



CLINICA ORTOPEDICA UNIVERSITA' DI SIENA  
SCUOLA DI SPEC. ORTOPEDIA E TRAUMATOLOGIA  
DIR.: PROF. S. GIANNOTTI



DODICESIMO CONVEGNO DI TRAUMATOLOGIA CLINICA E FORENSE

19° Corso di Ortopedia, Traumatologia e Medicina Legale

**LE CAUSE DI INSUCCESSO IN ORTOPEDIA  
E IN MEDICINA RIABILITATIVA:  
DAL PLANNING AL CONTENZIOSO**

PROBLEMATICHE GIURIDICHE E MEDICO LEGALI  
LA DIFFICOLTA' APPLICATIVA DELLA LEGGE GELLI-BIANCO



Presidenti

*F.M. Donelli, M. Gabbrielli, G. Varacca*

4 - 5 Novembre 2022

Palazzo dei Congressi - Salsomaggiore Terme (PR)



# PIATTO TIBIALE: ETERNO CHALLENGE DELL'ORTOPEDICO

S. GIANNOTTI



# ARTICOLAZIONE GINOCCHIO

• SUPERFICIE PORTANTE

• CINEMATICA COMPLESSA



# EPIDEMIOLOGIA

## • INCIDENZA:

- 1-2% DI TUTTE LE FRATTURE
- 10.3 PER 100.000 PERSONE OGNI ANNO

## ✓ **DEMOGRAFICA**

- ETÀ MEDIA **52AA**

## DISTRIBUZIONE BIMODALE

- MASCHI 40AA → TRAUMI AD ALTA ENERGIA
- FEMMINE 70 AA → CADUTE A BASSA ENERGIA

## ✓ **LOCALIZZAZIONE**

- PIATTO TIBIALE **LATERALE 70-80%**
- BICONDILARI 10-30%
- PIATTO TIBIALE **MEDIALE 10-20%**





# EZIOLOGIA

## MECCANISMO TRAUMATICO

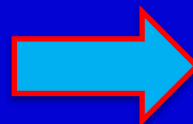
- VETTORI FORZE DI CARICO
- QUANTITA' DI ENERGIA
- QUALITA' OSSEA



## MORFOLOGIA DELLA FRATTURA

- CARICO IN VALGO
  - PIATTO TIBIALE LATERALE
- CARICO IN VARO
  - PIATTO TIBIALE MEDIALE
- CARICO ASSIALE
  - BICONDILARI
- CARICO COMBINATO
  - ALTA ENERGIA
  - SCOMPOSIZIONE DEI FRAMMENTI
  - COINVOLGIMENTO PIATTO MEDIALE FREQUENTE
  - DANNO DEI TESSUTI MOLLI
- BASSO CARICO
  - PIATTO TIBIALE LATERALE

