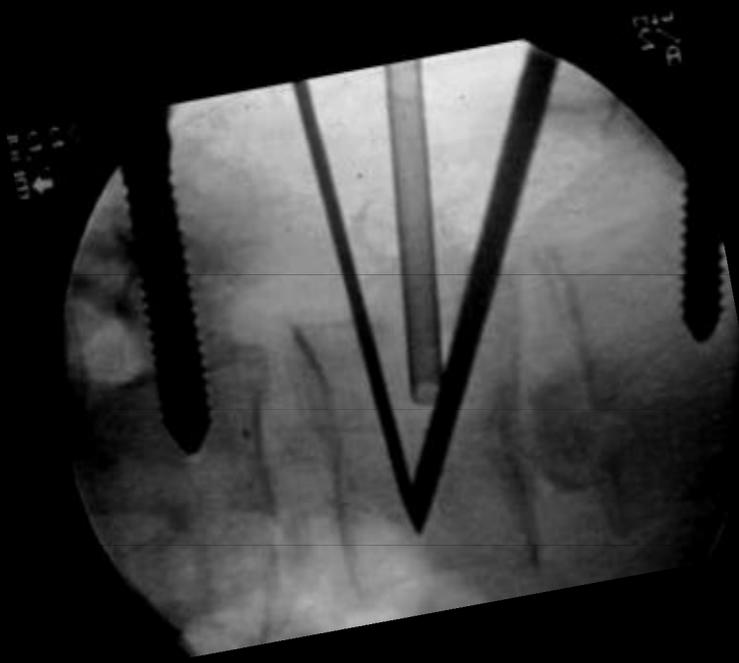


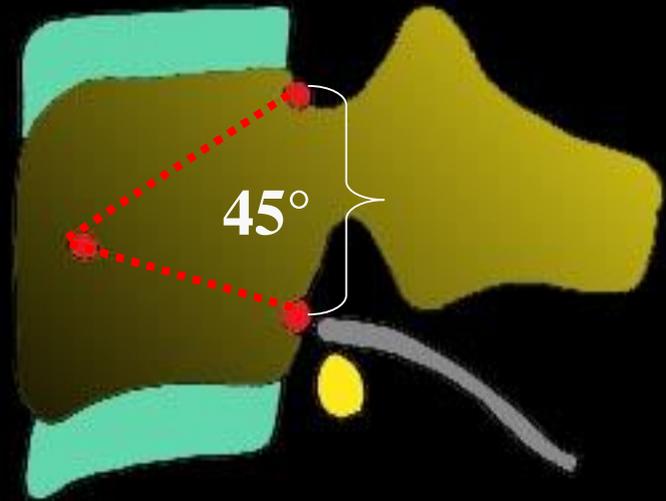
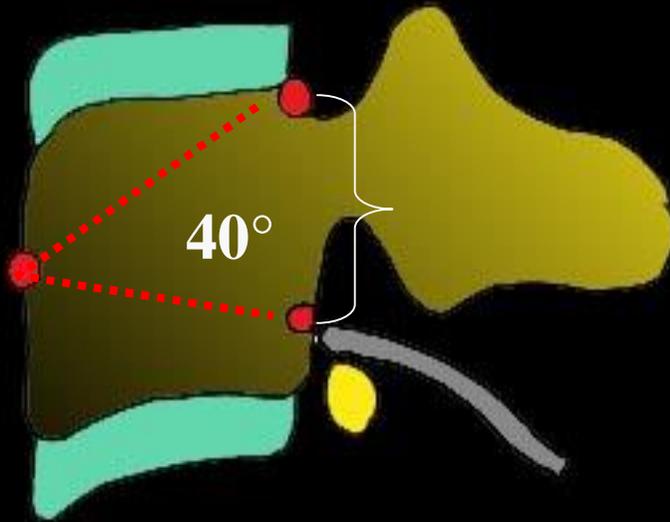
# TECHNIQUE



L3







**ANGLE MAXIMUM**



# Planification: quel niveau ?

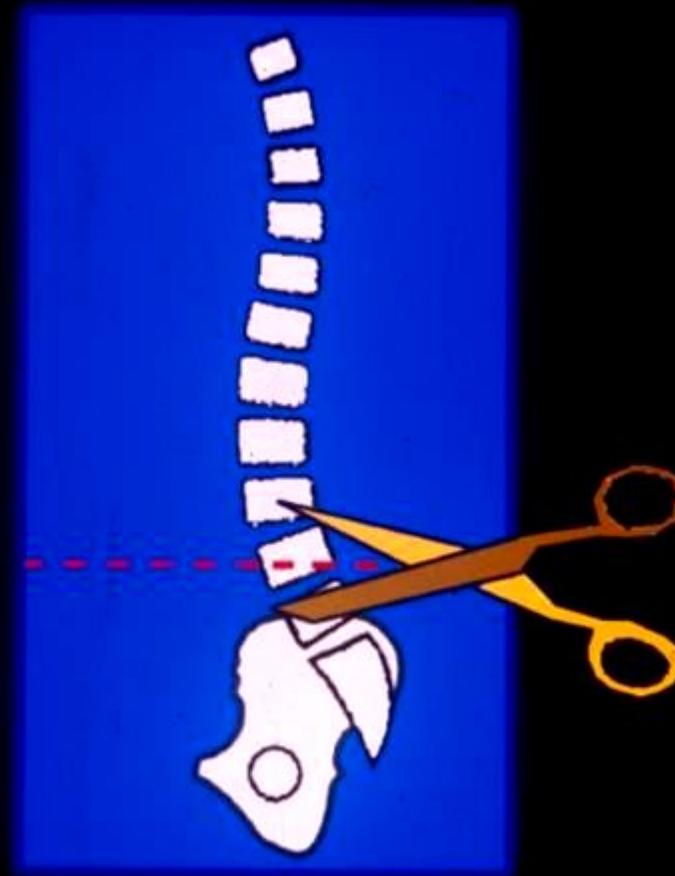
L3

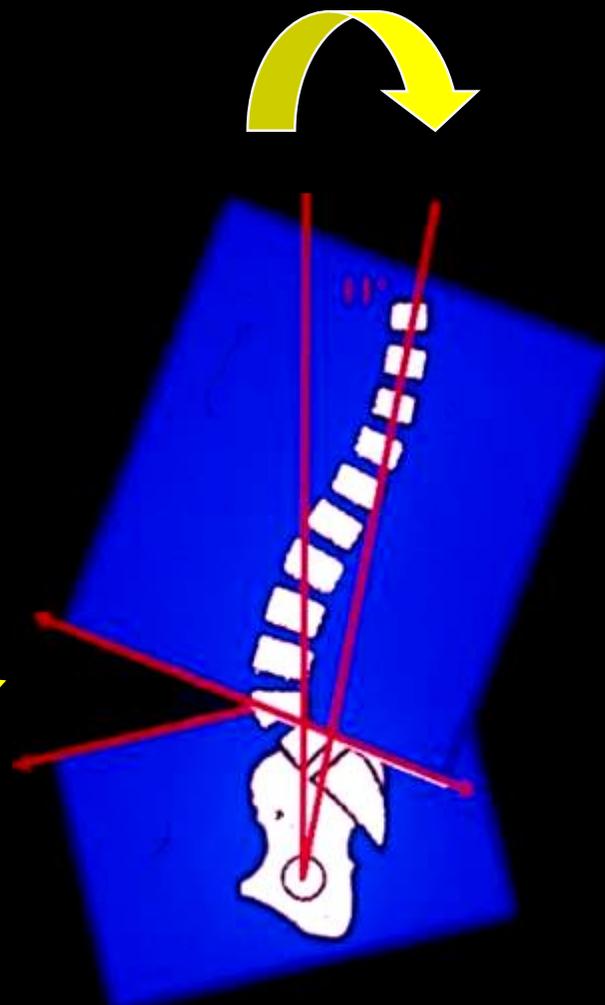
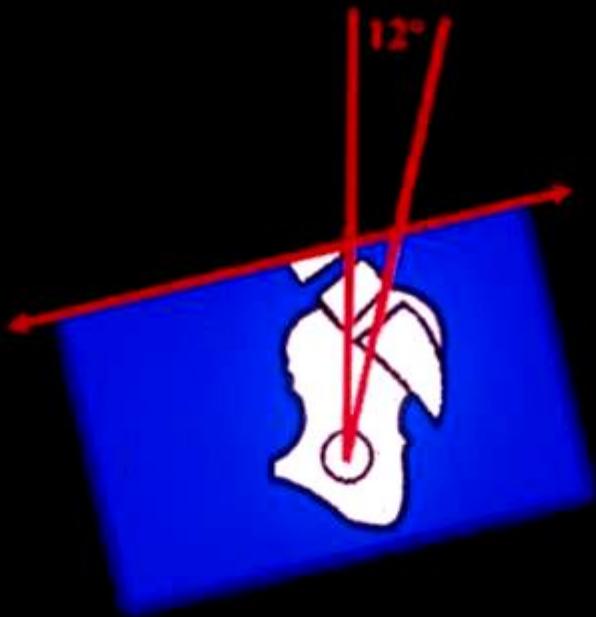


