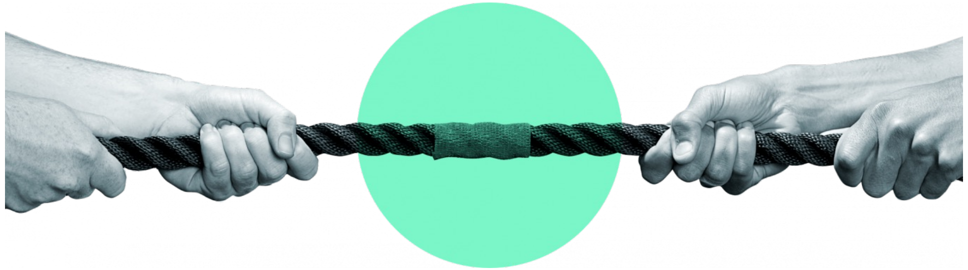
FONDAZIONE POLIAMBULANZA
Istituto Ospedaliero

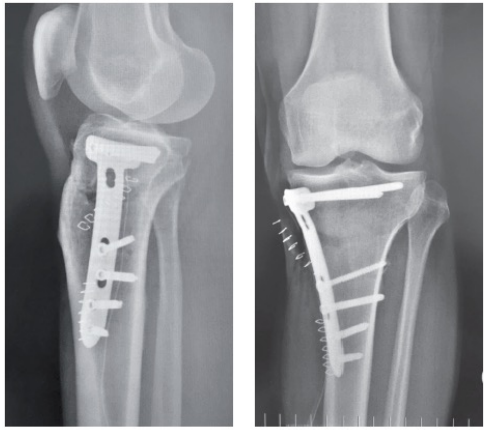
European Knee Society

OW - HTO

F. Benazzo

R. Sangaletti



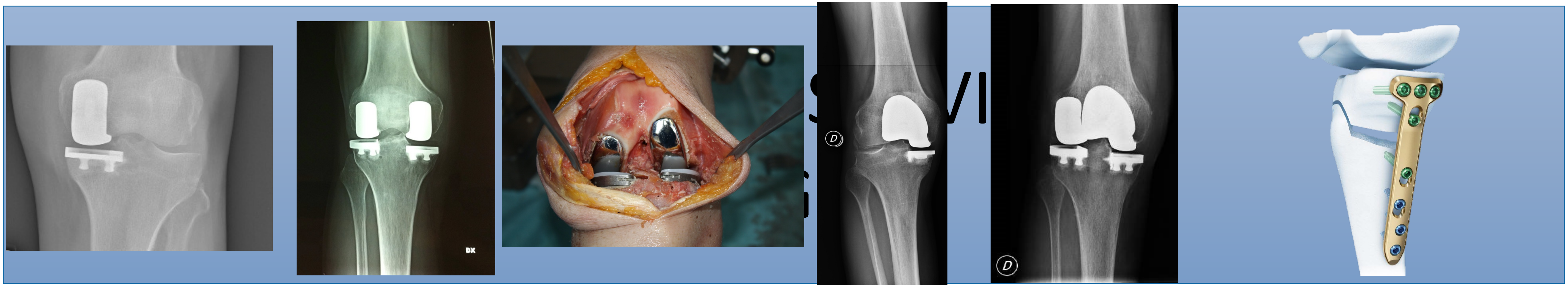


From the 80s-90s, prostheses become the main competitors of osteotomies

Game changer historical and technological development

- Birth of UKA - BiUKA

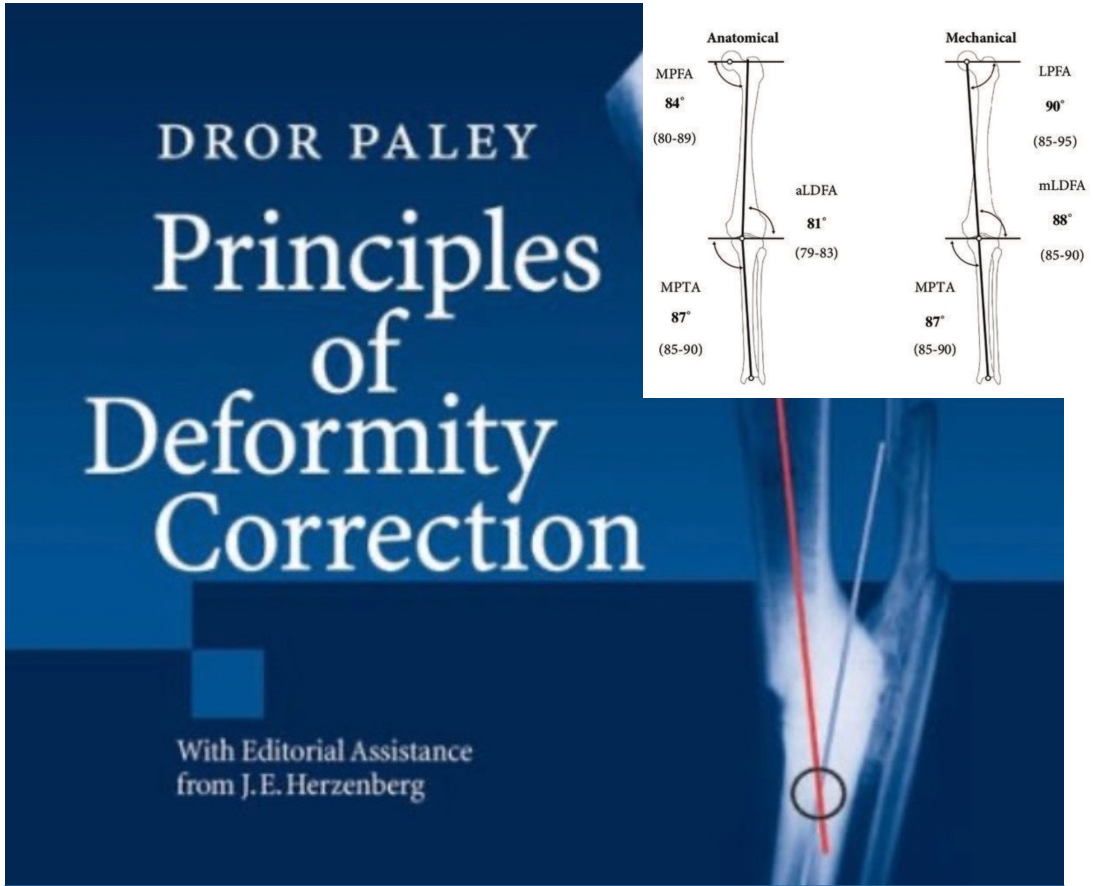
- 2002 Puddu's wedge plate
- 2003 Staubli and Lobenhoffer: angular stable plate



Major decision factor: DEFORMITY!

