

HIGH TIBIAL OSTEOTOMY

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ETIOLOGY

- Constitutional Varus Deformity.
- Posttraumatic Varus Deformity.
- Varus Deformity secondary to osteonecrosis.



OBJECTIVES

- Axis alignment.
- Loading redistribution.
- Biological effect.

HISTORY

- STEINDLER.
- JACKSON.
- COVENTRY.

UNSATISFACTORY RESULTS

- Medium and long term poor results.
- Development of Total Arthroplasty.

CAUSES

- Imprecise Technique.
- Poor fixation systems.
- Prolonged immobilization.

JOINT SPACE BIOMECHANICS

- BLAIMONT.
- MANSAT.



CARTILAGE

**BONE-
CARTILAGE
INTERFACE
(CRITICAL
POINT)**

SUBCONDRA PLATE

HISTORICAL EVOLUTION OF RESULTS

- Insall (1984): 63% at 9 years.
- Rudan (1991): 70% at 15 years.
- Naudie (1999): 30% at 20 years.
- Ordoñez (2002): 60% at 12 years.
- Allard (2004): 85% at 10 years.

IDEAL INDICATION

- ≤ 50 y.o.
- Osteoarthritis secondary to varus.
- Ahlback I-II.
- Maximum deformity 10° .
- Full ROM.
- No instability.



BEYOND THE LIMIT

- 60-65 years old.
- Alhback III-IV (Akizuki y R. Stone).
- Deformity $> 15^\circ$ (Dome osteotomy).
- Mobility: Ext -10° Flex $100^\circ - 110^\circ$.
- Medial instability (Open Wedge).
- Central instability:
 - Ligament reconstruction.
 - Slope modification.