L4

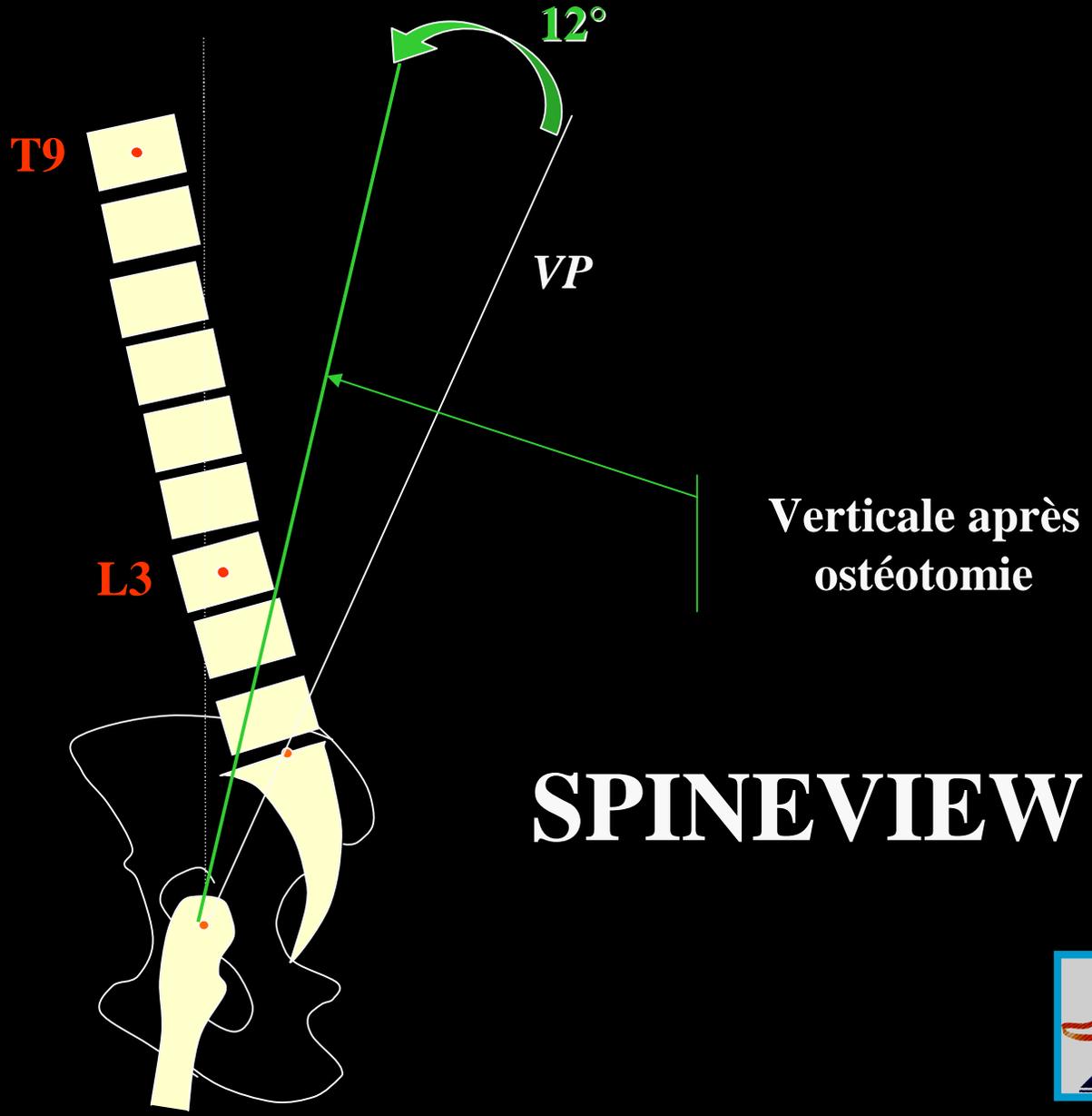


( MANGIONE )





