


## GAP BALANCING IN TKA

Spacer, Distractor, Tensor :  
description, how to use them.

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The resection space must be in all  
compartment  
and at any degrees of flexion

**Rectangular** 

If not

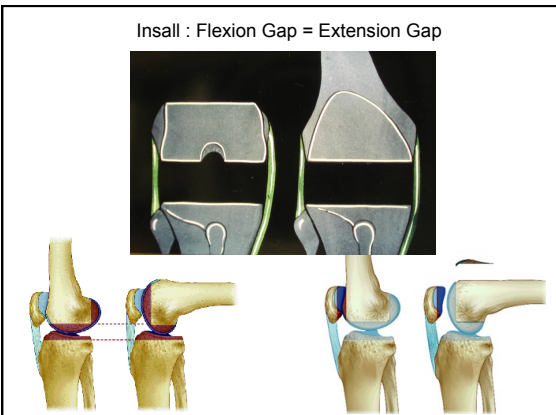
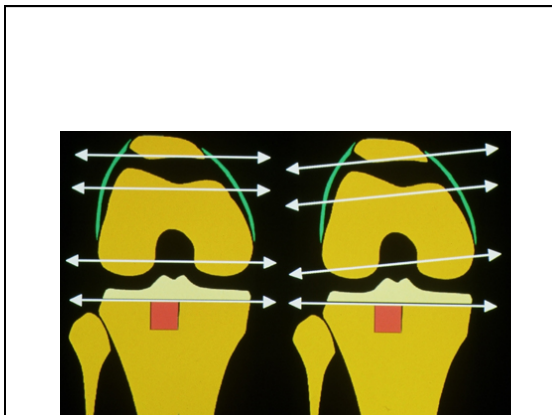
Impingement

↑↓

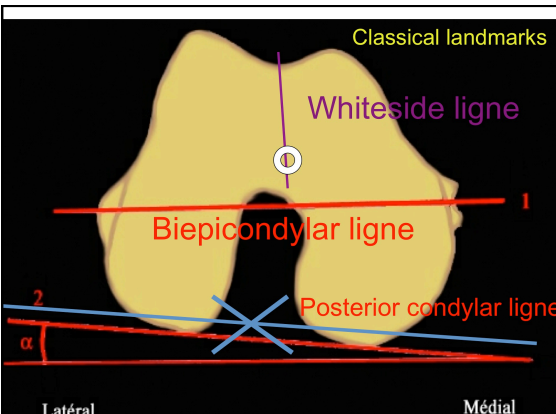
Laxity

**Pain Stiffness**

Insall : Flexion Gap = Extension Gap

Classical landmarks

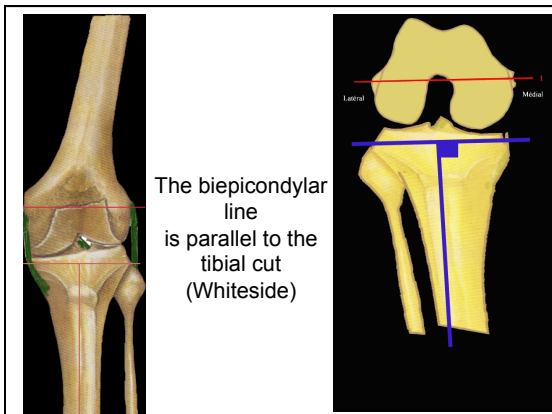


Whiteside ligne

Biepicondylar ligne

Posterior condylar ligne

Latéral Médial



The biepicondylar  
line  
is parallel to the  
tibial cut  
(Whiteside)

**Two possibilities**

- **Independents Cuts: *Spacer***
  - \* Extension Gap
  - \* Flexion Gap
- **Dependents Cuts: *Tensor***
  - \* Symetric : Distractor
  - \* Asymetric : tensor

