

TENSION BAND FIXATION

PLATES TO THE RESCUE ?

TIM BRAY MD

RENO TRAUMA 2024

NO CONFLICTS

Credit to ***AO FOUNDATION*** for SOME technique
slides

1843

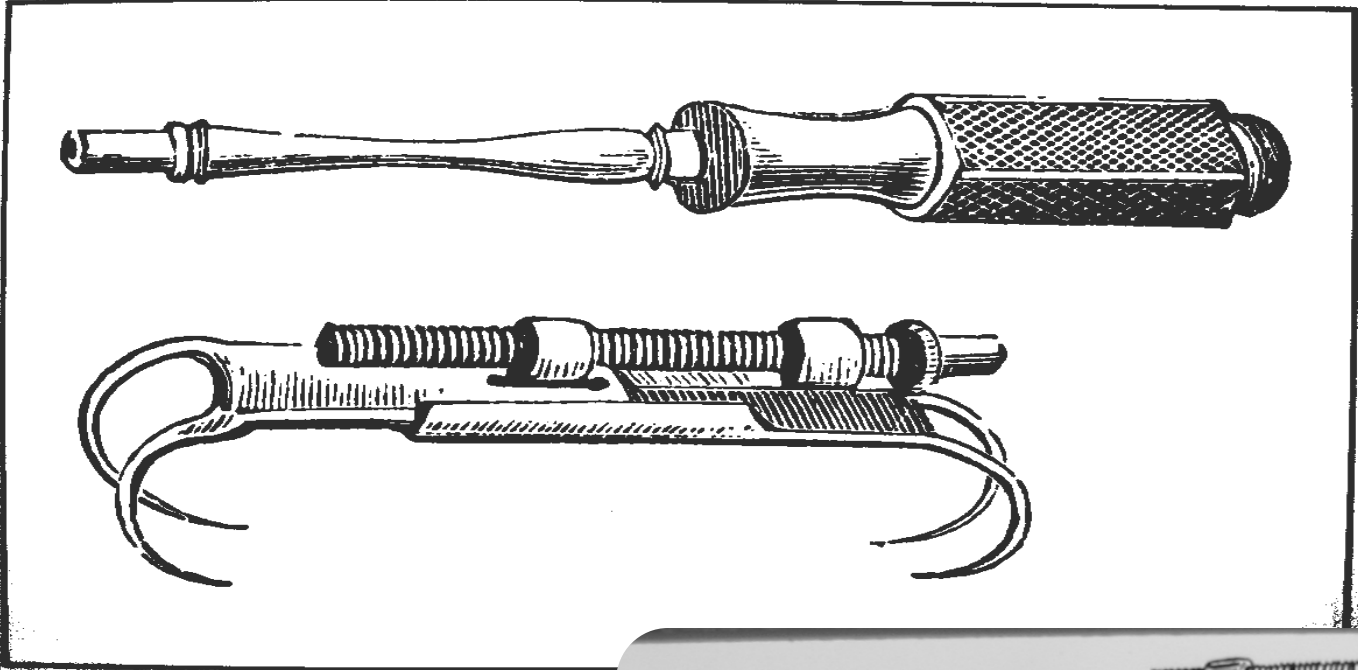


Fig. 15 Malgaigne's hooks. Fro

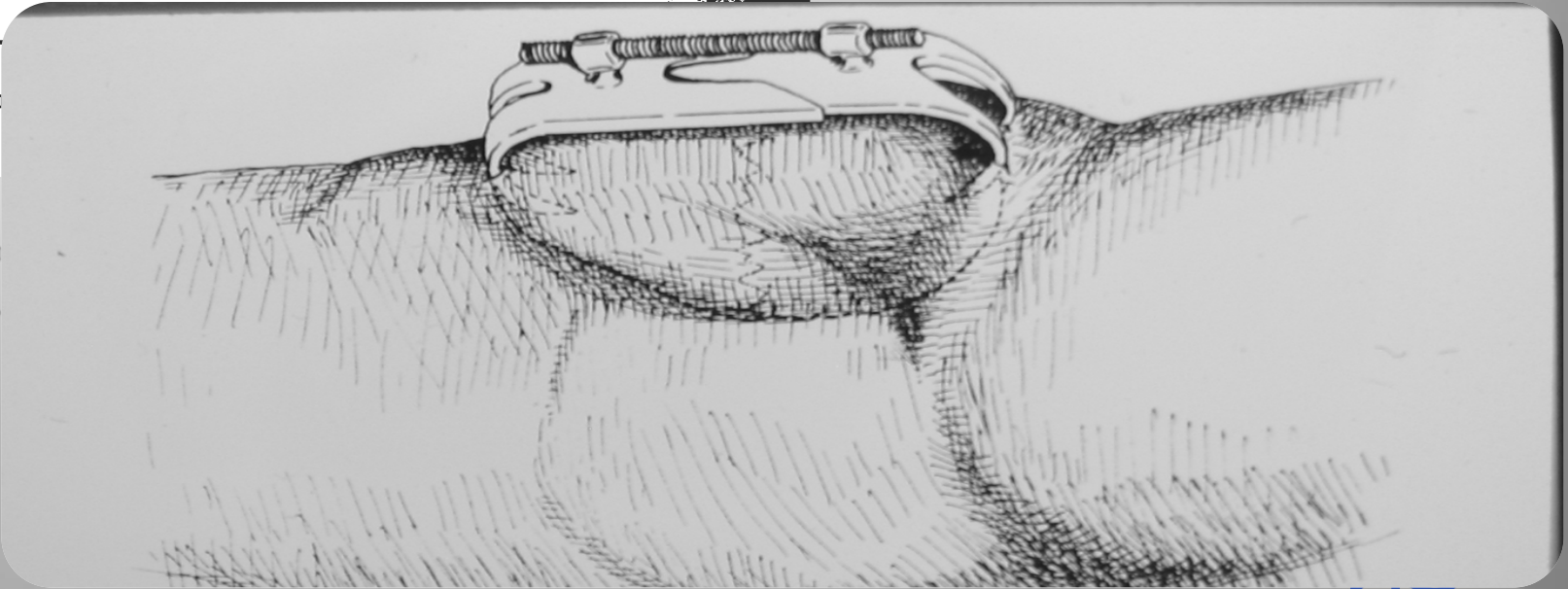
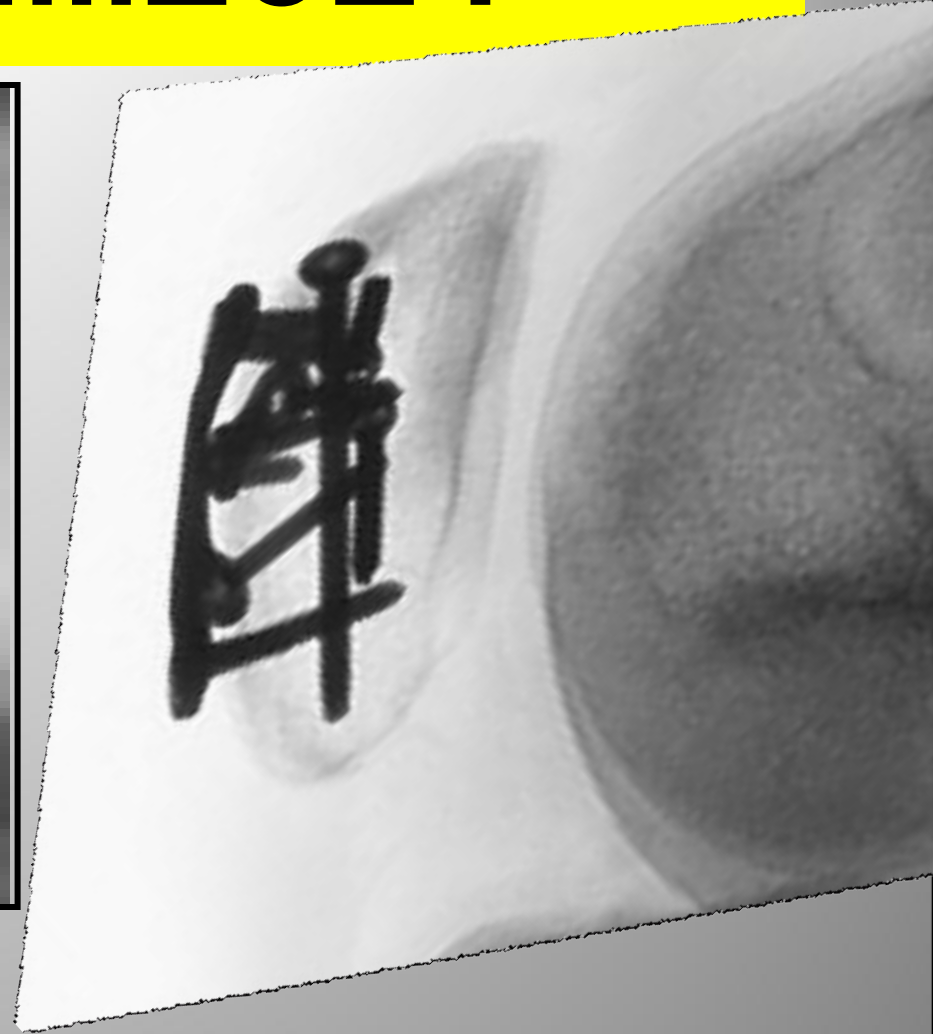
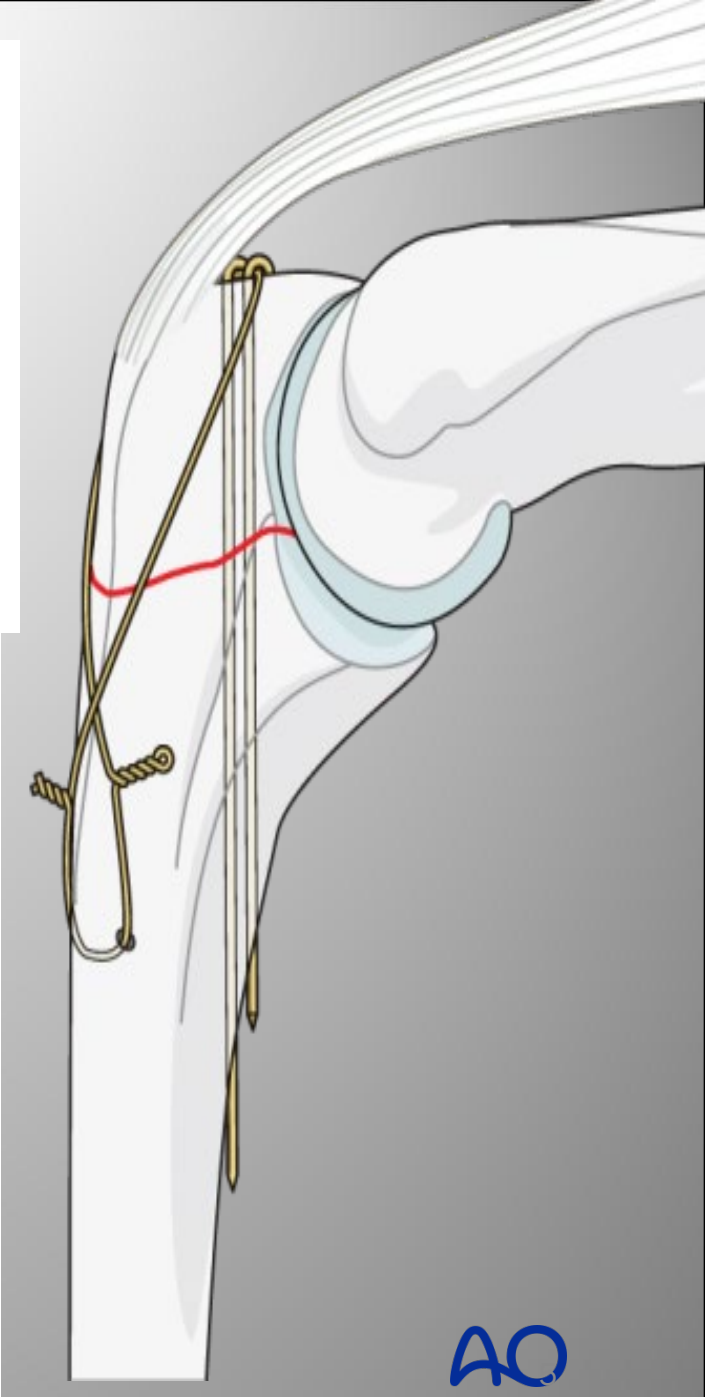
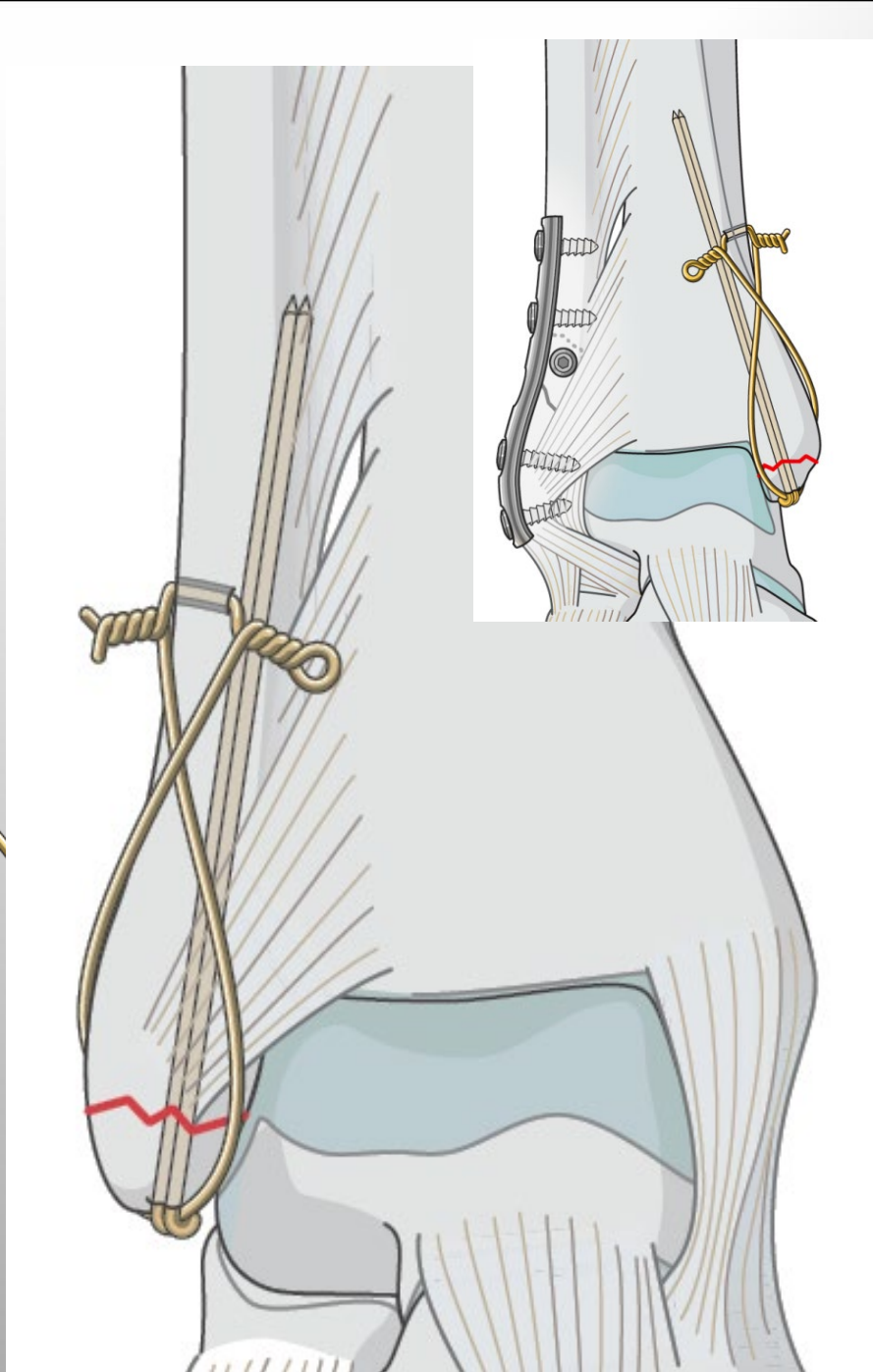
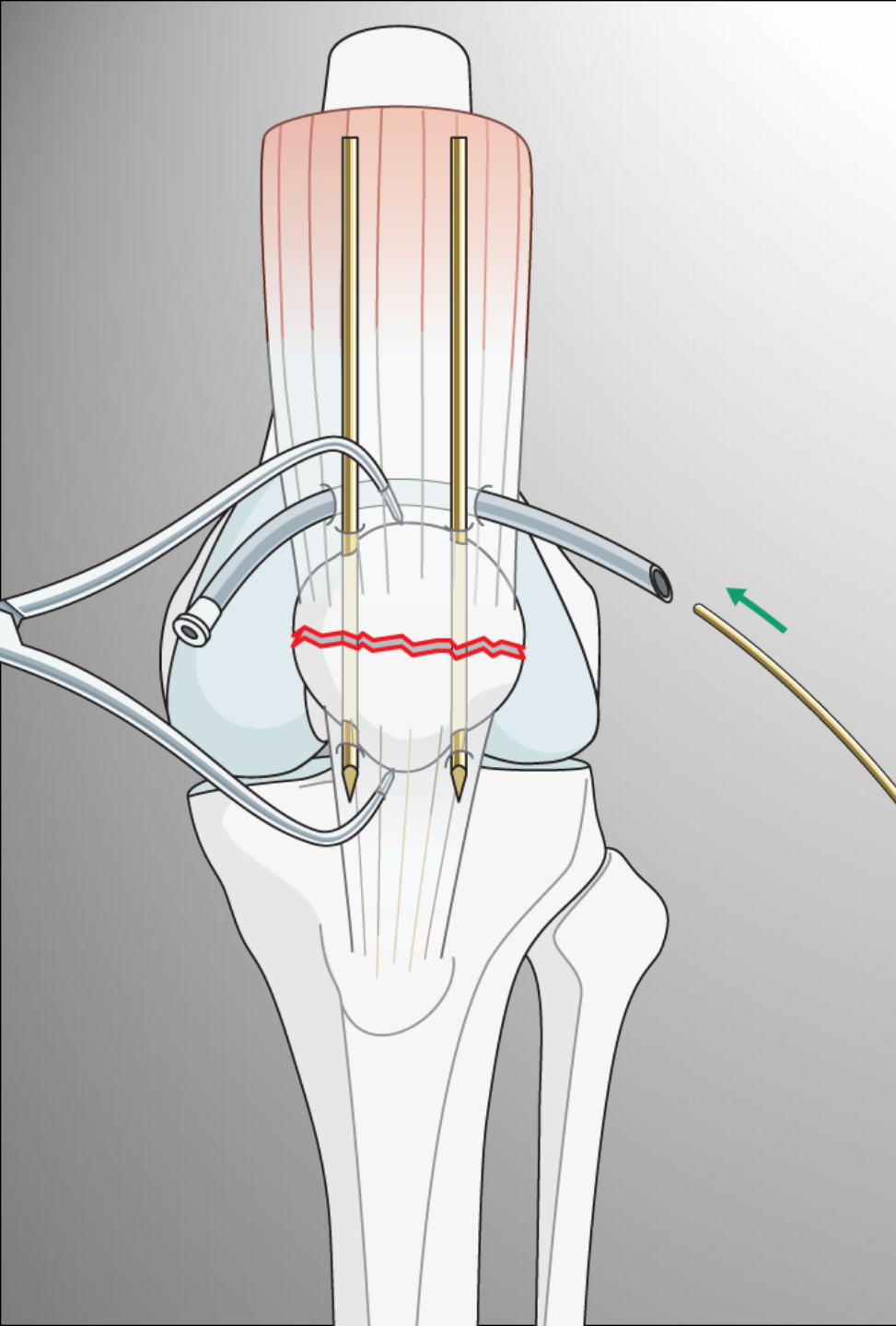
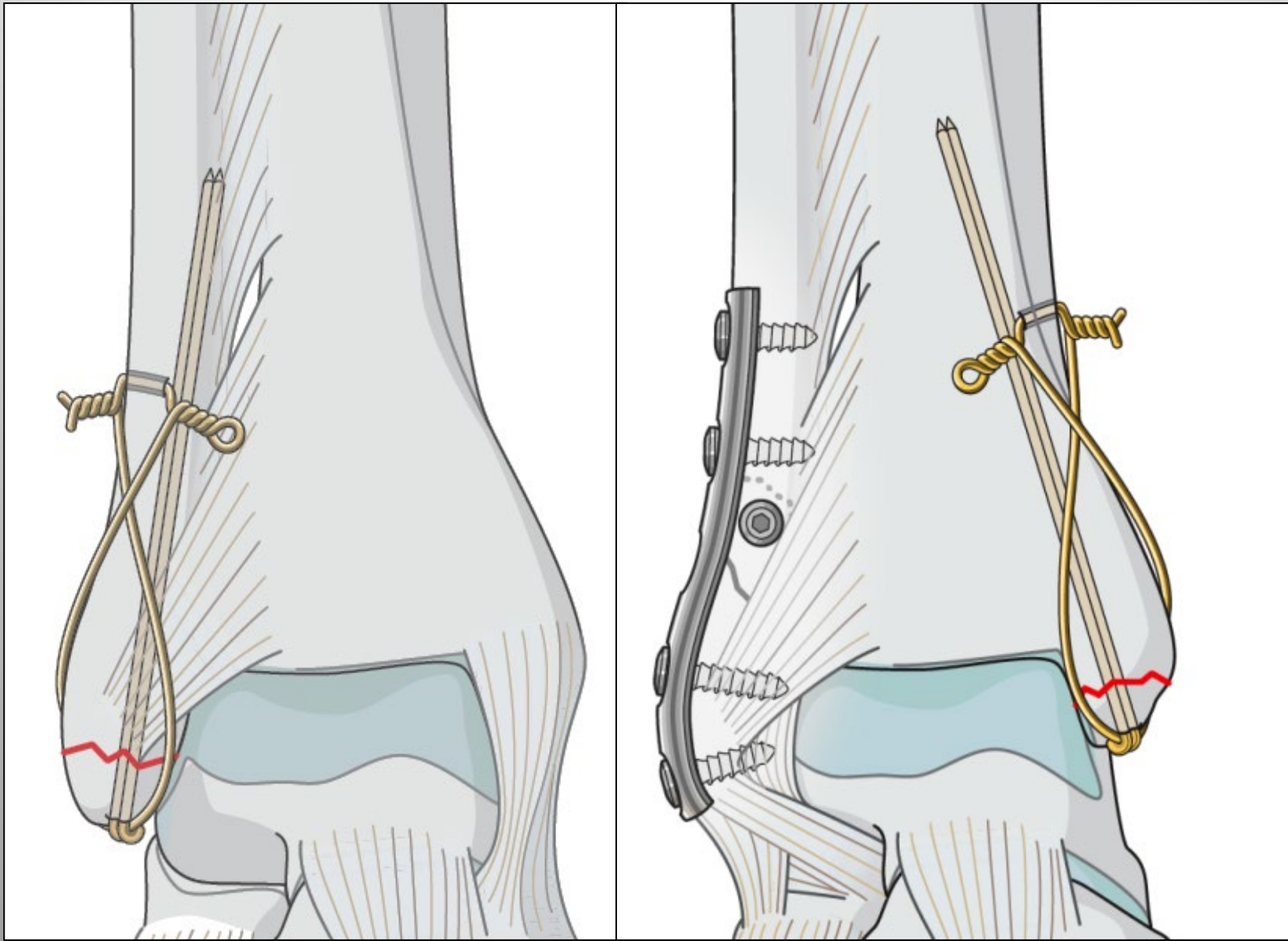