**ANGLE**



# SPINEVIEW



T9

L3

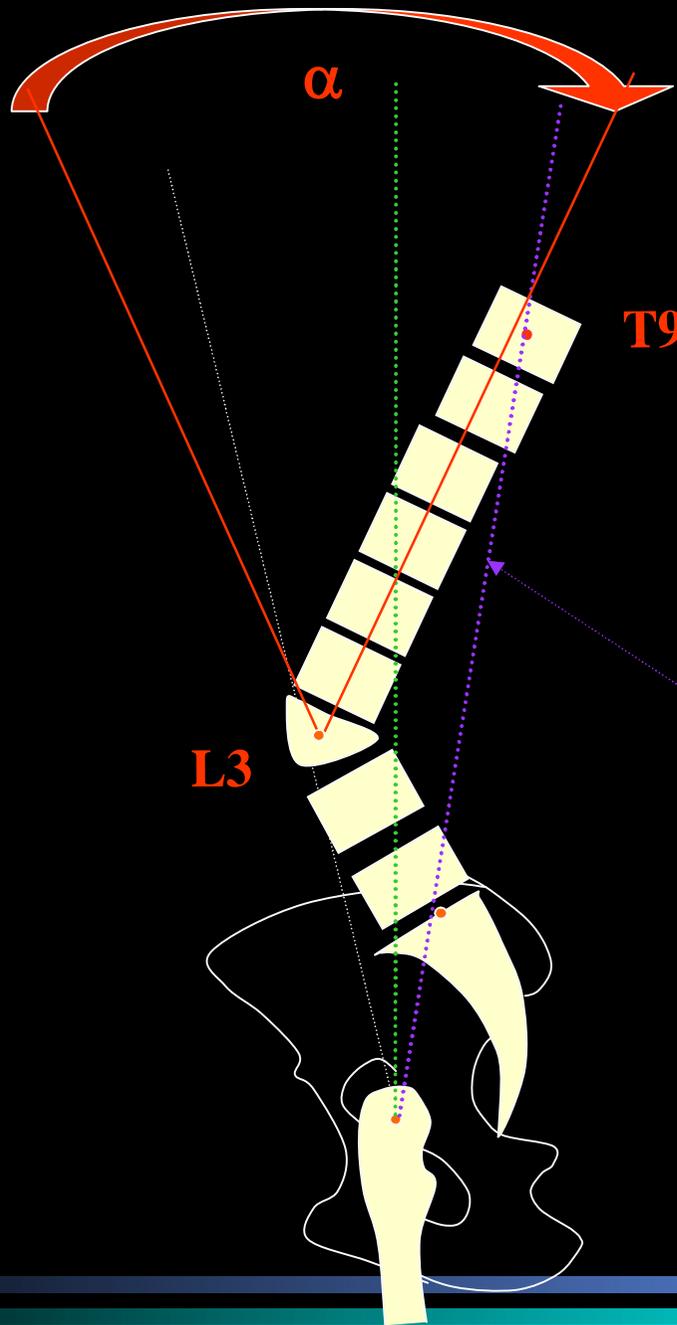
11°

VP=12°

GS=11°

Gîte sagittale  
théorique





PV=12°

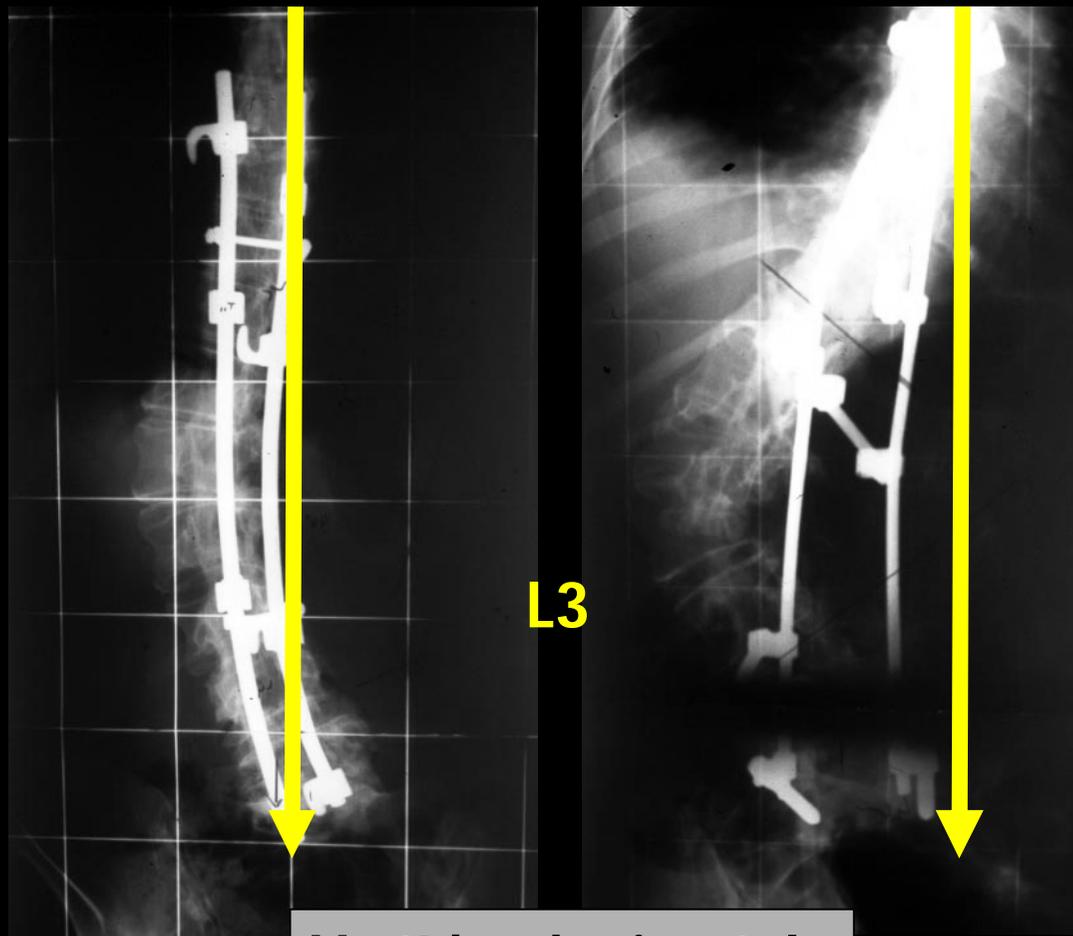
GS=11°

$\alpha$  : osteotomy angle

Gîte sagittale  
théorique à 11°



# Planification: quel niveau ?



L3

Vertèbre horizontale



# Planification



3 niveaux au dessus  
+/- charnière thoraco-lombaire → T10



# Planification

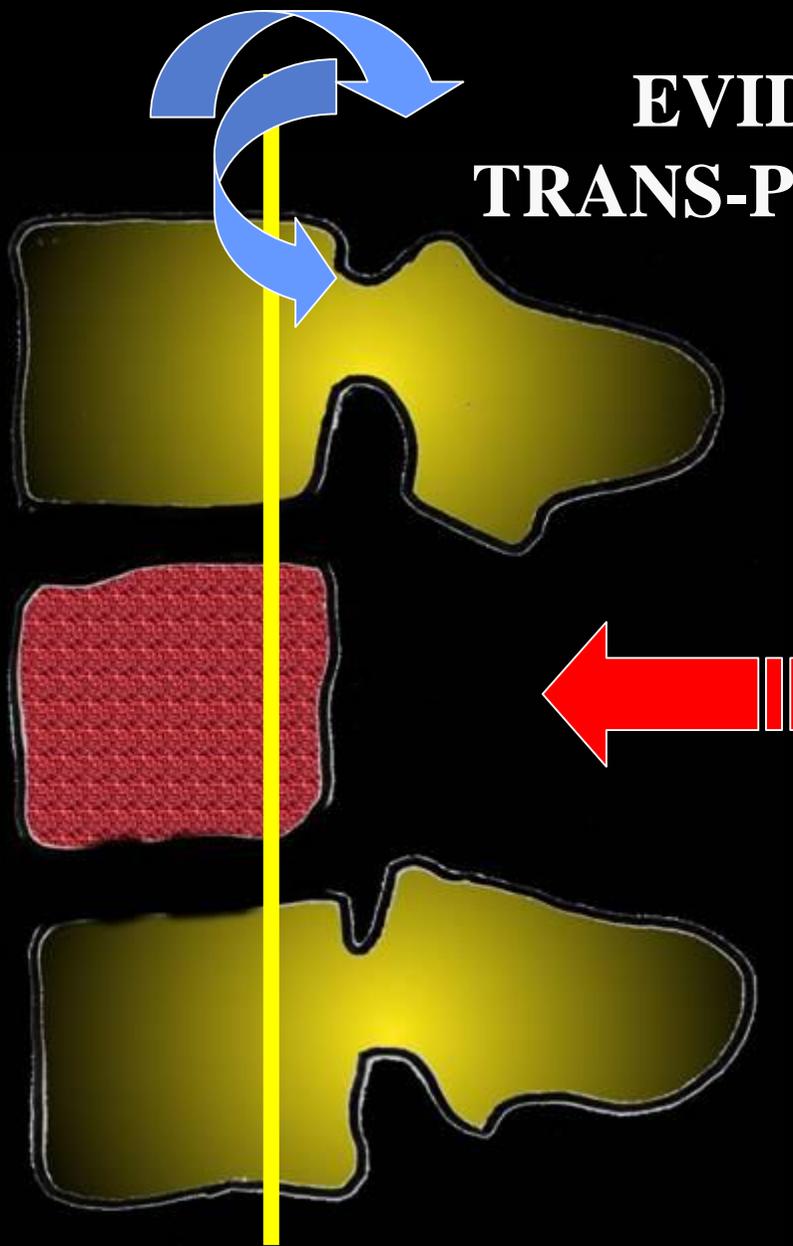


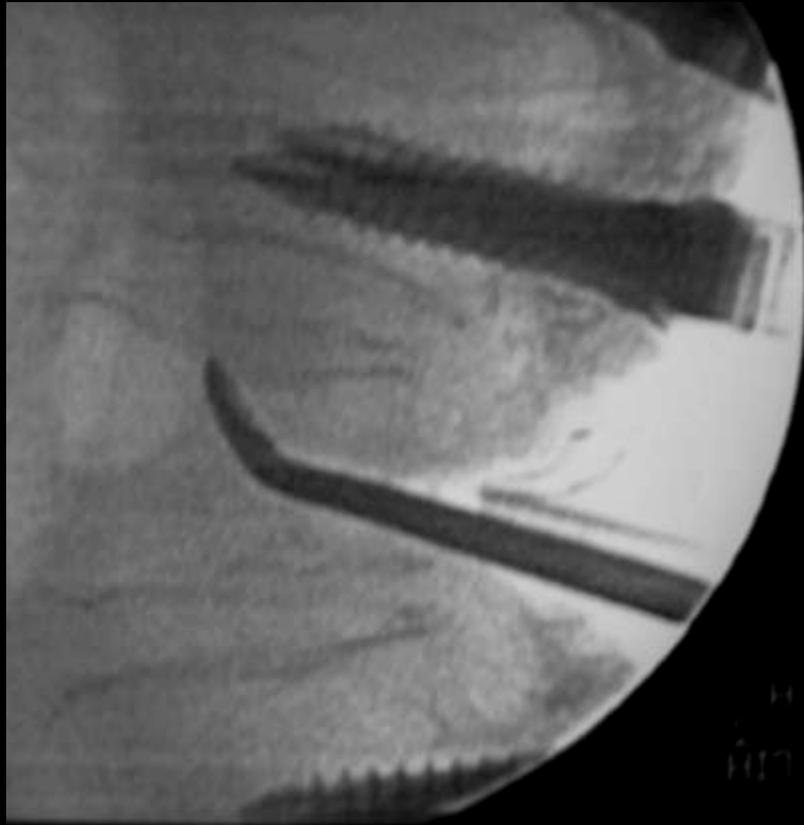
L5-S1 = circonférentiel  
4 prises pelviennes