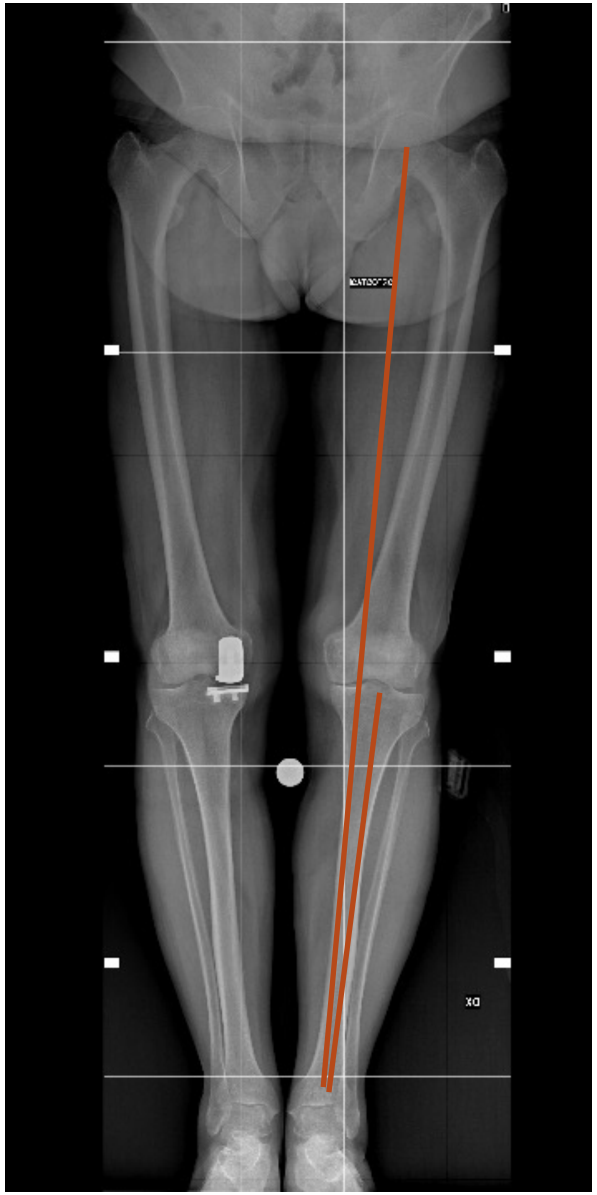
Constitutional deformity vs intra-articular deformity

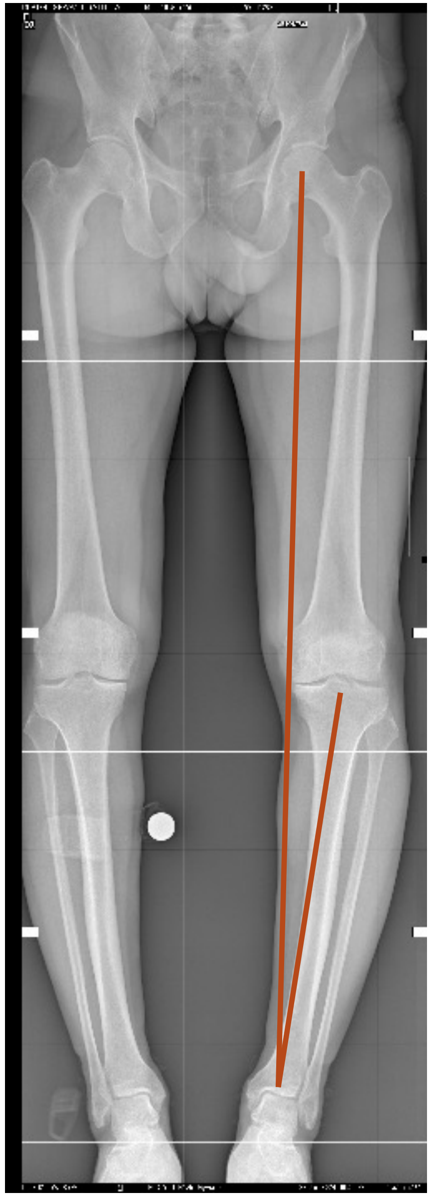
Indication based on osteoarthritis etiology deformity studied according to Paley's references.



CONSTITUTIONAL: at least one of LDFA or MPTA altered with a deformity greater than 5° → corrected by osteotomy

INTRARTICULAR: intrarticular wear and/or ligament laxity → UKA: achieve a resurfacing that restores spaces, retensions ligaments, and reinstates cartilage deficits


xa

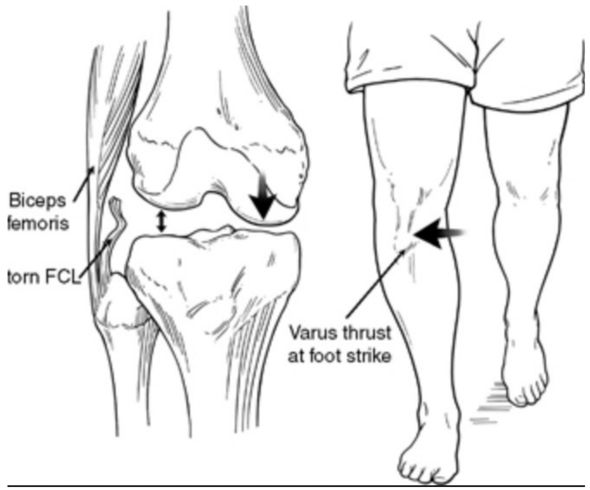


ATTISTA
M
18 Jun 1968
99031202
RF
M-1.0
132.0mGyxcm2
30 Jan

Let not forget the clinical aspect

1. REDUCIBILITY of the DEFORMITY

2. LIGAMENTS INSUFFICIENCY



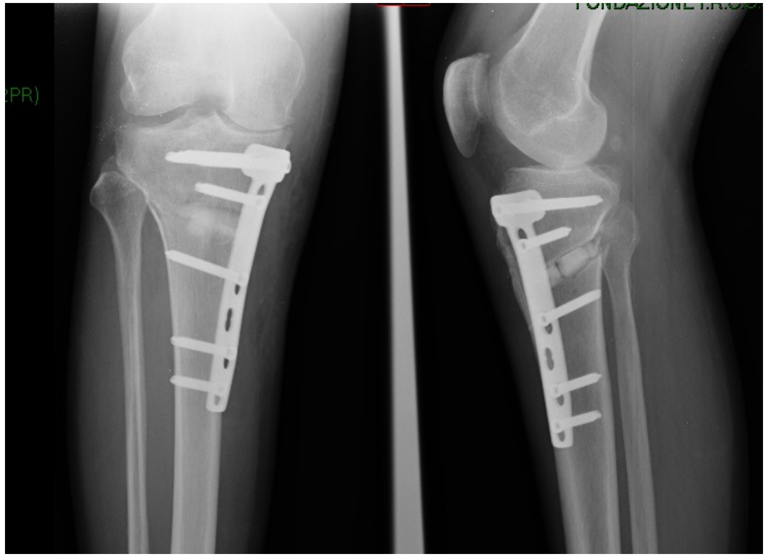
SINGLE VARUS
Unaltered gait

DOUBLE VARUS
Single varus + insufficiency of postero-lateral structures → VARO THRUST

TRIPLE VARUS
Severe double varus + genu recurvatum in extension → VARO RECURVATUM THRUST

My surgical standard

1. Analysis of Deformity
2. Planning
3. Surgery



1: Analysis of deformity

- LDFA (88°)