Fig. 15 Malgaigne's hooks. Fro

19602000.....2024



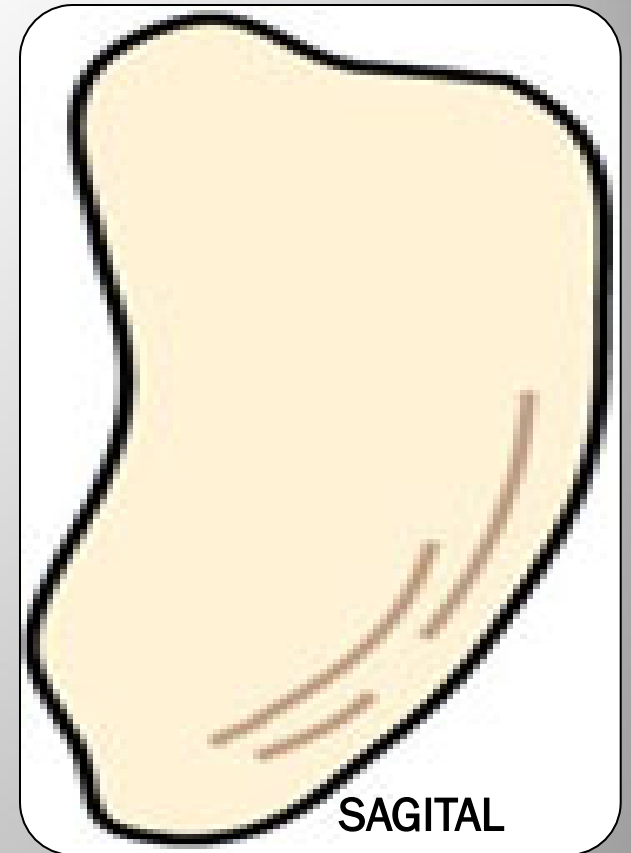




OSTEOLOGY



FRONTAL



SAGITAL



TRANSVERSE





AO

THE PATELLA

INJURY MECHANISM:

INDIRECT = TRANSVERSE PATTERN

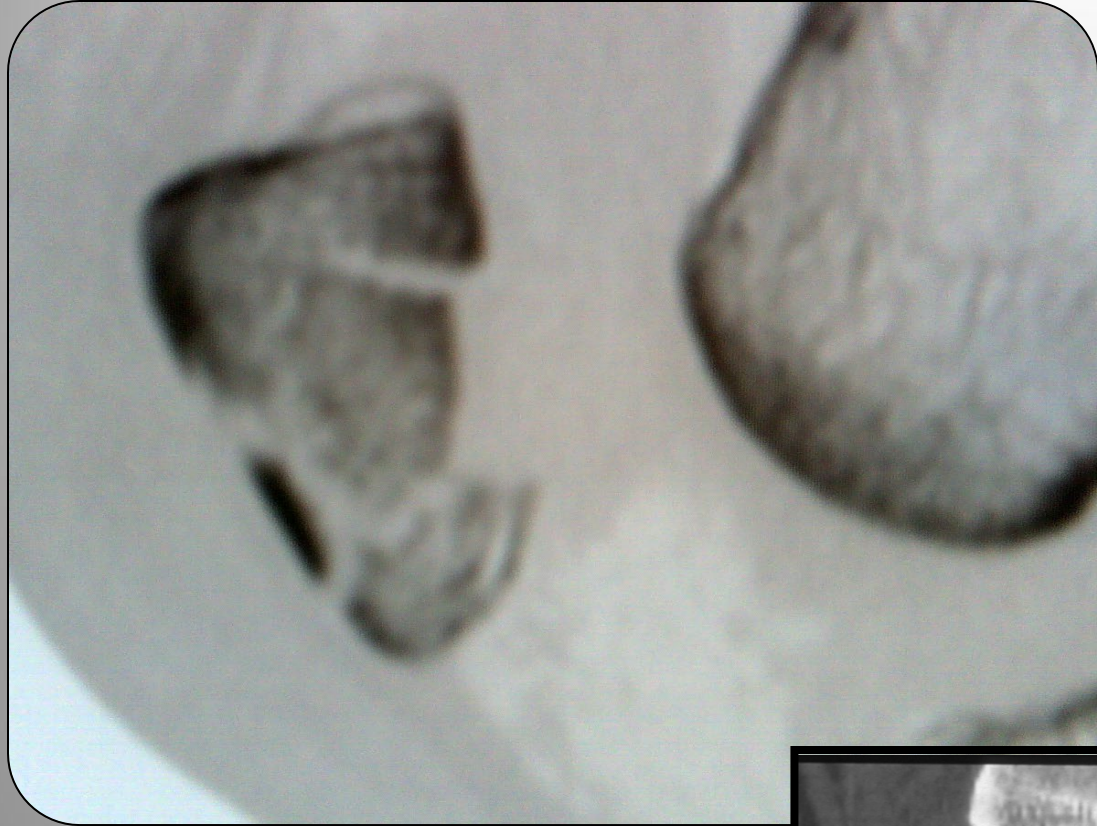
DIRECT = COMMINUTED FRACTURE
'DASHBOARD KNEE' INJURIES







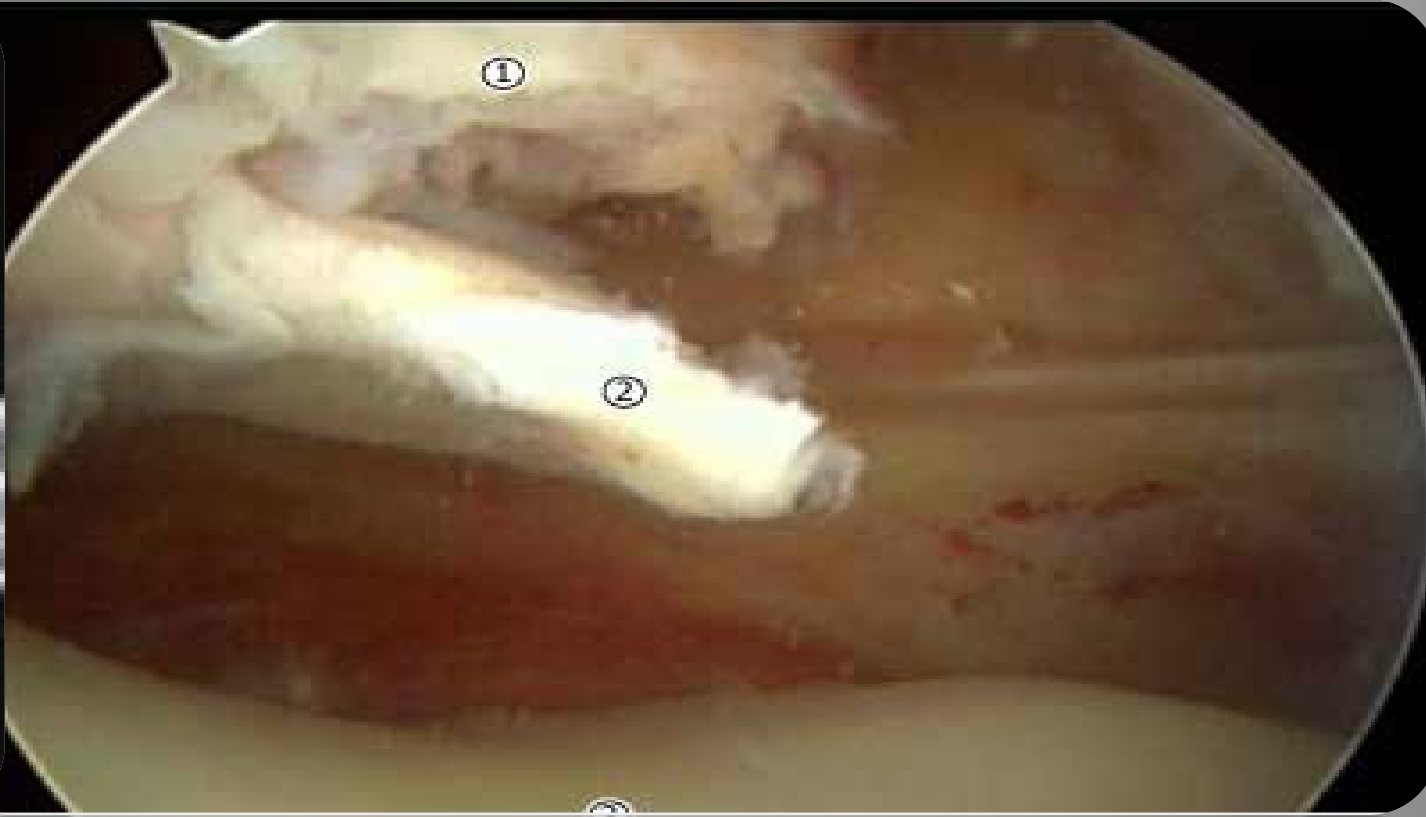
CT ARTICULAR FRACTURES



MRI FOR NON-OP FRACTURE MANAGEMENT

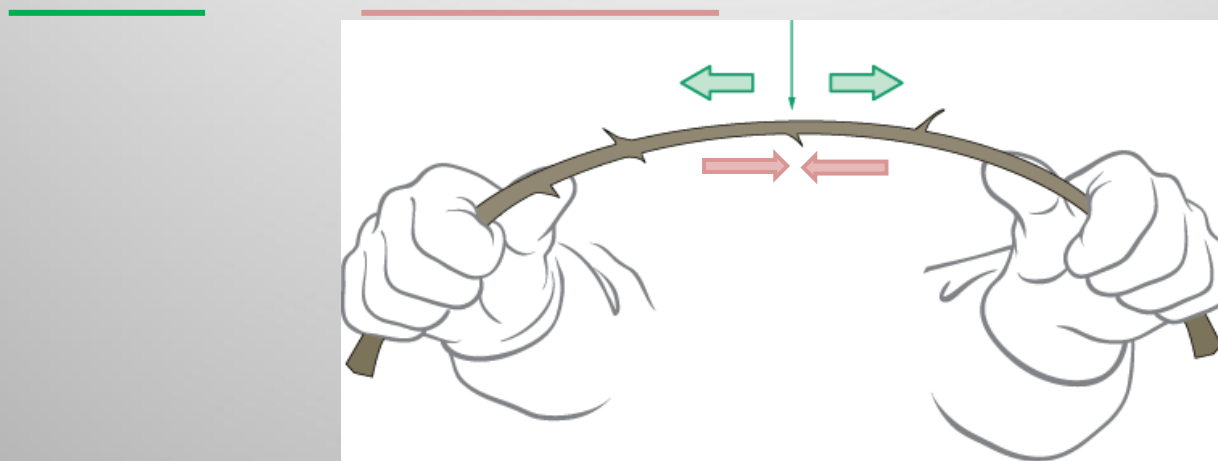
MPFL





What does «tension band principle» mean?

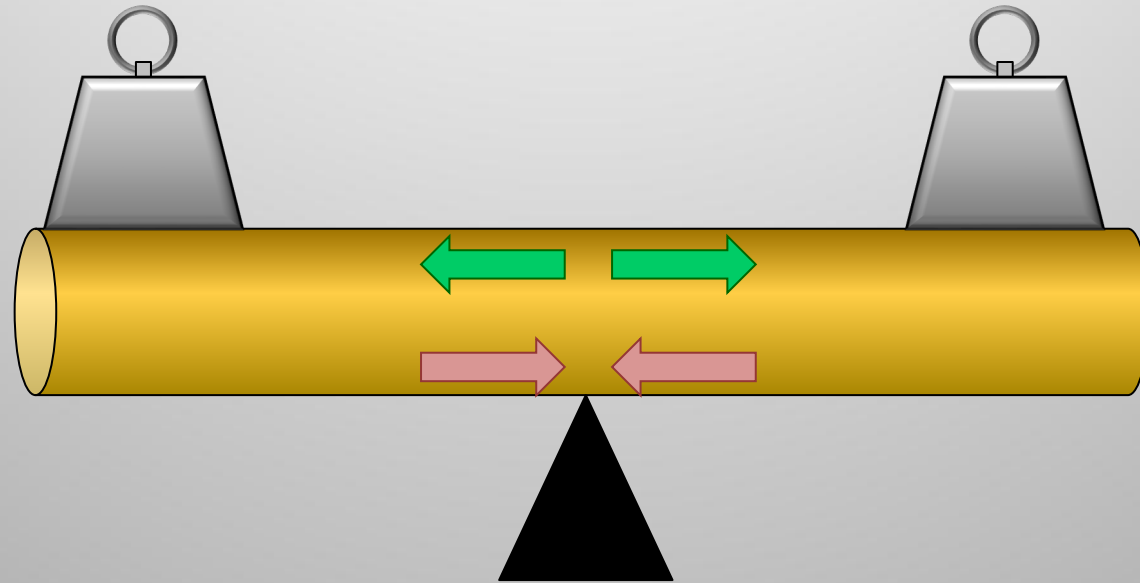
- Bending force applied eccentrically
 - Causes tension and compression within a column (bone)



- Tension can be absorbed/converted
 - By a band (wire, plate) on the tension side
 - However opposite side of column (bone) must be able to resist compression

Eccentric overloading of a beam/bone

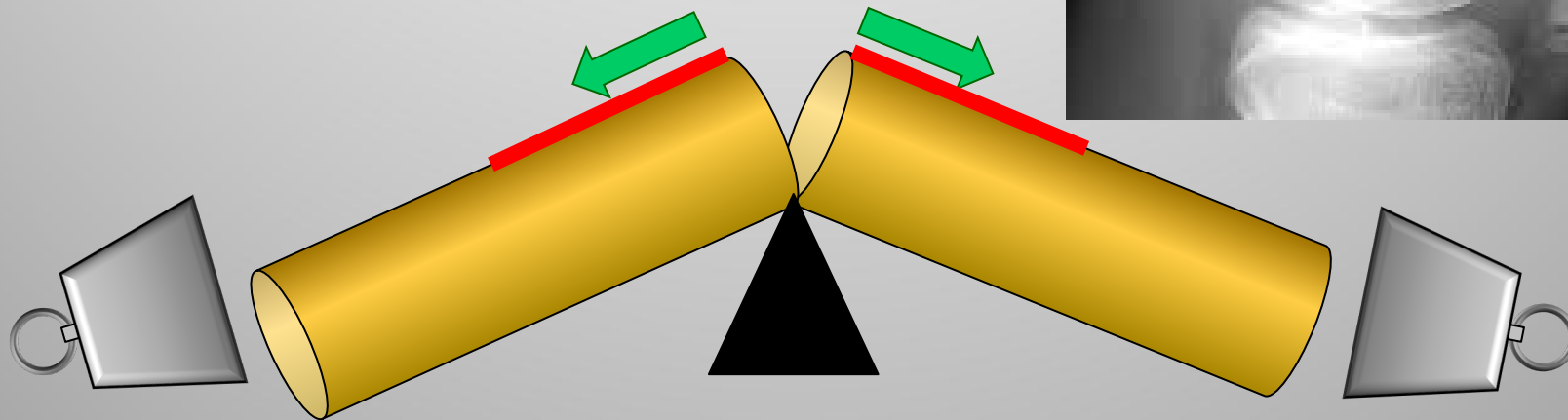
- What will happen?



Eccentric overloading of a beam/bone

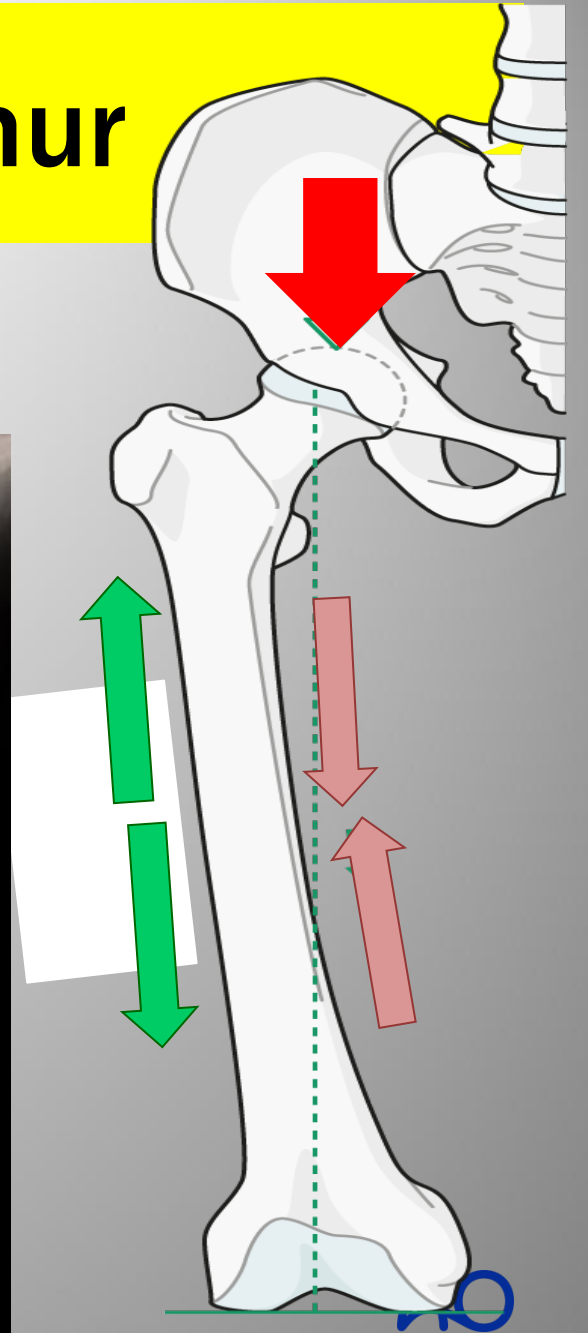
- Will break:

- One side loaded in tension
- Opposite side loaded in compression



Eccentric loading of the femur

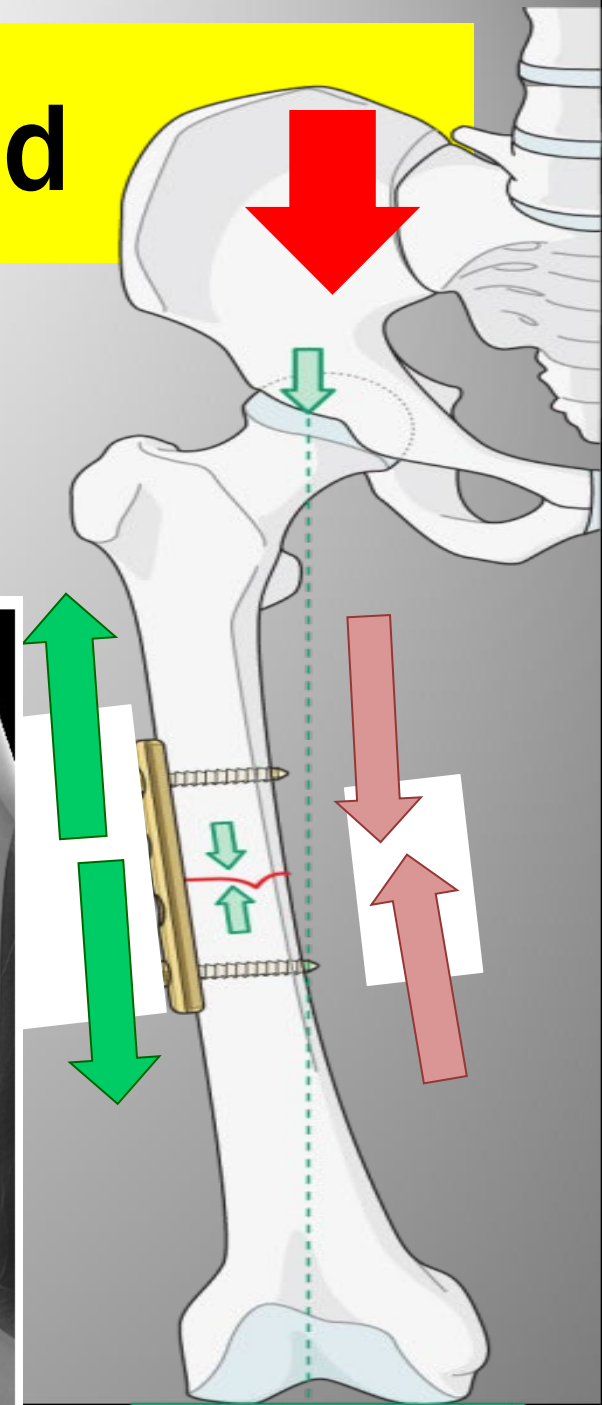
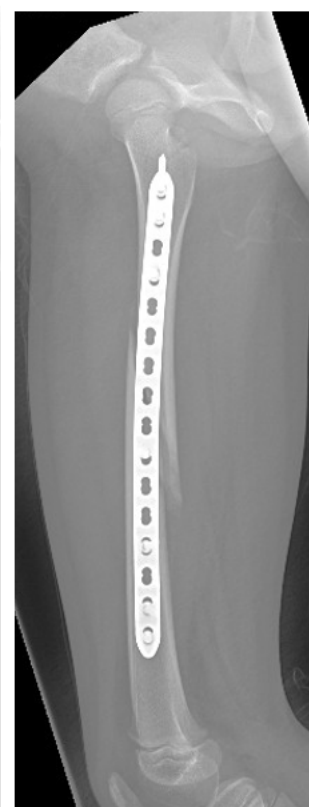
- Fracture will occur if overloaded



Application of tension band

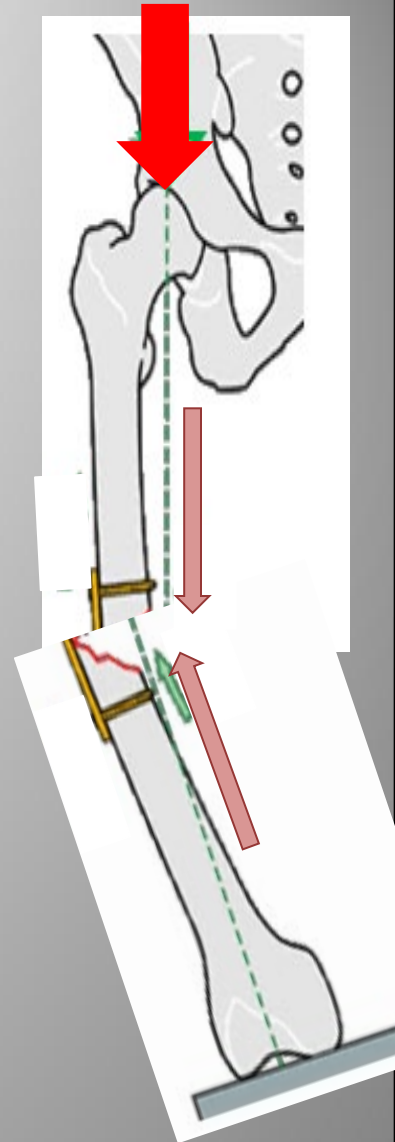
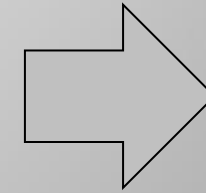
Lateral plate functions as “tension band”

