

Posterior condyle – Hoffa - fracture

Dr C. HORTEUR – Pr J. BARTH

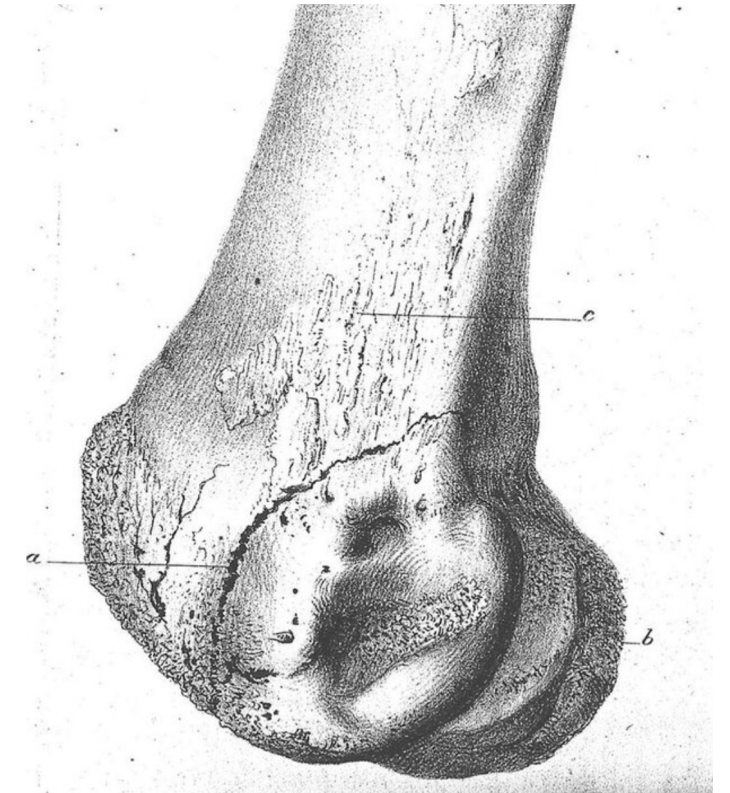
Service de chirurgie Orthopédique et Traumatologie du Sport, Urgences. CHU de Grenoble, Hôpital Sud



HOFFA fracture = coronal fracture of femoral condyle

First described by Friedrich BUSCH in 1869 but popularized later by Albert HOFFA in 1888.

Should be called BUSCH-HOFFA fracture



> [Int Orthop.](#) 2015 Jun;39(6):1245-50. doi: 10.1007/s00264-015-2730-x. Epub 2015 Mar 20.

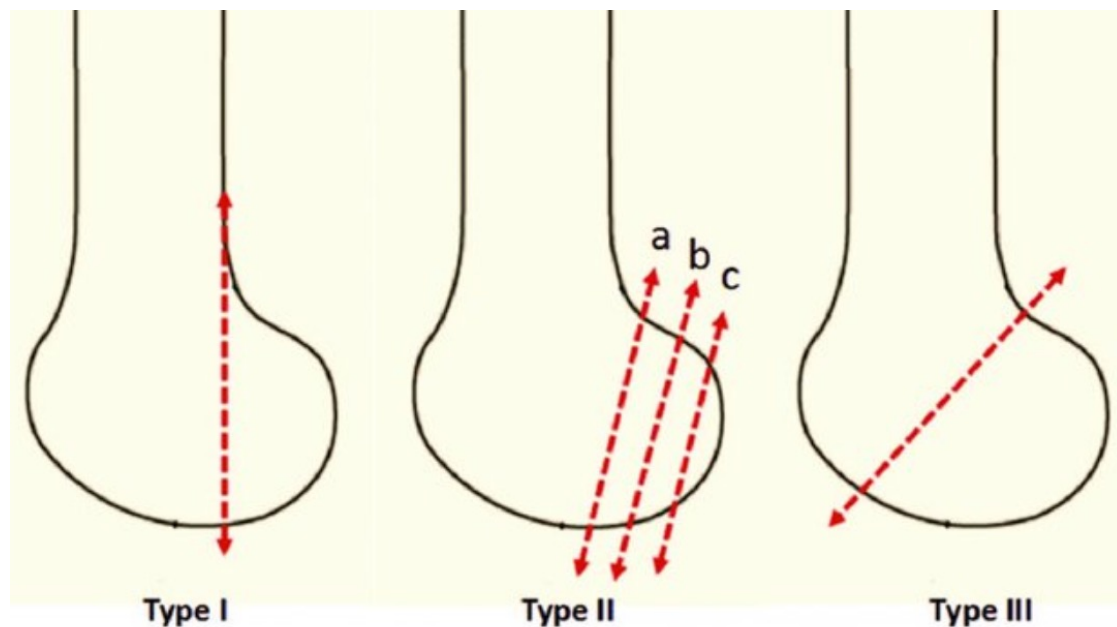
History of femoral head fracture and coronal fracture of the femoral condyles

Jan Bartoníček ¹, Stefan Rammelt



CLASSIFICATION

- Rare fracture pattern : < 10% of distal femoral fracture
- Lateral > medial condyle
Bilateral / associated with distal femoral fracture
- High energy traffic collision : 80%
Low energy (elderly)
iatrogenic : femoral tunnel after ACL reconstruction



Leteneur Classification

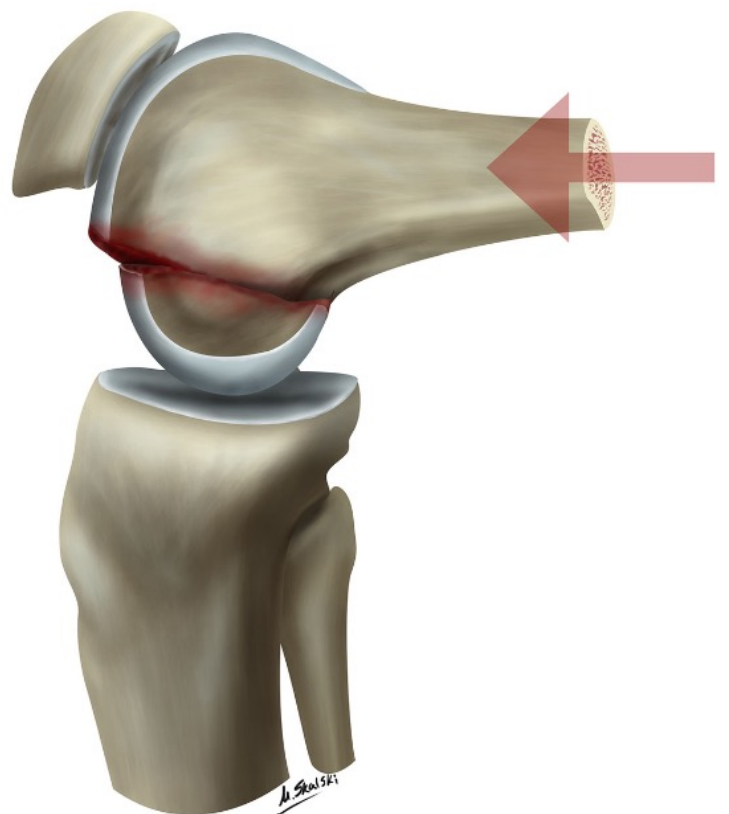
> [Injury](https://doi.org/10.1016/j.injury.2020.11.061). 2021 Apr;52(4):967-970. doi: 10.1016/j.injury.2020.11.061. Epub 2020 Nov 28.