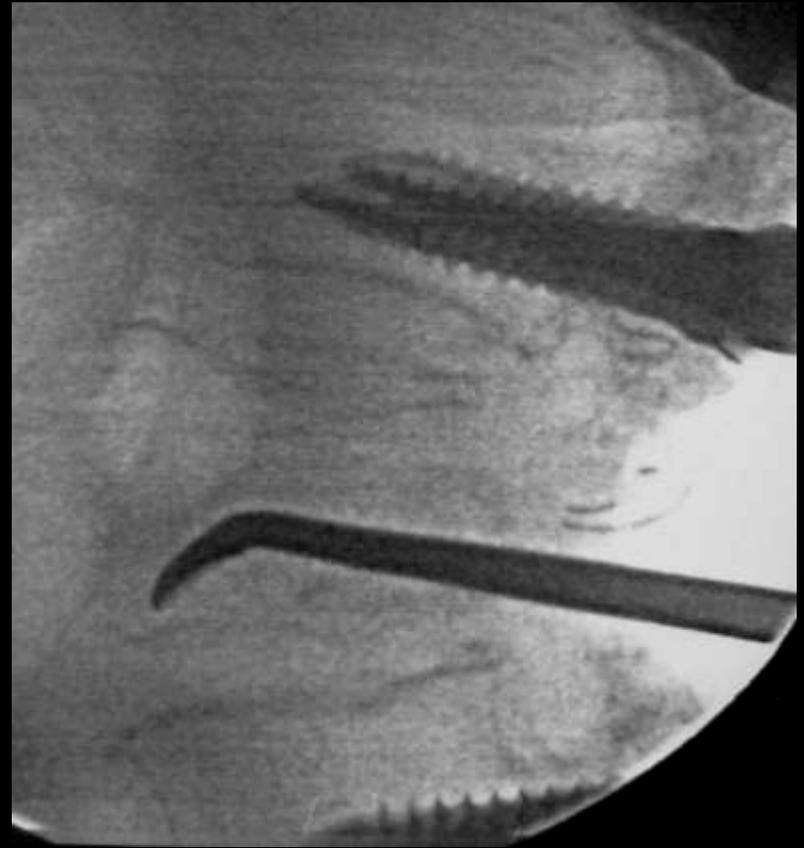


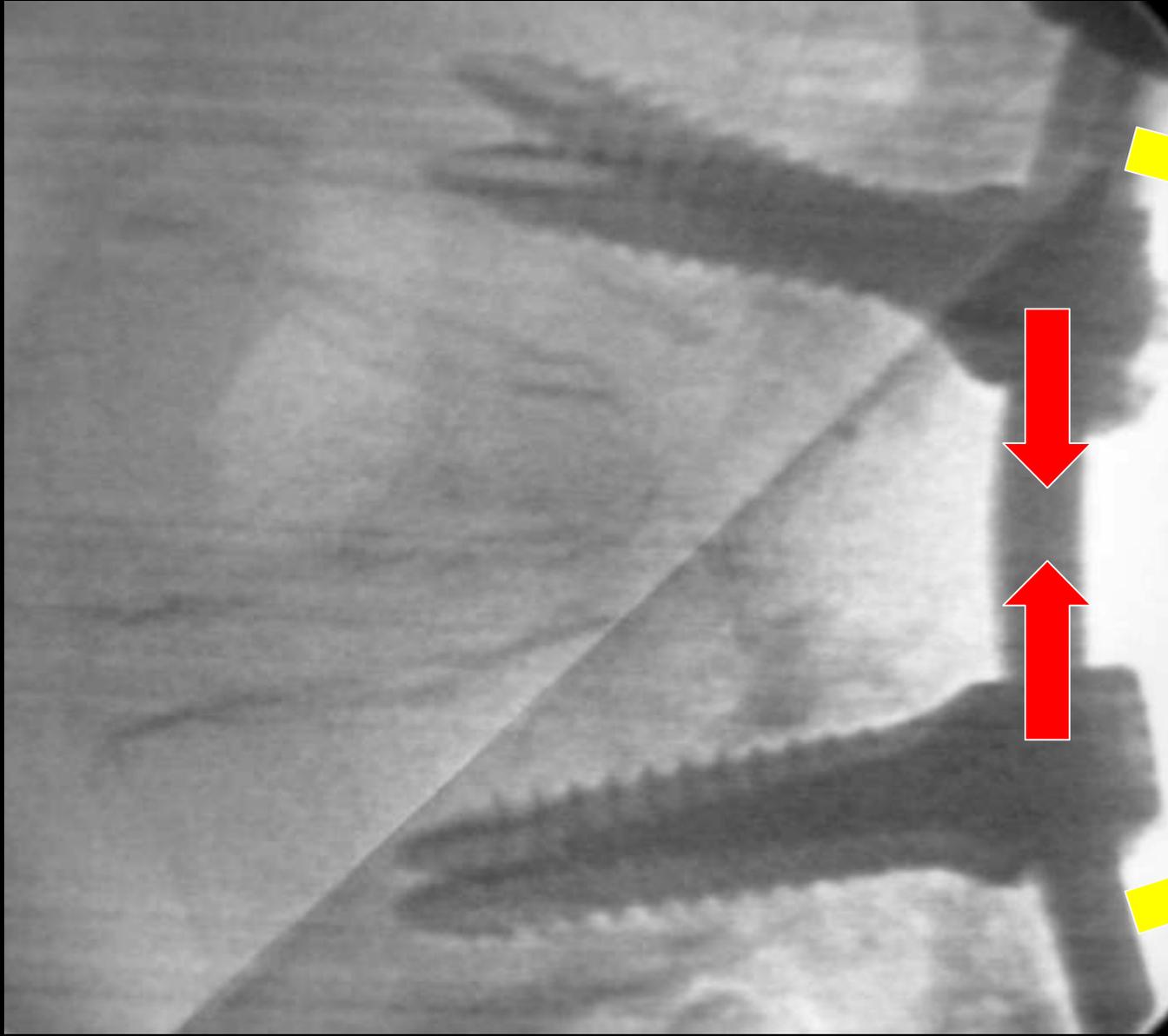
# EVIDEMENT TRANS-PÉDICULAIRE

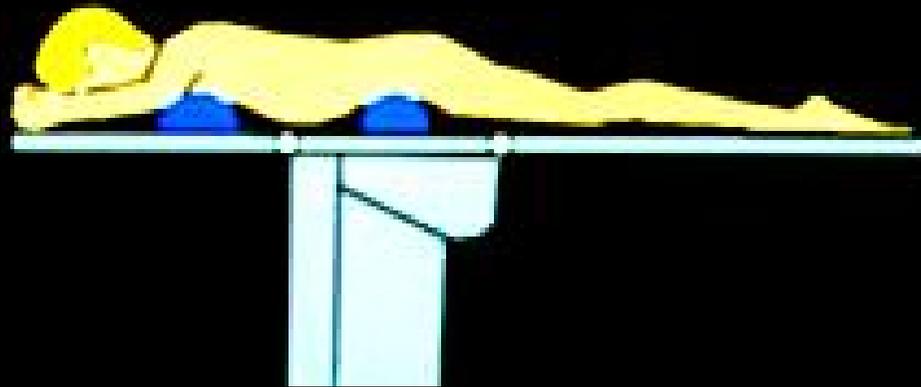




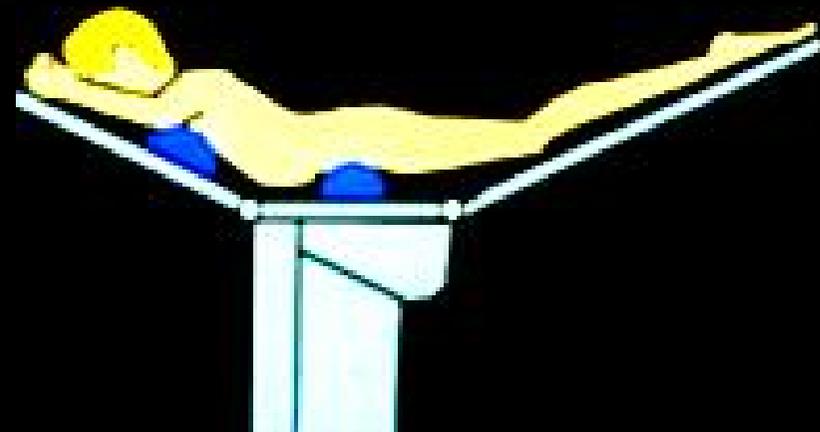
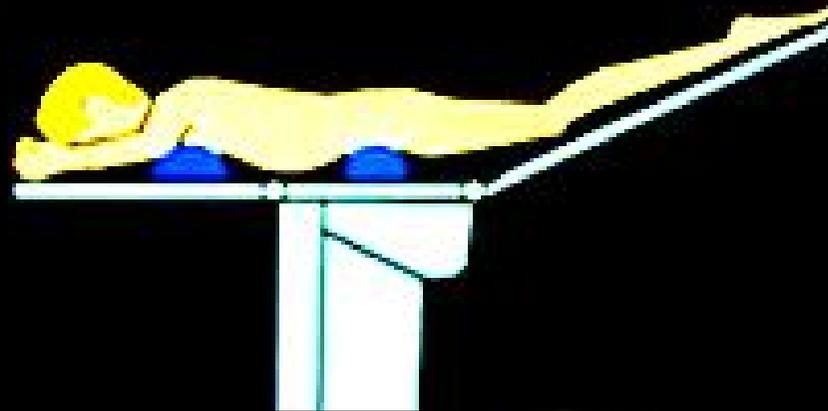
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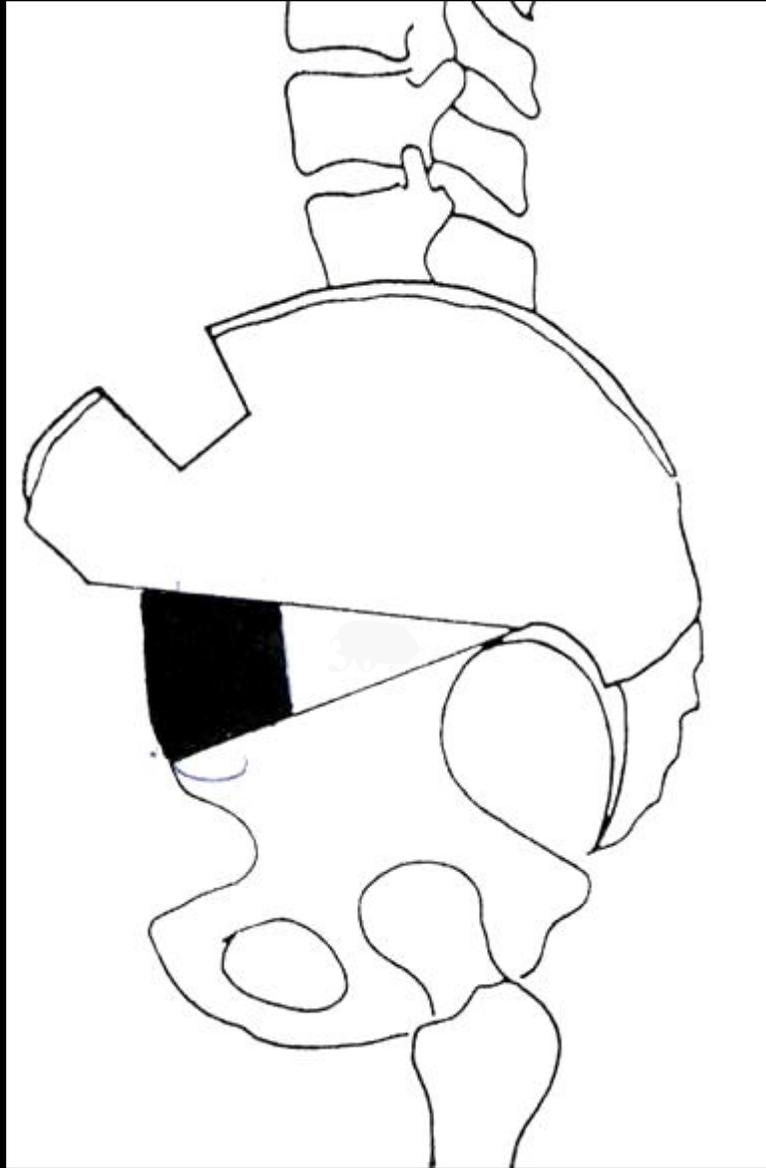