**GRADO FLESSIONE  
GINOCCHIO**



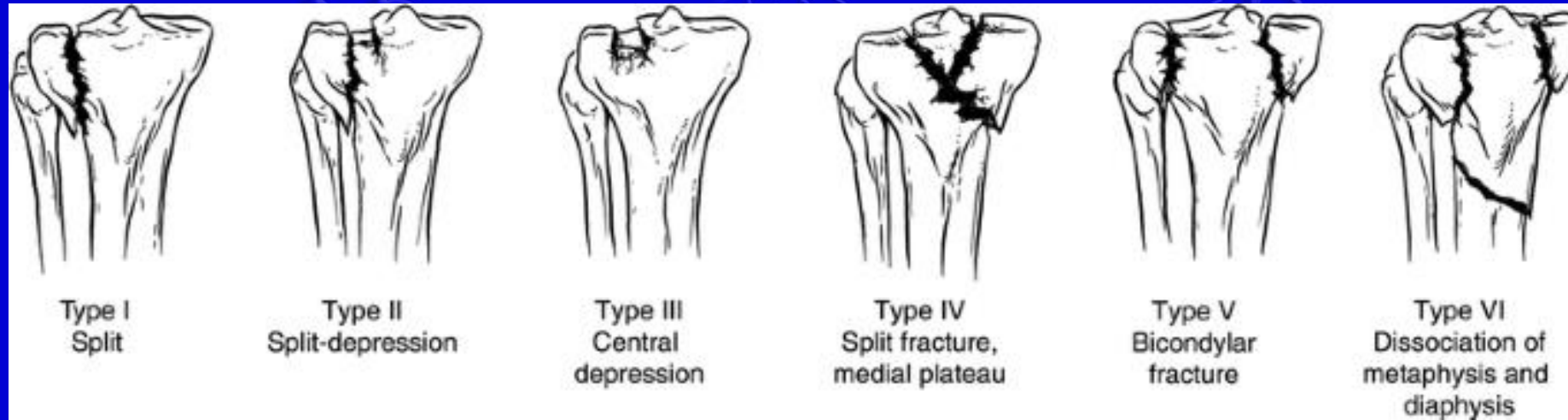
**CONFORMAZIONE DELLA  
FRATTURA**



# CLASSIFICAZIONI

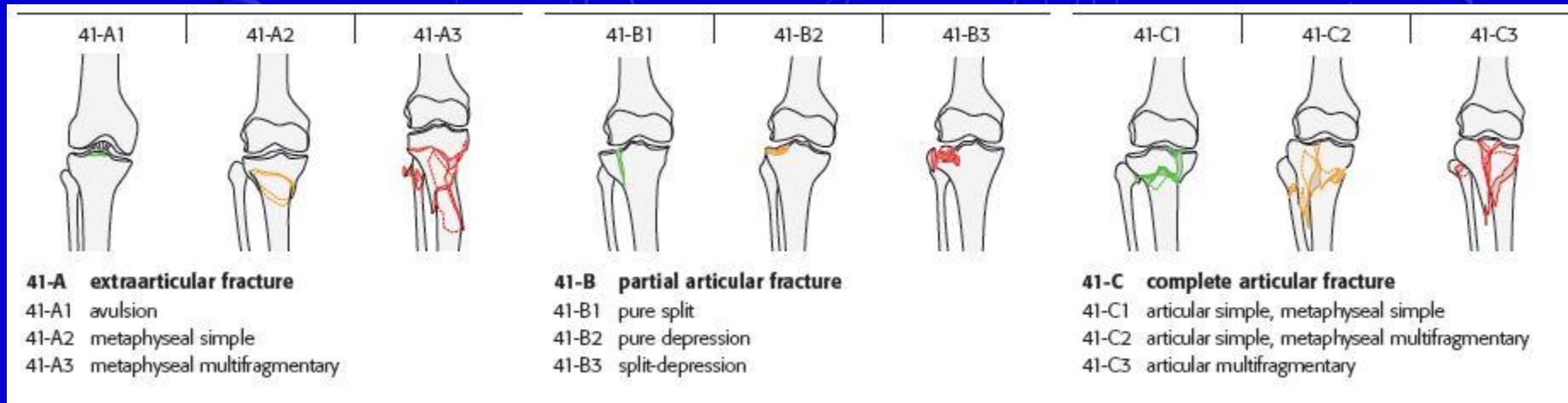
## SCHATZKER

Schatzker et al. - 1979



## AO-41

Meinberg EG et al. - 2018





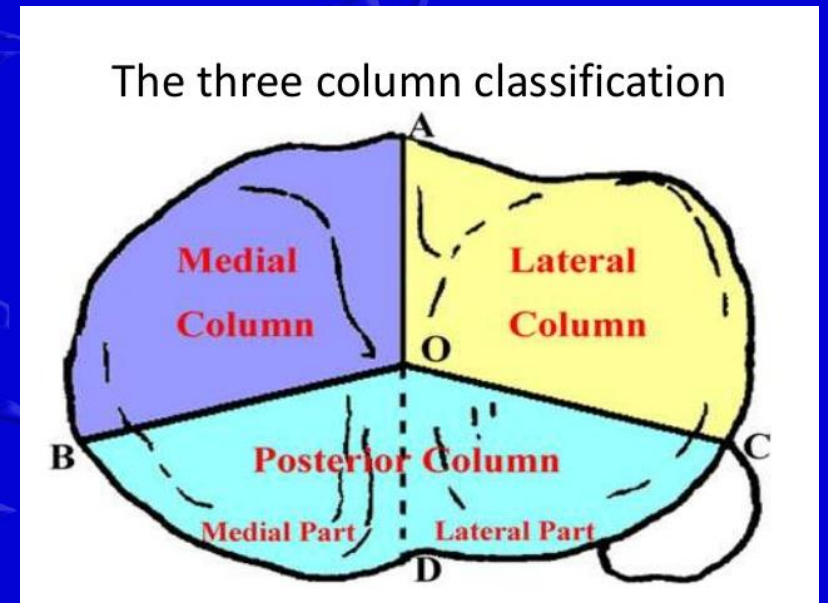
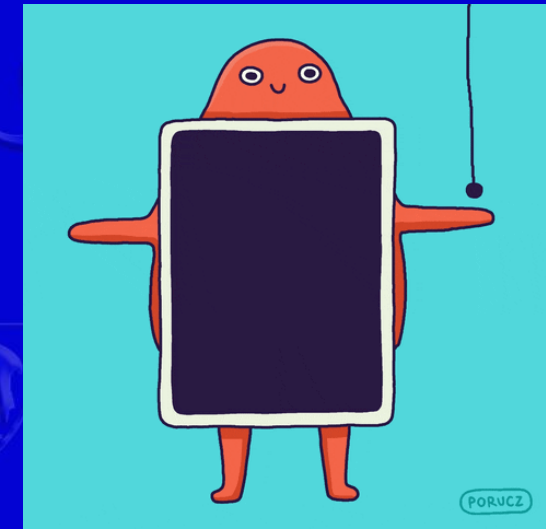
# LUO e le tre COLONNE

**Varus force**

Medial plateau fx.	Decreased MPTA	Hyperextension	Extension	Flexion
Medial plateau fx.	Decreased MPTA	Decreased PSA	Unchanged PSA	Increased PSA