Intra-articular Fracture Pattern in Intercondylar Distal Femur Fractures: An Analysis of Frequency and Major Fracture Fragments

Jarod A Richards ¹, Fehmi B Berkay ¹, Caleb M Davis ¹, Rodolfo A Zamora ²



MECHANISM



Mechanism : **shearing forces** between the femur and the proximal tibia are applied on femoral posterior condyles

+/- associated with direct impact

+/- Trauma in **valgus** → **lateral** fracture

+/- Trauma in **varus** → **medial** fracture

[Review](#) > [Skeletal Radiol.](#) 2015 Jan;44(1):37-43. doi: 10.1007/s00256-014-2015-2.

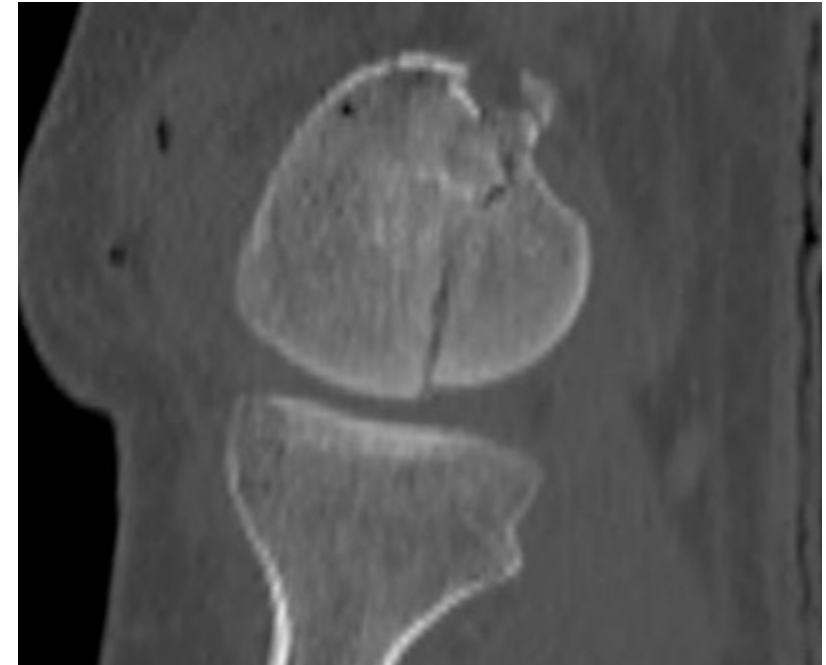
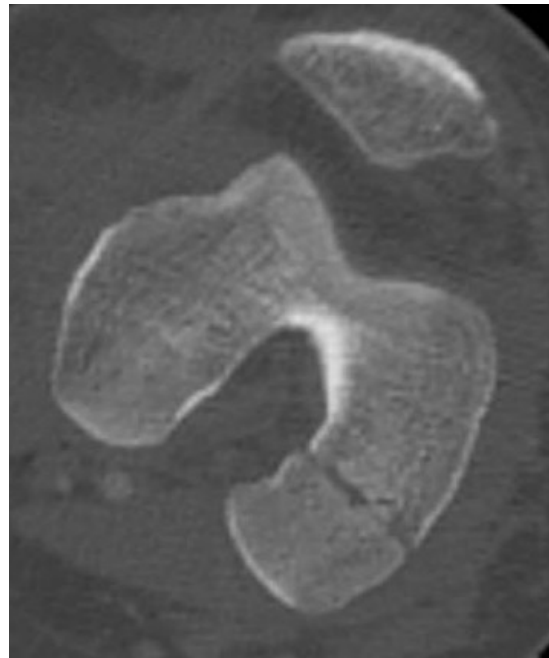
Epub 2014 Oct 2.

**Coronal plane fracture of the femoral condyles:
anatomy, injury patterns, and approach to
management of the Hoffa fragment**



DIAGNOSIS

- **Radiographs :**
Anteroposterior
Lateral
Oblique (+++ for non displaced fractures) radiographs
- **CT scan :**
always





TREATMENT

Anatomic reduction

Stable - rigid fixation

Early mobilisation

Minimally aggressive surgery / surgical risks

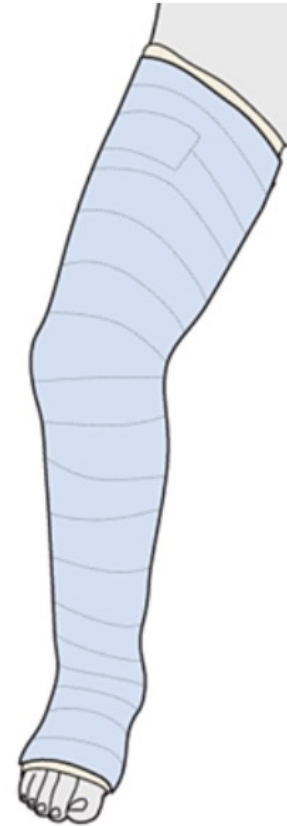
As always





What are the options ?

Conservative treatment
45 – 60 days



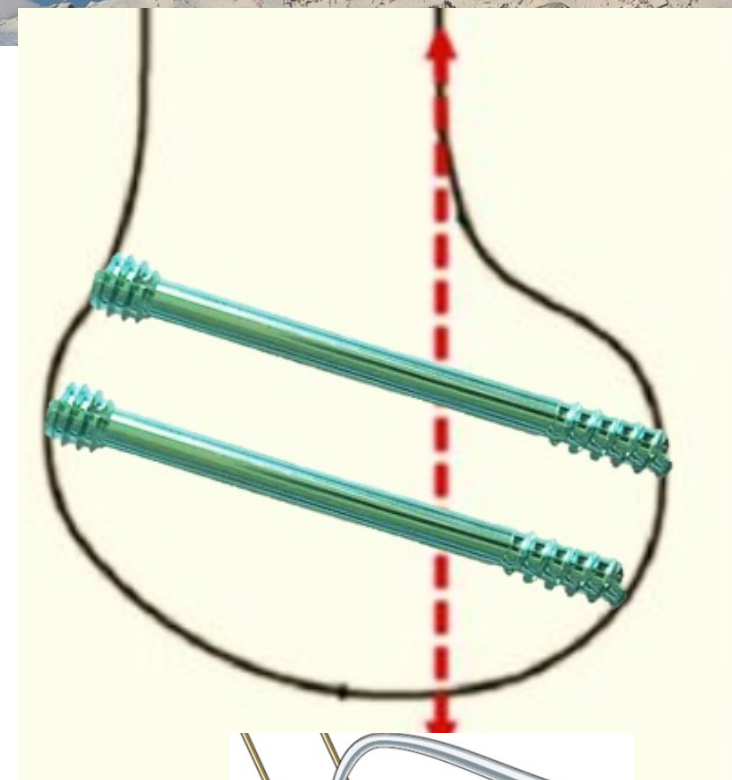


What are the options ?