**REDUCTION**



**MOBILISATION  
DE LA TABLE**

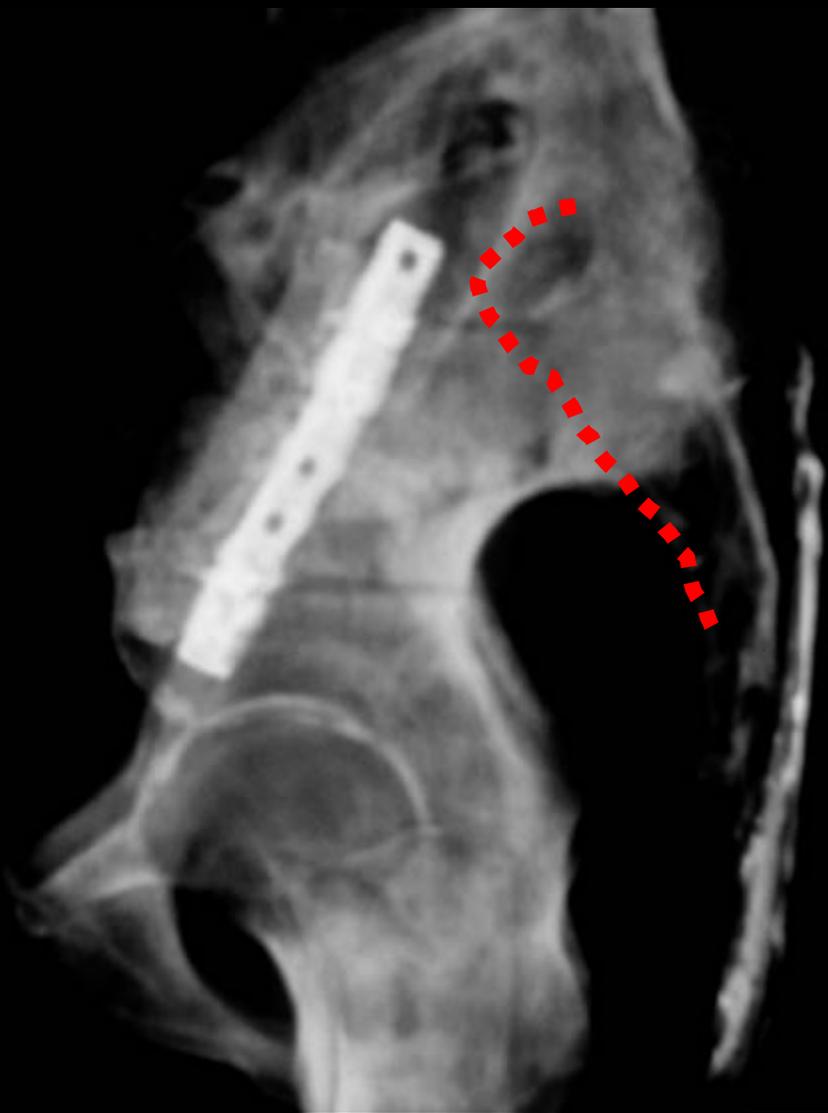
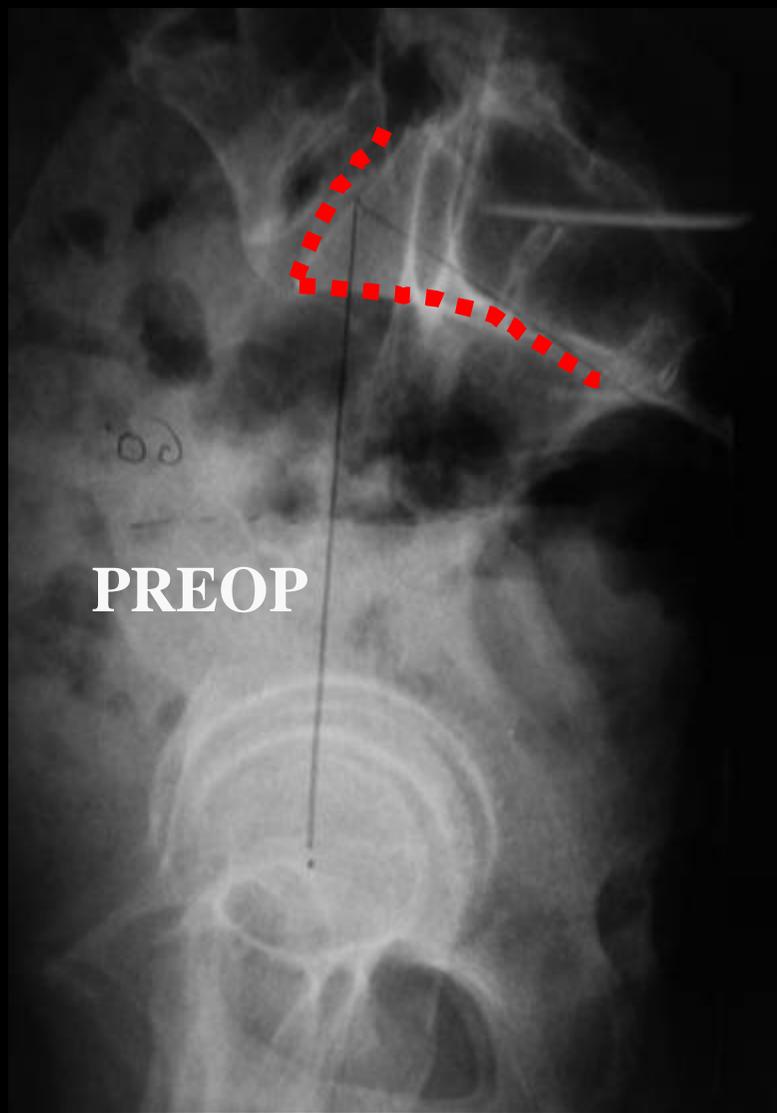