**Valgus force**

lateral plateau fx.	Increased MPTA	Hyperextension	Extension	Flexion
lateral plateau fx.	Increased MPTA	Decreased PSA	Unchanged PSA	Increased PSA





# LESIONI ASSOCIATE

## LESIONI MENISCALI 60-70 %

➤ MENISCO ESTERNO

➤ MENISCO INTERNO



- + FREQUENTI DEL MI
- PATTERN SCHATZKER II
- > 10MM DEPRESSION >6MM SPLIT
- PATTERN SCHATZKER IV

## LESIONI LEGAMENTOSE 20-50%

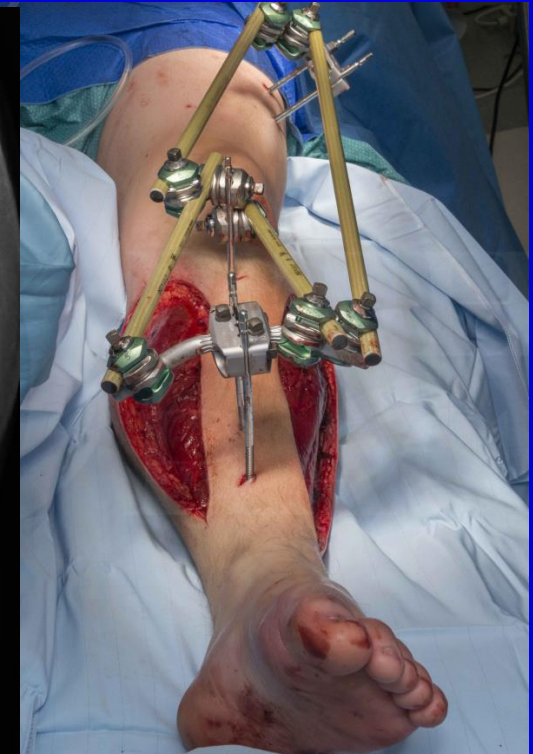
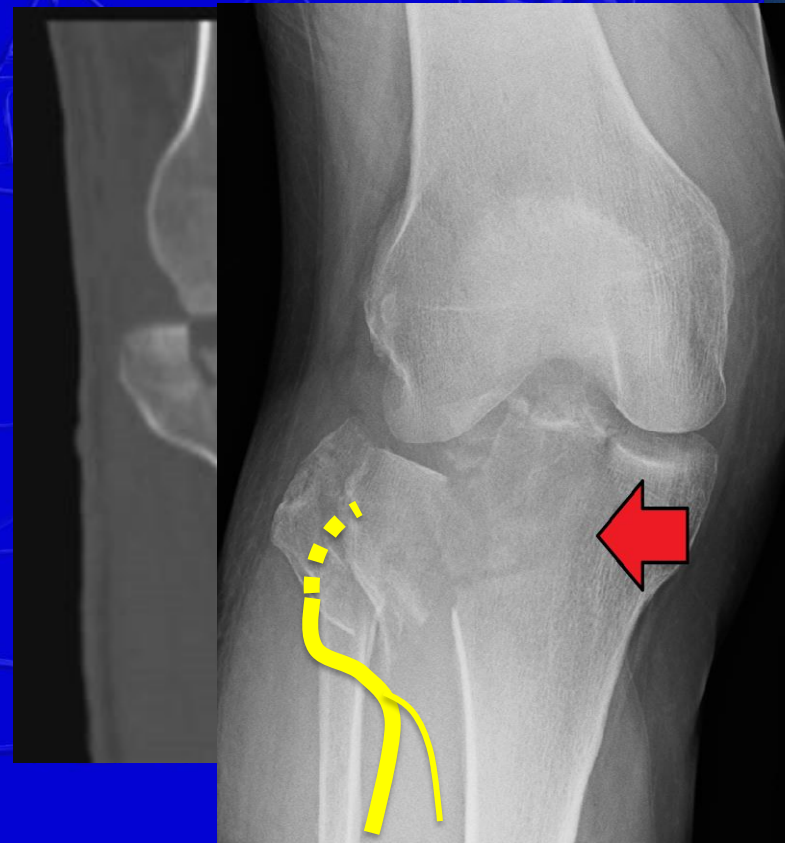
➤ ACL: PATTERN SCHATZKER IV E VI