Antero posterior screws (at least 2)

- Antero medial/lateral approach
- Arthroscopy
- X – Ray

Supine position



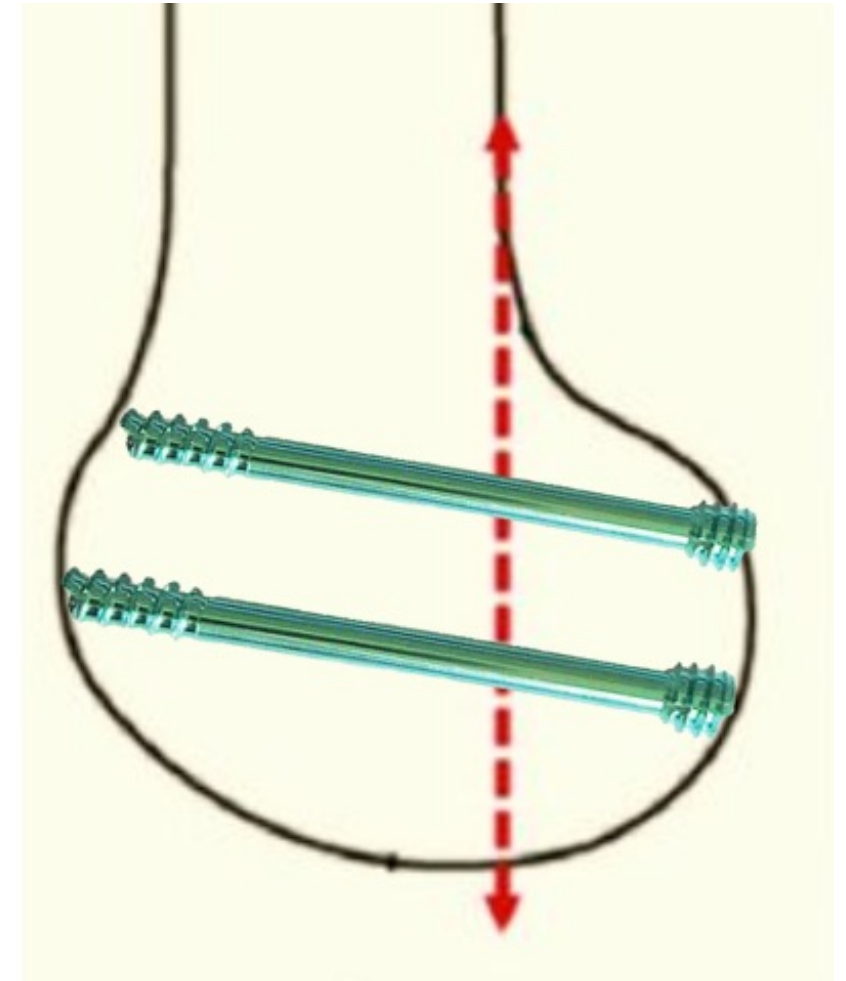


What are the options ?

Postero anterior screws

- Postero medial/lateral approach
- Posterior approach

Lateral decubitus / prone position

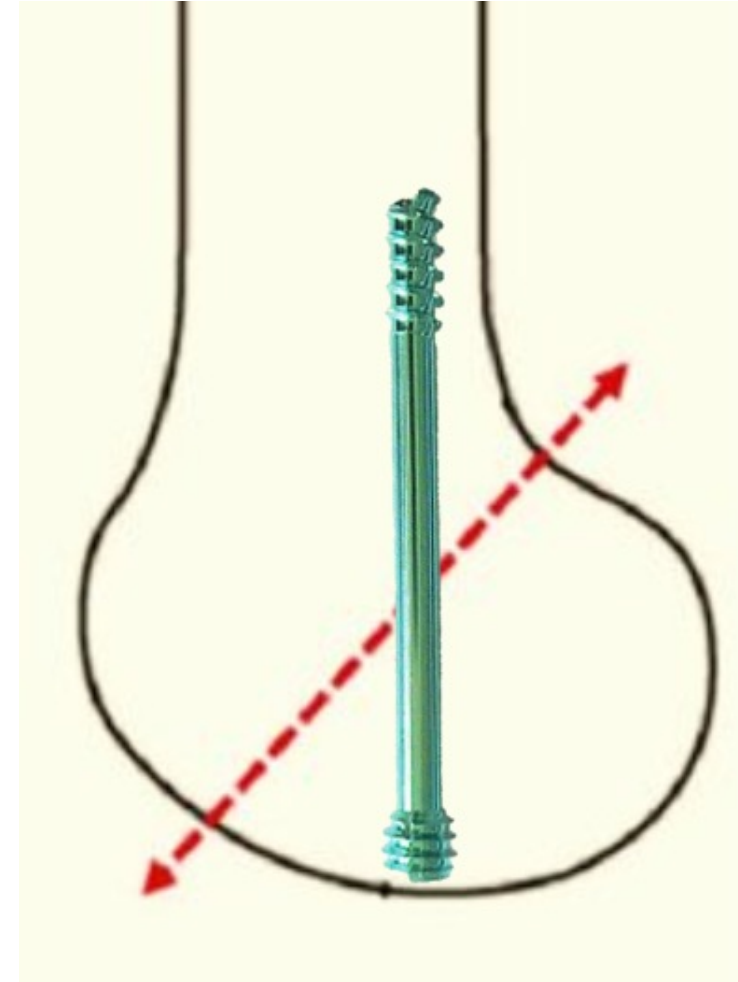




What are the options ?

Anterograde screw fixation

- anterior approach
- arthroscopy



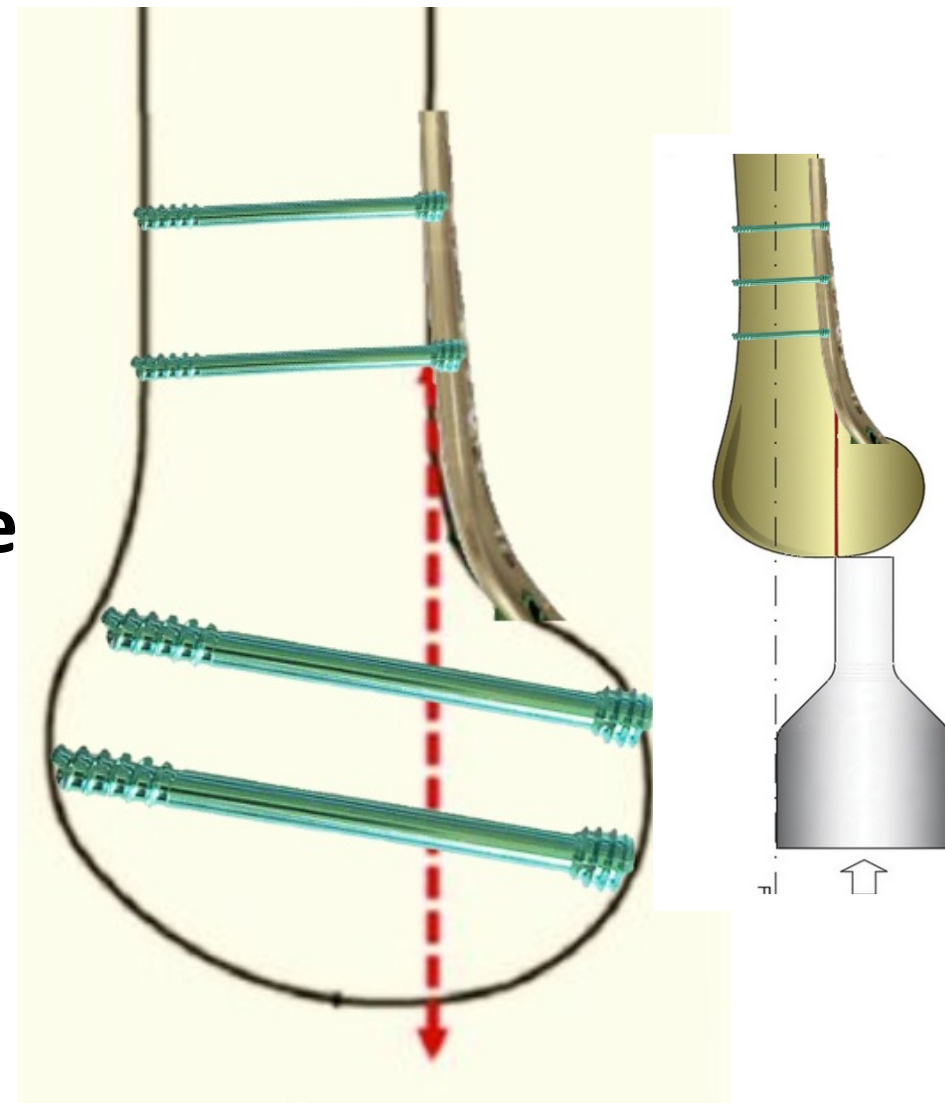


What are the options ?