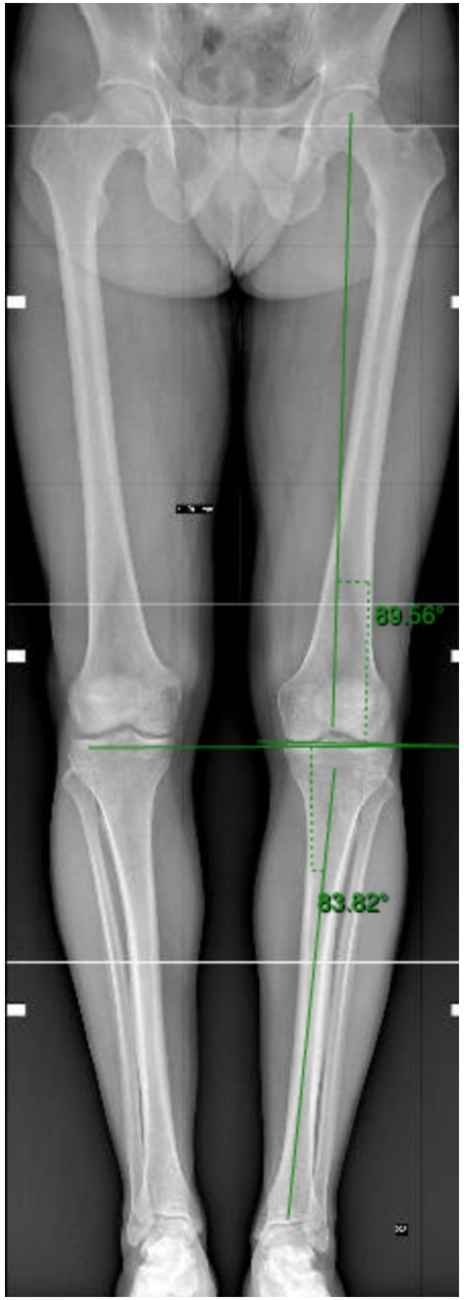
  Femoral Component of the Deformity

- JLCA (0-2° LATERAL OPENING)

  Intra-articular Component of the Deformity

- MPTA (87°)

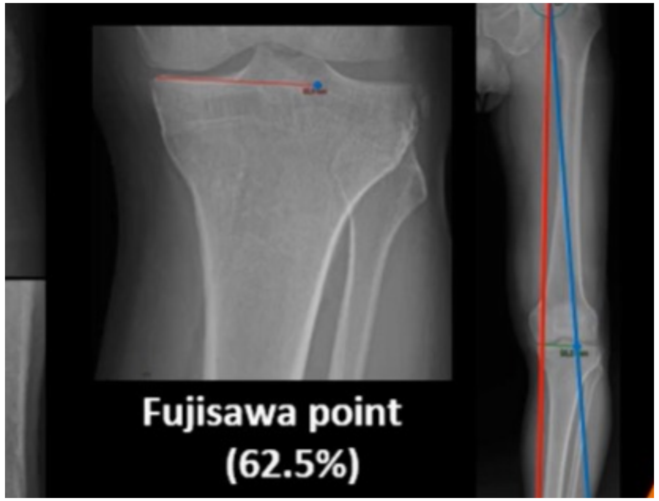
  Tibial Component of the Deformity



2: PLANNING

1. **New Mikulicz LINE**
2. Determining the Correction Level
3. Correction Angle (MINIACI Method)
4. Measurement of the Correction

NEW **Mikulicz line:**



from the center of the hip to the NEW center of the ankle

Through the Fujisawa POINT

in the knee

2: PLANNING

1. New Mikulicz LINE
2. **Determining the Correction Level**
3. Correction Angle (MINIACI Method)
4. Measurement of the Correction

Mikulicz joint line angle (MJLA):
medial angle between the middle knee joint space line and the weight-bearing line

Lobenhoffer

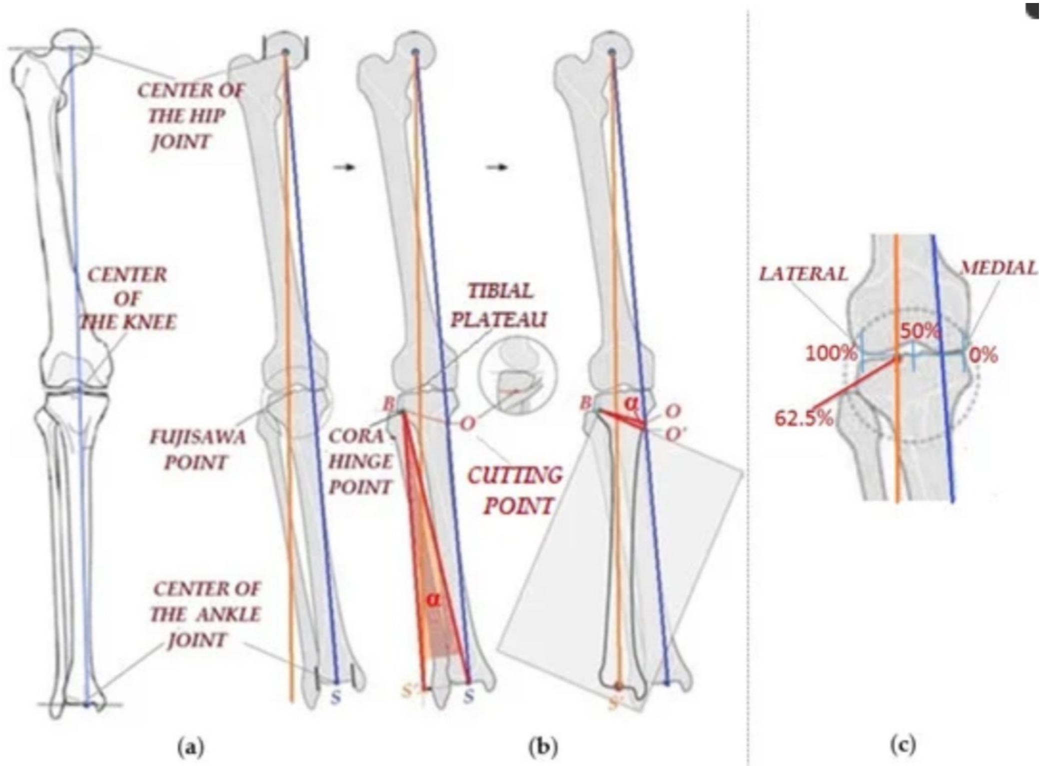
normal values around 90 plus or minus 4

below 83 and above 94, a double-level osteotomy is necessary.

2: PLANNING

1. New Mikulicz LINE
2. Determining the Correction Level
3. **Correction Angle (MINIACI Method)**
4. Measurement of the Correction

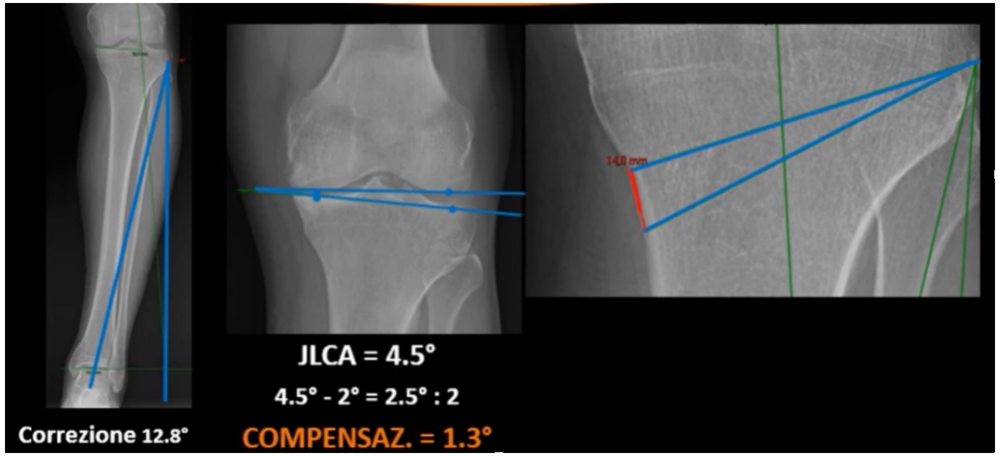
MINIACI Method



OVERCORRECTION ISSUE

If the JLCA increases

the risk of overcorrection grows



- simplest way:

reducing the correction by half of the JLCA above 2

For example, if it is 4.5 degrees:

(4.5-2)/2=1.3

OVERCORRECTION ISSUE

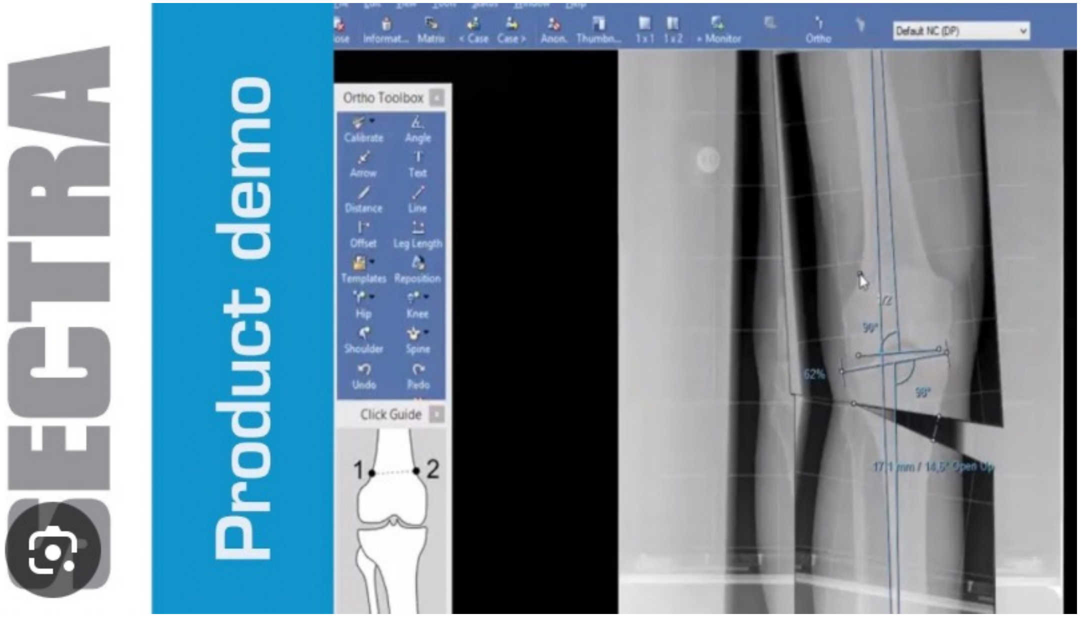
Then subtract the blade thickness

(2 mm if subtracting, 1 mm if adding)

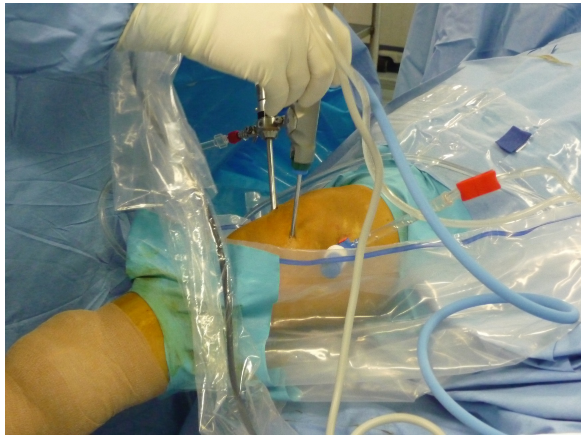
2: PLANNING

Mediolateral Diameter of Osteotomy	Preoperatively Measured Correction Angle															
	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°
50 mm	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	16
55 mm	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	18
60 mm	4	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20
65 mm	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21
70 mm	5	6	7	8	10	11	12	13	15	16	17	18	20	21	22	23
75 mm	5	6	8	9	10	12	13	14	16	17	18	20	21	22	24	25
80 mm	6	7	8	10	11	13	14	15	17	18	19	21	22	24	25	26

1. New Mikulicz LINE
2. Determining the Correction Level
3. Correction Angle (MINIACI Method)
4. **Measurement of the Correction**

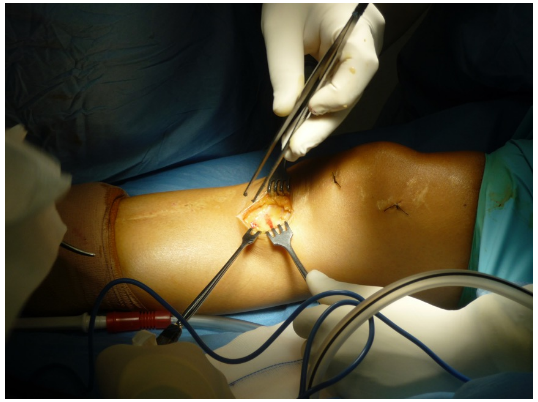


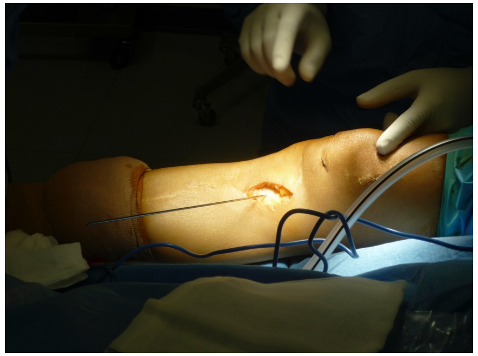
3: Surgery - Preparation



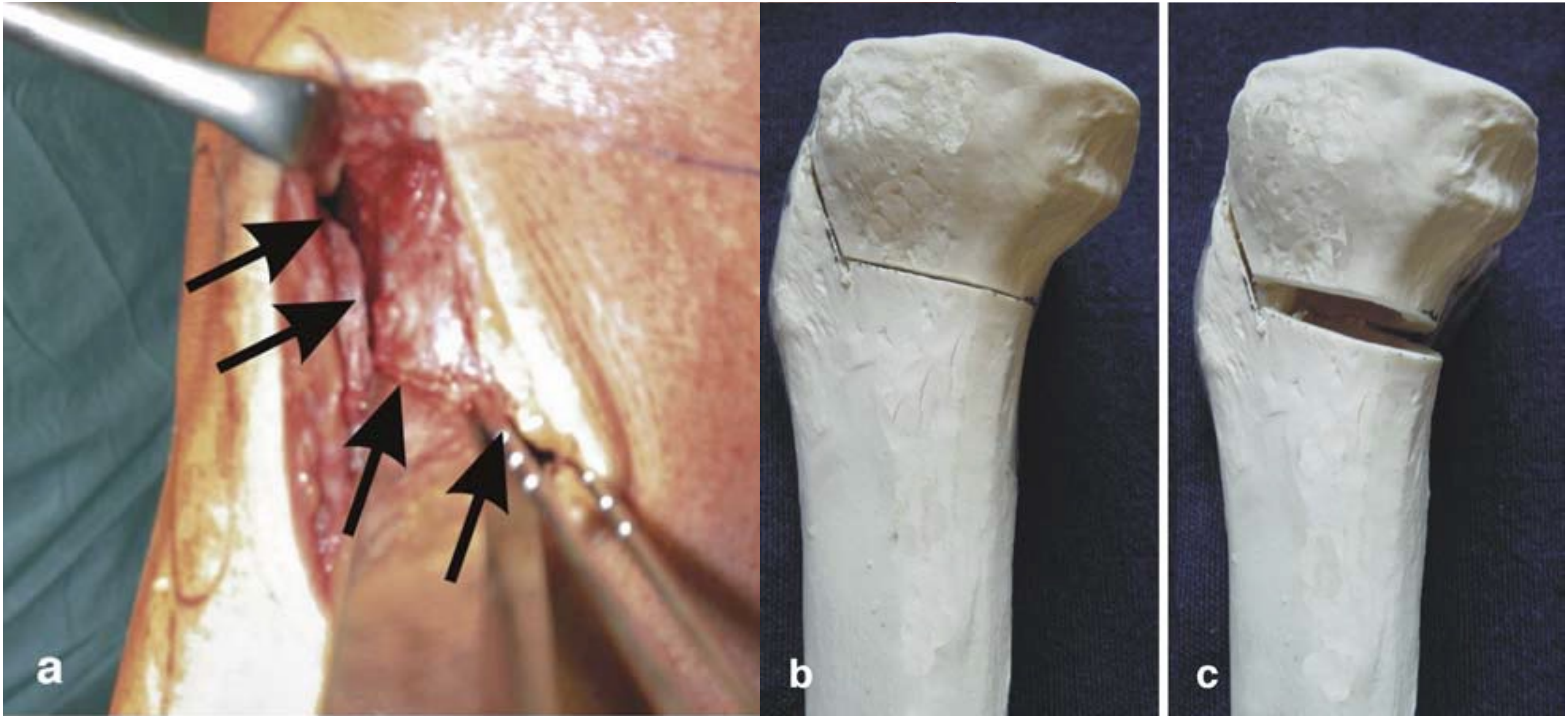
Arthroscopy:
- Evaluation of lateral compartment
- Other intra-articular lesions