➤ PCL: TRAUMI IN IPERESTENZIONE

## SINDROME COMPARTIMENTALE 10-40%

## LESIONI NEUROVASCOLARI

- PATTERN SCHATZKER IV
- + FREQUENTI SPE E A/V POPLITEA





# DIAGNOSTICA

## □ ANAMNESI

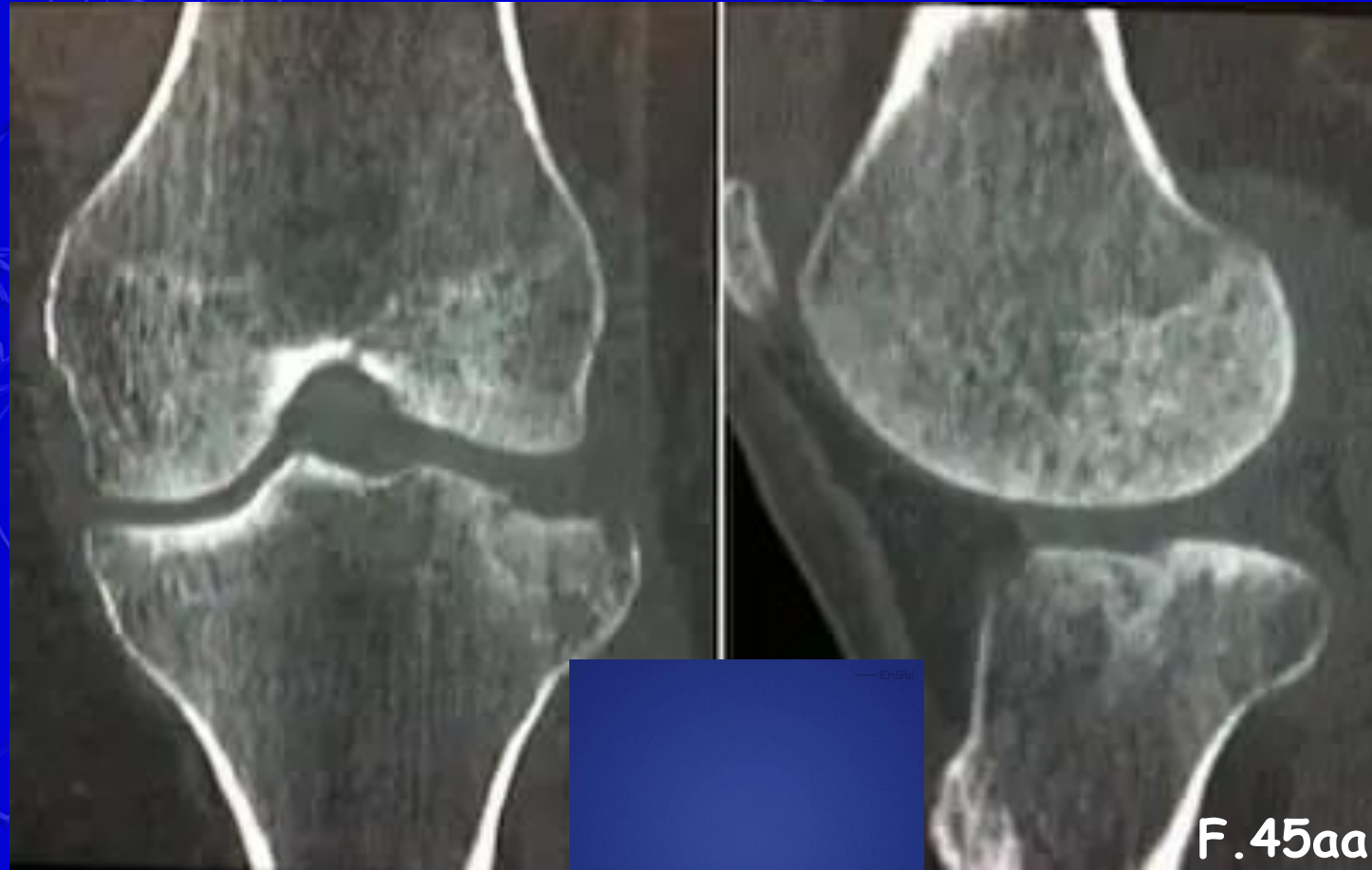
## □ CLINICA

- ARTROCENTESI: «FAT DROPLETS»
- VALUTAZIONE CAPSULO-LEGAMENTOSA

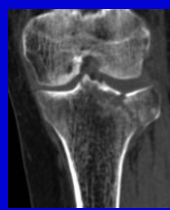
## □ RX

- PROIEZIONI OBLIQUE: FALSI NEGATIVI

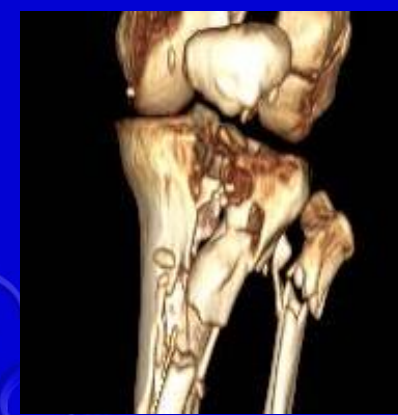
## □ TAC







# TRATTAMENTO



- DEPRESSIONE ARTICOLARE < 2 MM
- DIASTASI DEL FRAMMENTO < 2 MM
- INSTABILITÀ IN VARO/VALGO < 10 DEG
- NESSUN COINVOLGIMENTO MEDIALE