Postero anterior screw + buttress plate

- Postero medial/lateral approach
- Posterior approach

Only for metaphyseal fractures





WHAT WE KNOW



Rare fracture → Data from current literature are limited

- **Case report**
- **Small series < 20 patients**
- **No comparative studies**

> [Injury](#). 2011 Dec;42(12):1495-8. doi: 10.1016/j.injury.2011.09.005. Epub 2011 Oct 10.

Operative management of Hoffa fractures--a prospective review of 18 patients



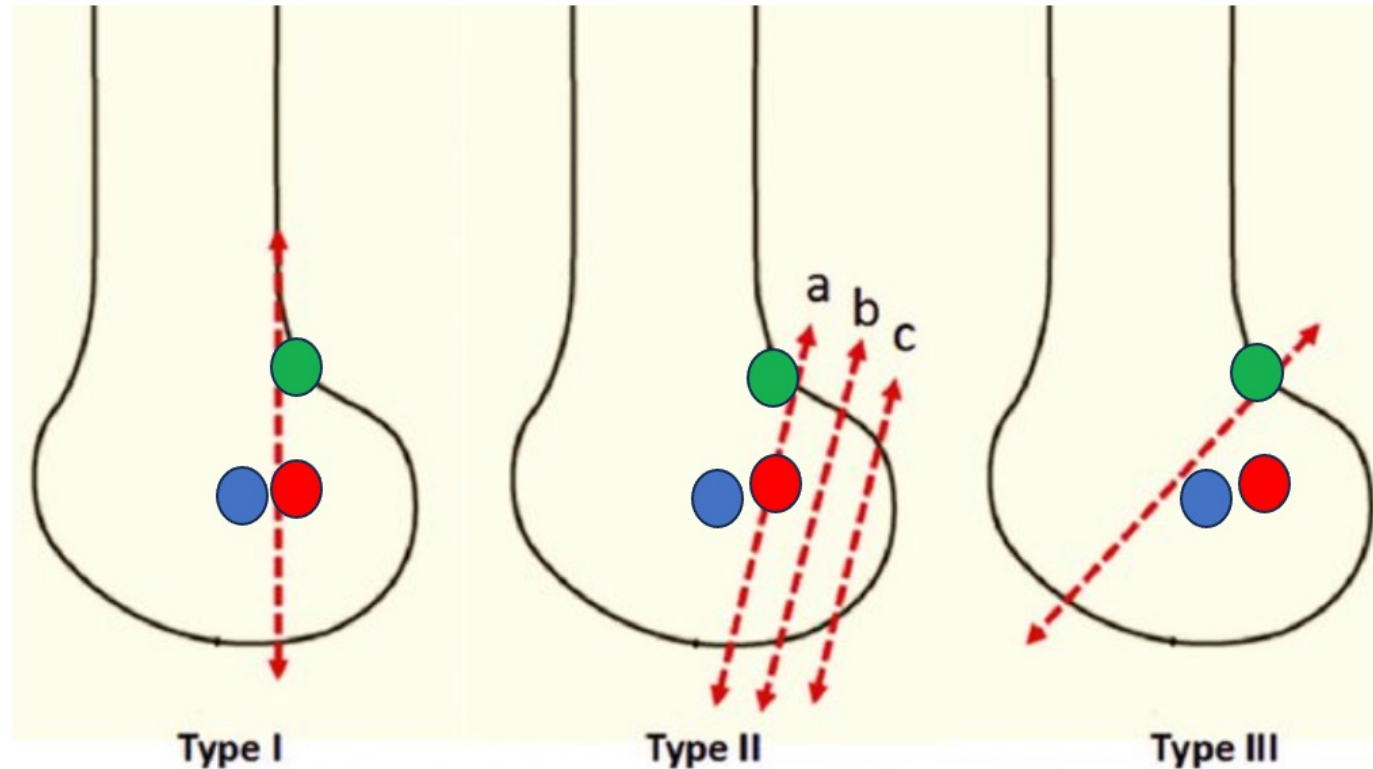
WHAT WE KNOW

Anatomy

Type 2 +++

- poorly vascularised
- « Free bone block »
- fracture blood clot washed by synovial fluid