- Tension is absorbed by the plate
- The compression cortex becomes stable



Application of tension band

- Plate functions as “tension band”
 - If opposite cortex is intact
 - If the compression cortex is defective, the tension band cannot resist bending

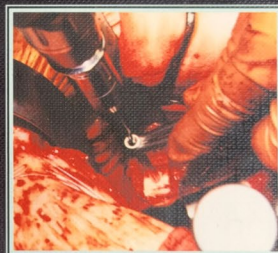
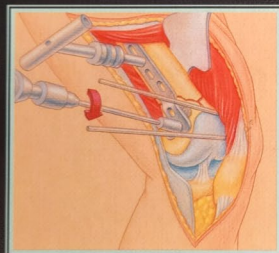


TECHNIQUE

Techniques in

Fracture Fixation

*As Practiced by the
Reno Orthopaedic Clinic*

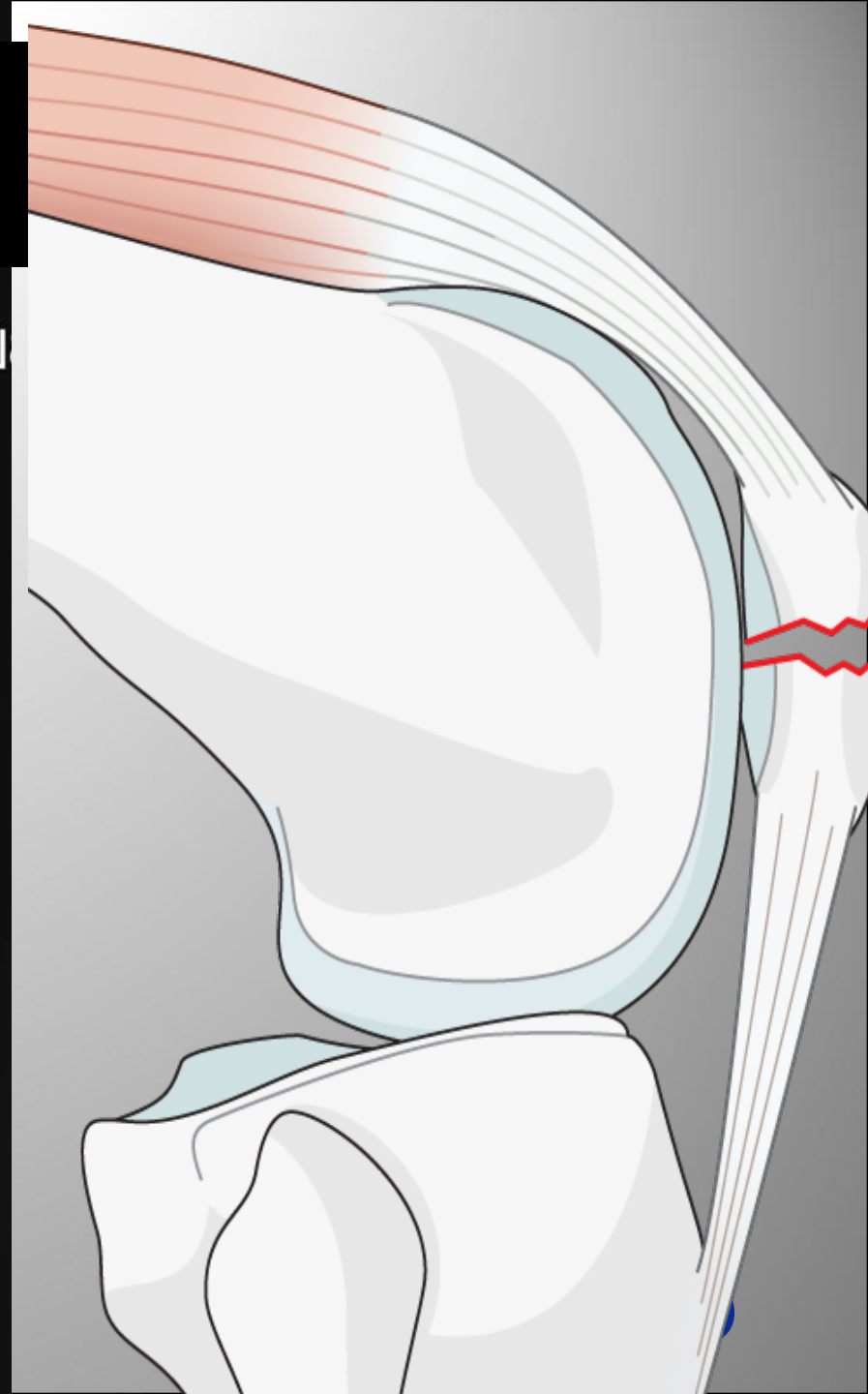


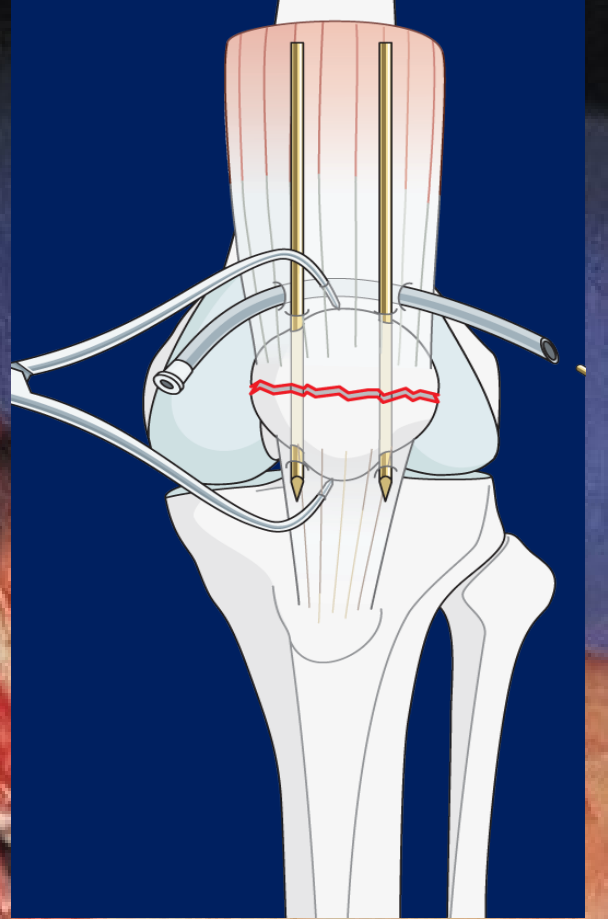
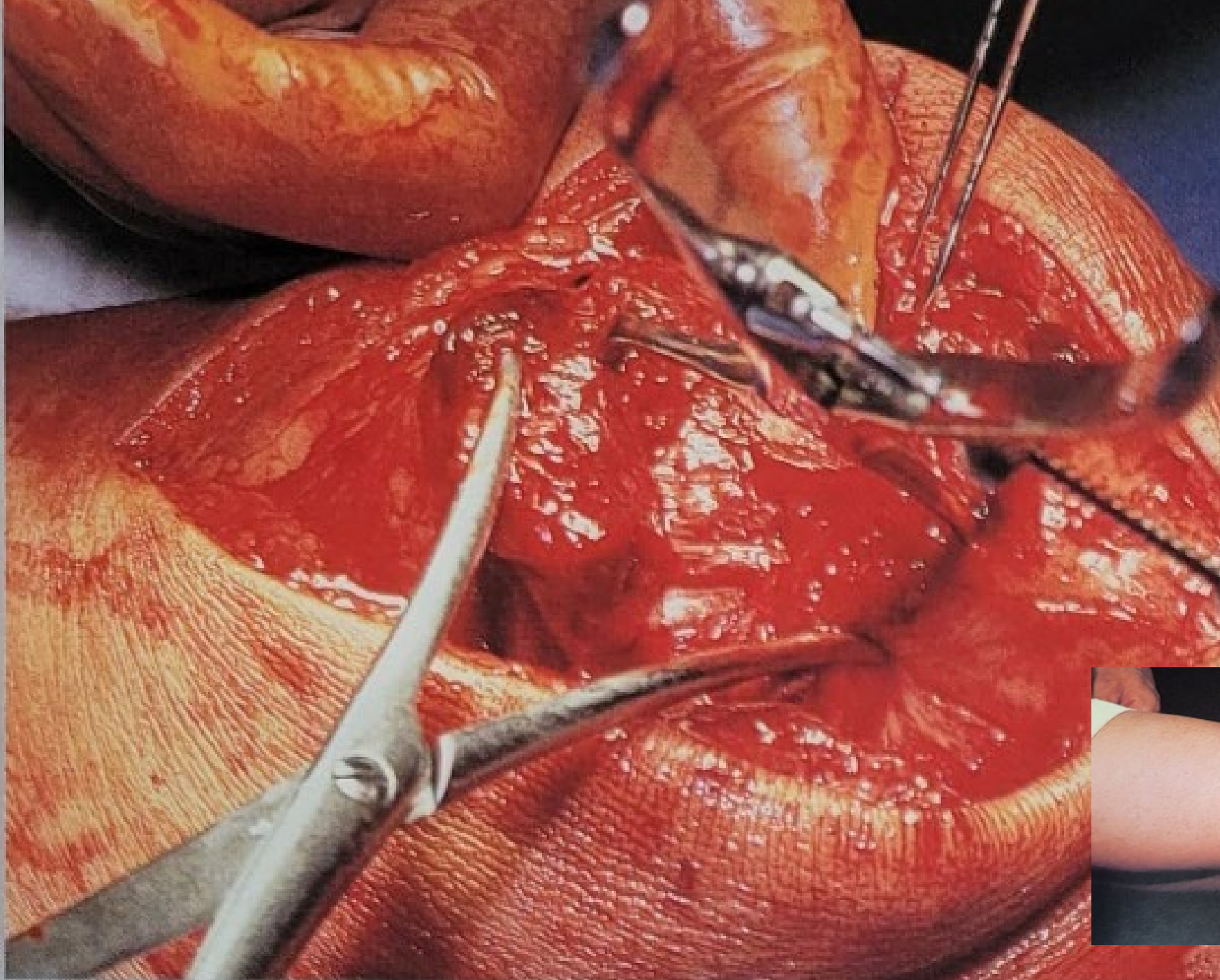
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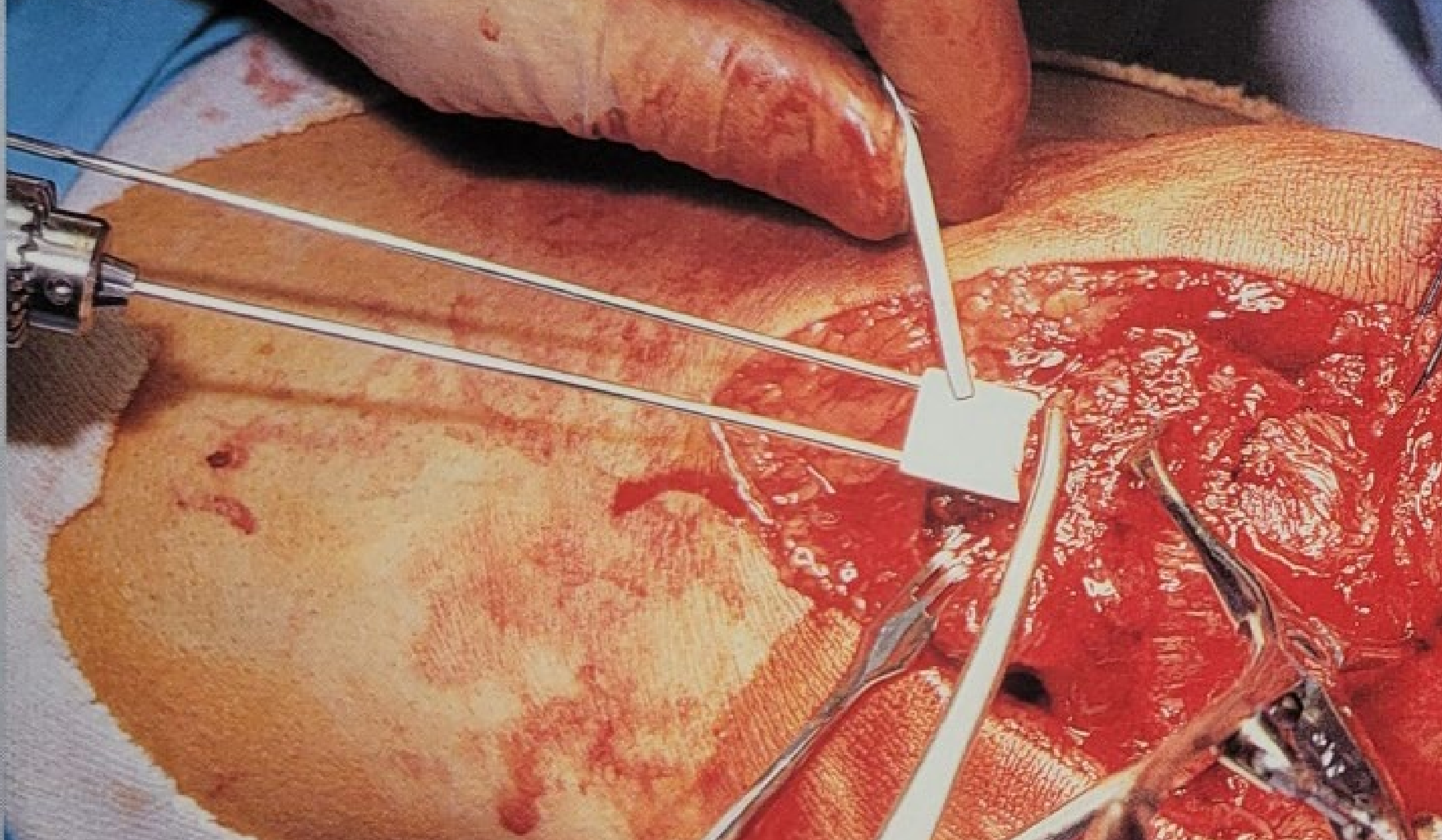
Timothy J. Bray