# OSTÉOTOMIE PELVIENNE

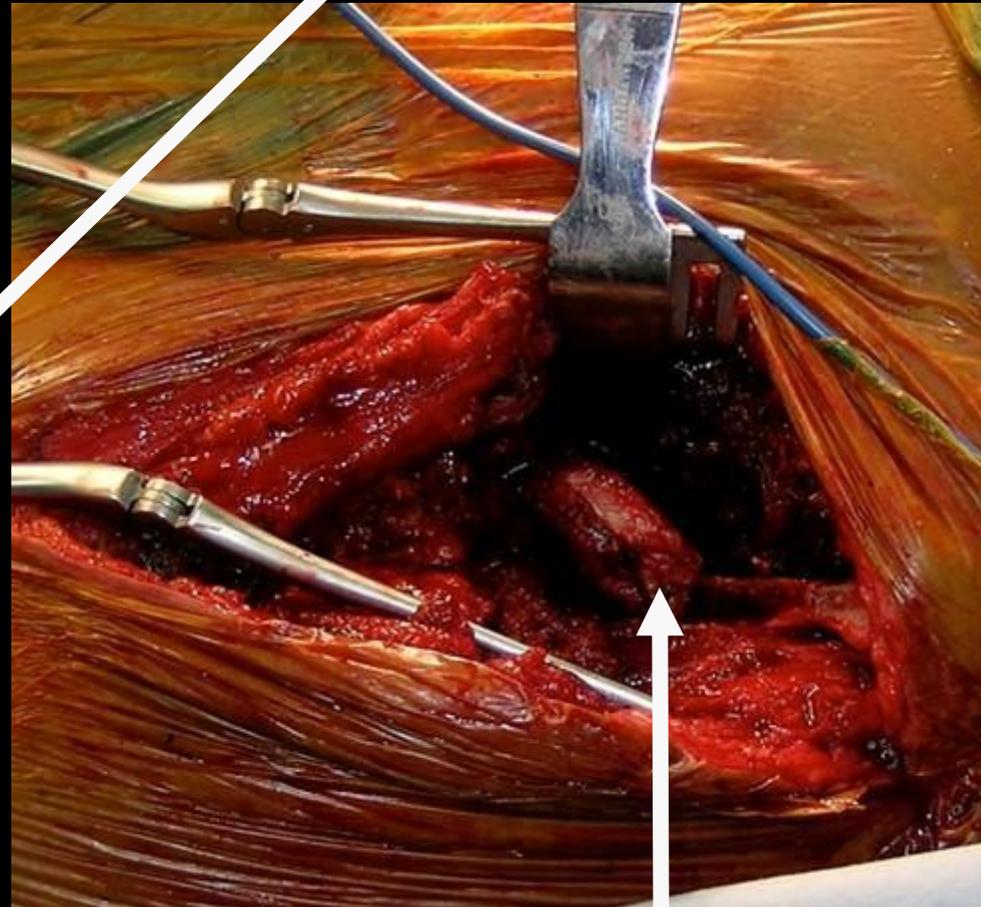
WILSON 1969

SEGAL 1971



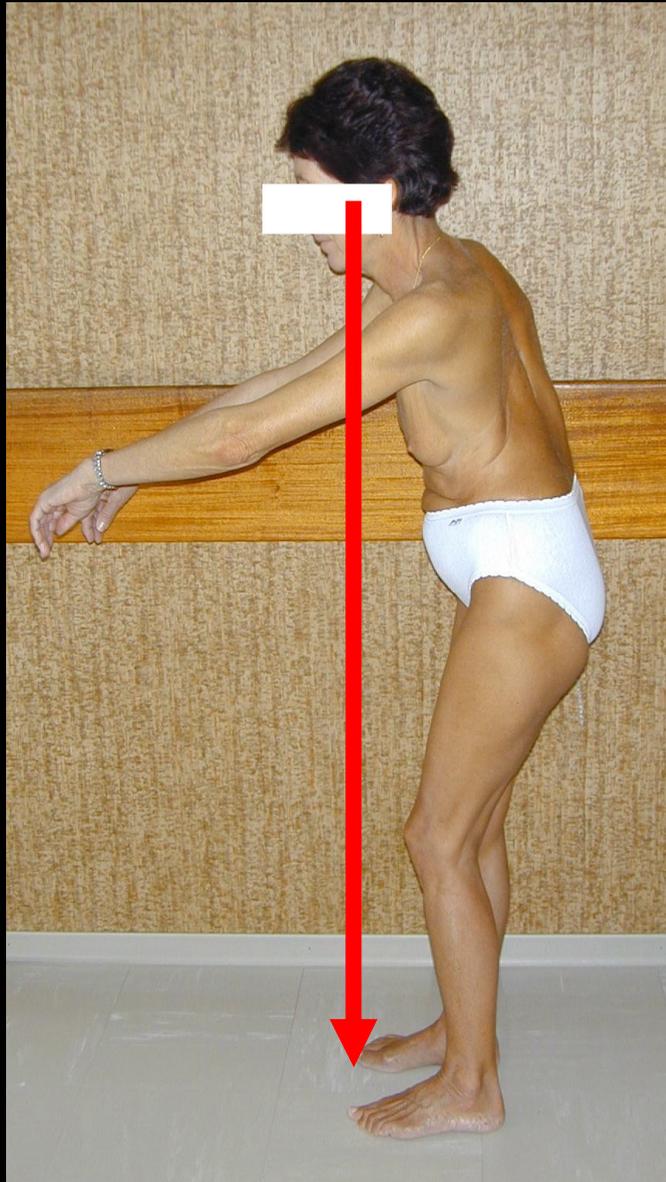


# OSTEOTOMIE GAUCHE



**GREFFON**

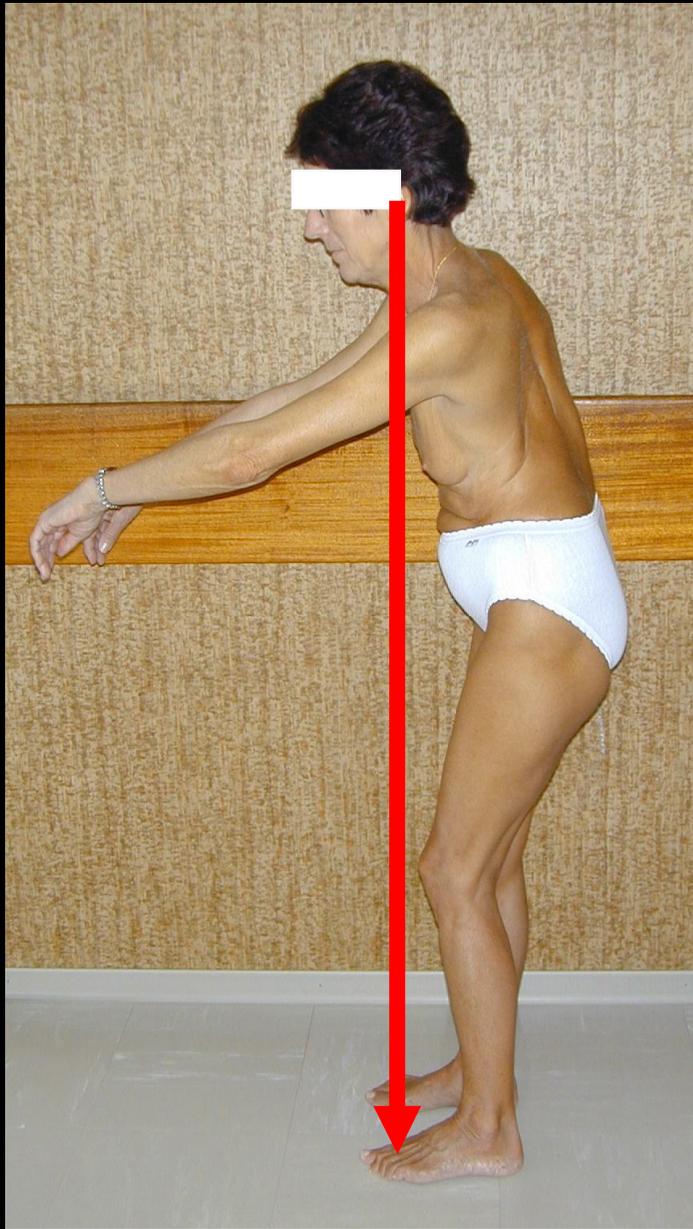


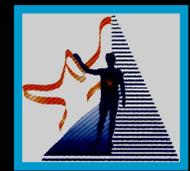
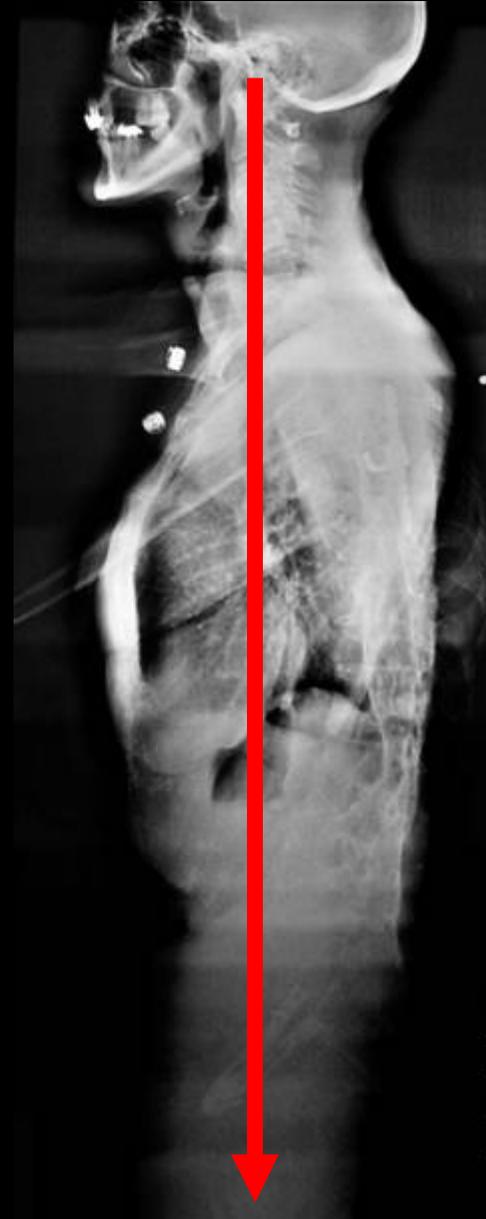




**+ 6 semaines**







OTP ?  
OSP + TLIF ?