Risk of delayed union or non union
 Risk of avascular necrosis

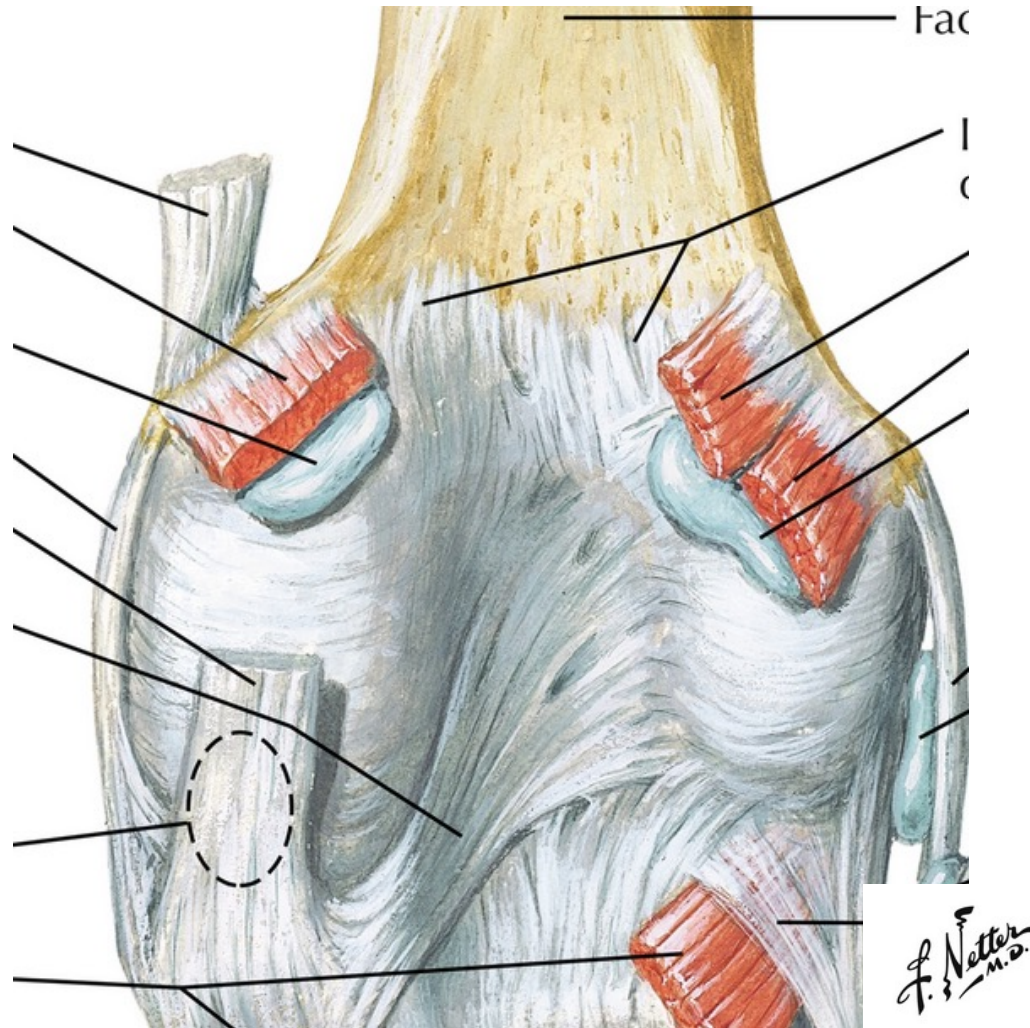


GASTROC. MUSCLE
LATERAL COLLATERAL LIGAMENT
POPLITEUS MUSCLE



WHAT WE KNOW

Anatomy





WHAT WE KNOW



Conservative treatment :

High risk of non union (and secondary displacement)

➔ Should be avoided in healthy patients

[Review](#) > [Musculoskelet Surg.](#) 2012 Jun;96(1):49-54. doi: 10.1007/s12306-011-0165-0. Epub 2011 Sep 9.

Coronal fractures of the medial femoral condyle: a series of 6 cases and review of literature

[Mandeep Singh Dhillon](#)¹, [Aditya Krishna Mootha](#), [Kamal Bali](#), [Sharad Prabhakar](#), [Sarvadeep Singh Dhatt](#), [Vishal Kumar](#)

> [Chin J Traumatol.](#) 2011 Jun 1;14(3):143-6.

Nonunion of coronal shear fracture of femoral condyle

[Ajay-Pal Singh](#)¹, [Ish-Kumar Dhammi](#), [Raju Vaishya](#), [Anil-Kumar Jain](#), [Arun-Pal Singh](#), [Prashant Modi](#)

> [J Bone Joint Surg Br.](#) 1989 Jan;71(1):118-20. doi: 10.1302/0301-620X.71B1.2914979.

Coronal fractures of the lateral femoral condyle

[S L Lewis](#)¹, [J L Pozo](#), [W F Muirhead-Allwood](#)



Biomechanics :

Big fragment

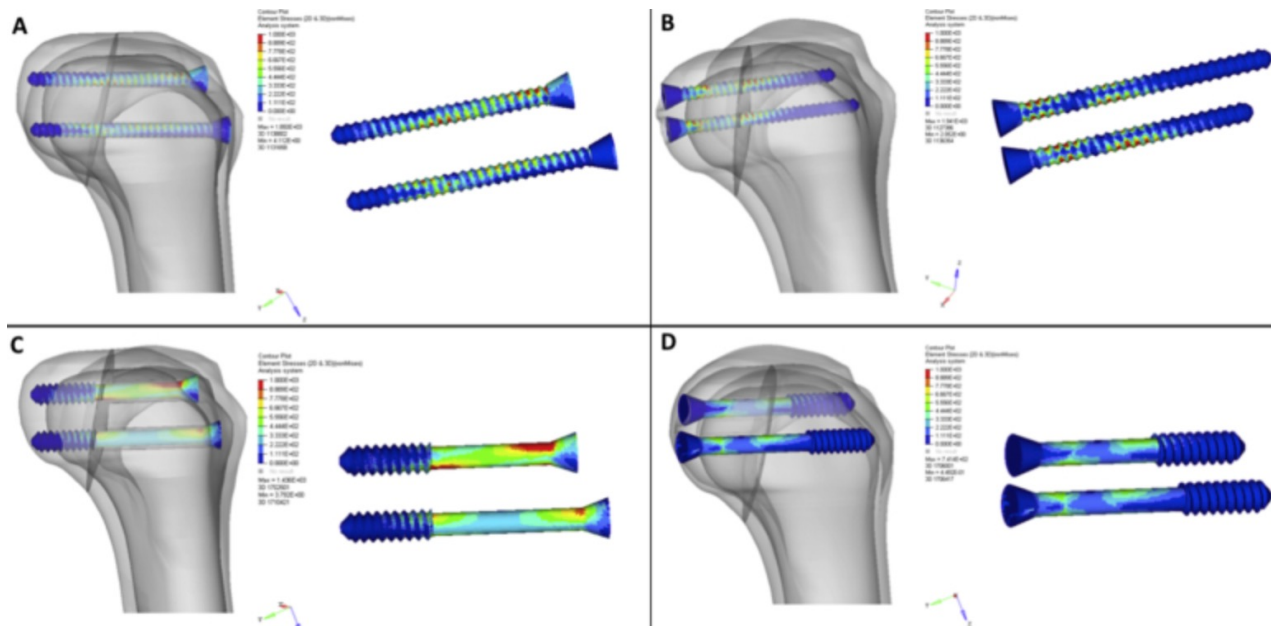
Posteroanterior screw (but AP seem sufficient)

Diameter > or = to 6 mm

Small fragment

Posteroanterior fixation +++

Diameter adapted to fragment' size (3.5 – 6mm)



> [J Clin Orthop Trauma](#). 2020 Aug 1:14:101-105. doi: 10.1016/j.jcot.2020.07.032.
eCollection 2021 Mar.

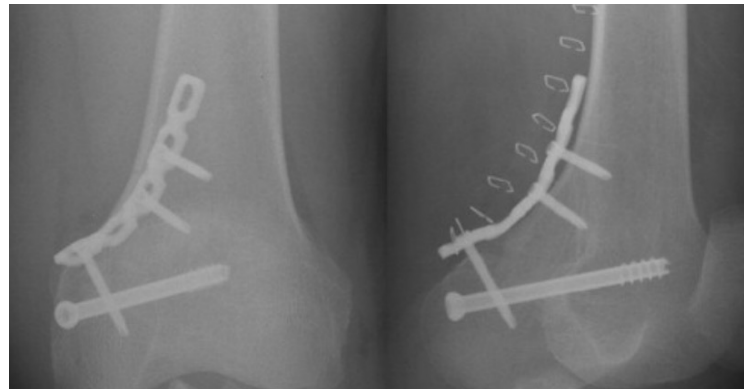
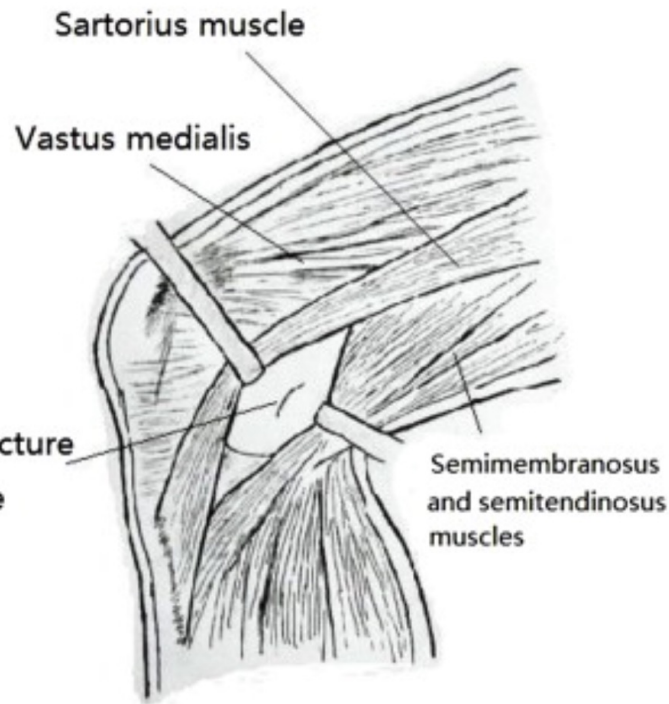
Analysis of mechanical variables in Hoffa fracture – A comparison of four methods by finite elements

