

# Medial Hinge Fracture After Closing Wedge HTO: Classification and Risk Factor Analysis of a Neglected Complication

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# DISCLOSURE

- S.Z.:  
consultant for Smith and Nephew and Depuy Synthes  
research support from Medacta and Depuy Synthes
- All other authors declares no COI

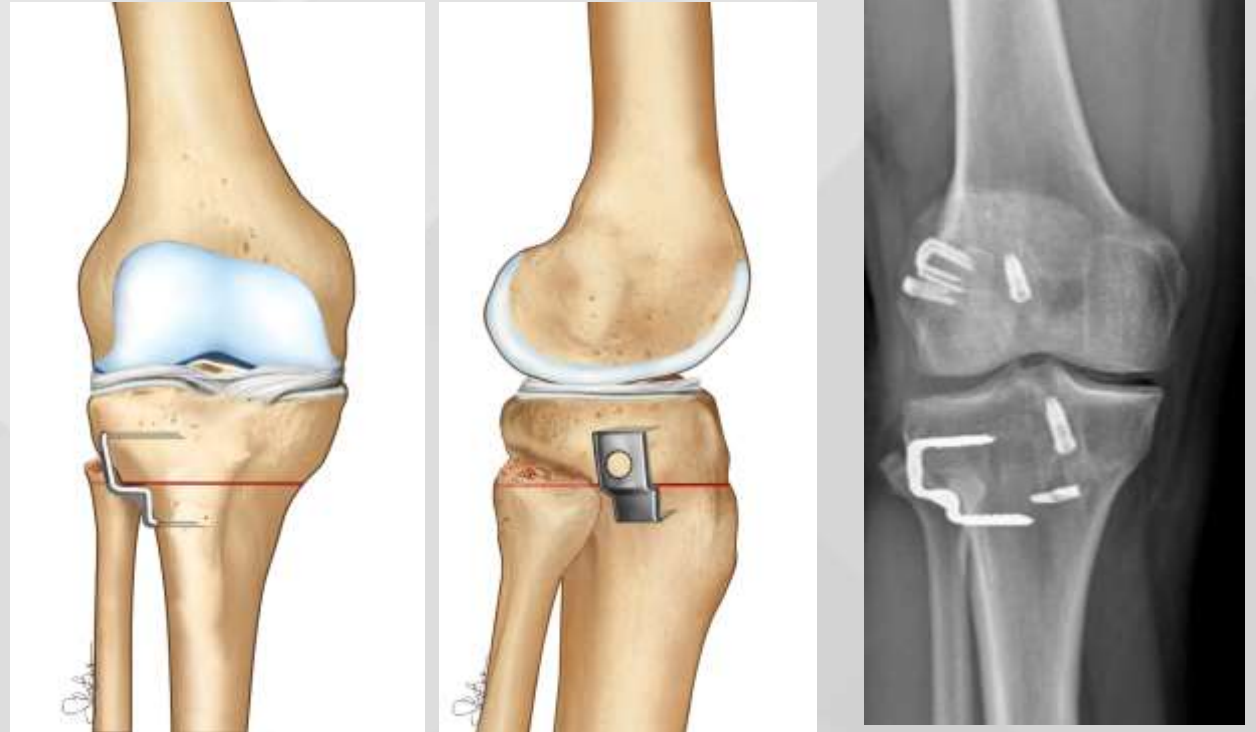


# INTRODUCTION

- HTO ESTABLISHED PROCEDURE FOR VARUS KNEE
- MEDIAL OW-HTO are MORE COMMONLY PERFORMED...