# Smith-Petersen + TLIF

Cyphose  
arthrogénique

Dos plat post-opératoire

Volumineux cal postérieur

Ouverture canalaire étendue

Fusion antérieure

Spondylarthrite  
ankylosante

Trans-pédiculaire

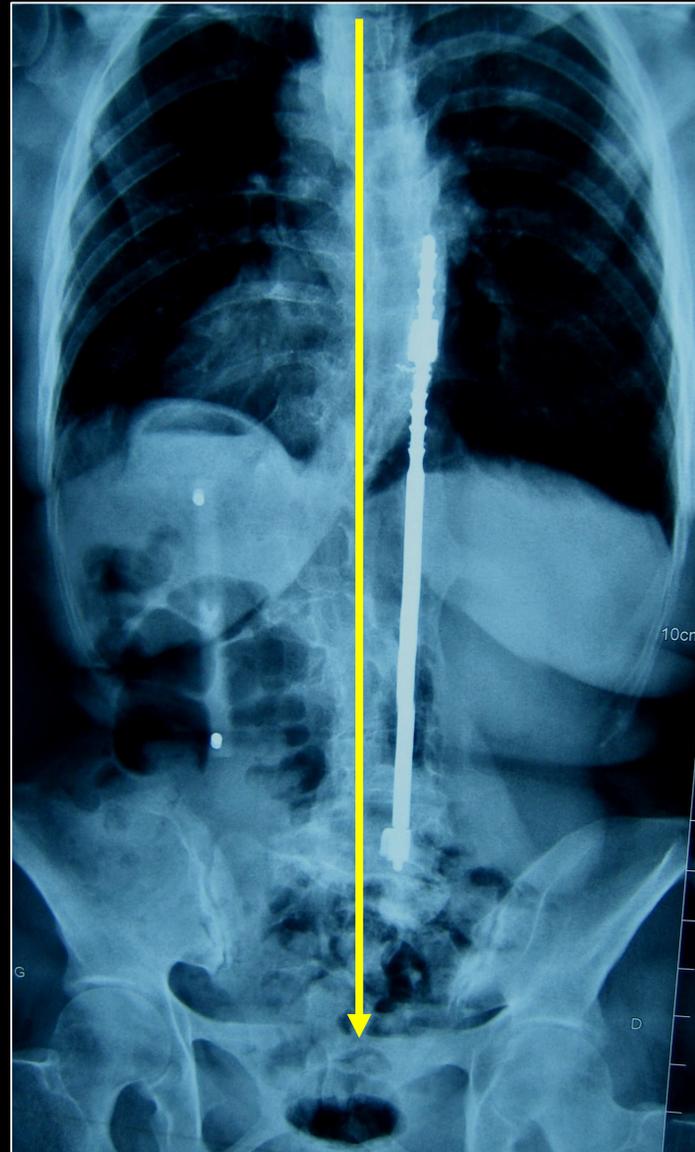
OP

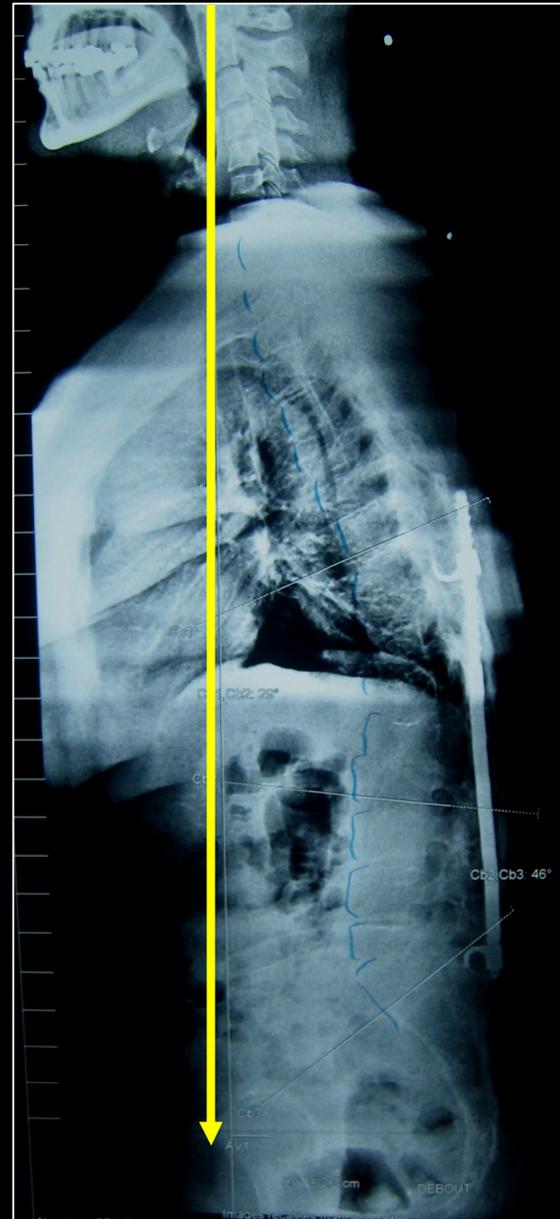
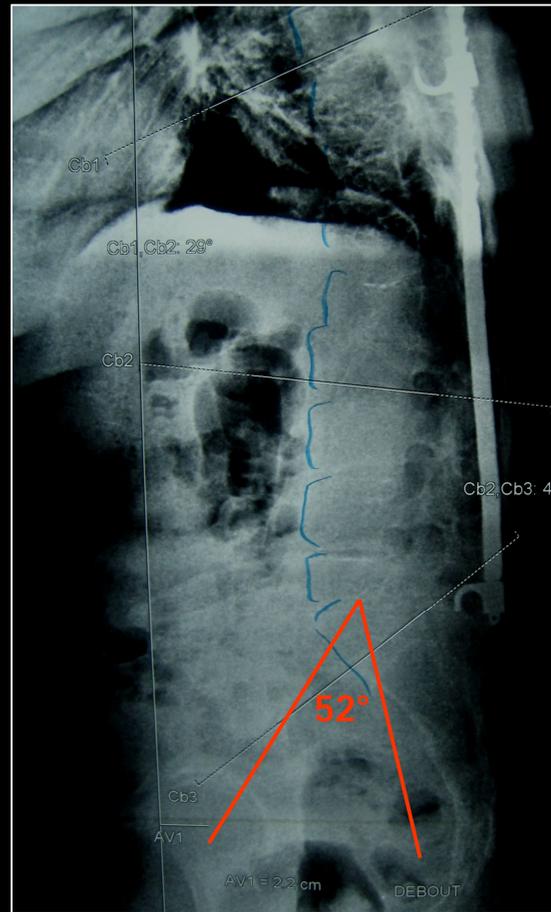


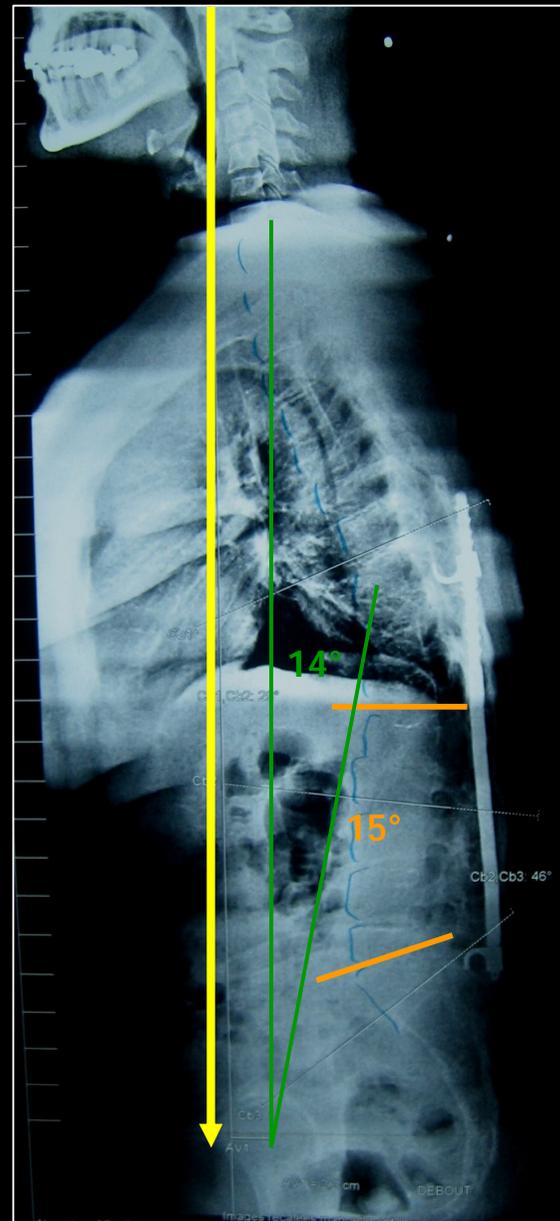
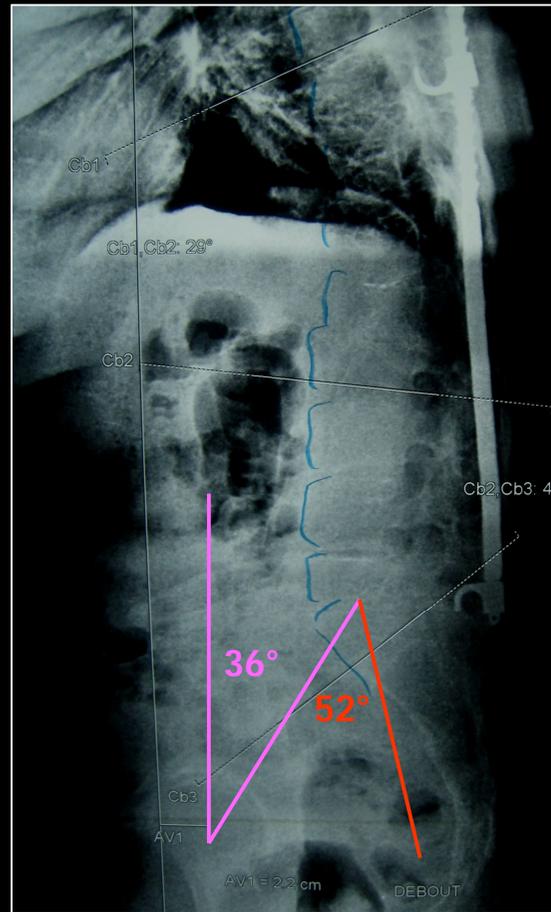
Merci de votre attention