Anderson Freitas^{1 2}, Rubén Jeri Aquino¹, Felipe Fagundes de Brito¹,
Vinicius Mendes Bonfim¹, Joubert Vieira Toledo Júnior¹, Walter Rodrigo Daher¹

WHAT WE KNOW

Surgical approaches :

| Surgical approach | Safety | Reduction | Screw / plate positioning | Agressivity |
|-------------------------|--------------------------|-----------|---------------------------|-------------|
| Arthroscopy | +++ | ??? | AP only | - |
| Antero lat/med | +++ | + | AP only | - |
| Posteromedial / lateral | + (vascularisation risk) | +++ | PA + (slightly oblique) | + |
| Posterior | -- (neurovascular risk) | +++ | PA +++ | +++ |



> [Int J Surg.](#) 2015 Jul;19:95-102. doi: 10.1016/j.ijssu.2015.05.027. Epub 2015 May 26.

Surgical treatment and rehabilitation of medial Hoffa fracture fixed by locking plate and additional screws: A retrospective cohort study

Mingjie Gao ¹, Jie Tao ², Zihui Zhou ¹, Qingbin Liu ¹, Lin Du ¹, Jieming Shi ³

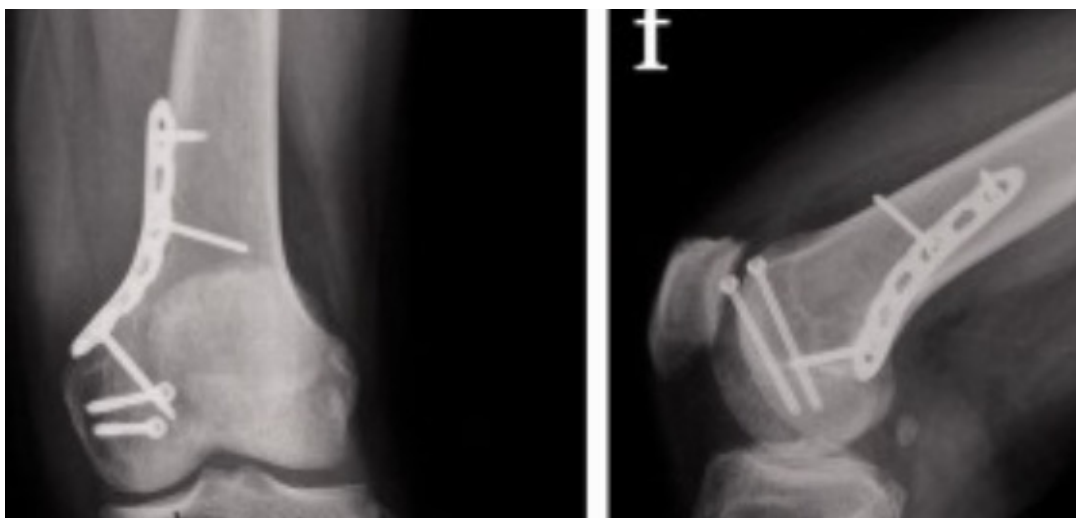


WHAT WE KNOW

Is buttress plate mandatory ? → No clinical evidence

Comparison CS vs CS + BP

the authors added BP only if stability was considered insufficient



[Comparative Study](#) > [J Int Med Res.](#) 2019 Jan;47(1):142-151.

doi: 10.1177/0300060518798224. Epub 2018 Sep 18.

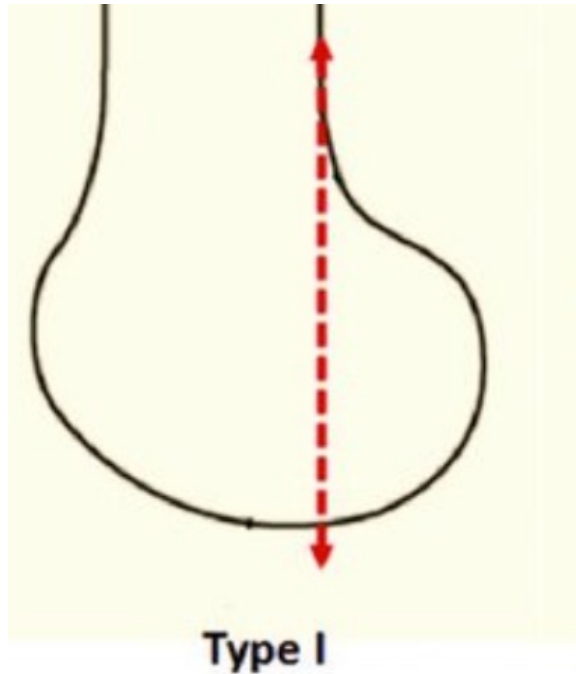
Compression screws and buttress plate versus compression screws only for Hoffa fracture in Chinese patients: a comparative study

[Bangbao Lu](#)¹, [Shushan Zhao](#)¹, [Zhongwei Luo](#)¹, [Zhangyuan Lin](#)¹, [Yong Zhu](#)¹