**First : Proximal Tibial Cut with Extra or Intramedullary rods**

**Proximal Tibial Cut  
Bone stock preservation**

**Independent cuts**

**Three independent cuts**

**Ligament balancing after**

**Symétrique    Insall    Whiteside**

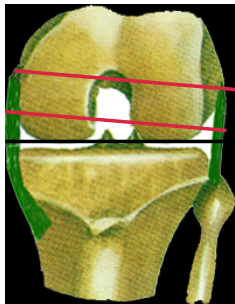
**Systématique    Tenseur**

**Independents Cuts**

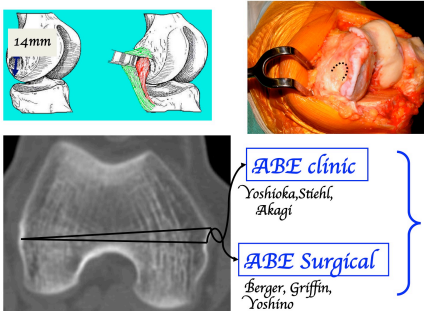
**Parallel to the bicondylar line    External Rotation 3°**

**Posterior cuts Parallel to the Biepicondylar axis**

If the two posterior cuts are egal, the femoral prosthesis will be in internal rotation (Whiteside)



**Difficulty to find the landmarks per operatively**

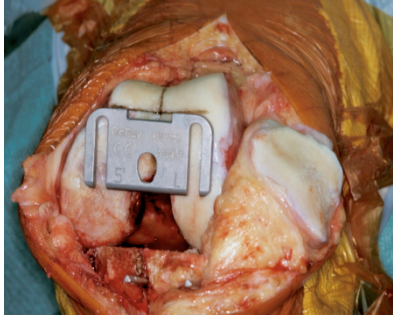


**ABE clinic**  
Yoshioka, Stiehl, Akagi

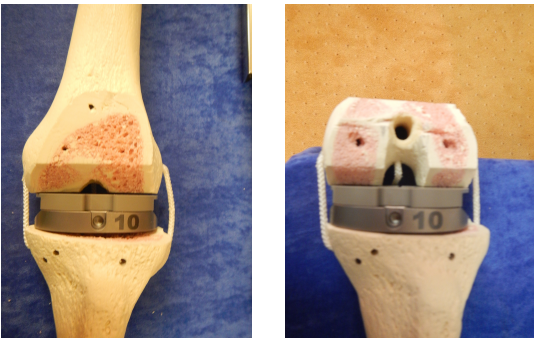
**ABE Surgical**  
Berger, Griffin, Yoshino

delta 1,2° à 4,9°

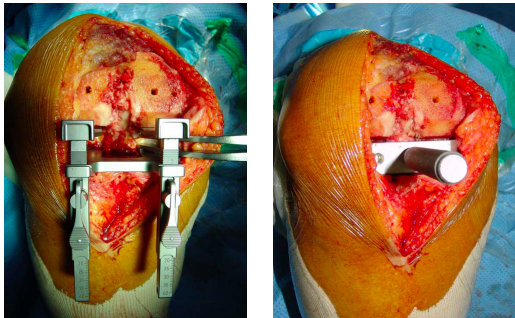
**Whiteside line**



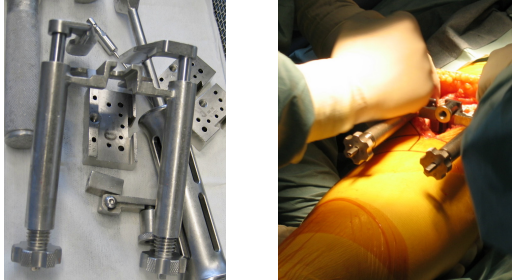
**SPACER : Extension Gap = Flexion Gap**