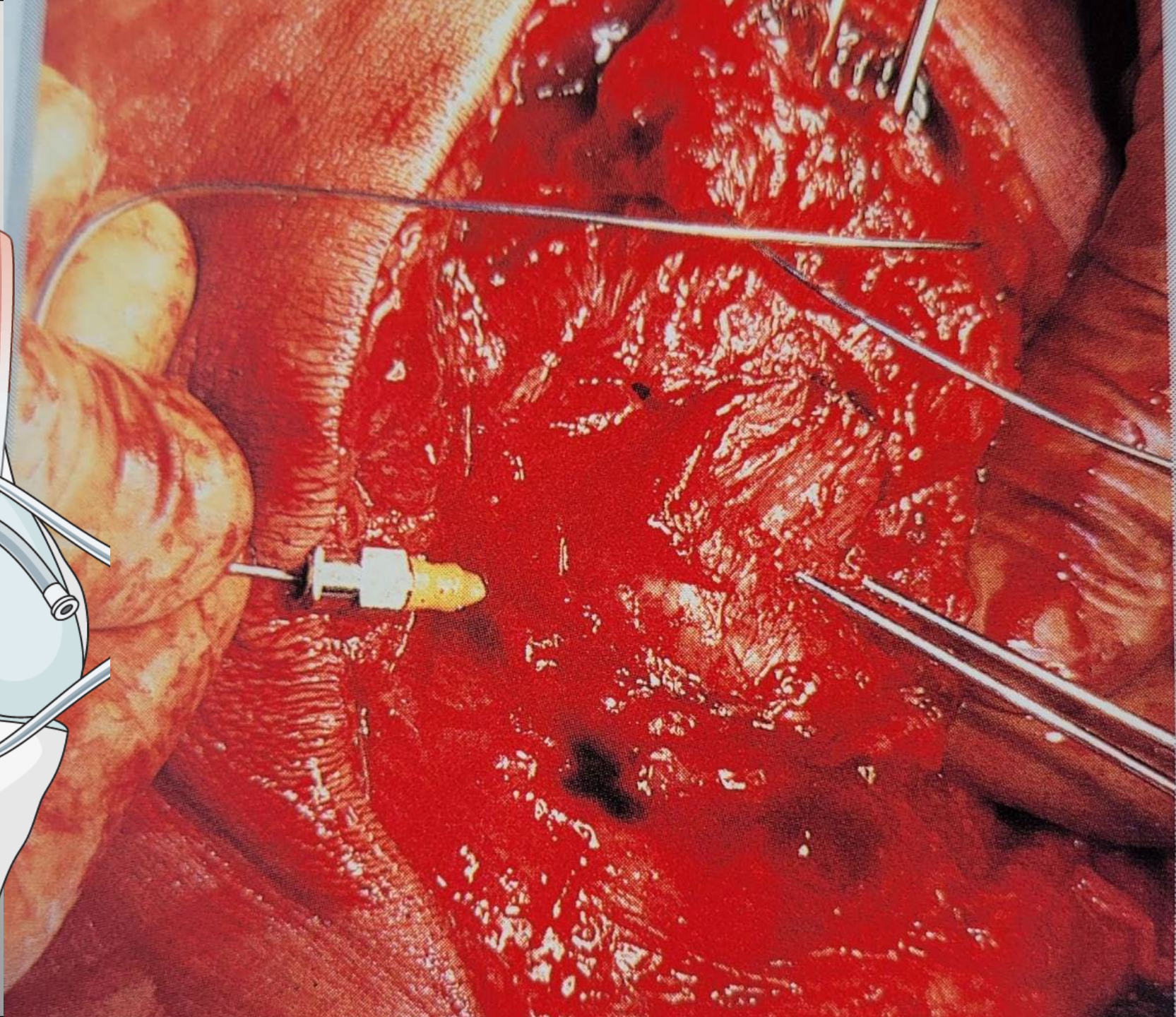
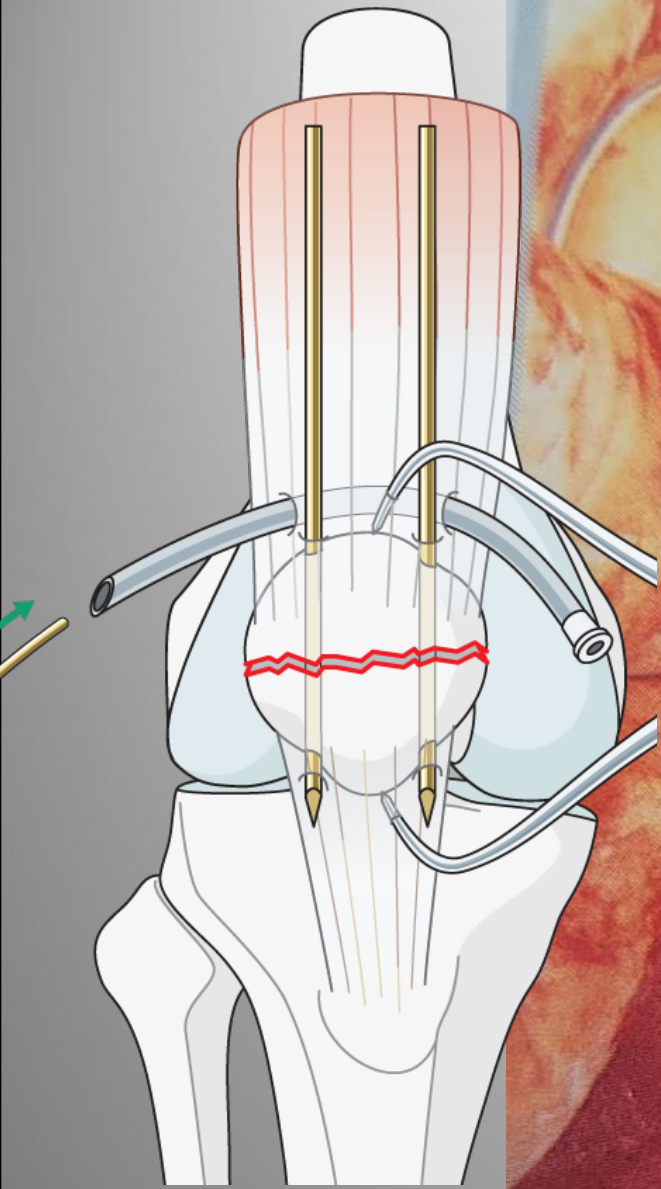
Foreword by Michael W. Chapman

Galaxy S21+ 5G









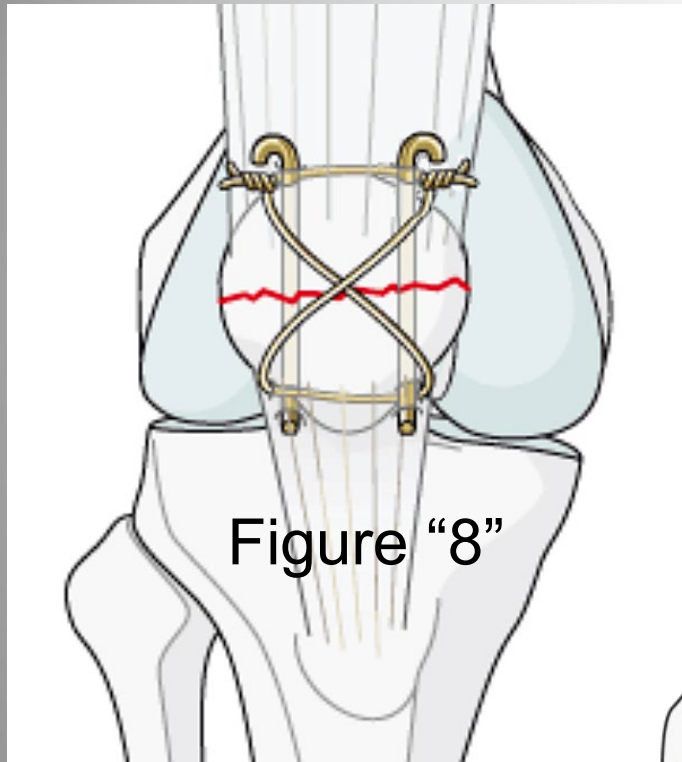
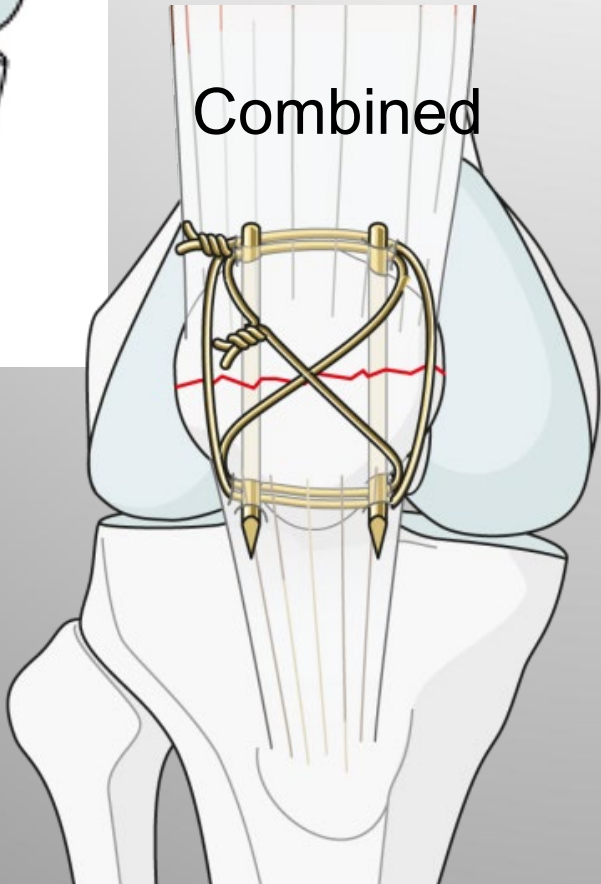


Figure "8"



Combined

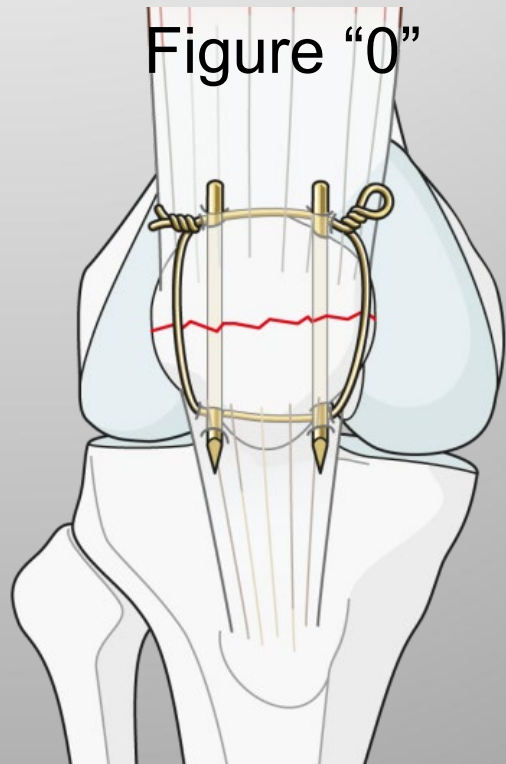
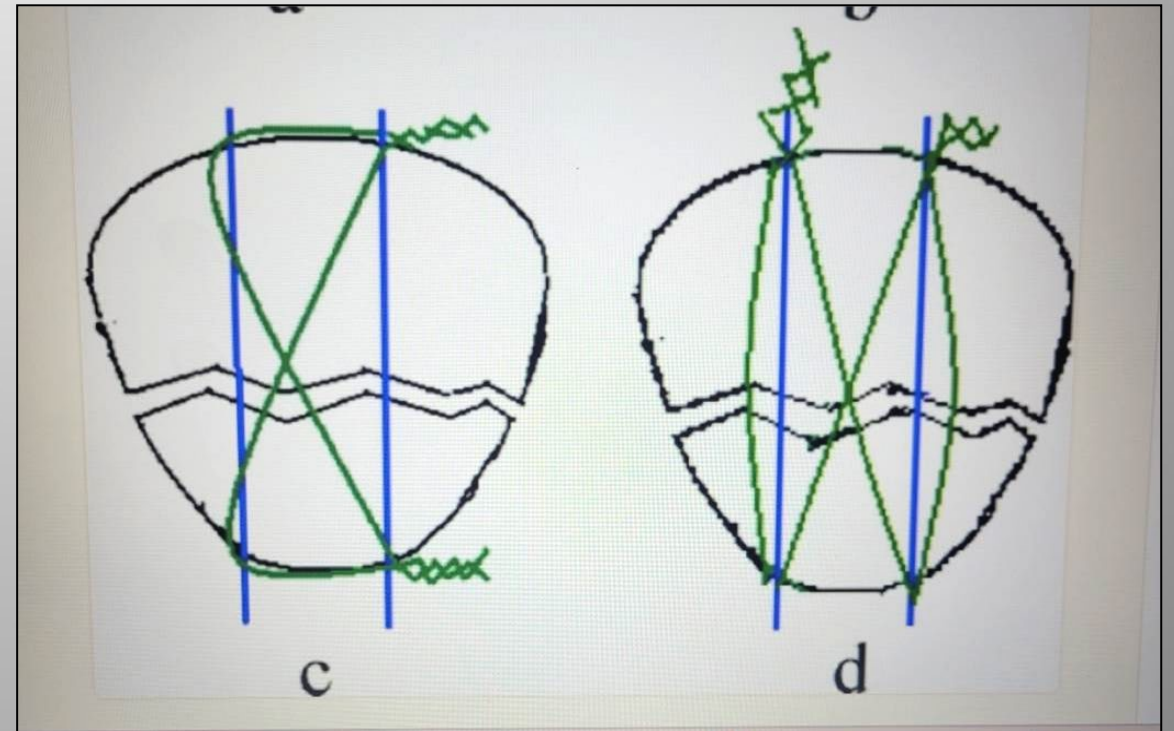
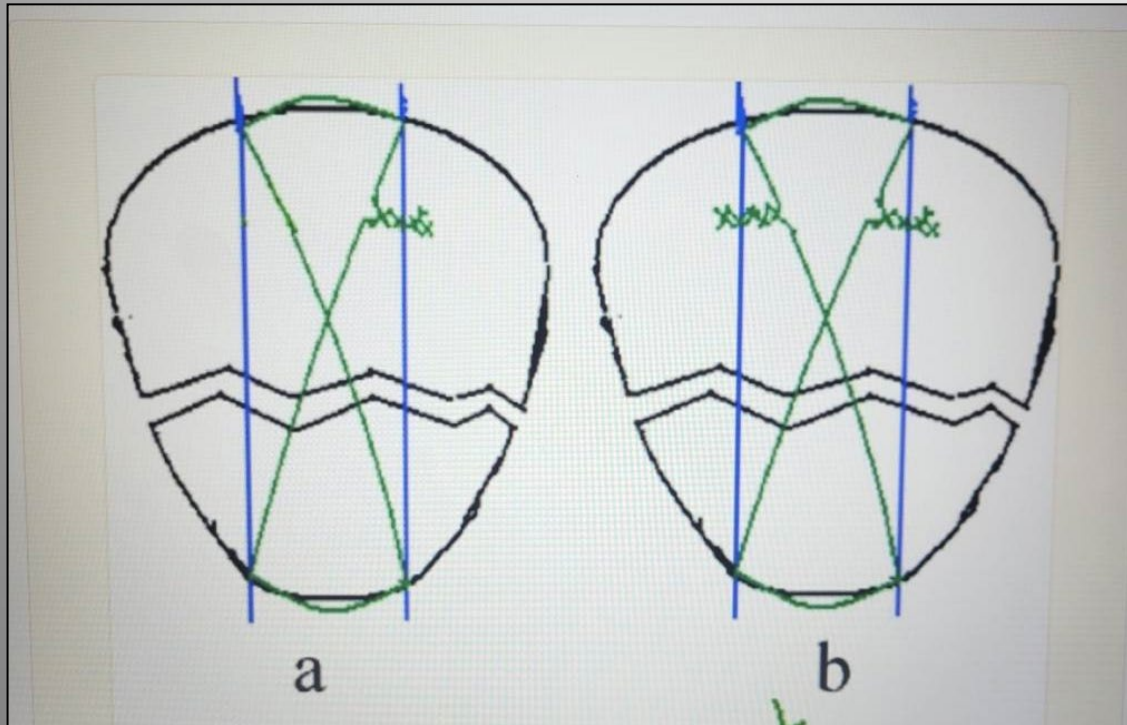