MINOR



MODERATE



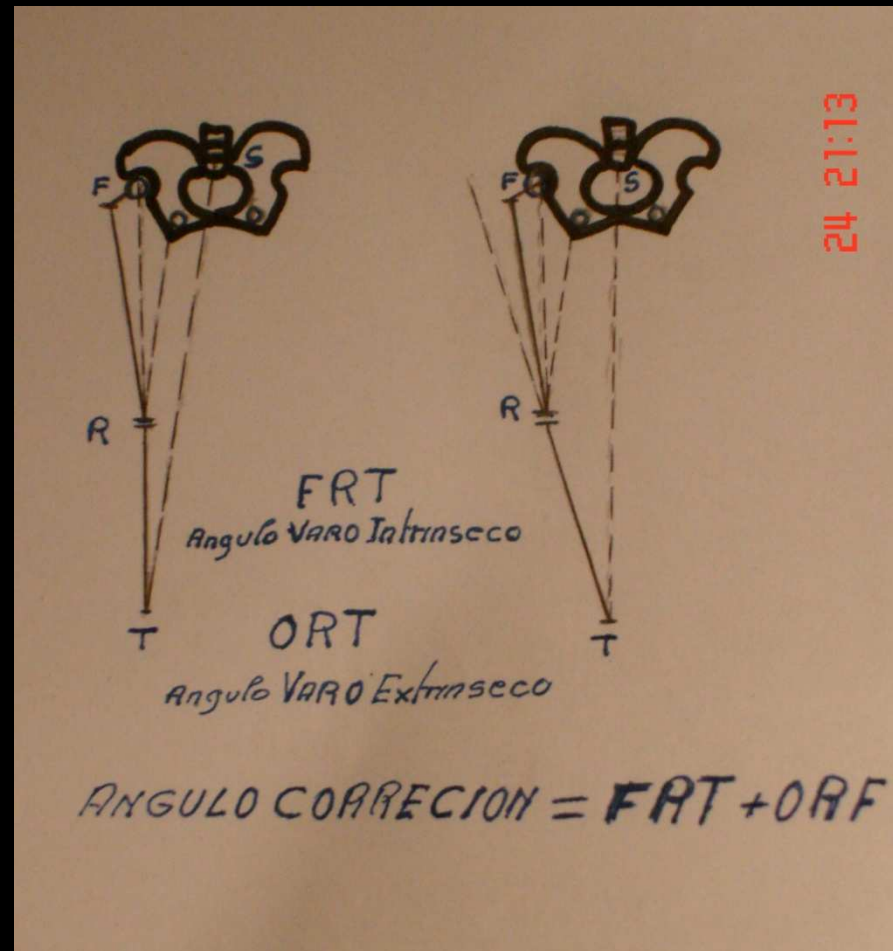
SEVERE



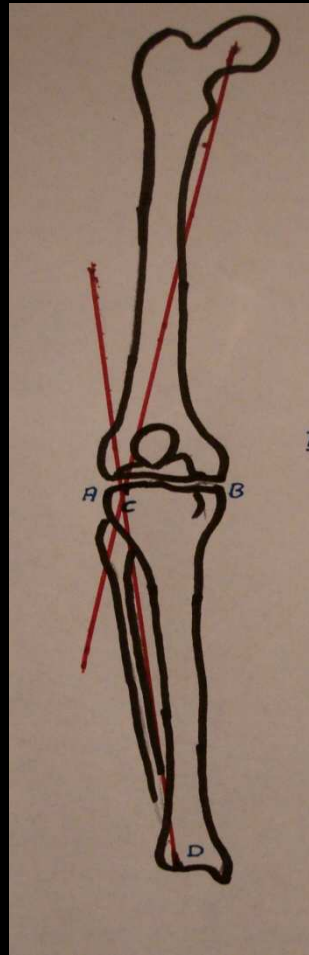
MEASSUREMENT OF EPIPHYSEAL ANGLE



MANSAT TECHNIQUE



PUDDU TECHNIQUE



PARAMETERS

- Coronal and sagittal axis alignment problems.
- Tridimensional axis alignment problems.
- Instability.
- Meniscopathy.
- Condropathy (Akizuki y Stone).

HTO CLASSIFICATION

- Closed Wedge Osteotomy.
- Open Wedge Osteotomy.
- Dome Osteotomy.
- Tridimensional Osteotomy.

