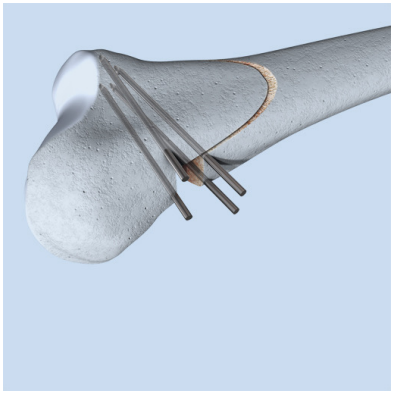
Distal Femoral Osteotomy
(Lateral) Opening Wedge Technique

FX GUNEPIN– A Tronchot



CHU Rennes

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HSS

Orthopedic
Knowledge Exchange

How and Why I do a Distal Femoral Osteotomy

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HSS Education Institute

COI

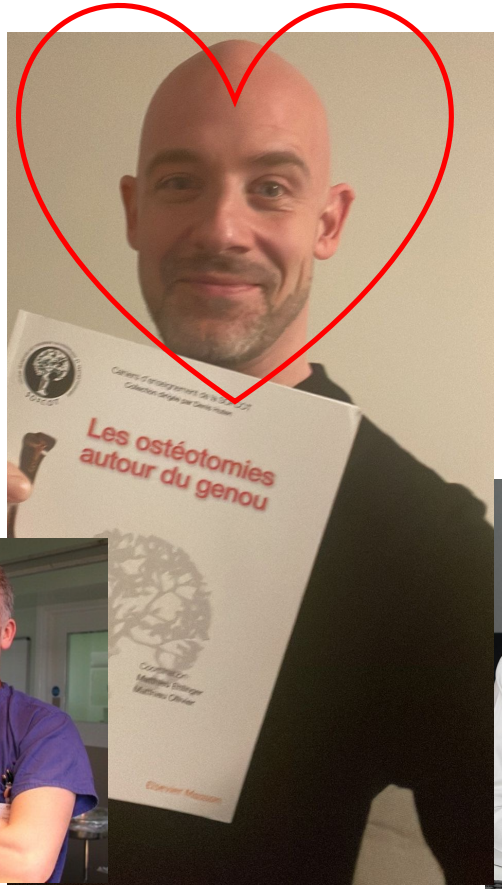
Newclip paid consultant

stryker paid consultant

arthrex paid consultant

Esska osteotomy comitee vice-chair

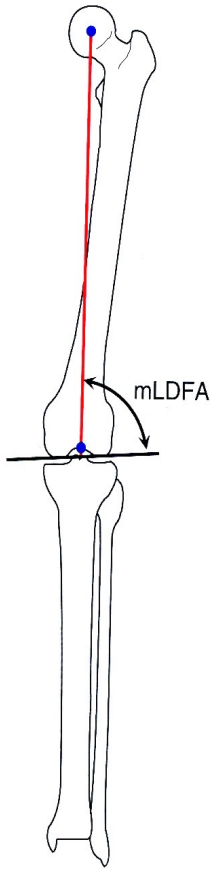
Esska osteotomy consensus chair



Why?

1. What are we trying to achieve?
2. What pathologies are we aiming to treat?
3. When to exercise caution?

Anatomy



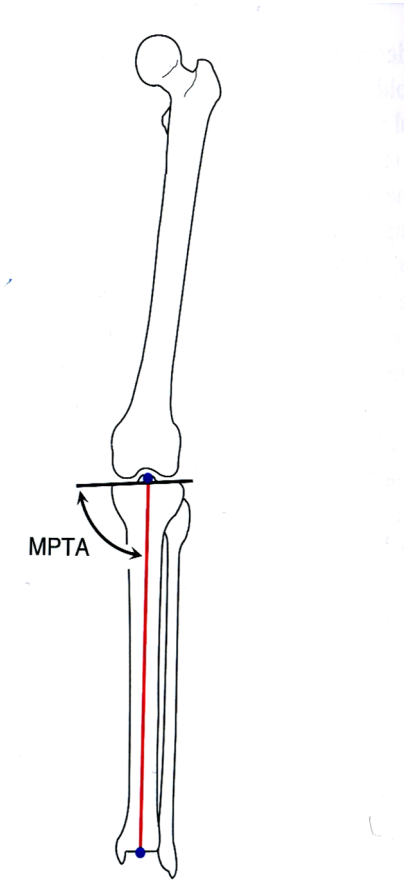
Joint line femur

mech.
Lateral Distal Femur Angle

mLDFA 87° (85 – 90°)