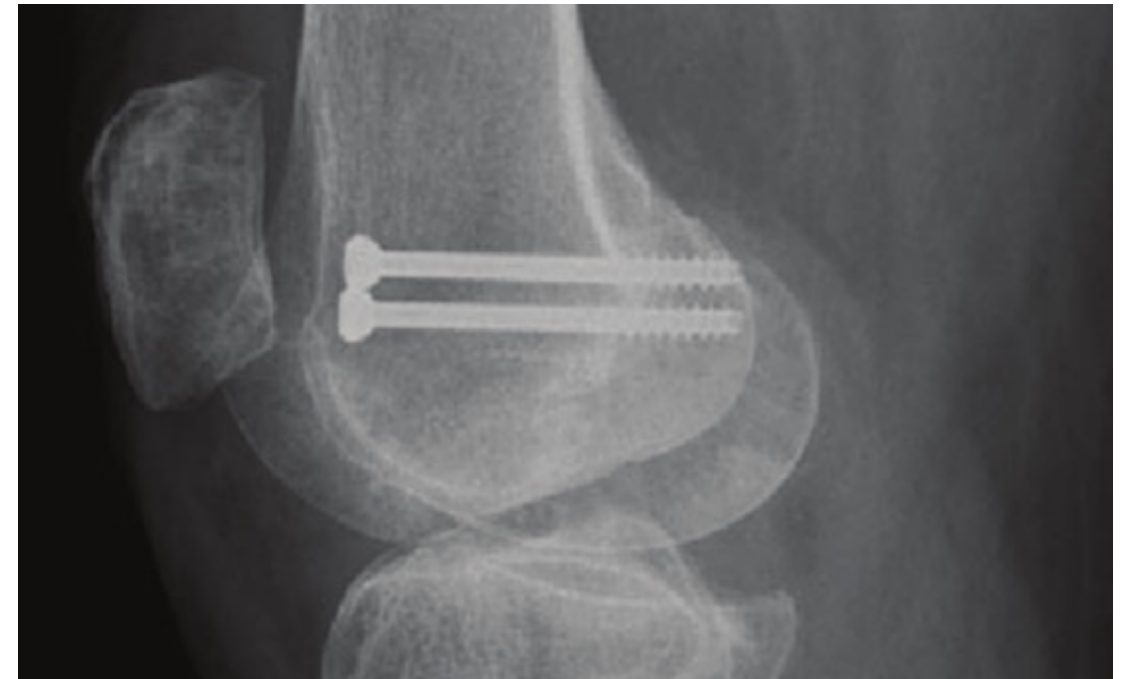
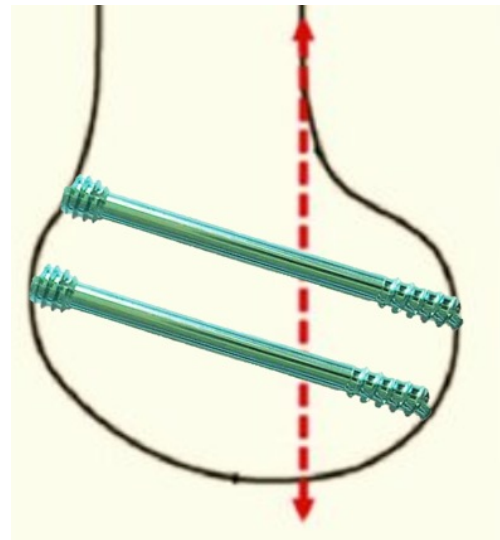


TIME TO MAKE A CHOICE

NON-DISPLACED or CLOSED REDUCTION OBTAINED (extension)



Antero posterior fixation
Arthroscopic control

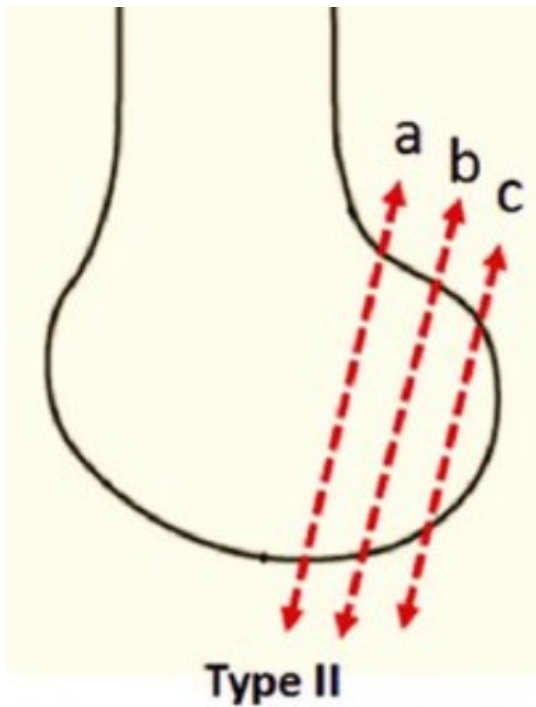


available for type IIa ?

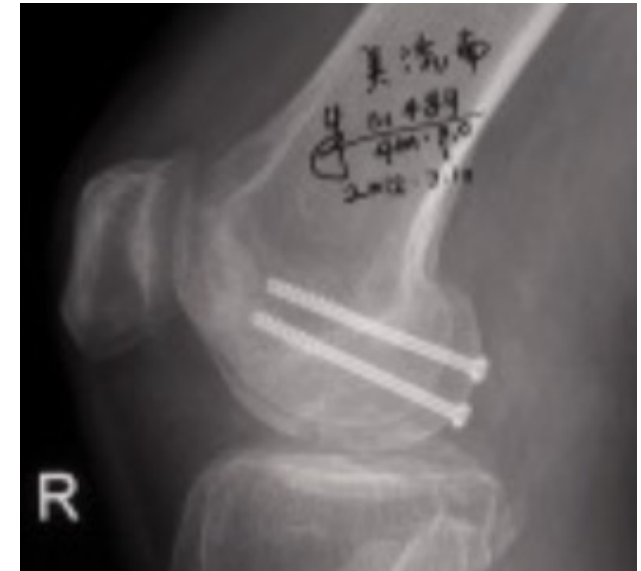
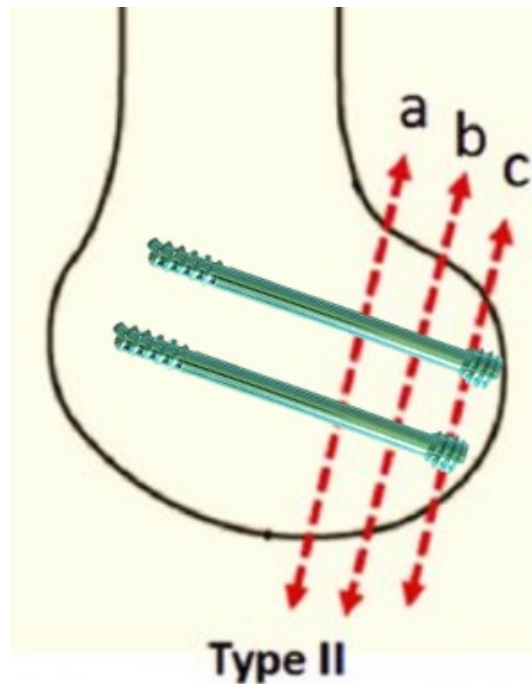


TIME TO MAKE A CHOICE

NON-DISPLACED or CLOSED REDUCTION OBTAINED (extension)



Posterior fixation
Postero medial / lateral approach



Comparative Study > J Int Med Res. 2019 Jan;47(1):142-151.

doi: 10.1177/0300060518798224. Epub 2018 Sep 18.

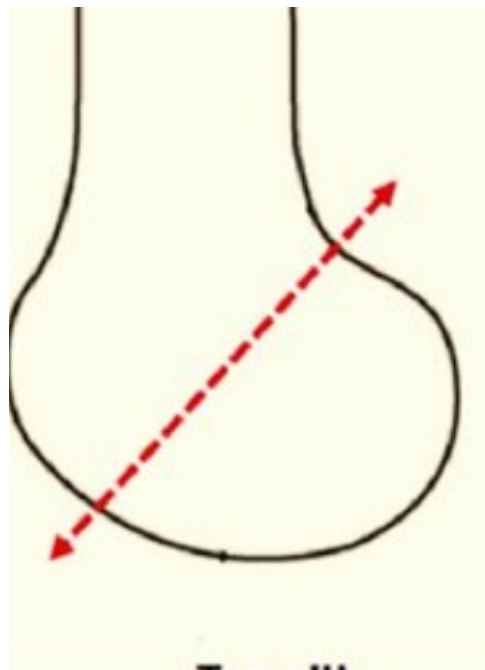
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Bangbao Lu ¹, Shushan Zhao ¹, Zhongwei Luo ¹, Zhangyuan Lin ¹, Yong Zhu ¹