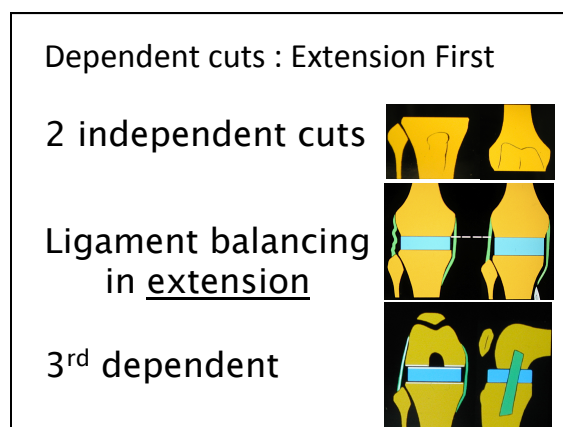
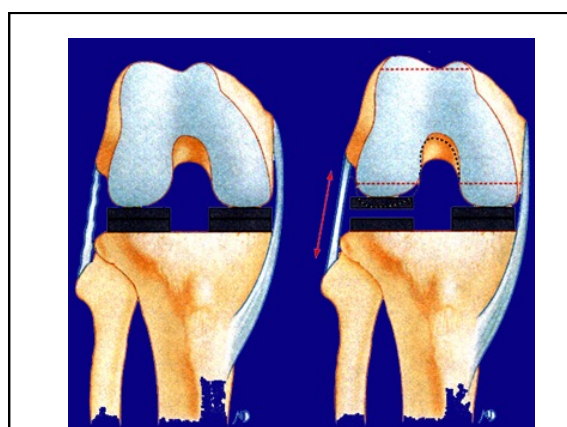
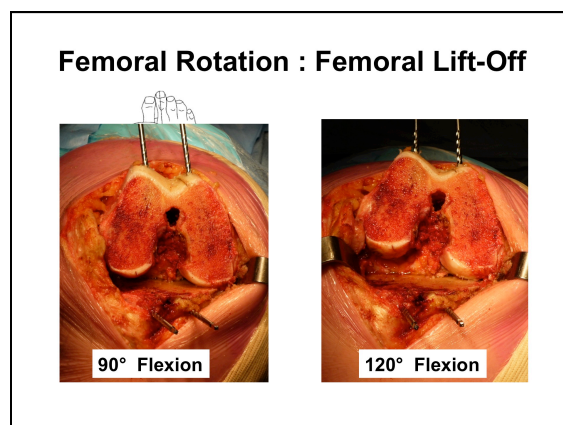
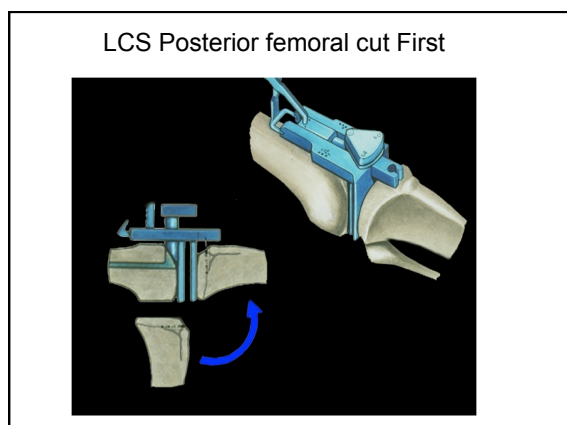
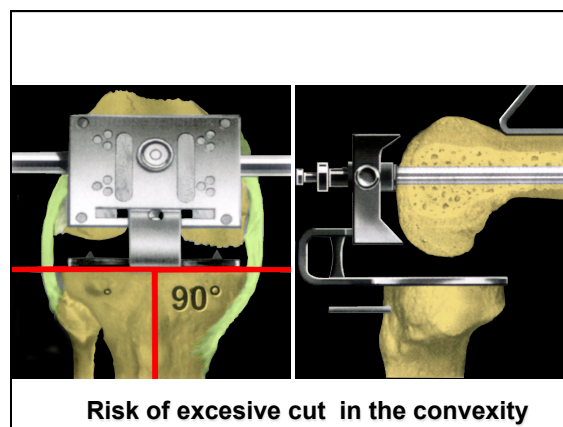
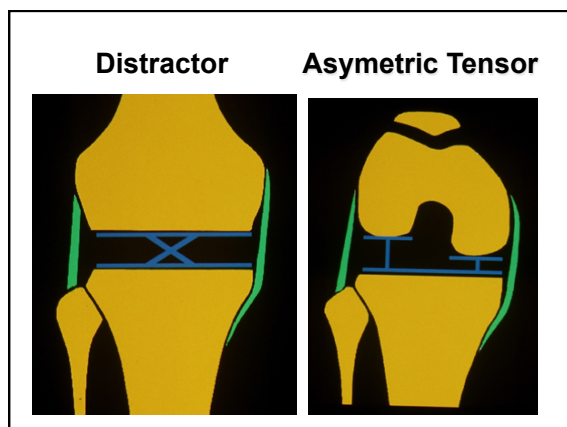


**Flexion gap and mediolateral symmetry measured by Distractor or Spacer block.**  
The same tension or gap is reported in extension