Bhave 88,1 ± 1,5°
Chao 88,1 ± 3,2°
Cooke 86 ± 2,1°
Paley 87,8 ±1,6°

Anatomy



Joint line tibia

Medial Prox. Tibia Angle

MPTA 87° (85 – 90°)

Bhave 88,3 ± 2°
Chao 87,5 ± 3°
Cooke 87 ± 2,3°
Paley 87,2 ± 1,5°

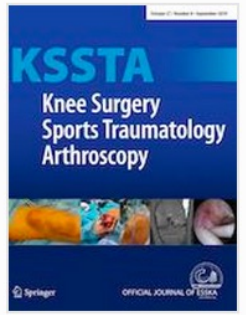
What is NORMAL ?

KNEE

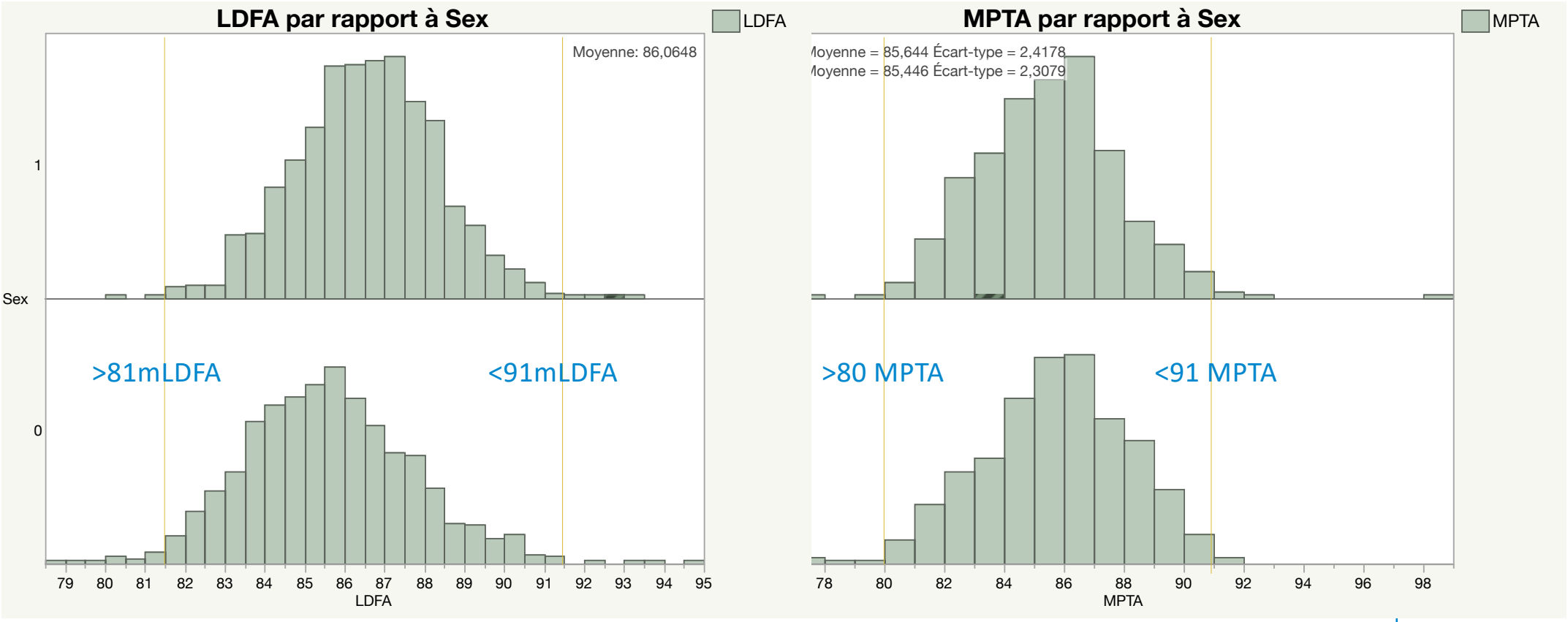
Check for updates

Neutral alignment resulting from tibial vara and opposite femoral valgus is the main morphologic pattern in healthy middle-aged patients: an exploration of a 3D-CT database

Grégoire Micicoi[1,2,3] · Christophe Jacquet[2,3] · Akash Sharma[2,3] · Sally LiArno[4] · Ahmad Faizan[4] · Kristian Kley[2,6] · Sébastien Parratte[2,3,5] · Matthieu Ollivier[2,3]



What is NORMAL ?



What are we trying to achieve?

- **Coronal Plane Correction**
  - Reduce knee adduction moment (varus knee)
  - Reduce knee abduction moment (valgus knee)

- Indirect effects:
  - Reduce medial or lateral compartment load
  - Reduce tension of soft tissue structures at apex of deformity
  - Eliminate thrust

Simply…

- **Correction of a mechanical issue inside the joint that at least partially originated from outside the joint**
- **i.e. due to a metaphyseal deformity**

What pathologies are we aiming to treat?

Coronal Alignment Correction

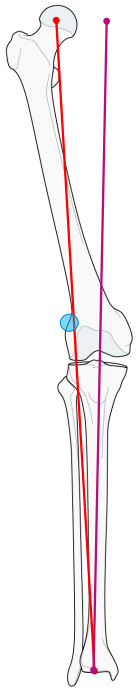
- **OA**
- **Articular Cartilage Repair**
- **Meniscal Transplantation**
- **Ligament Instability**

When to exercise caution?

A predominantly intra-articular deformity (i.e no metaphyseal deformity)
Obese
Bicompartmental OA
Inflammatory arthritis
Age > 60
Females
Osteopenia
Smokers

How?

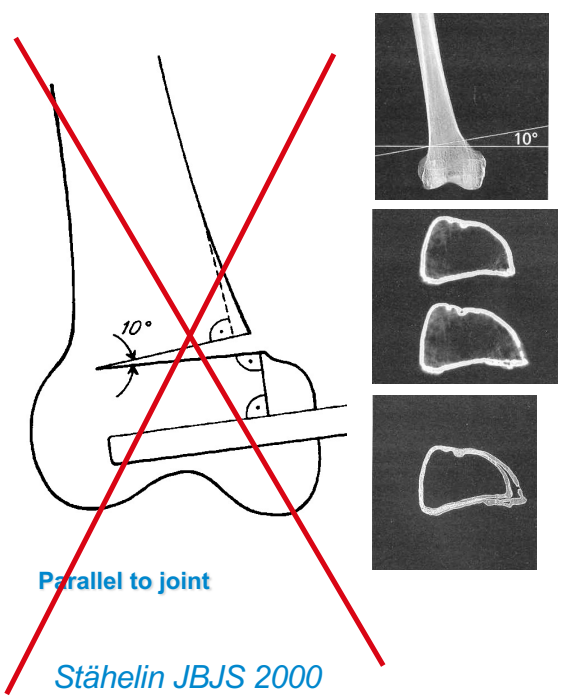
- **Indication => 30%**
- **Planning => 20%**
- **Surgery => 50%**
  - **Technique and Correction 35%**
  - **Optimal Materials (Void fillers) 5%**
  - **Unscathed Hinge 10%**