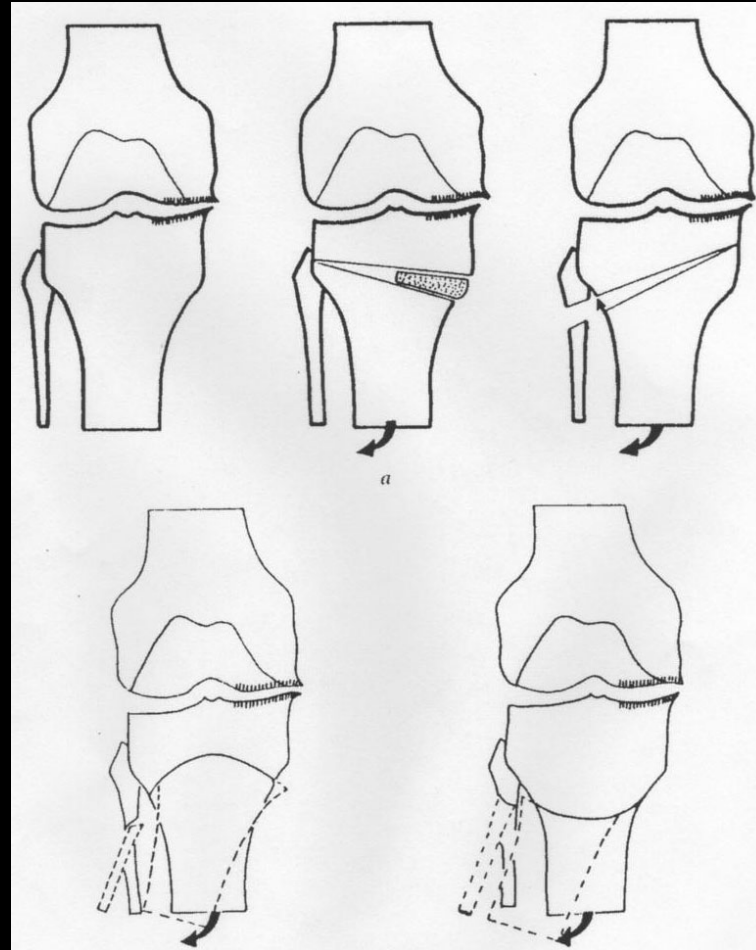
OPEN WEDGE OSTEOTOMY



CLOSE WEDGE OSTEOTOMY



DOME OSTEOTOMY



TRIDIMENSIONAL OSTEOTOMY



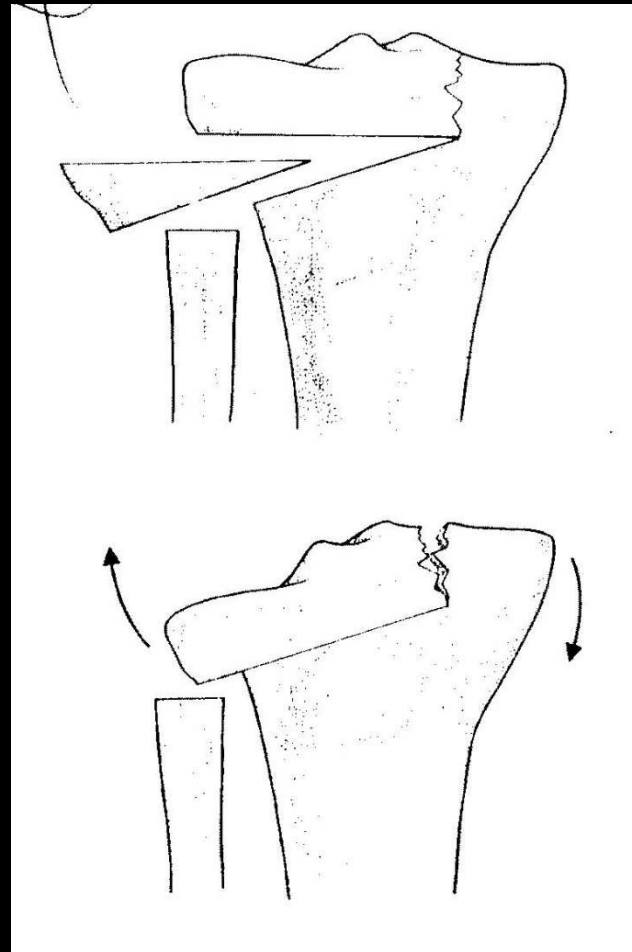
FIXATION

- External Fixators.
- Staples (Blount)
- Neutralization Plate (AO).
- Compression Plate (VCO).
- Shelf Type Plate (Puddu).

COMPLICATIONS HTO

- Infection.
- Neurovascular damage (Zaidi).
- Proximal fragment fracture.
- Contralateral cortical fracture.
- Slope alterations.
- Pathological increase of external rotation.
- Extensor mechanism alteration.
- Hipo or hipercorection.