## LATERAL CW-HTO ADVANTAGES:

- BONE-ON-BONE HEALING (NO GRAFT)
- ASSOCIATED PROCEDURE
- SLOPE REDUCTION
- PATELLA HEIGHT

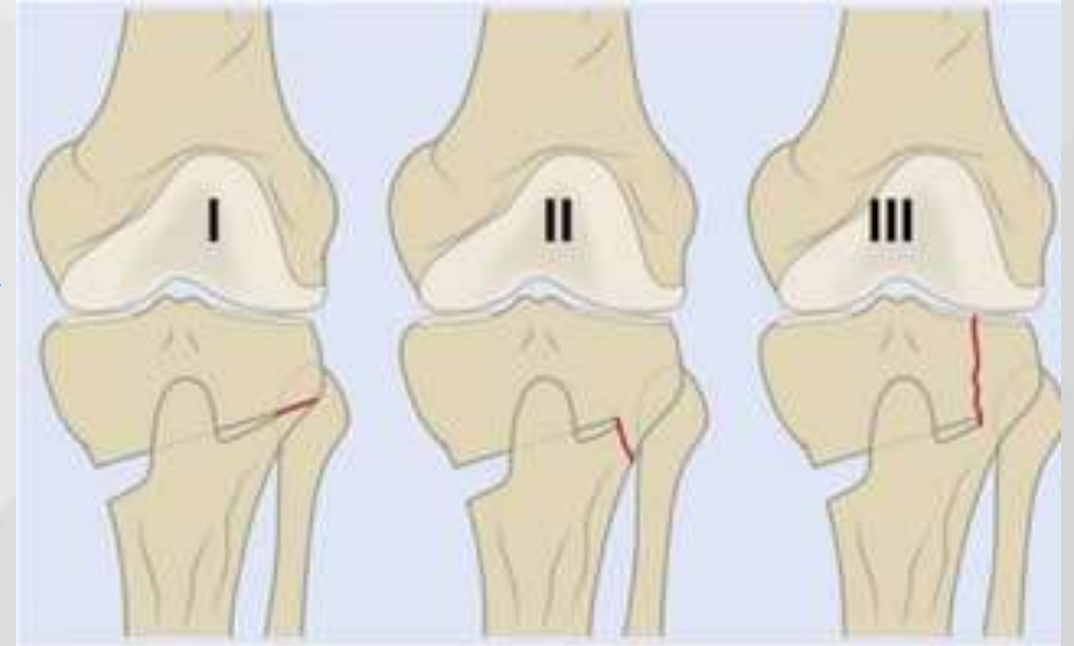


# INTRODUCTION



## HINGE FRACTURE AFTER OW-HTO:

- MOST COMMON COMPLICATION (10-30%)
- DELAYED UNION, LOSS OF CORRECTION, OA
- TAKEUCHI CLASSIFICATION (3 TYPE)
- SEVERAL RISK FACTORS (GAP 11mm)



## WHAT ABOUT MEDIAL HINGE FRACTURE (MHF) after LATERAL CW-HTO?

# MATERIAL AND METHODS

## **137** ISOLATED LATERAL CW-HTO INCLUDED

- RESTROSPECTIVE, SINGLE CENTER
- AGE AT SURGERY  $43.7 \pm 10.5$  YEARS
- 86% MALES, 14% FEMALES
- PREOP PLANNED CORRECTION  $10.9 \pm 16.4^\circ$



- **1st ENDPOINT “HINGE FRACTURE”**: INTRA and POSTOPERATIVE RADIOGRAPHS
- **2nd ENDPOINT “FRACTURE CLASSIFICATION”**
- **3rd ENDPOINT “RISK FACTORS FOR MHF”**: PATIENT’S and SURGERY RELATED

# MATERIAL AND METHODS

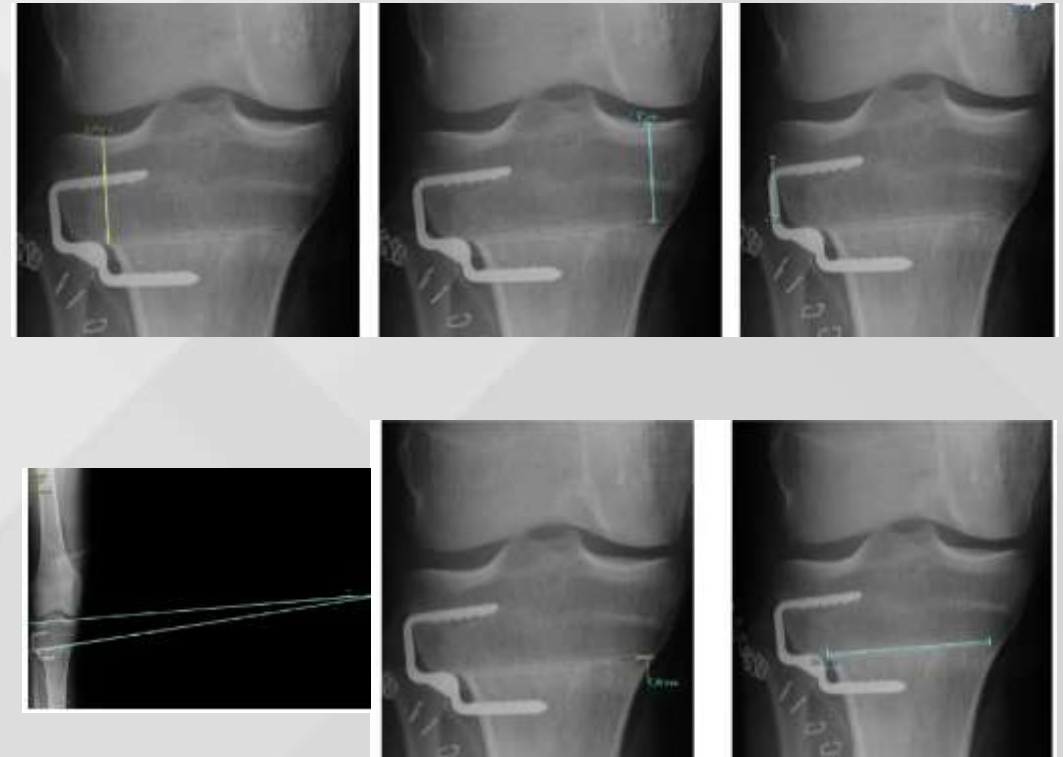
## “RISK FACTORS FOR MHF”:

### PATIENT’S RELATED

- AGE, SEX
- BMI, SMOKING
- PREVIOUS SURGERIES

### SURGERY RELATED:

- PREOP. HKA, PLANNED CORRECTION
- **OSTEOTOMY RELATED:**
  - “HEIGHT” of CUT (MEDIAL and LATERAL)
  - DISTANCE FIBULA, CUT INCLINATION
  - CUT DEPTH and HINGE PRESERVED

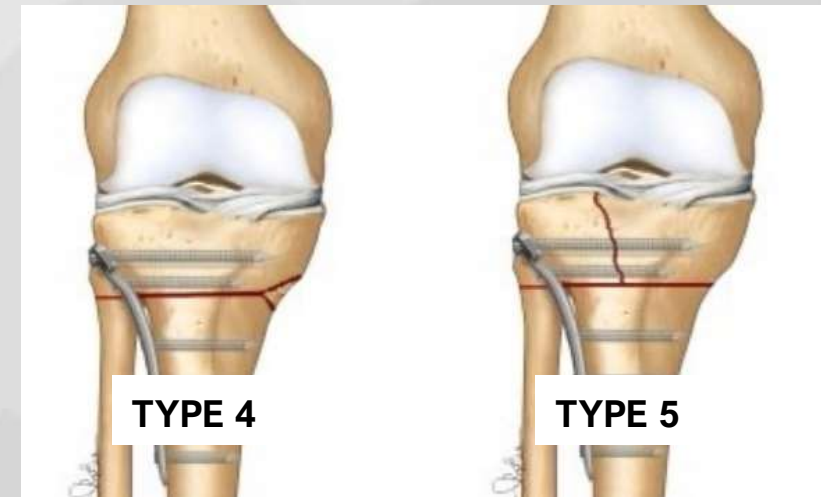
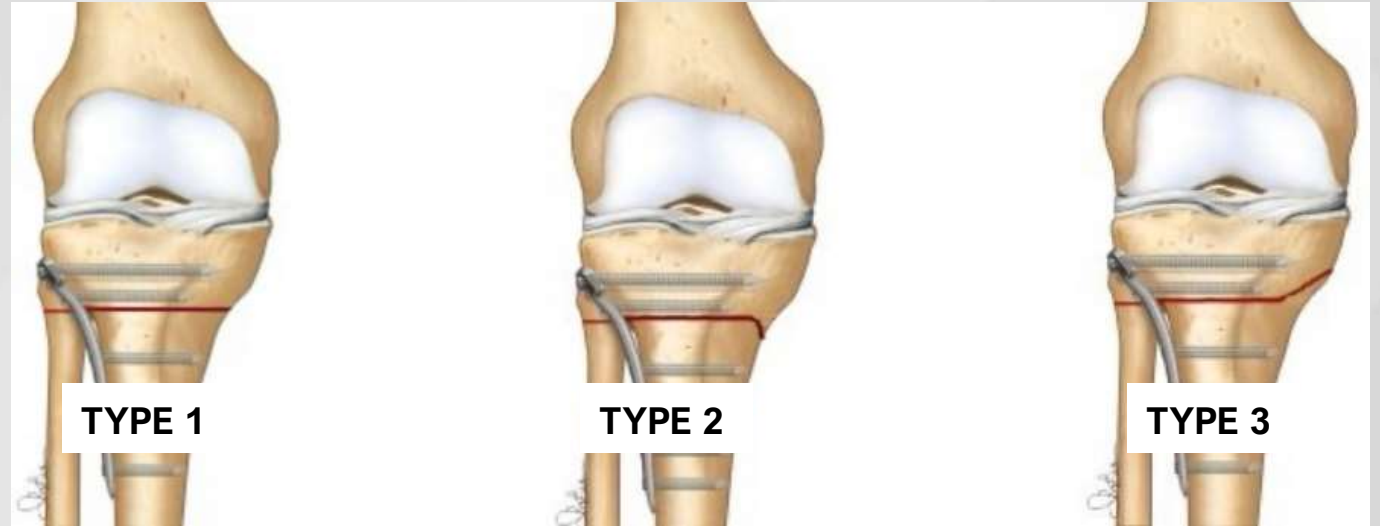