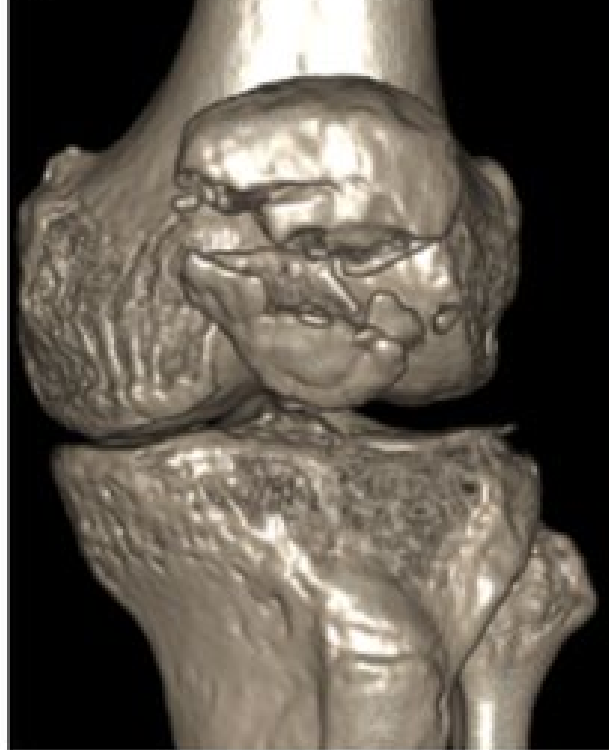
Figure "0"



Sustained interfragmentary compression for each group tested

Groups	Compression	Standard Deviation
Vertical 1 twist	79.5	22.5
Vertical 2 twists	88.8	39.0
Vertical 2 twists corner	104.8	27.2
Horizontal 2 twists corner	171.1	33.3





**TAKE YOUR TIME
MAKE IT RIGHT**



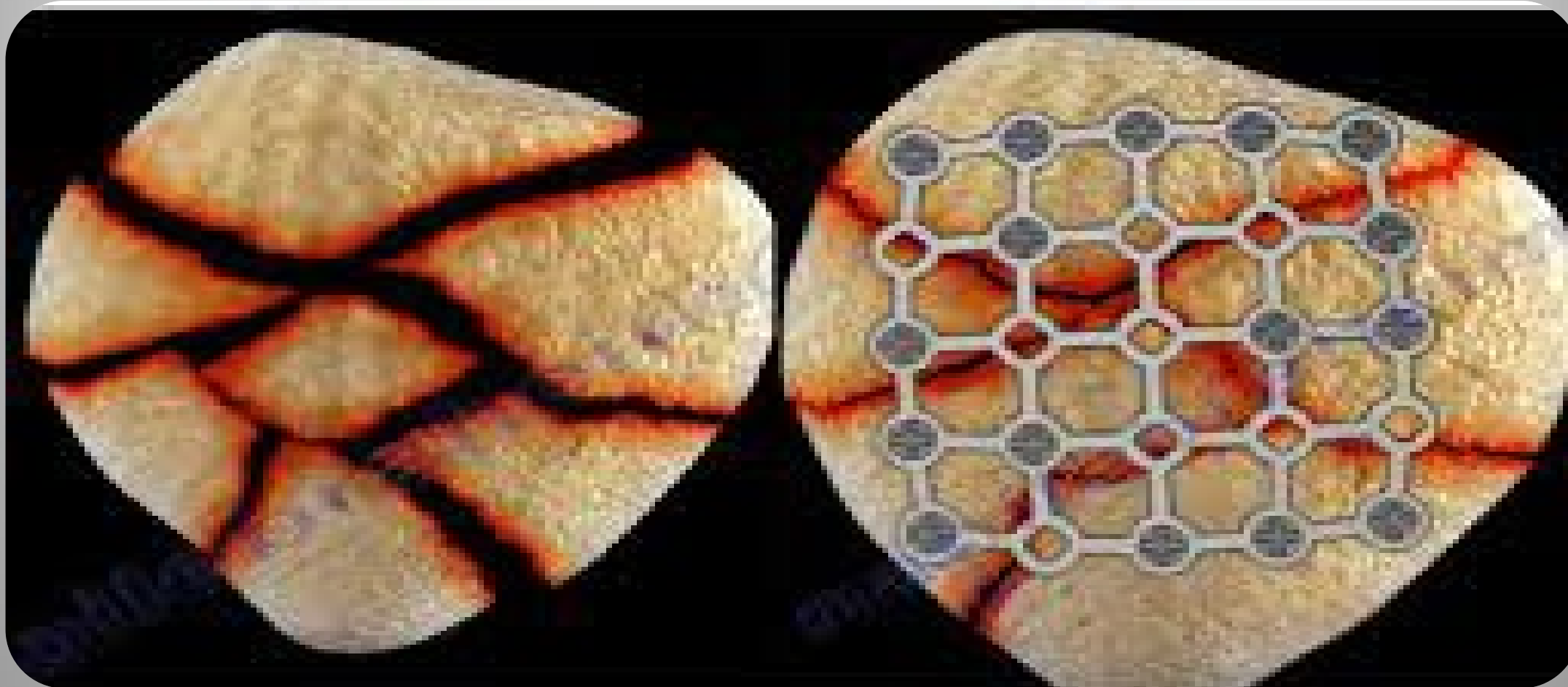


WHY NOT THE PATELLA?



MULTIPLE POINTS OF *FIXED* ANGLE SUPPORT

- *ANGLED SCREW* PURCHASE
- *VARIABLE* PLATE DESIGNS



**TITANIUM MESHED LOCKED PLATES
PRIMARY OR AUGMENTED**

Biomechanical Assessment of Locked Plating for the Fixation of Patella Fractures

Wurm, Simone; Augat, Peter; Bühren, Volker
Journal of Orthopaedic Trauma. 29(9):e305-
e308, September 2015

**Functional Outcomes of Patella
Fractures Treated With Anterior Plate
Osteosynthesis at One Year**

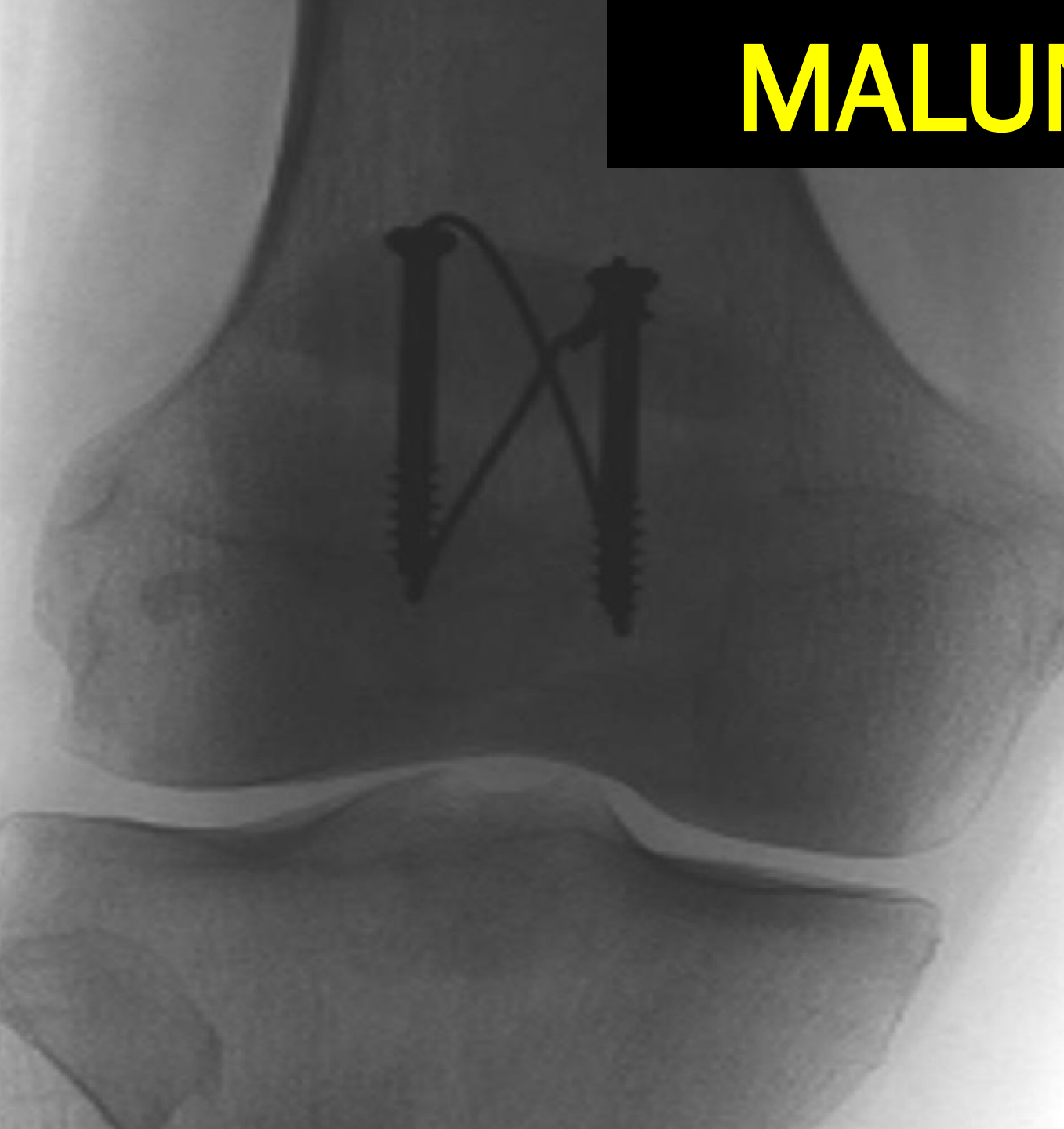
**Shymon, Stephen J.; Jansson, Hayley;
Schneiderman, Brian A.; More
Journal of Orthopaedic
Trauma. 35(1):e1-e6, January 2021.**

Open Reduction and Internal Fixation of Patella Fracture With Contoured Dorsal Plating

**Brusalis, Christopher M.; Gruskay, Jordan A.;
Bornes, Troy D.; More**

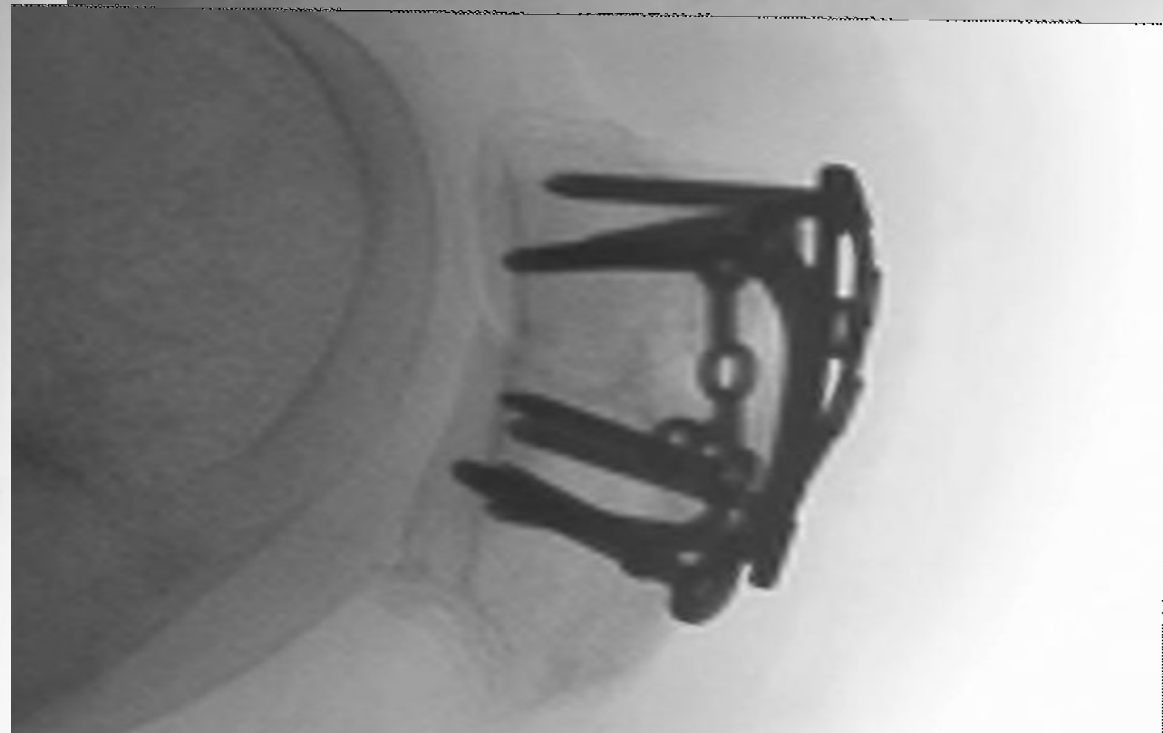
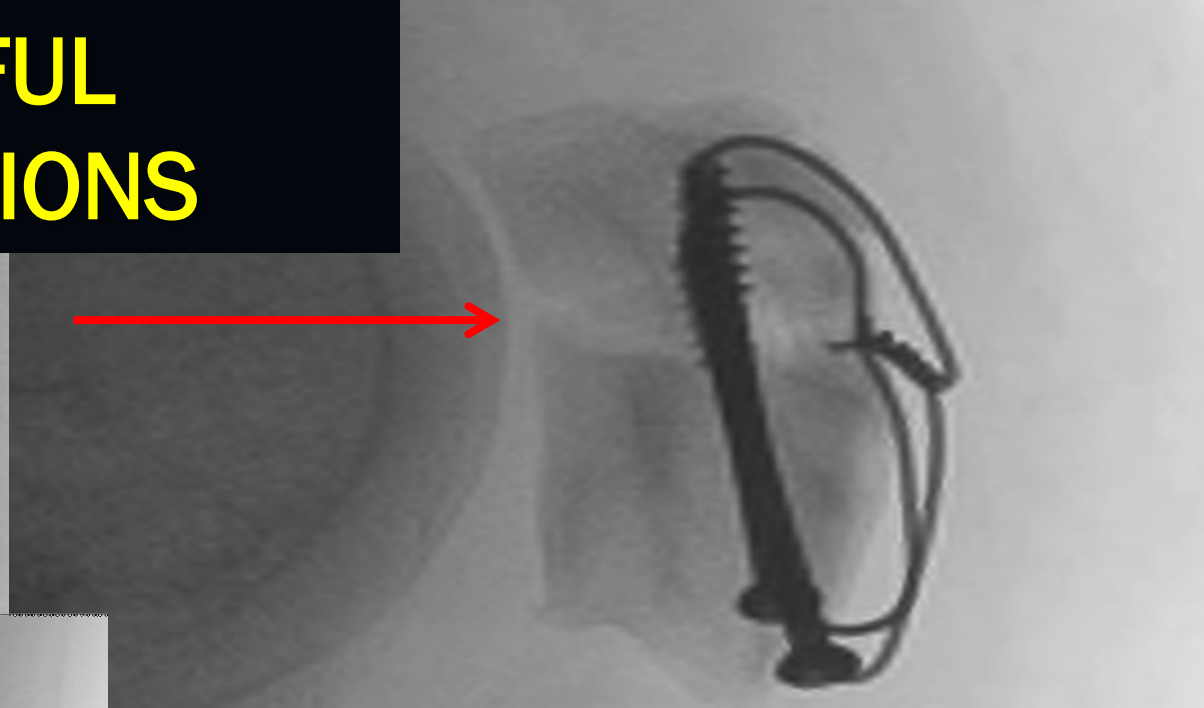
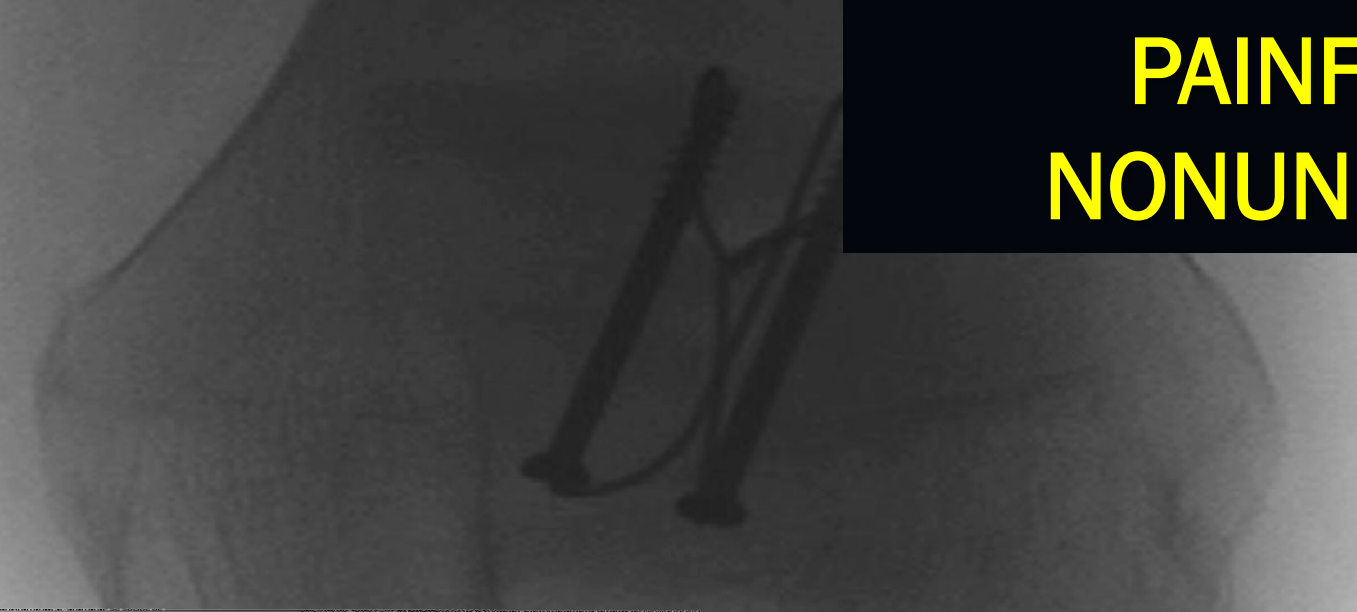
**Journal of Orthopaedic Trauma. 35:S34-
S35, August 2021.**