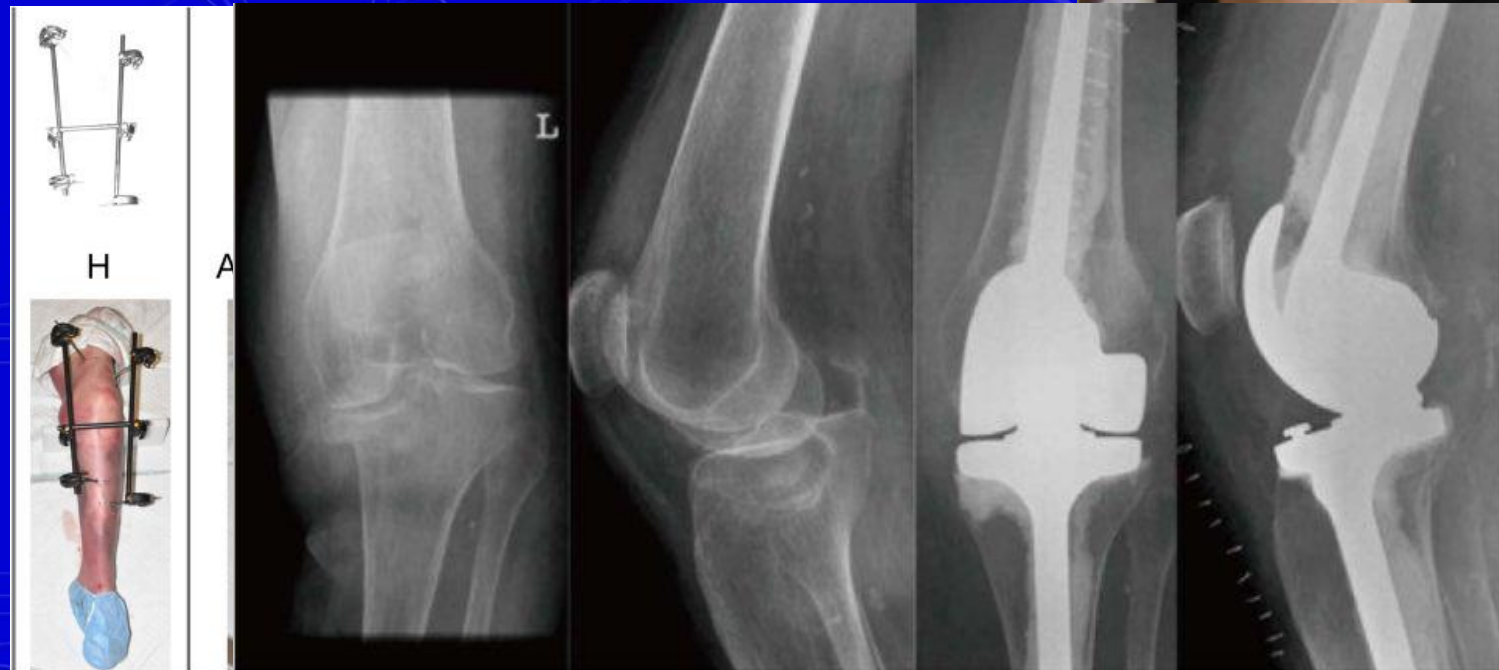
## □ CONSERVATIVO

## □ ORIF

- VITI
- PLACCA E VITI

## □ FISSATORE ESTERNO

- TEMPORANEO: «A PONTE»
- DEFINITIVO: HILIZAROV O IBRIDI

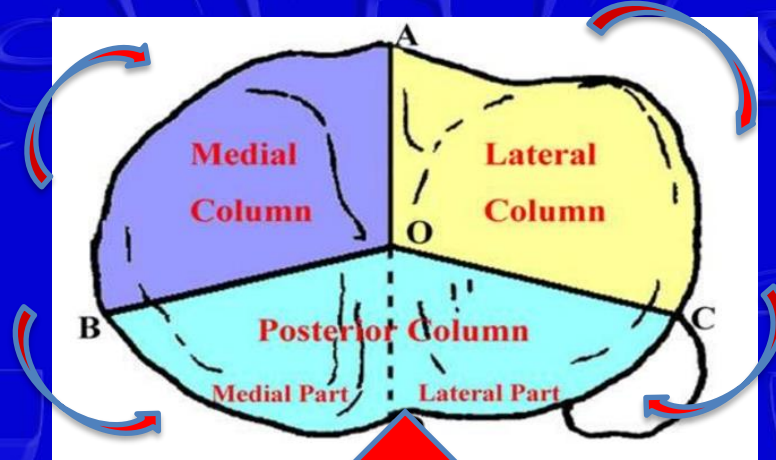


\* Morandi-2020

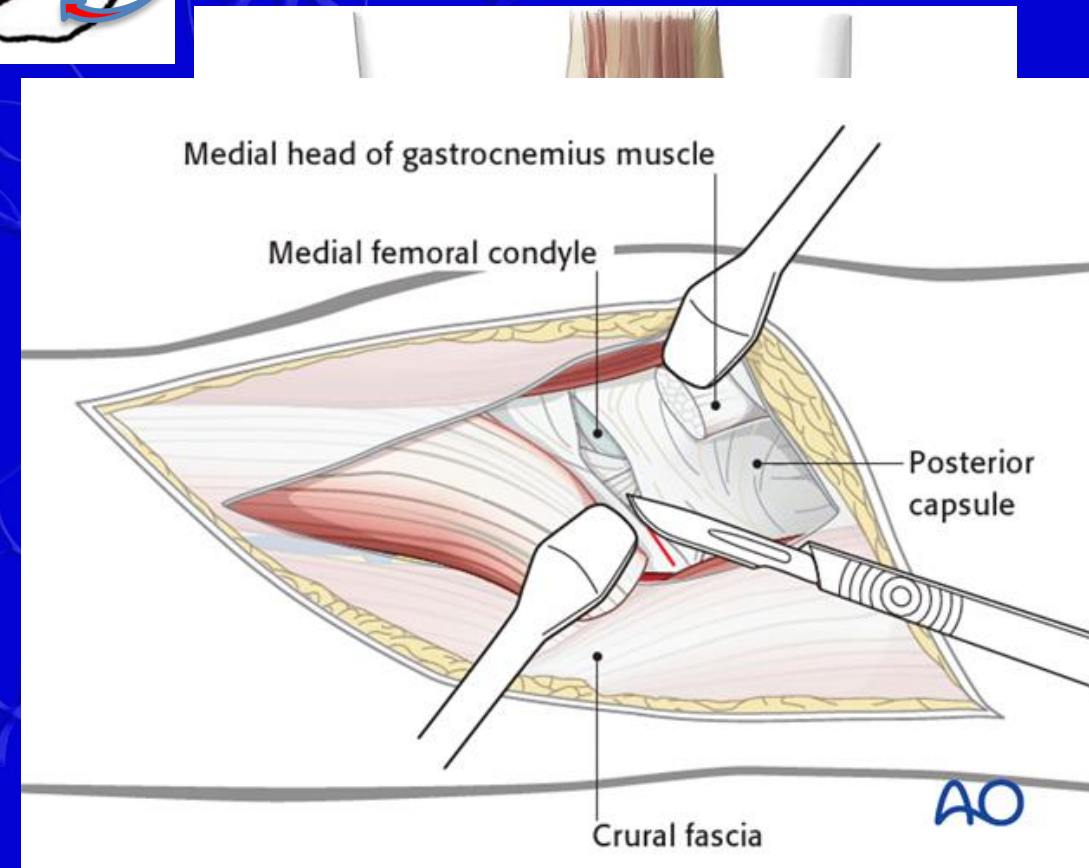
## □ PROTESI VINCOLATE E SEMIVINCOLATE

\* Orthobullets

# VIE D'ACCESSO



- ❑ ANTERO-LATERALE