# RESULTS: HINGE FRACTURE

## CLASSIFICATION TYPE:

1. LINEAR: 43 (55.1%)
2. DISTAL DIRECTION: 12 (15.3%)
3. PROX. DIRECTION: 11 (14.1%)
4. THIRD FRAGMENT: 10 (12.8%)
5. TIBIAL PLATEAU: 2 (2.5%)



# MATERIAL and METHODS

**RISK FACTOR ANALYSIS using HINGE FRACTURE as ENDPOINT:**

**UNIVARIATE ANALYSIS:**

**ASSOCIATION WITH:**

- ✓ INCREASED MEDIAL PLATEAU DISTANCE
- ✓ INCREASED HTO LENGTH
- ✓ INCREASED CUT/TIBIA LENGTH
- ✓ FEMALE SEX

**NO ASSOCIATION WITH:**

- ALL DEMOGRAPHICAL
- HKA, PLANNED CORRECTION and OTHER X-RAYs MEASURES





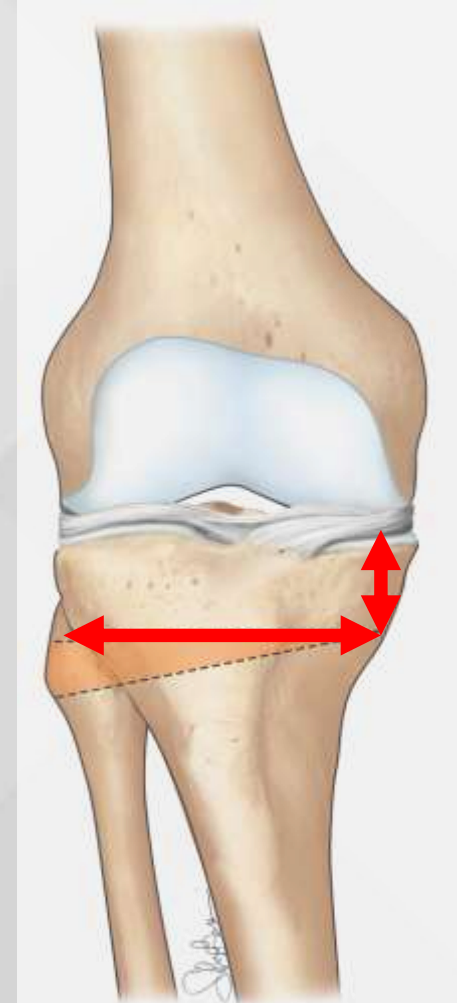
# MATERIAL and METHODS

**RISK FACTOR ANALYSIS using HINGE FRACTURE as ENDPOINT:**

**MULTIVARIATE ANALYSIS:**

**ASSOCIATION WITH:**

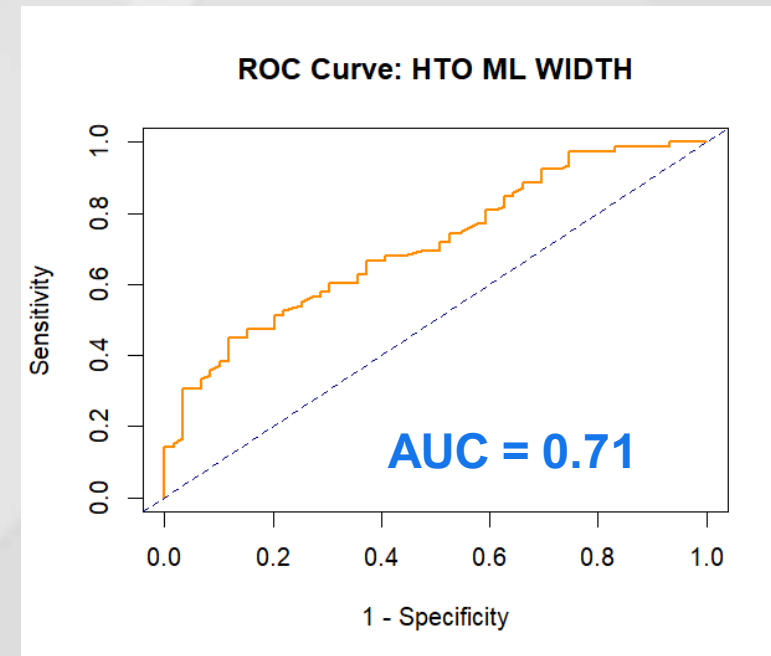
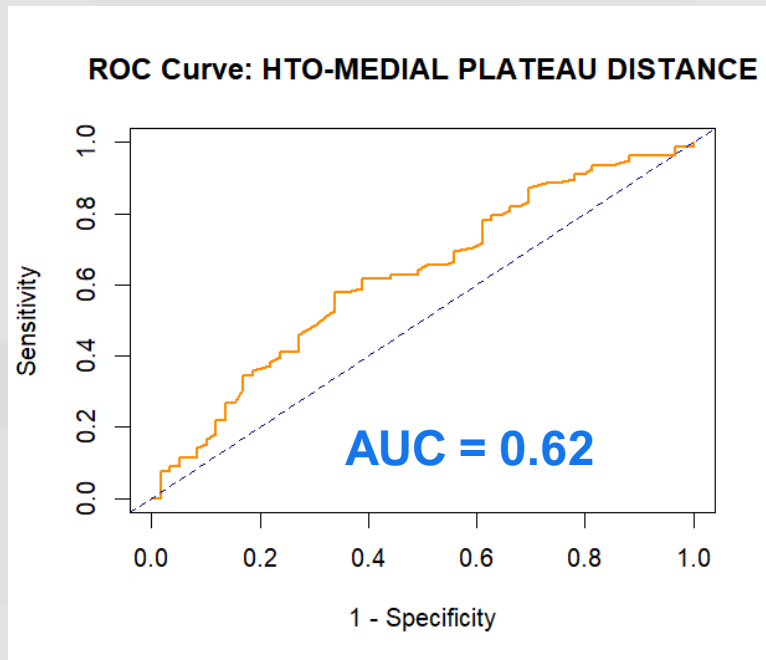
- ✓ INCREASED MEDIAL PLATEAU DISTANCE ( $p=0.03$ )