Planning of an cw DFO

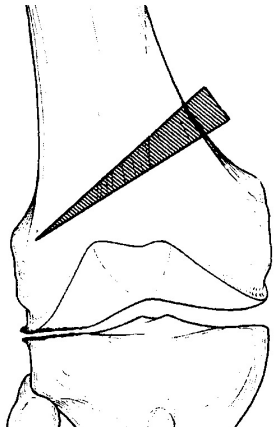
- Mikulicz-line detects deformity
- Virtual Mikulicz-line
- Define hinge-point of osteotomy

Oblique osteotomy plane

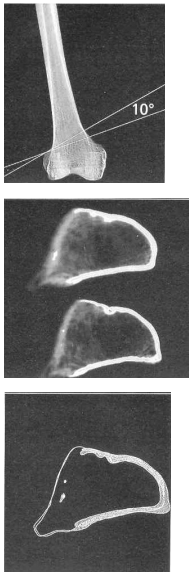


Parallel to joint

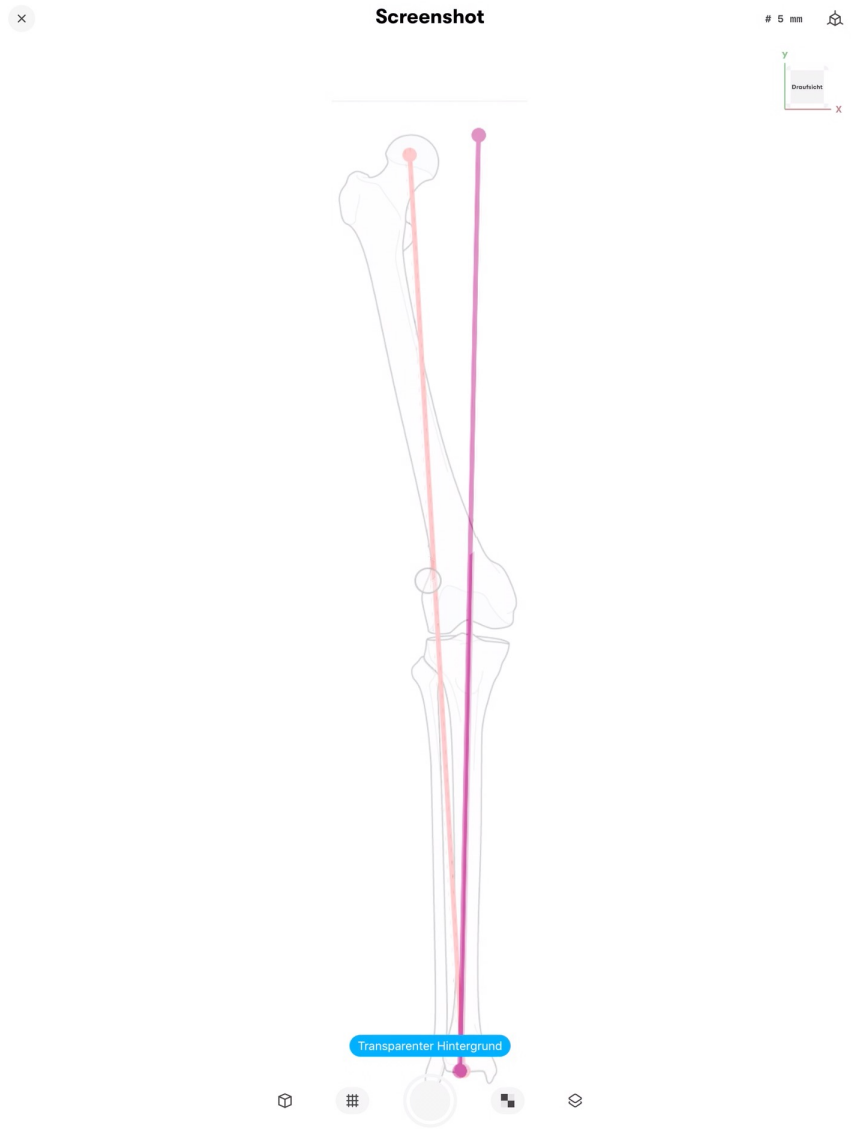
Stähelin JBJS 2000

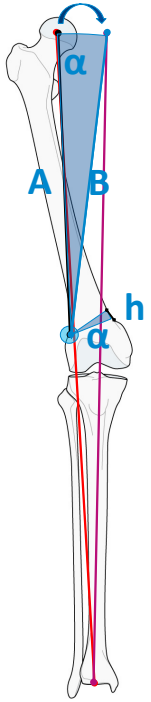


oblique



- **No offset**
- **Cortical support**
- **Stability significantly higher**


Screenshot
5 mm
Draufsicht
Y
X
Transparenter Hintergrund

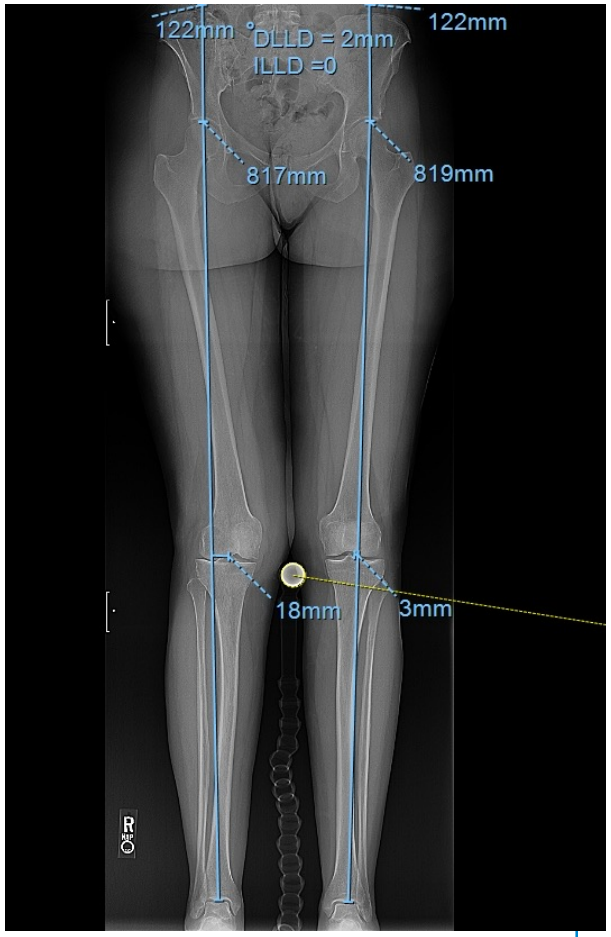