- ❑ MEDIALE
- ❑ POSTERO-LATERALE
- ❑ POSTERO-MEDIALE
- ❑ POSTERIORE DIRETTO





# TRATTAMENTO

## SCHATZKER I

➤ SINTESI CON 2 VITI

PARZIALMENTE FILETTATE

RESEARCH ARTICLE

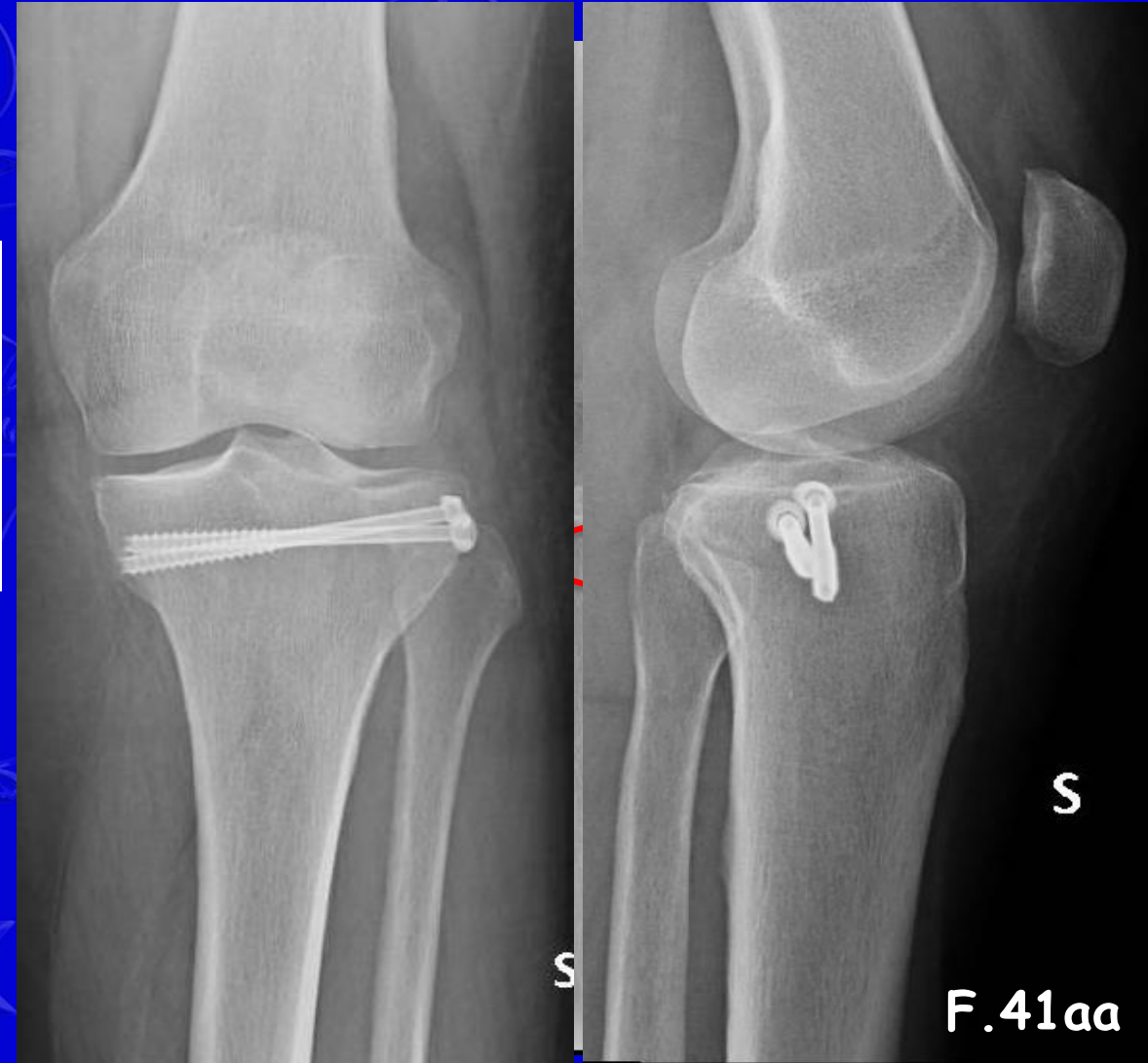
Open Access

The effect of screw thread length on initial stability of Schatzker type 1 tibial plateau fracture fixation: a biomechanical study