Approach:
- Slightly oblique incision 5 to 8 cm long, 4 cm distal to the joint line and 1 cm above the pes anserinus





1 Kirschner wire mark the oblique osteotomy 5 cm distal to the joint line, starting proximal to the pes anserinus and extending to the level of the tip of the fibula at the lateral cortex


a
b
c

3: Surgery - Osteotomy

1: Osteotomies:

<u>Oblique osteotomy</u>

➔ posterior 2/3 of medial aspect of tibia
➔ distal to K wire
➔ parallel to the tibial slope
➔ extending to the tip of the fibula,
➔ leaving a 10-mm lateral bone bridge intact

<u>Second osteotomy</u>

➔ anterior one-third of the tibia at an angle of 135°, leaving the tibial tuberosity intact

2: Open

Open the initial osteotomy in a stepwise fashion using stacked osteotomes to avoid creating an intra-articular fracture of the tibial plateau

3: Fine-tuning of the mechanical axis

- based on preoperative planning
- calibrated wedge spreader

➔overall alignment can be checked with use of the cable method

Osteotomy and patellar height

The effect on the sagittal plane of the addition and the subtraction osteotomy is quite different

OW osteotomy CAN LOWER the patella

- NO with patella baja
- In the case of a high patella, or patellar patellar instability, it is therefore appropriate this type of osteotomy

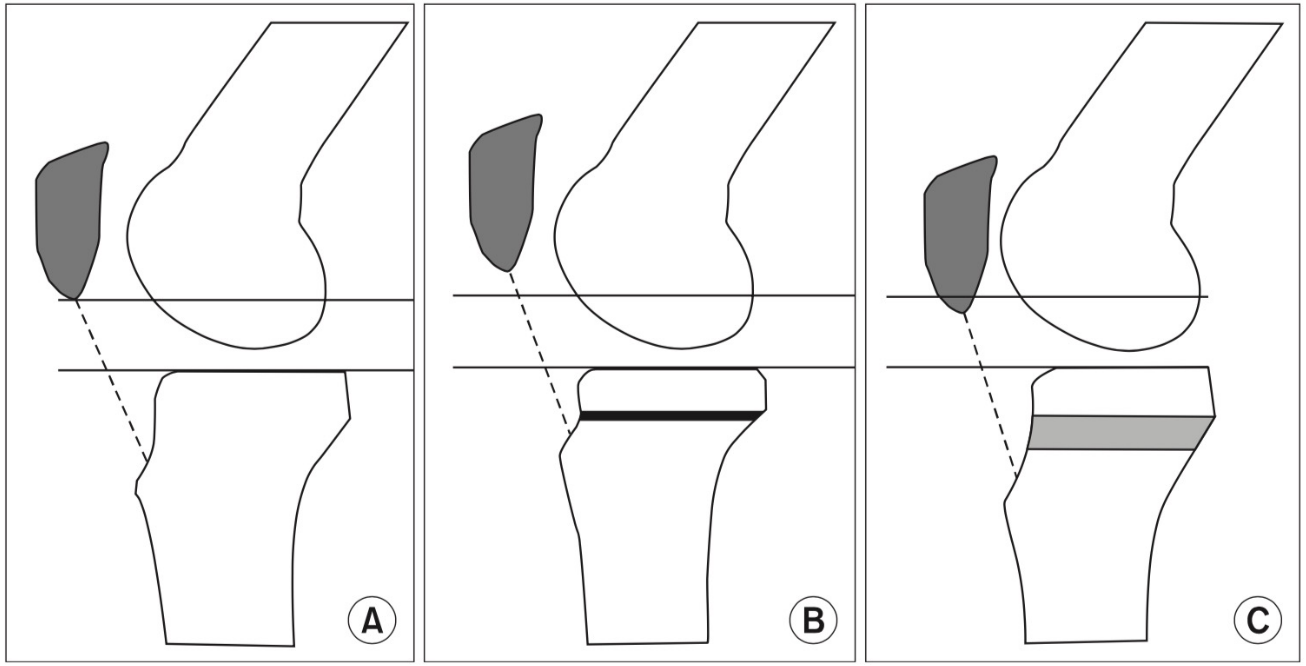


Fig. 5. The level of the patella after closing and opening wedge high tibial osteotomy. (A) Preoperatively. (B) After closing wedge osteotomy, the segment between the tibial plateau and tibial tuberosity is shortened. (C) After opening wedge osteotomy, this segment is enlongated. Relative patella baja can occur.

Distal tuberosity osteotomy in open wedge high tibial osteotomy can prevent patella infera: a new technique