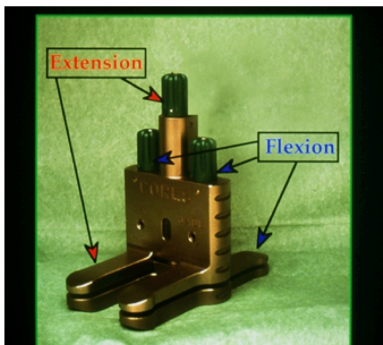


**Dependents cuts :  
Insall Asymmetric Tensor**

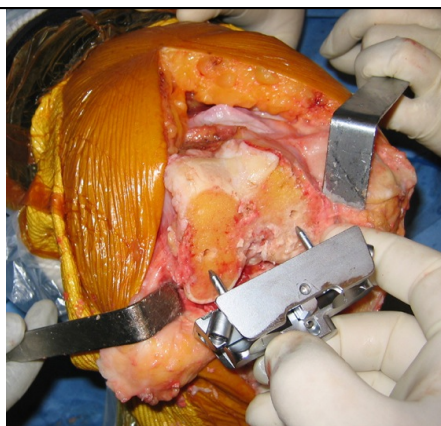
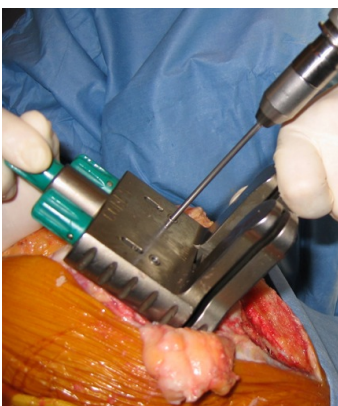
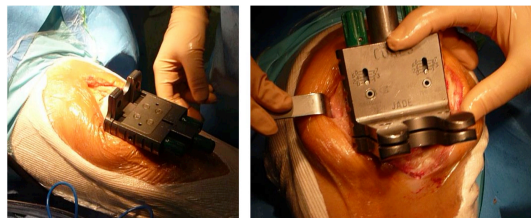




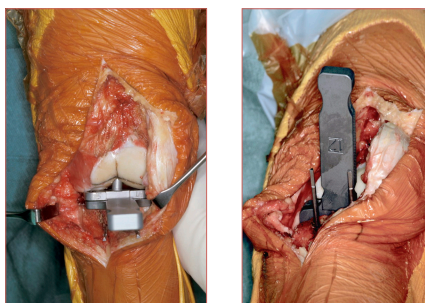
### Asymmetric Tensor : CORES



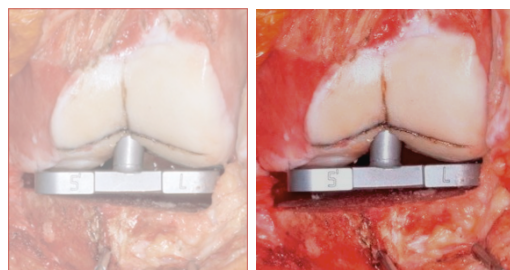
### Rotation report from extension to Flexion Gap Automatic External Rotation