Planning of an owDFO

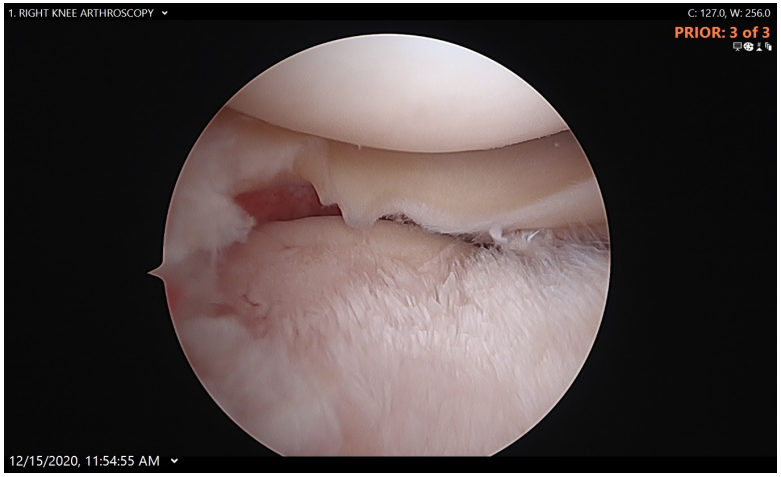
- Mikulicz-line detects deformity
- Virtual Mikulicz-line
- Define hinge-point of osteotomy
- Connection between hinge-point and center of hip (line A)
- Circular movement of line A around the hinge till virtual Mikulicz-line is cut
- Connection of hinge and intersection is line B
- Angle between line A and B is closing angle α
- Transpose α to medial cortex to get wedge base
- Wedge base height h can be measured on calibrated x-ray