Ahmet Salduz<sup>1\*</sup>, Fevzi Birisik<sup>1</sup>, Gokhan Polat<sup>1</sup>, Bugra Bekler<sup>2</sup>, Ergun Bozdog<sup>2</sup> and Onder Kilicoglu<sup>1</sup>

\* Salduz et al. - 2016



- SINTESI PERCUTANEA

- PRECOCE MOBILIZZAZIONE



# TRATTAMENTO

## SCHATZKER I

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\* Salduz et al. - 2016



- SINTESI PERCUTANEA
- PRECOCE MOBILIZZAZIONE





# TRATTAMENTO

## SCHATZKER II E III

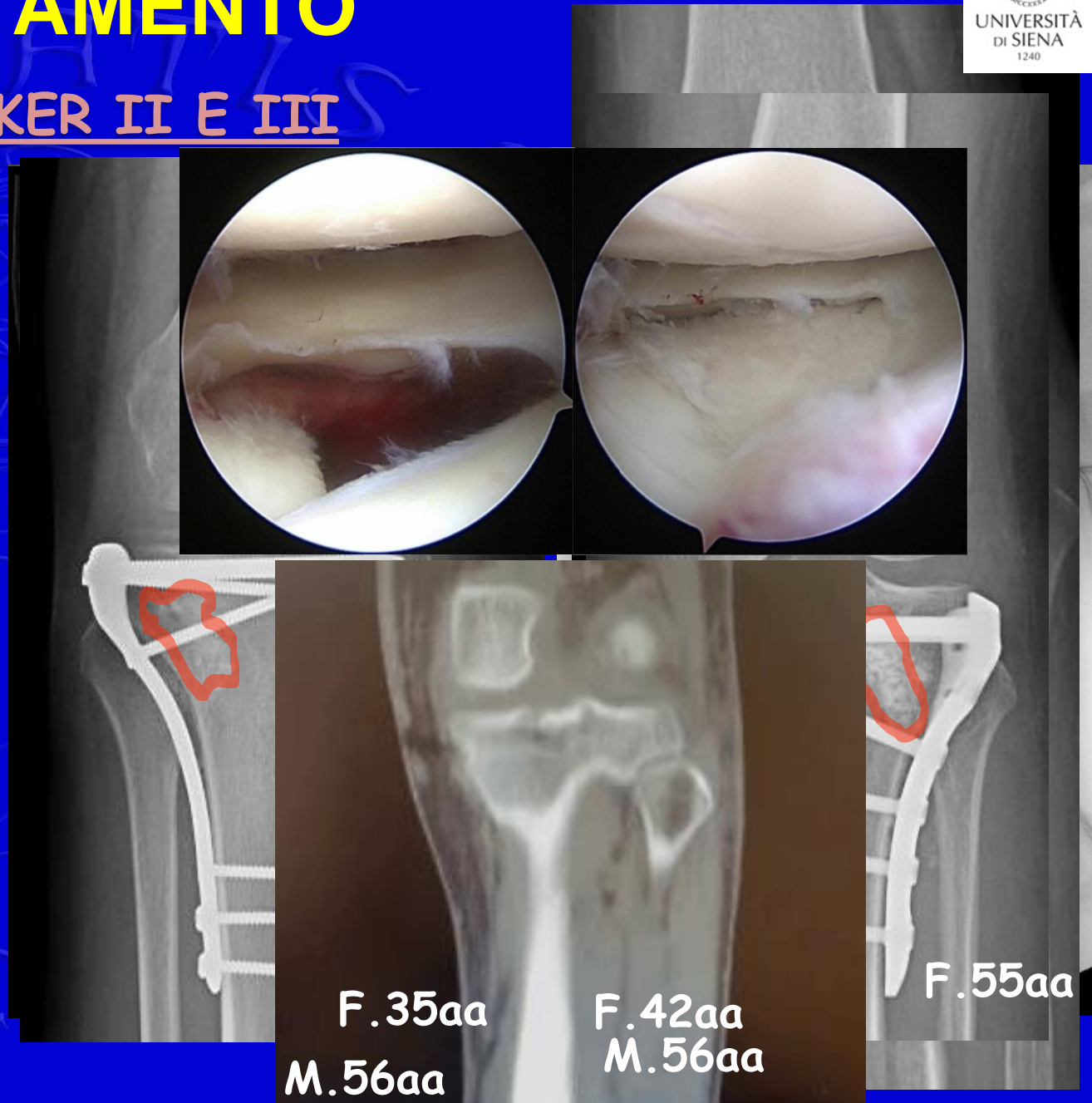
### ➤ ORIF

- VITI
- PLACCA E VITI

\* CARICO PRECOCE

▪ INNESTI OSSEI

▪ ASSISTENZA ARTROSCOPICA





# TRATTAMENTO

## SCHATZKER IV

➤ "MIKULICZ POINT" -> 60% DEL CARICO



ALTO TASSO DI SCOMPOSIZIONE SECONDARIA

SPESSO POSTERO-MEDIALE

\* Moore et al. - 1981

GENERAL OF  
Fracture-Disloc  
TILLMAN

➤ ORIF

▪ PLACCA E VITI

SUPPORTO MEDIALE DIRETTO

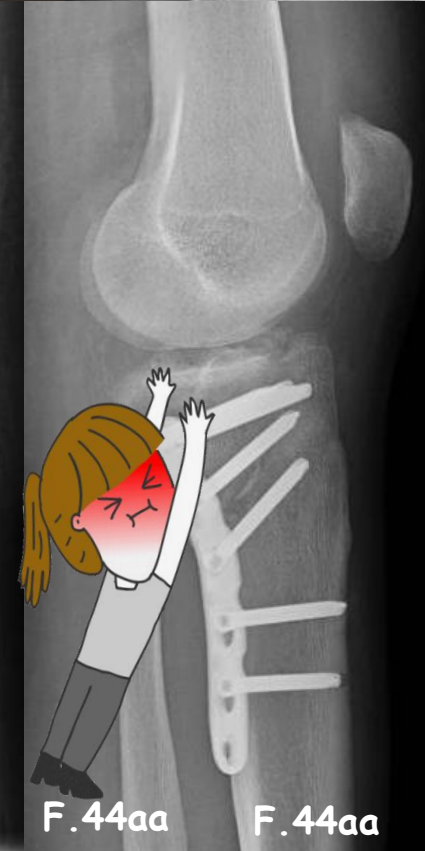
APPROCCIO POSTERO-MEDIALE



F.44aa

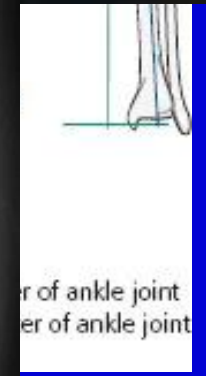
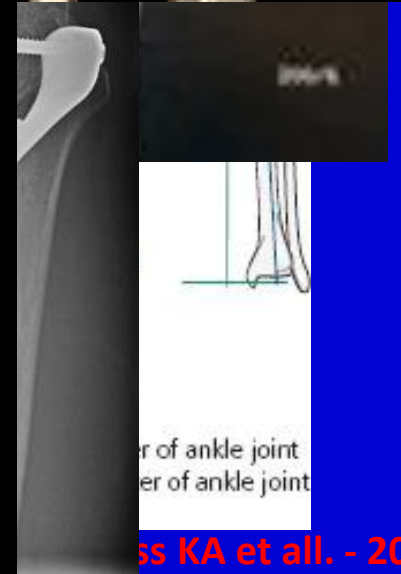


M.41aa



F.44aa

F.44aa



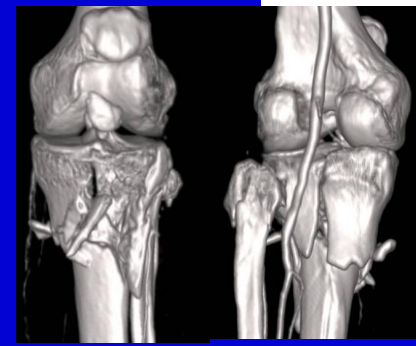
er of ankle joint  
er of ankle joint

ss KA et al. - 2017



# TRATTAMENTO

## SCHATZKER V E VI



### DAMAGE CONTROL

ORIGINAL ARTICLE

#### Risk Factors of Infection After ORIF of Bicondylar Tibial Plateau Fractures

*Brent J. Morris, MD,\* R. Zackary Unger, BS,† Kristin R. Archer, PhD,\* Shannon L. Mathis, PhD,\* Aaron M. Perdue, MD,\* and William T. Obremskey, MD, MPH\**

\* Morris et al. - 2013

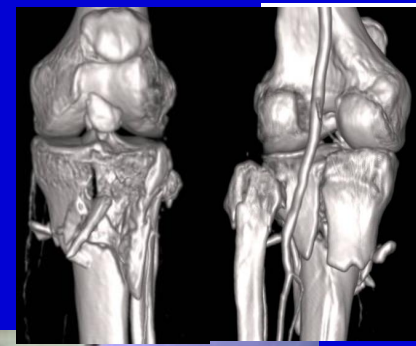


- **SINDROME COMPARTIMENTALE**  
**14,5%-27%**
- **INFEZIONE PROFONDA 36%**



# TRATTAMENTO

## SCHATZKER V E VI



### DAMAGE CONTROL

#### ➤ FISSAZIONE ESTERNA

SPAN

PLAN

SCAN



SYMPOSIUM: CURRENT ISSUES IN ORTHOPAEDIC TRAUMA: TRIBUTE TO CLIFFORD H. TUREN

**Does Early versus Delayed Spanning External Fixation Impact Complication Rates for High-energy Tibial Plateau and Plafond Fractures?**

Justin M. Haller MD, David Holt MD, David L. Rothberg MD, Erik N. Kubiak MD, Thomas F. Higgins MD

\* Haller et al. - 2015



■ NO DIFFERENCE EARLY VS DELAYED

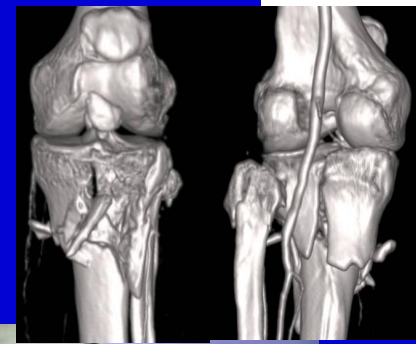
>12h





# TRATTAMENTO

## SCHATZKER V E VI



### DAMAGE CONTROL

#### ➤ FISSAZIONE ESTERNA

SPAN

PLAN

SCAN



Original article

Complications in the management of closed high-energy proximal tibial plateau fractures

Kavin Khatri <sup>a,\*</sup>, Vijay Sharma <sup>b</sup>, Darsh Goyal <sup>c</sup>, Kamran Farooque <sup>b</sup>

<sup>a</sup> Department of Orthopaedics, GGS Medical College and Hospital, Punjab, India

<sup>b</sup> Department of Orthopaedics, All India Institute of Medical Sciences, New Delhi, India