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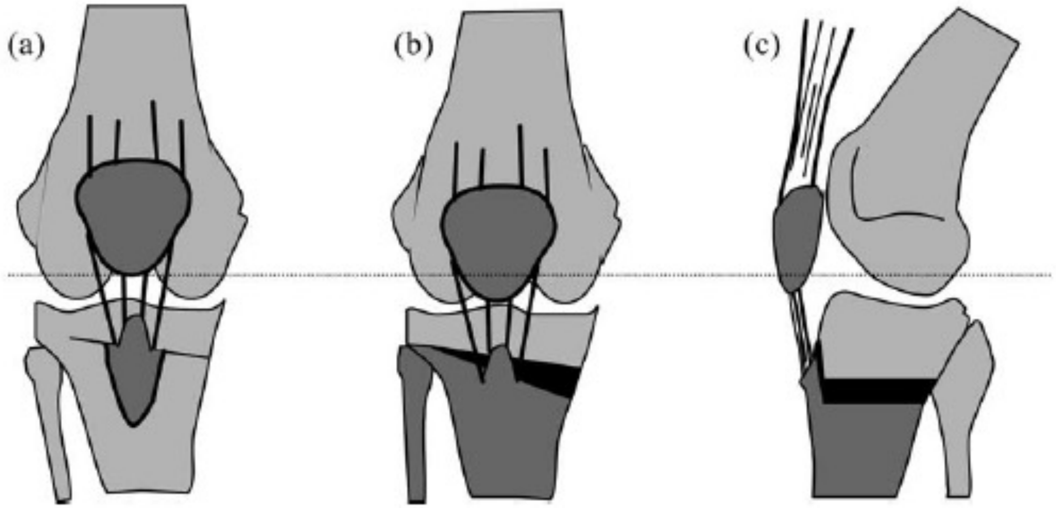
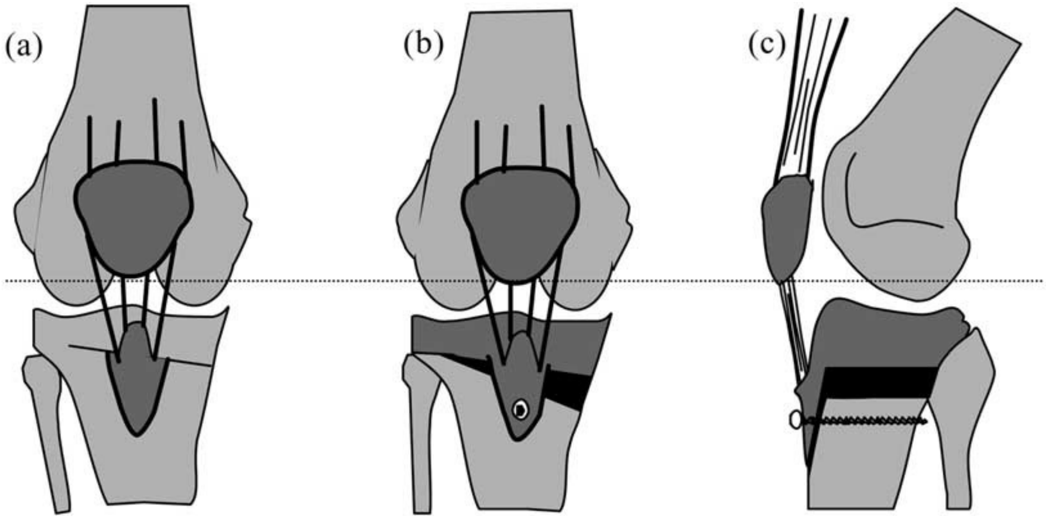
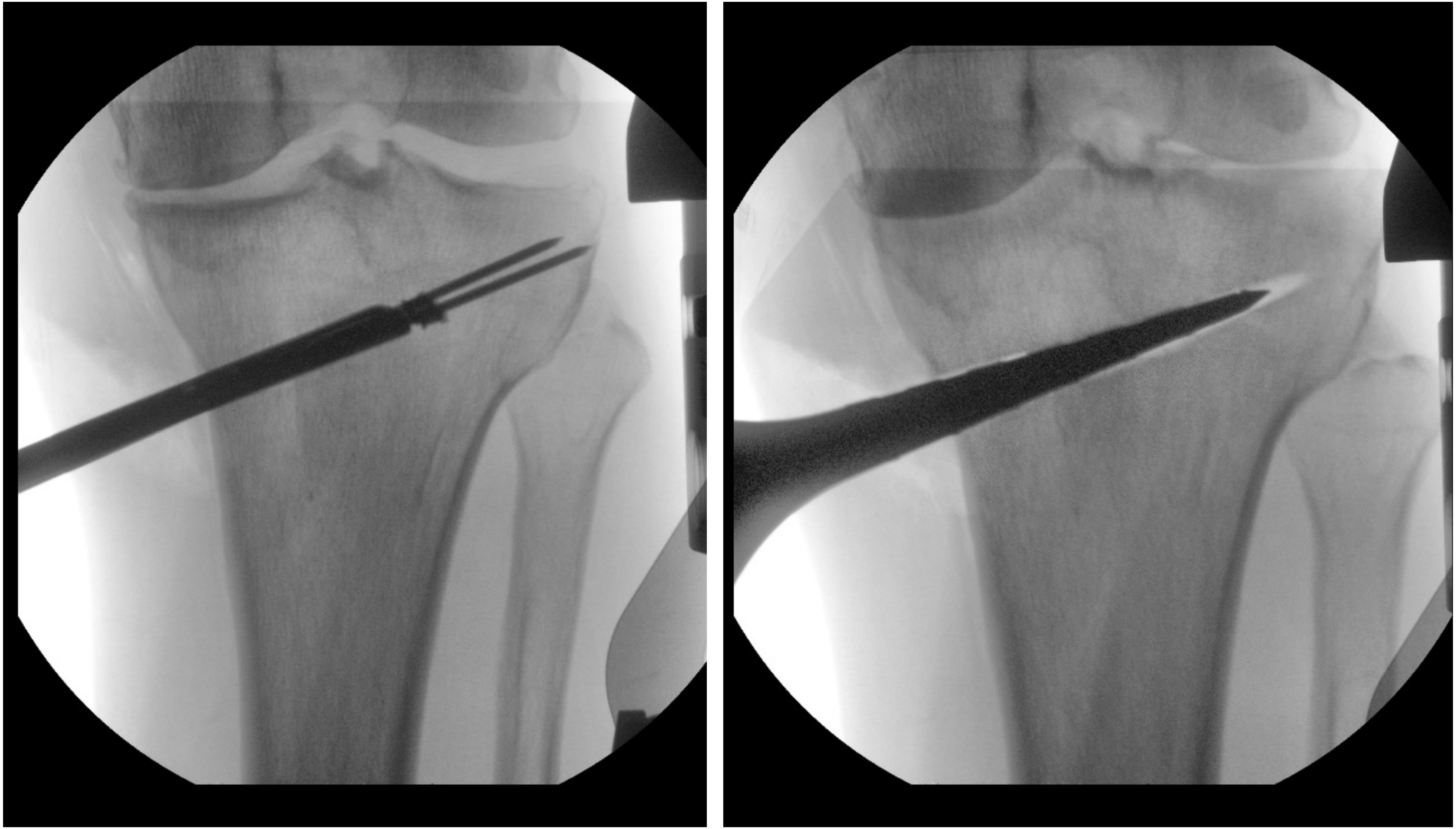