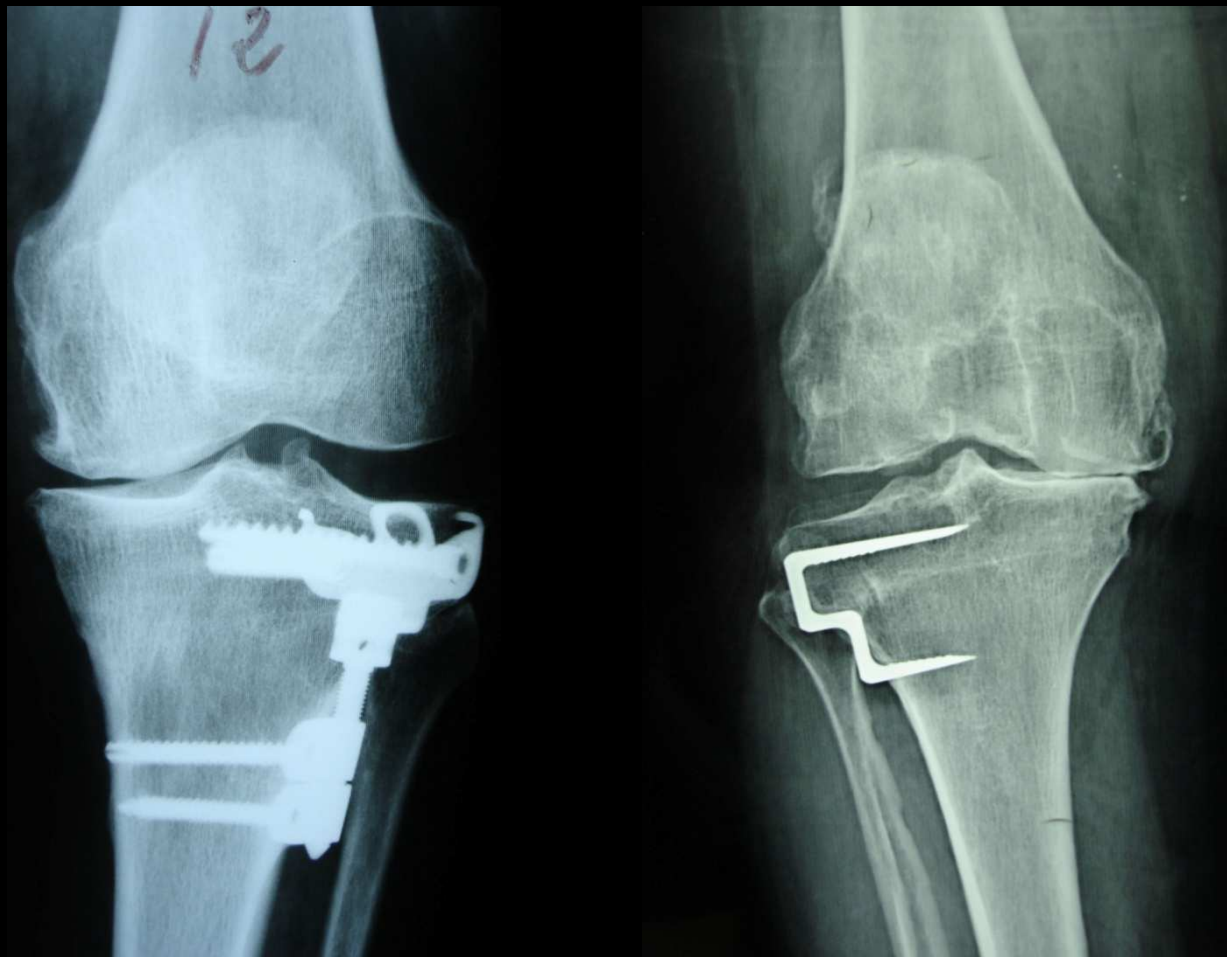
PROXIMAL FRAGMENT FRACTURE



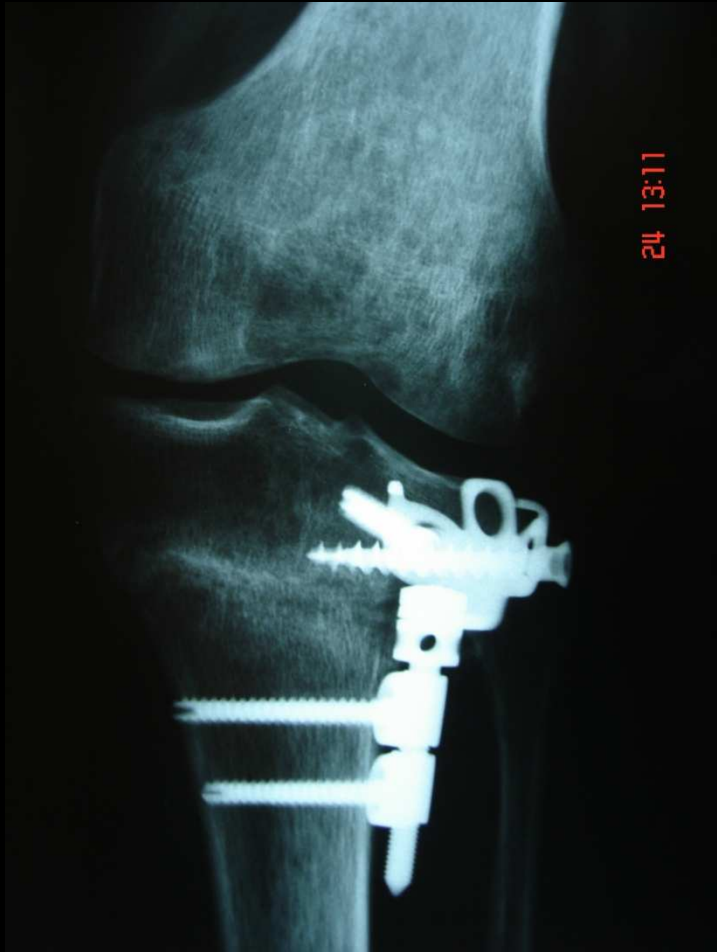
CONTRALATERAL CORTICAL FRACTURE



HIPOCORRECTION



HIPERCORRECTION



CONCLUSIONS

- Joint loading redistribution.
- Biological and mechanical effects.
- Pain relief.
- Walking pattern improvement.
- No modification of ROM.

THE FUTURE IS HERE

- Bone substitutes.
- Improved Implants design.
- Navigation.
- New investigations about the biological effect (Erasmus).
- Osteotomy + Restoration techniques:
 - MACI
 - Osteochondral transplant
 - Meniscal transplant

THANK YOU



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