### TRAM : Tige de Repérage de l' Axe Mécanique Spacer First in extension

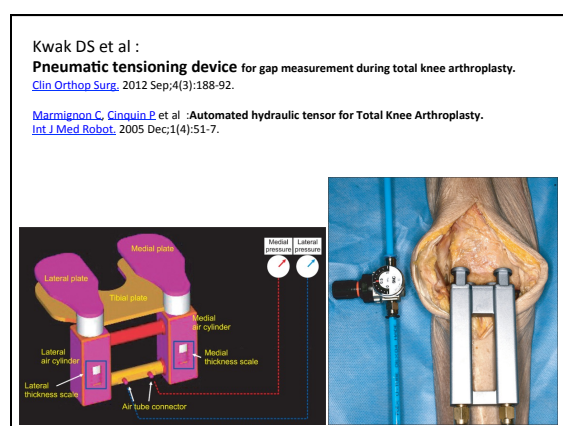
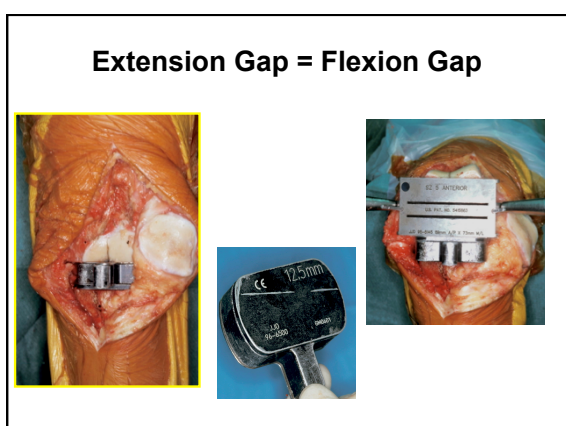
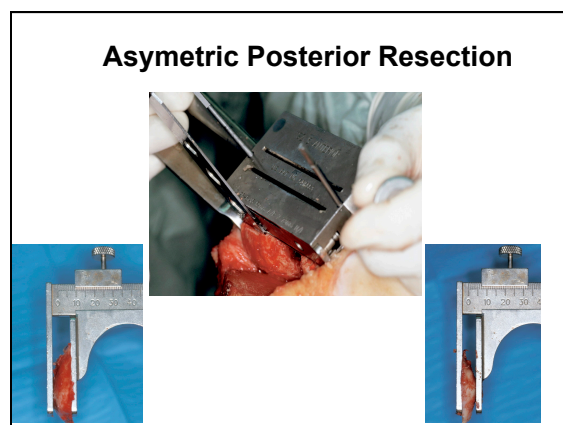
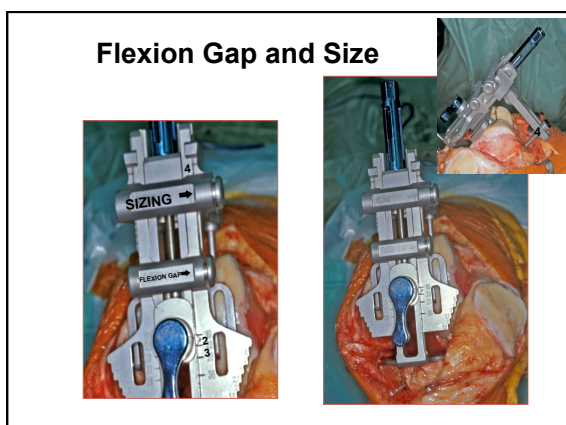
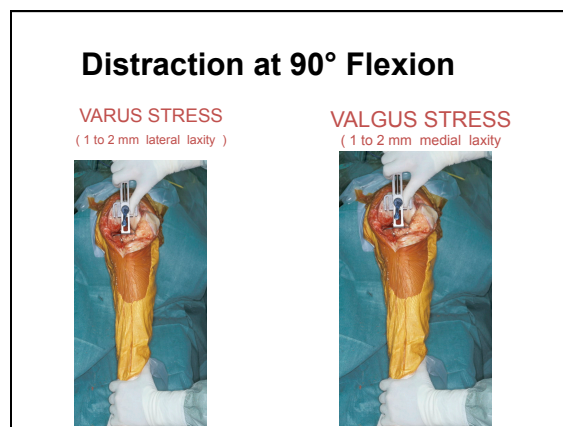


### Ligament balance in Extension



Varus stress

Valgus stress



**Varus more of 25°**  
**Minimal lateral tibial cut**  
**Medial Bone defect replace by metallic wedge**

27° 32°

**Same Tension in Extension and in Flexion**  
**with trials components in place**

**Gap balancing**  
**was better**  
**estimated using**  
**trial**  
**components**  
**with the**  
**extensor**  
**mechanism in**  
**its anatomical**  
**position**

**Total knee arthroplasty.** Clin Orthop Relat Res 1985  
[Insall JN](#) et al

The question of **Posterior cruciate** preservation or substitution is unresolved, and both types give equivalent clinical results.

Correction of deformity occurs by soft-tissue release and **ligament balancing**, rather than by bone resection.

**Alignment** is critical to the function and survival of a functioning arthroplasty.

Most failures can be attributed to incorrect ligament balance or incorrect alignment.

Philippe Neyret vision

Femoral Gap = 2 cuts

Tibial cut and Releases make up the "Tibial Gap"

Femoral GAP

Tibial GAP

**TAKE HOME MESSAGE**



**34<sup>th</sup> Caribbean Orthopaedic Congress**  
**2<sup>nd</sup> Franco-Cuban Orthopaedic Congress**  
**2014, March 31<sup>st</sup> to April 5<sup>th</sup>, -**  
**National Hotel in Havana - Cuba**