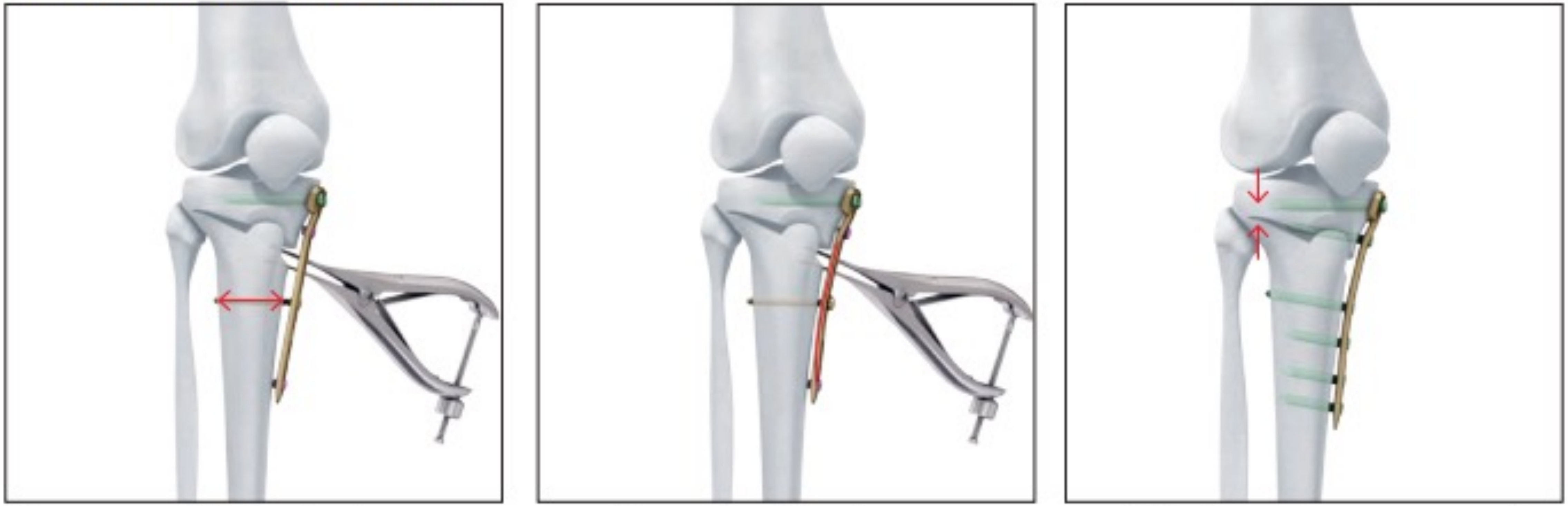
Lobenhoffer



Gaasbeek

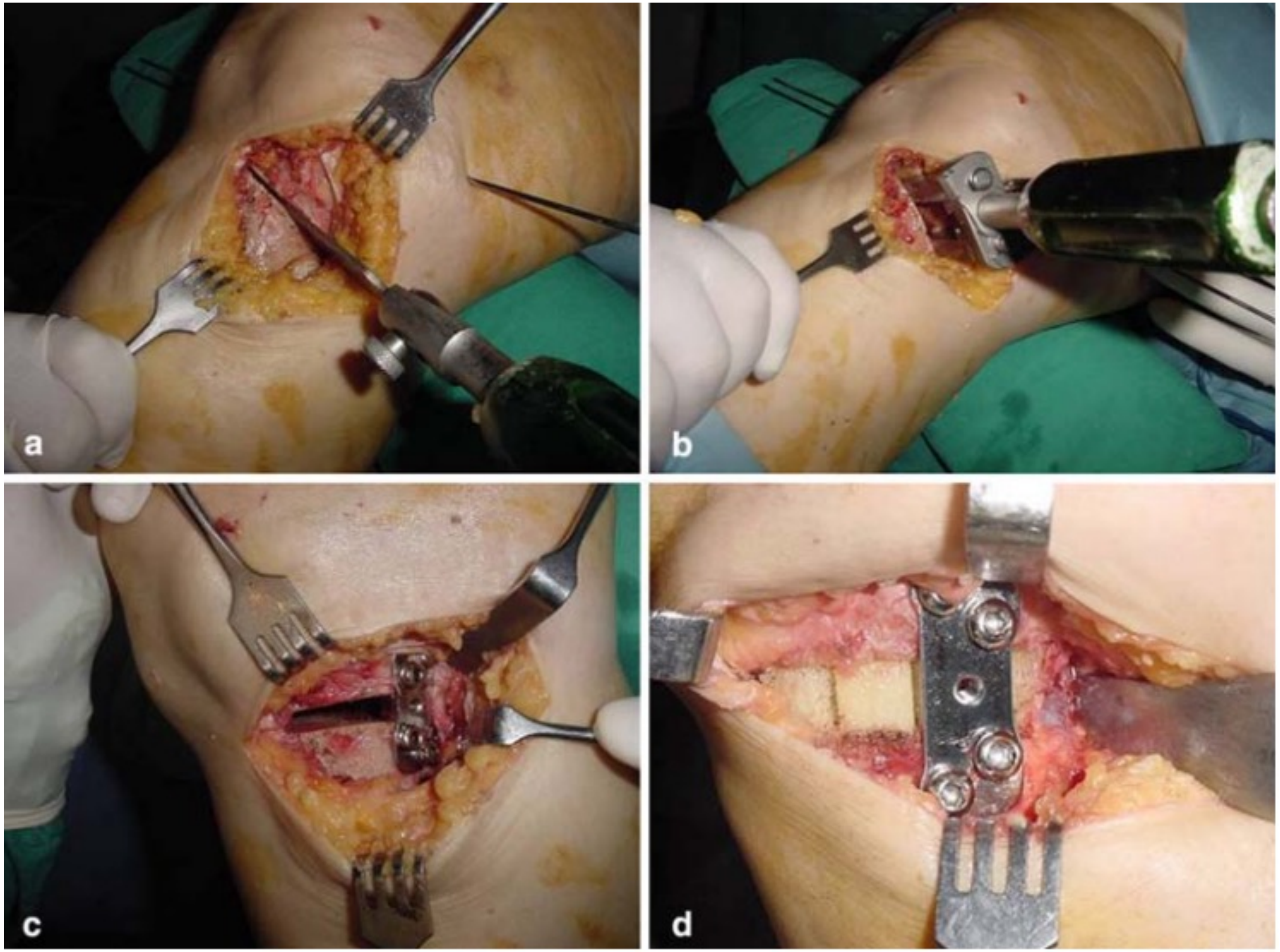


Compression of the lateral hinge



A lag screw pulls the distal osteotomy segment towards the plate … … and forces the plate into suspension, creating an elastic preload … … which imposes pressure upon the lateral hinge.