MALUNIONS

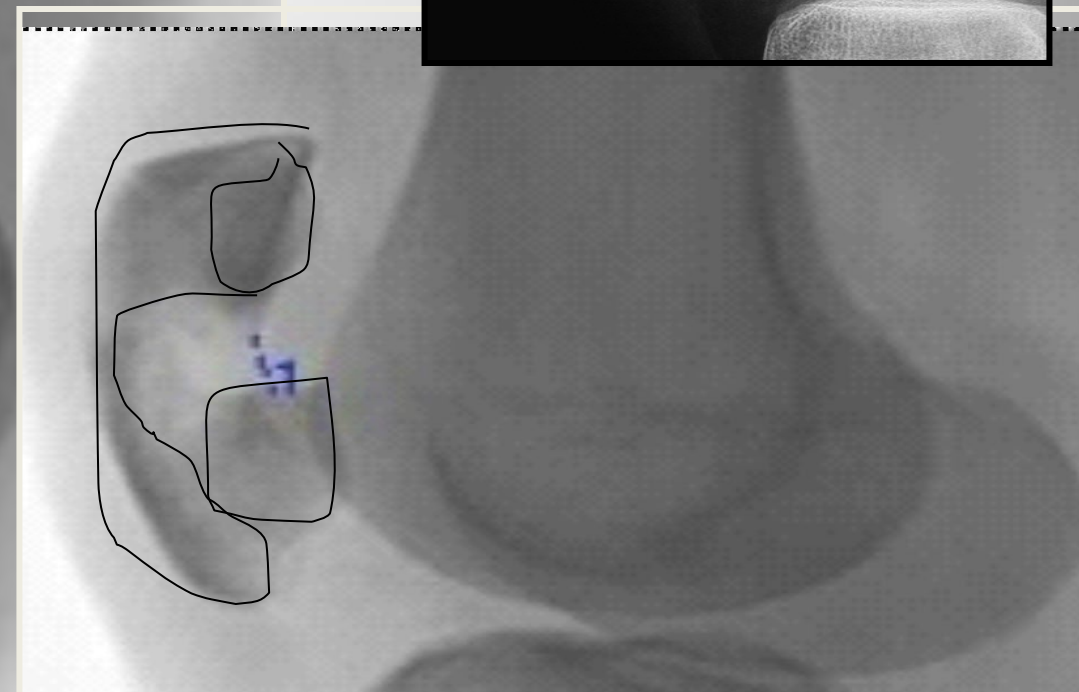
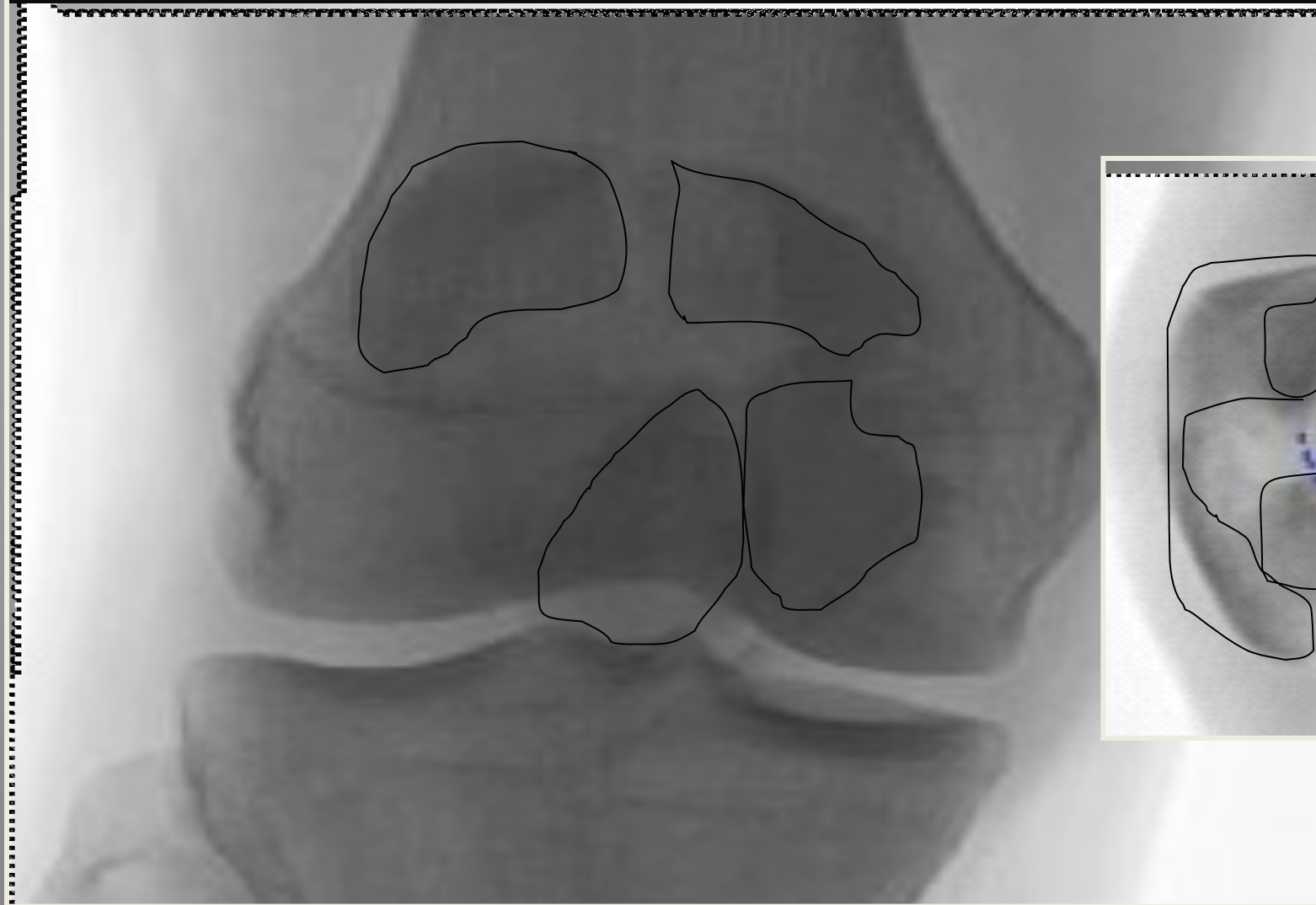


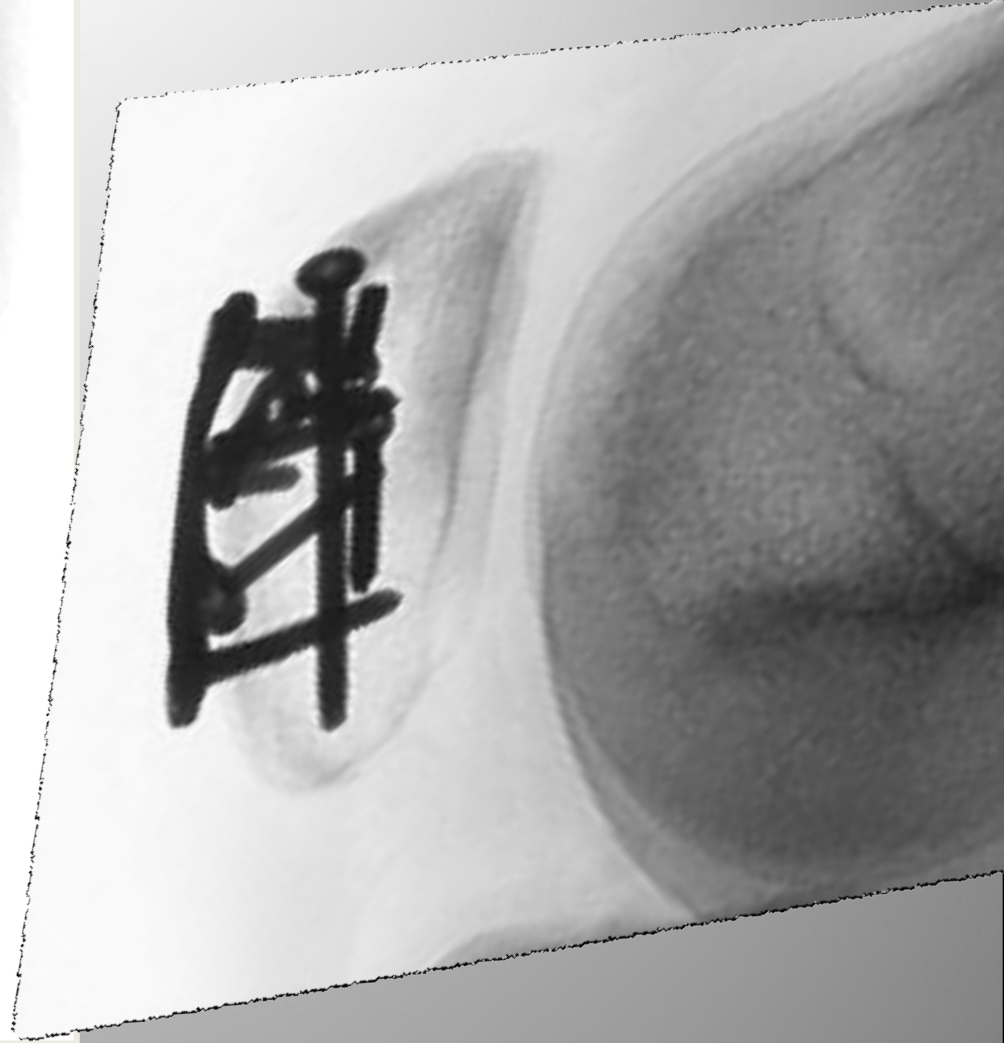
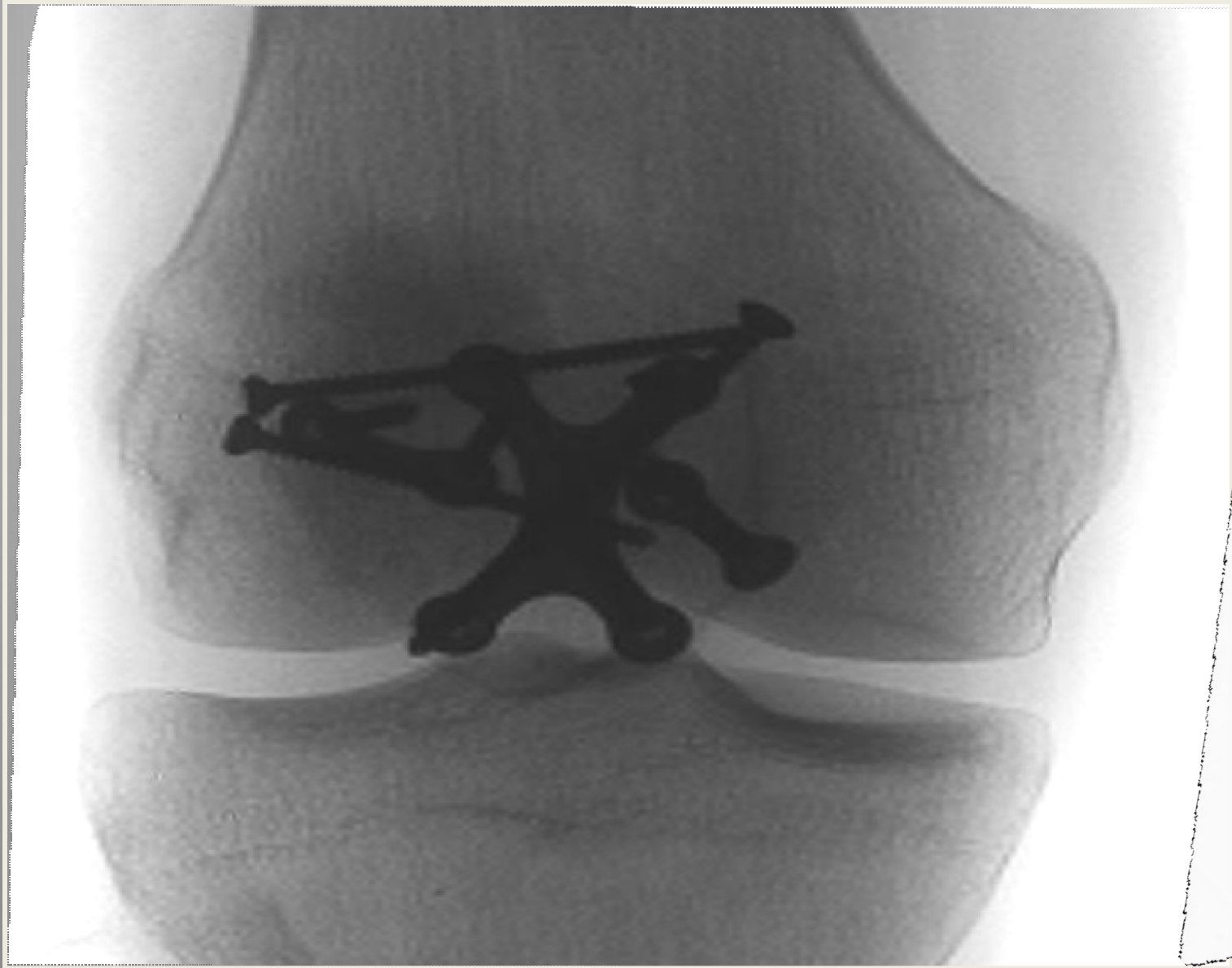
“OIF”