<sup>c</sup> Sports Injury Centre, Safdarjung Hospital, New Delhi, India

**\* Khatri et al. - 2016**

➤ **COMPLICANZE RIDOTTE dal 30% al 10%**





# TRATTAMENTO

SCHATZKER V E VI

ORIF

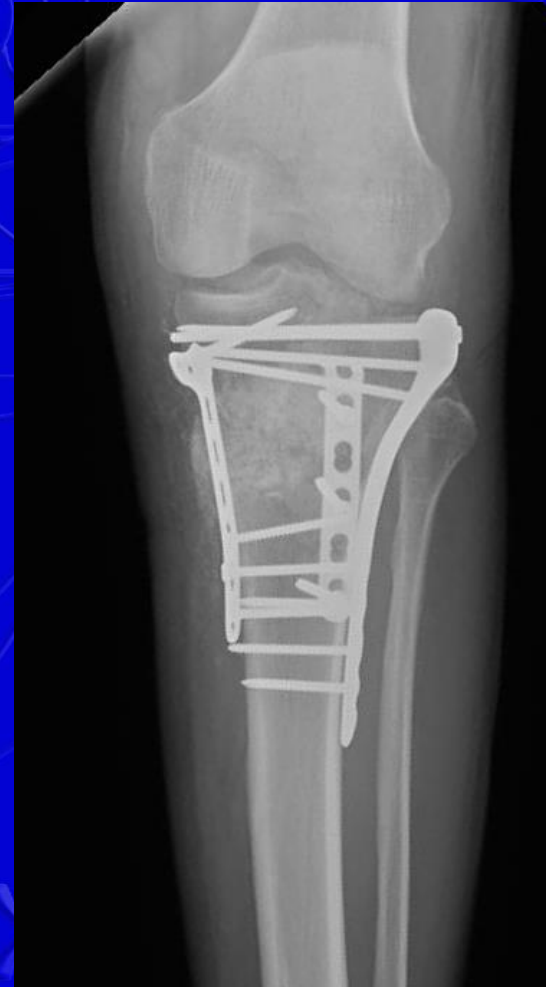
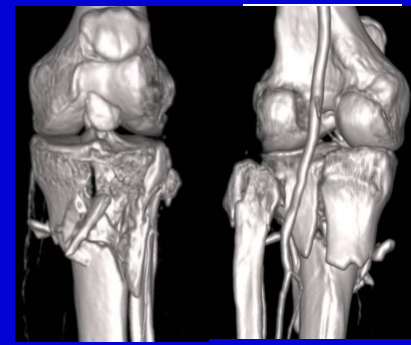
SINGOLA INCISIONE vs  
DOPPIA

Complications Associated With Internal Fixation of  
High-Energy Bicondylar Tibial Plateau Fractures Utilizing a  
Two-Incision Technique

*David P. Barei, MD, FRCS(C), Sean E. Nork, MD, William J. Mills, MD, M. Bradford Henley, MD, and  
Stephen K. Benirschke, MD*

**\* Barei et al. - 2005**

TASSO DI COMPLICANZE CON  
DOPPIA INCISIONE



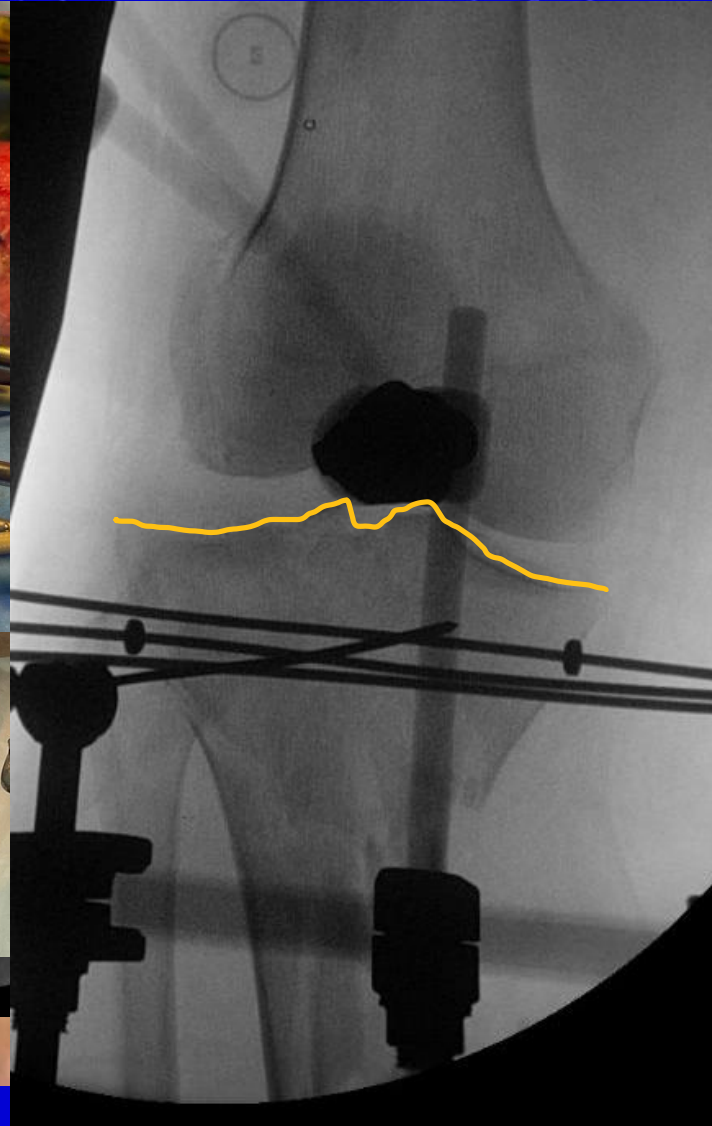


# TRATTAMENTO

## SCHATZKER V E VI

### ORIF

- STUDIO DELLA FRATTURA
- GESTIONE DEI TESSUTI MOLLI
- RIDUZIONE ANATOMICA





# TRATTAMENTO

## SCHATZKER V E VI

POST-OP

➤ DIVIETO DI CARICO  
6 SETTIMANE

➤ CHINESI PRECO



6 MESI

M.31aa



# COMPLICANZE

- **30% ARTROSI POST-TRAUMATICA ( 5 YEARS )**  
( Fr. BICONDILARI, COMMINUTE, ASP. MENISCALI, INSTABILITA', MALALLINEAMENTO , SCARSA RIDUZIONE )
- **6% INFEZIONI POST-CHIRURGICHE**  
( FUMATORI, OBESI, Fr. ESPOSTE, FASCIOTOMIE )
- **RIGIDITA' ARTICOLARI**
- **ESITI LESIONI NEURO-VASCOLARI**





# CONCLUSIONI



## TRATTAMENTO

- RIPRISTINO CONGRUITA' ARTICOLARE
- RIPRISTINO ASSETTO MECCANICO
- SALVAGUARDIA DEI TESSUTI MOLLI



## OBIETTIVO FINALE

- ✓ ARTICOLAZIONE STABILE
- ✓ RECUPERO PRECOCE RANGE ARTICOLARE



**GRAZIE**