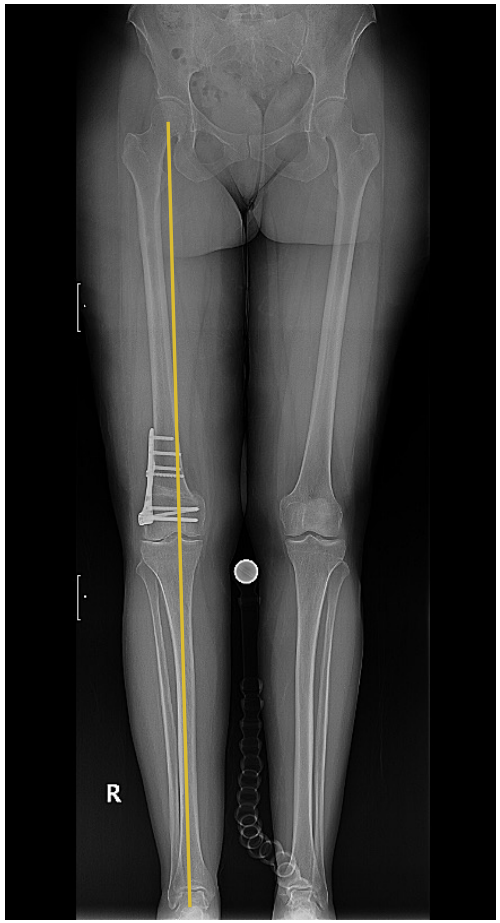
Case Example – OW DFO

- 38 yo female
- 2 years progressive lateral knee pain
- Now unable to exercise or stand for long hours at work
- Occasional mechanical symptoms
- Indicated for knee arthroscopy and partial lateral meniscectomy by local doctor
- mLFDA = 85 degrees
- mMPTA = 88 degrees