- ✓ INCREASED HTO LENGTH ( $p=0.01$ )
- ✓ INCREASED CUT/TIBIA LENGTH
- ✓ FEMALE SEX



# MATERIAL and METHODS

## ROC ANALYSIS:

*“to discover a cut-off value to reduce the number of fractures ”*



**POOR CORRELATION – LITTLE CLINICAL RELEVANCE - MULTIFACTORIAL**



# CONCLUSION

- MEDIAL HINGE FRACTURE OCCURS IN MORE THAN HALF OF PATIENTS
- THE STUDY PROVIDES A DESCRIPTIVE CLASSIFICATION (5 TYPE),  
FUTURE DIRECTION INVESTIGATE TREATMENT / PROGNOSTIC
- INCREASED MEDIAL PLATEAU DISTANCE and INCREASED OSTEOTOMY LENGTH are ASSOCIATED WITH FRACTURE BUT...THERE IS NO CUT-OFF!

**HINGE FRACTURES IN CW-HTO ARE REALLY  
COMMON and MULTIFACTORIAL!**



# KSSTA

Knee Surgery  
Sports Traumatology  
Arthroscopy

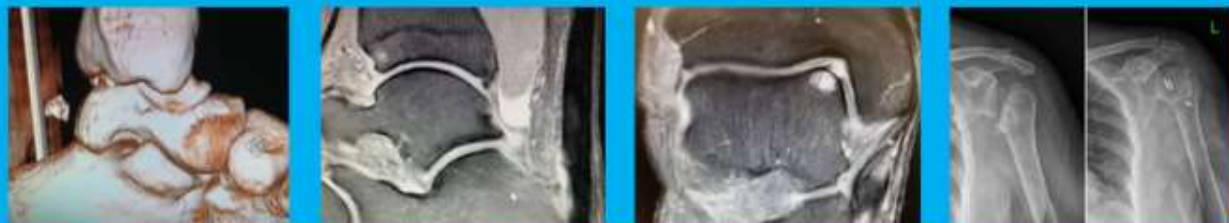
*Thank you!*



Gian Andrea Lucidi, MD

KSSTA web-editor

Ig: giana90



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