Mme C. 47 ans

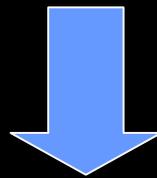






Quelle attitude ?

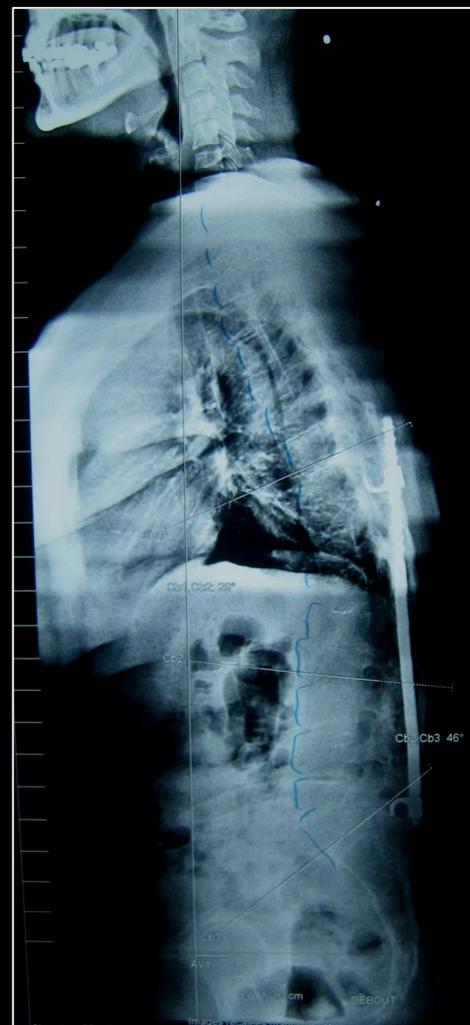
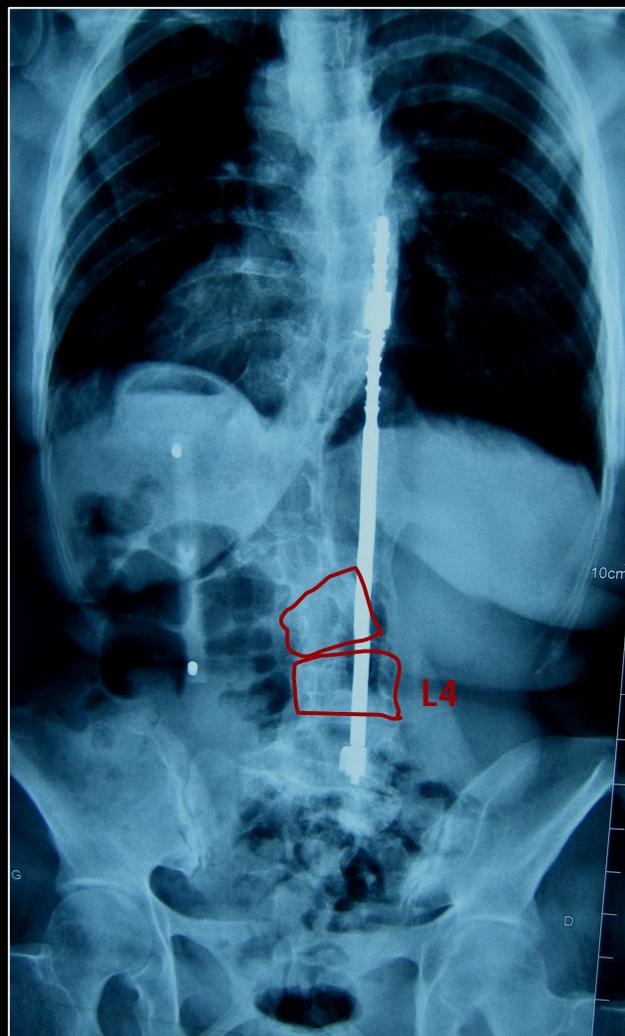
Harrington = cal très volumineux



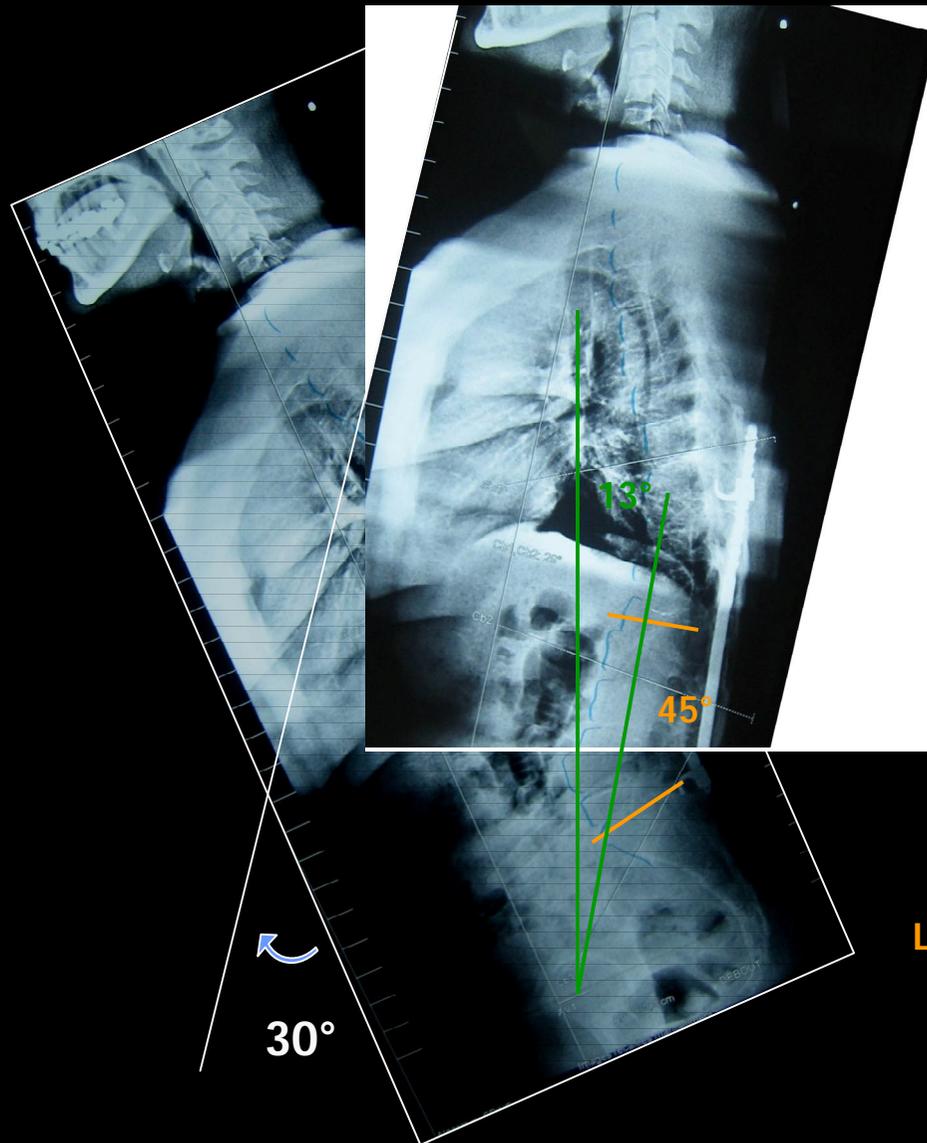
Ostéotomie trans-pédiculaire



# Quelle stratégie ?







L1-S1 théorique  $\sim 60^\circ$