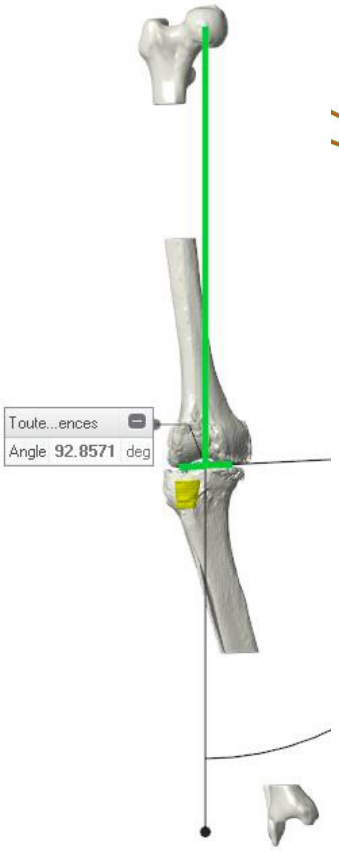


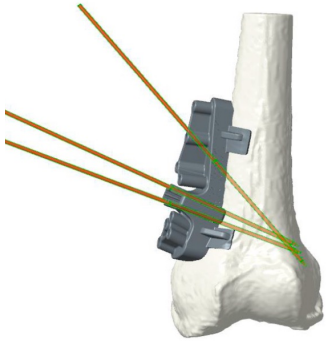
Case Example – OW DFO

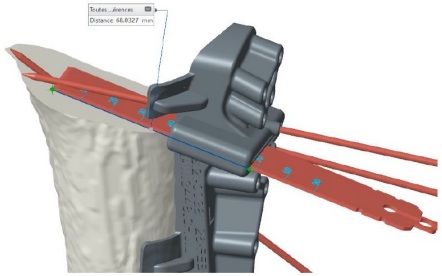


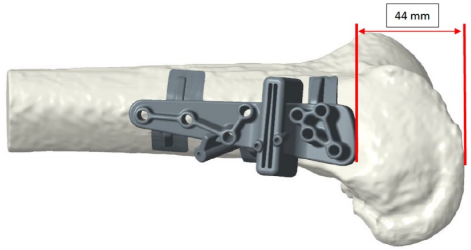


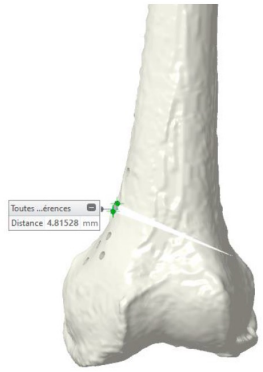
Current Practice – 3D Planning and PSI

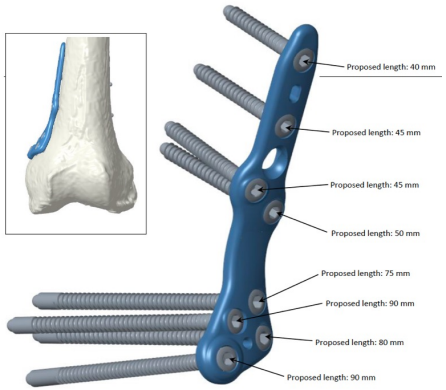












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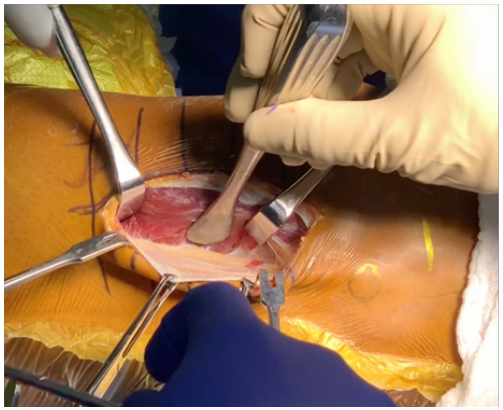

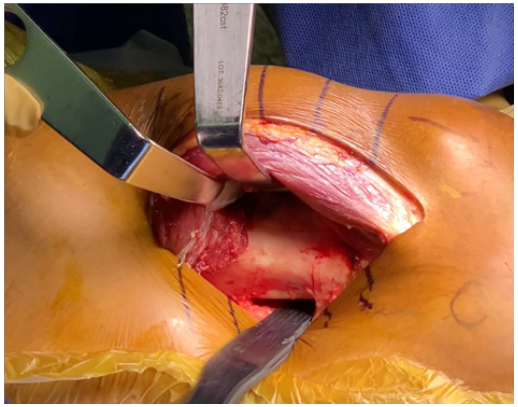

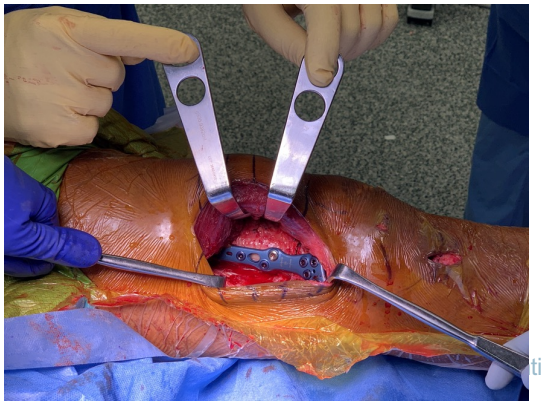

Take Home Messages

- Preoperative Planning and Imaging analysis is critical
- Treat the mechanical issue inside the joint by correcting the metaphyseal deformity in the relevant bone
- Not all valgus is treated with a DFO and not all varus is treated with an HTO
- Remain within the ‘normal’ range with your correction
- If you have to do a big correction (WB axis outside the knee; >10 varus), consider a DLO – it will respect the joint line!


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