PAINFUL NONUNIONS

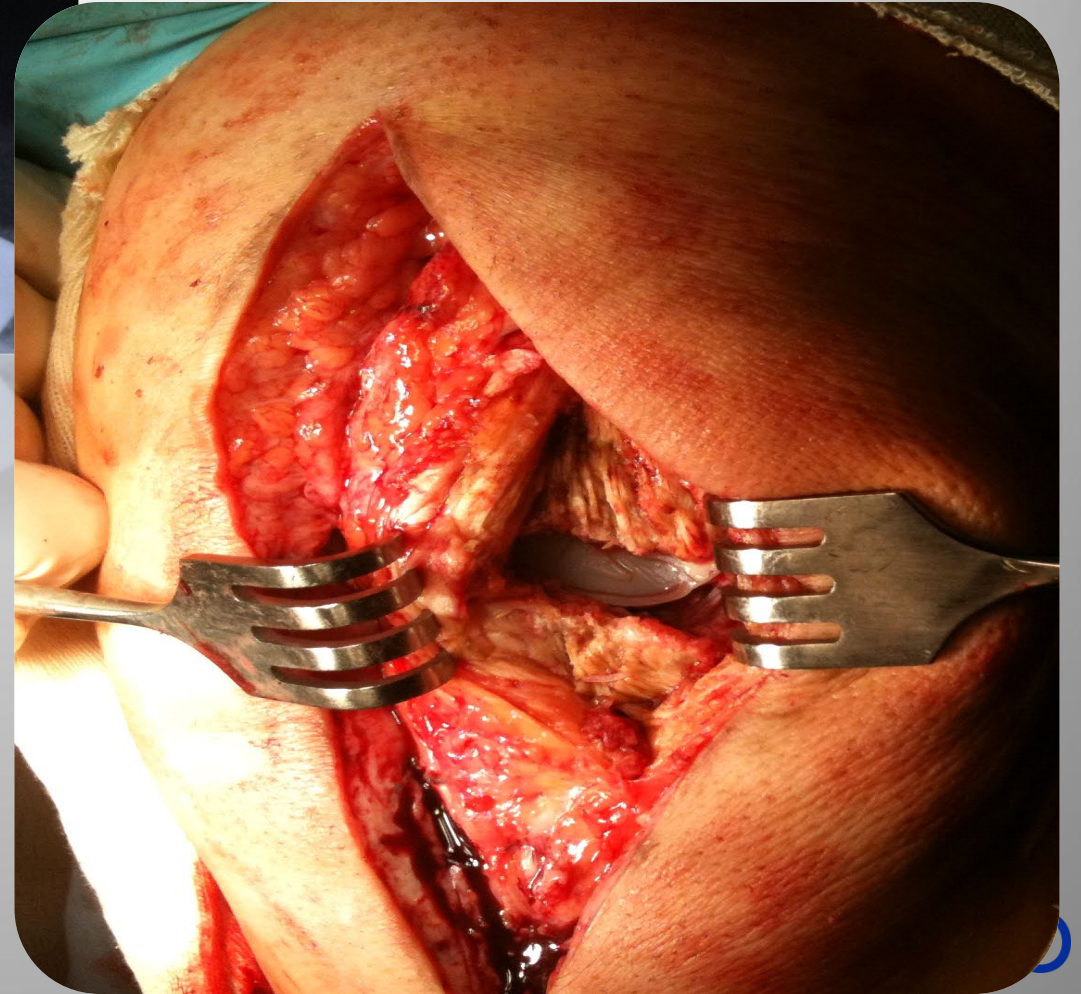
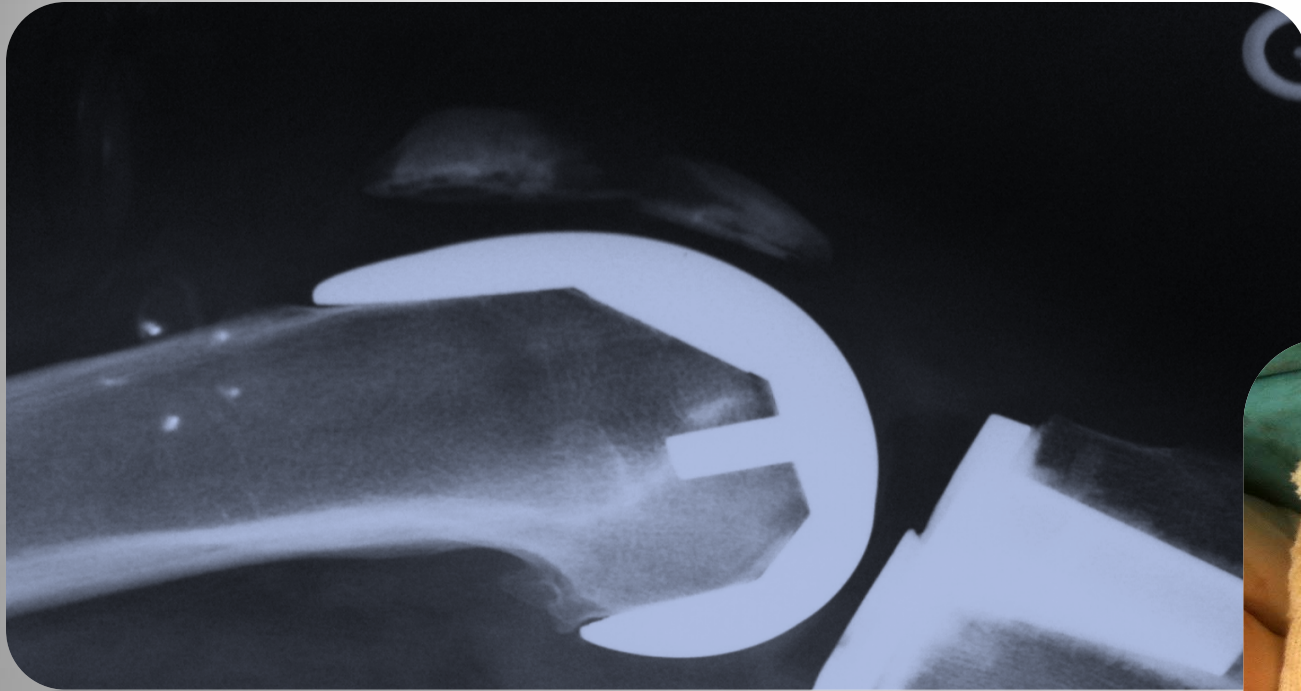


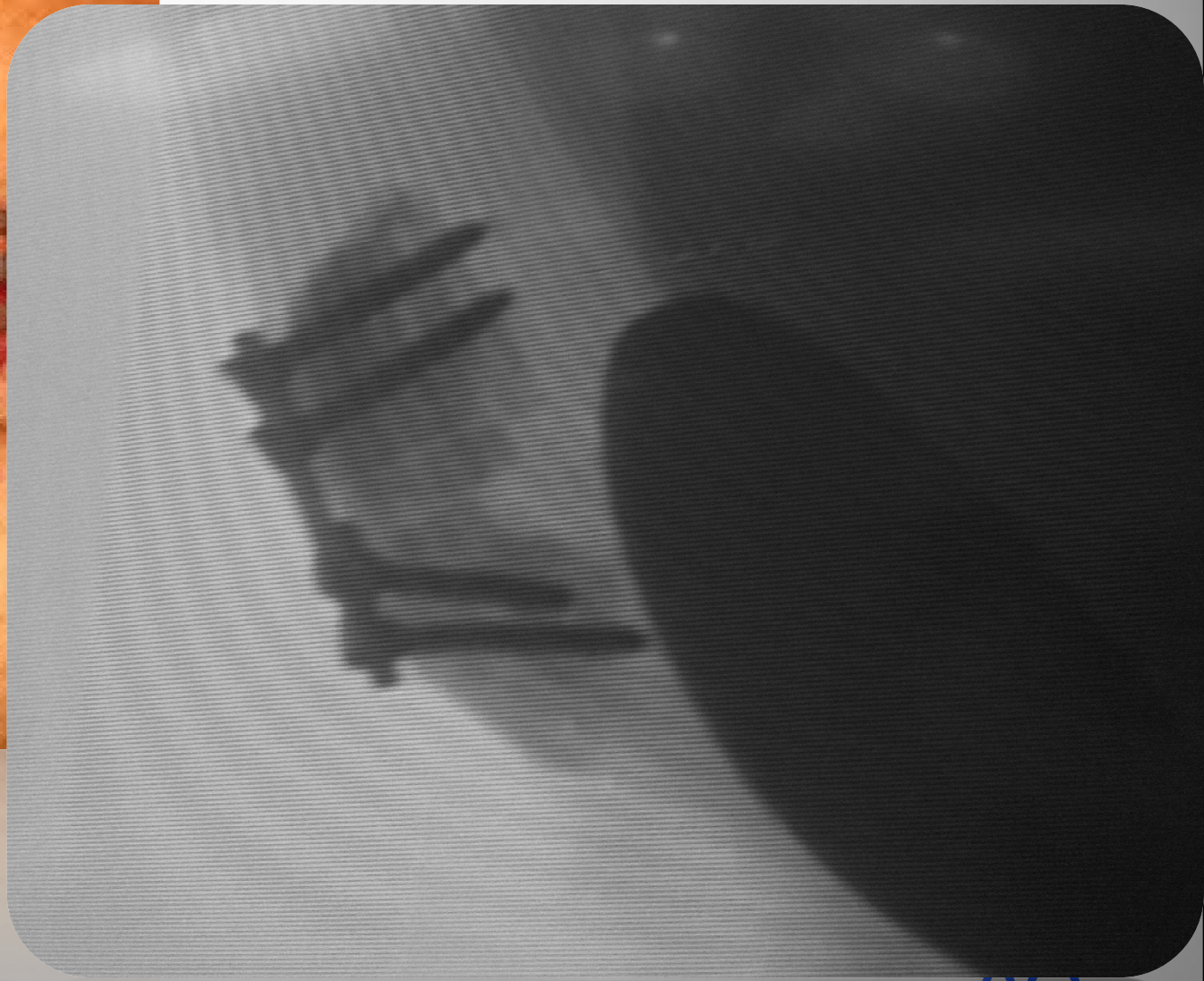
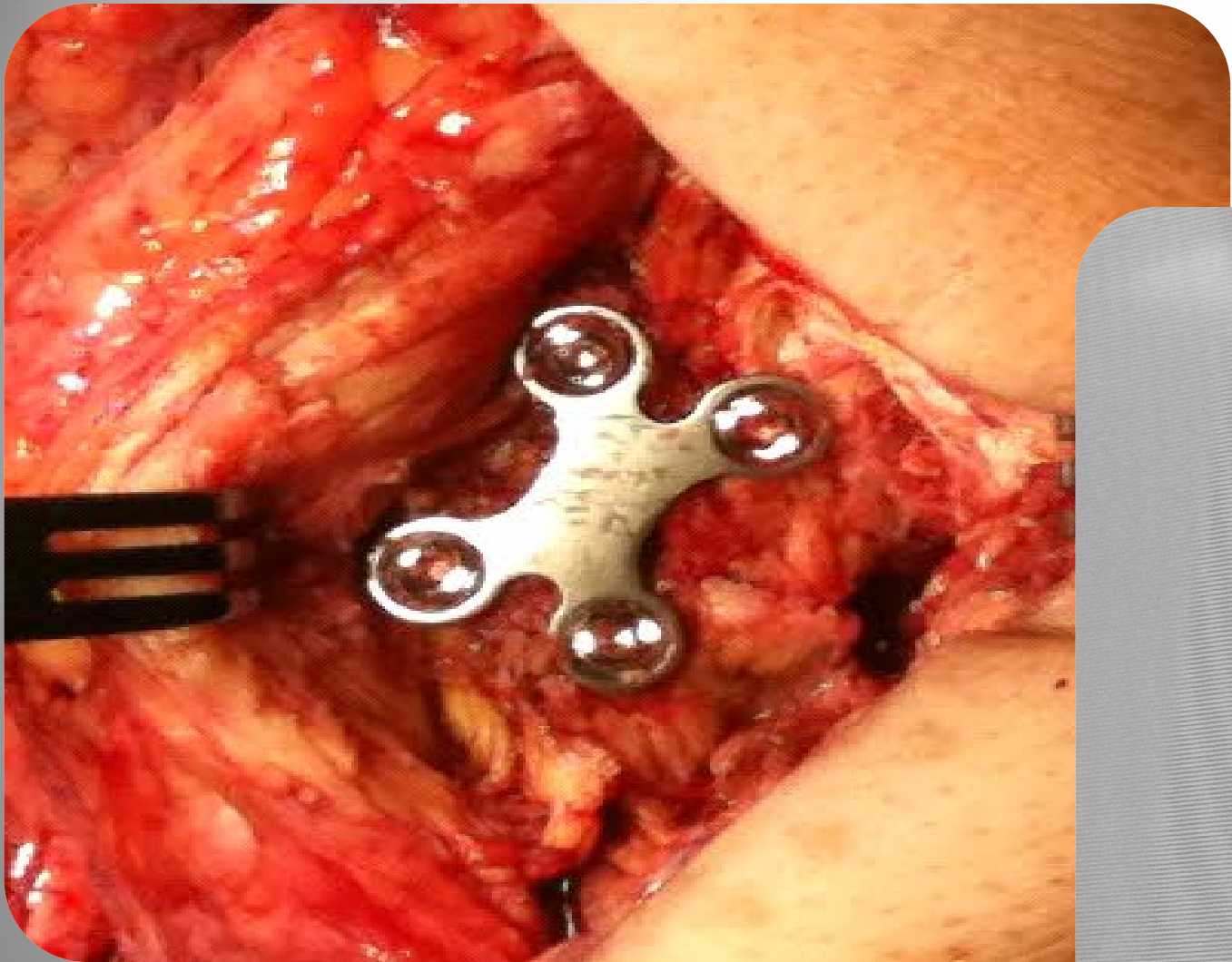
SEVERE COMMUNION

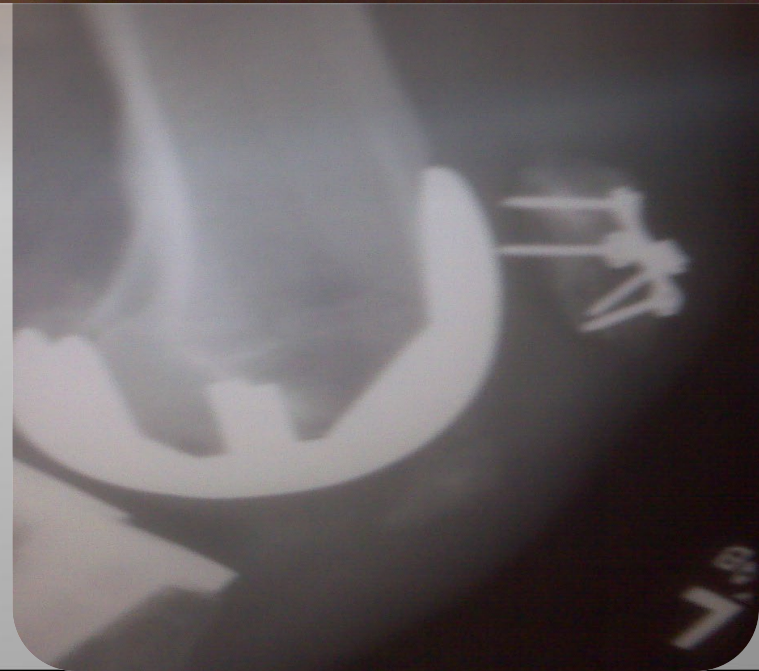




PATELLA FRACTURE TKA







FINALLY...

FINALLY...

- BEST FOR SIMPLE, TRANSVERSE FRACTURES
 - INEXPENSIVE, TECHNICALLY EASY
 - DO A GOOD JOB, PREVENT HARDWARE PAIN
- FUTURE? SMALL INCISIONS, ADVANCING PLATE TECHNOLOGY, PERC IMPLANTS AND IMPROVED THERAPY TECHNIQUES

1960 2000 2024