PUDDU PLATE

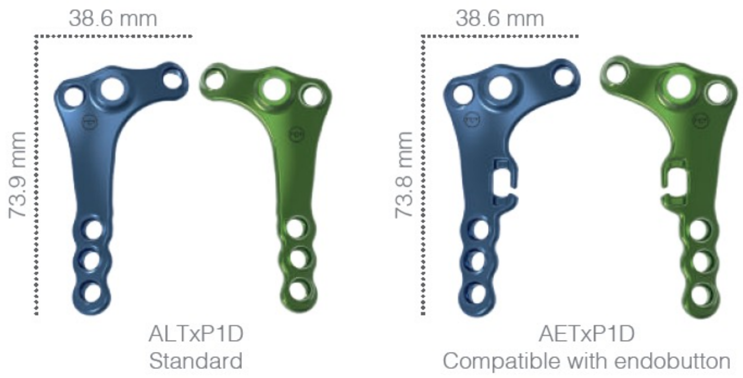


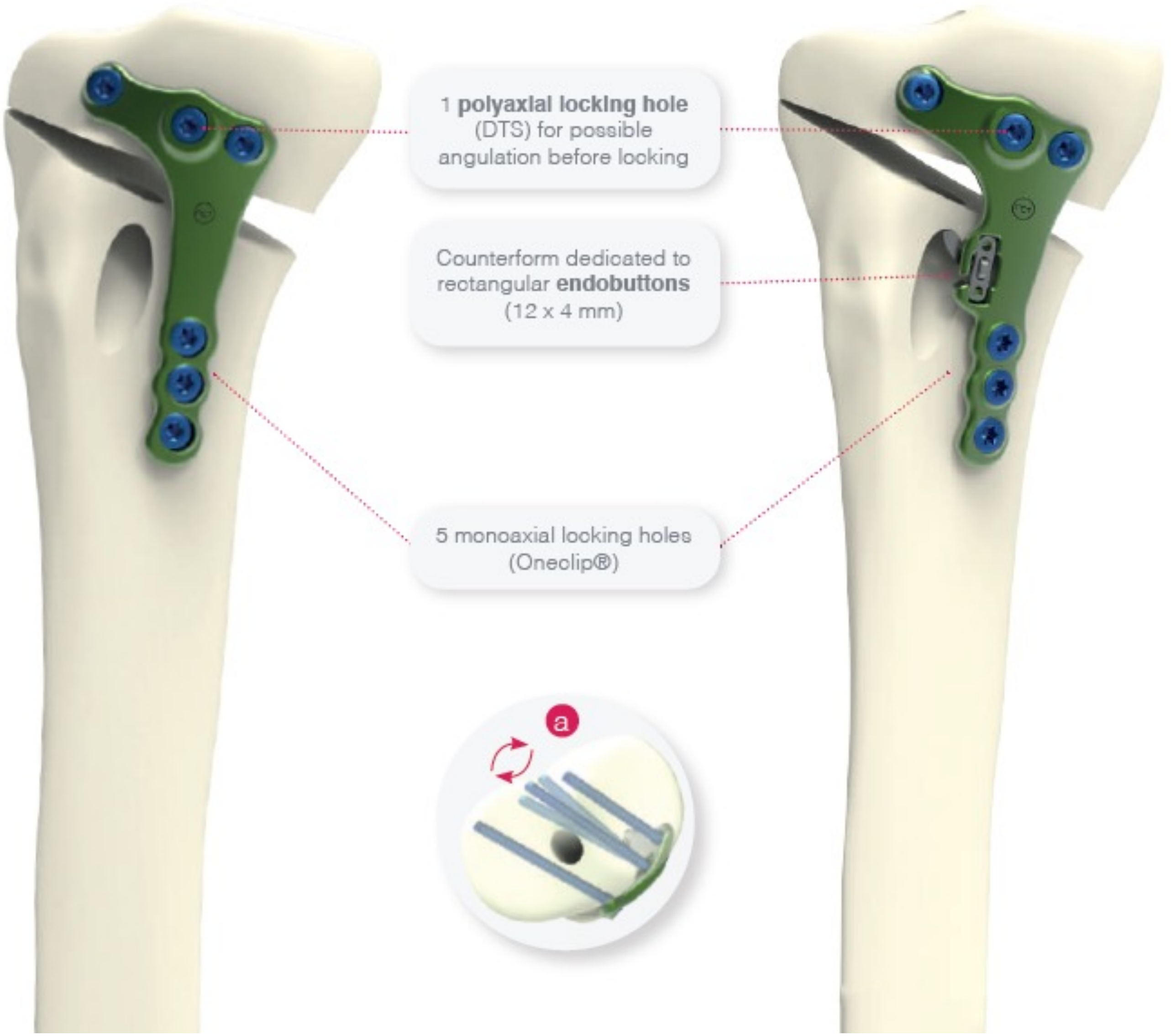
Dynamic compression plate (DCP) concept

OPENING WEDGE HIGH TIBIAL OSTEOTOMY WITH ACL REPLACEMENT PLATES

TECHNICAL FEATURES

- **Anatomic asymmetrical implants**
- plate's upper part is **optimized for ACL reconstruction**.
- 1 polyaxial locking hole located in the proximal part of the ACL tunnel to avoid damaging the graft.
- One design compatible with the PEEK or titanium endobutton placement.

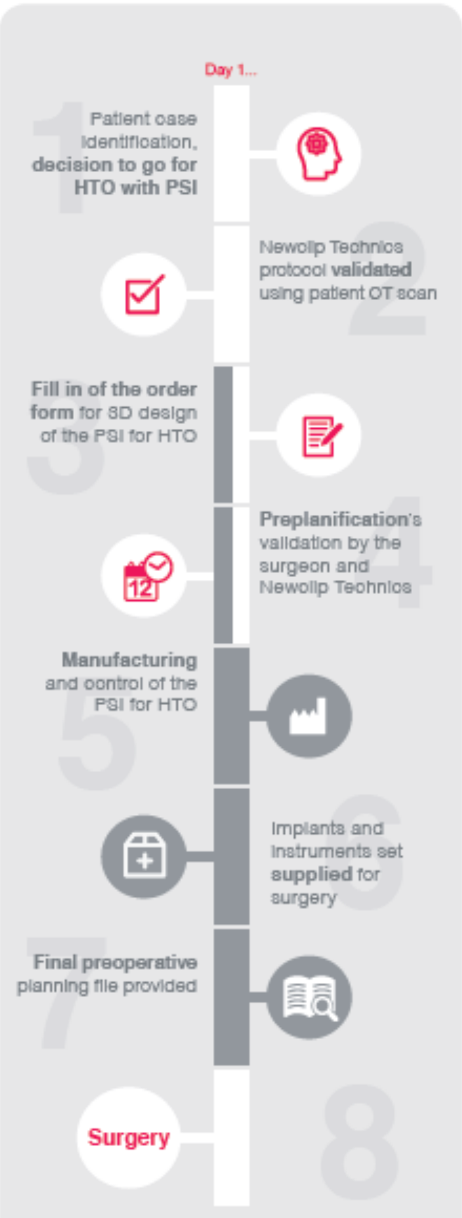




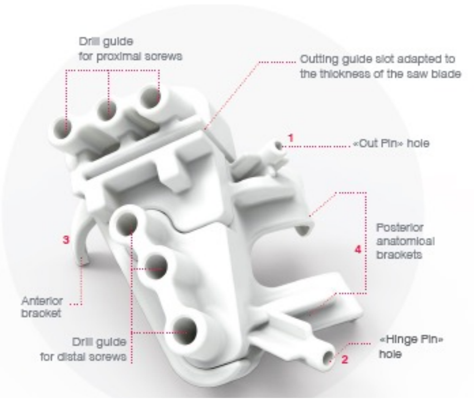
PSI SYSTEMS

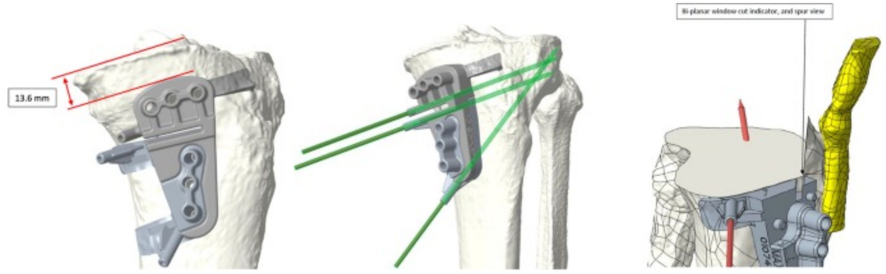
LATERAL OPENING WEDGE DISTAL FEMORAL OSTEOTOMY USING PATIENT SPECIFIC CUTTING GUIDE

- Internal hinge protection
- Femoral slope controlled
- Accuracy of correction



HTO USING PATIENT SPECIFIC CUTTING GUIDE





The patient specific guide based on patient's CT scan, offers a correction into the frontal and sagittal planes.

Type of augmentation

Bone graft vs synthetic bone substitues

Bone graft (auto/allograft):

- Osteoinductive, osteogenic and osteoconductive (less for allograft) properties
- donors site morbidity (allograft)

Synthetic bone substitutes

(Hydroxyapatite, Beta-tricalcium phosphate, bone cement)

- Concerns about resistence to compressive loads and biological degradability
- Bone cement not recommended to achieve biological repair

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10th Advanced Course on Knee Surgery

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