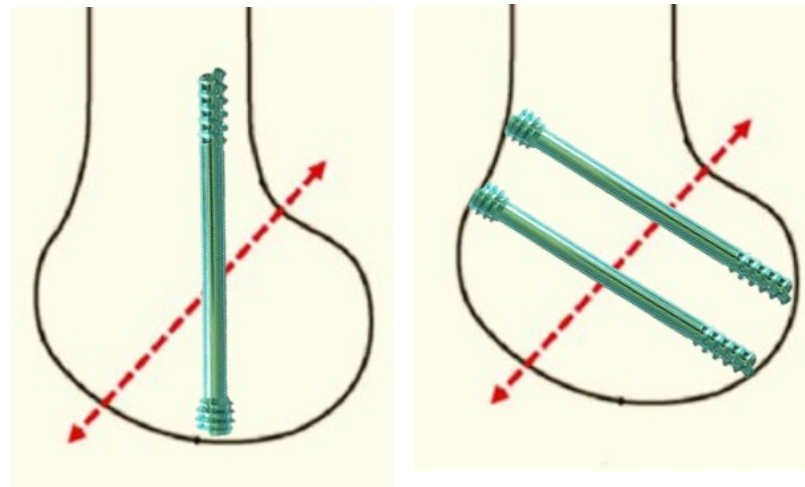
TIME TO MAKE A CHOICE

NON-DISPLACED or CLOSED REDUCTION OBTAINED (extension)



Type III

Arthroscopic approach



Case Reports > [Int J Surg Case Rep. 2021 Feb;79:198-205. doi: 10.1016/j.ijscr.2021.01.032.](#)
Epub 2021 Jan 15.

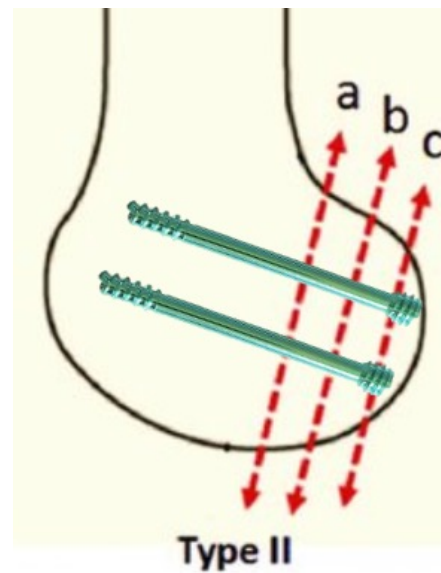
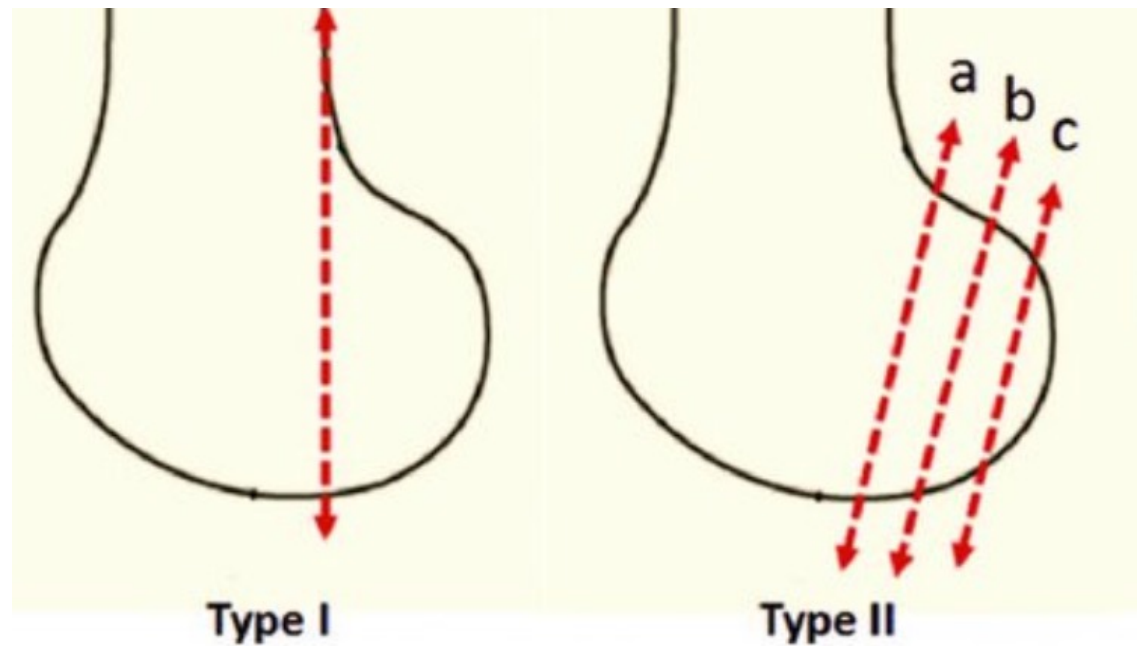
A case report of an arthroscopic-assisted fixation of a small Hoffa fracture in a young patient

[Abdullah Noufal](#)¹, [Muhammad Rafat Meda](#)², [Muhammed Fayez Aboujaib](#)¹



TIME TO MAKE A CHOICE

DISPLACED FRACTURE



Comparative Study > J Int Med Res. 2019 Jan;47(1):142-151.

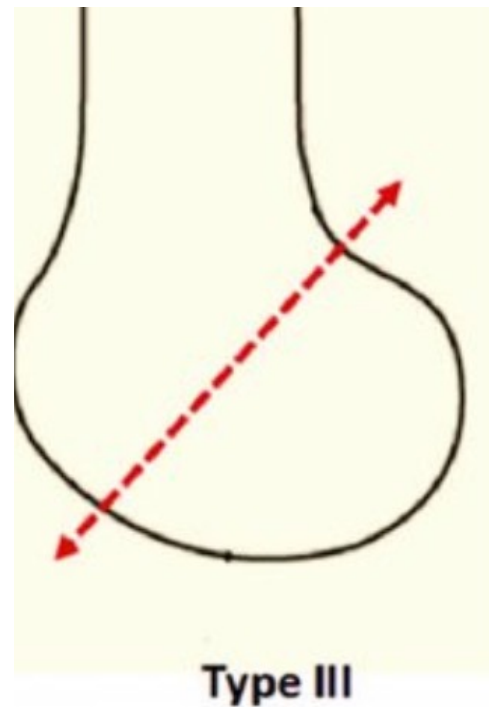
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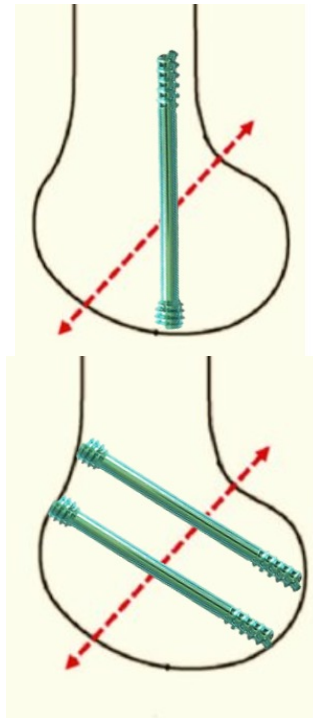
Bangbao Lu¹, Shushan Zhao¹, Zhongwei Luo¹, Zhangyuan Lin¹, Yong Zhu¹

Buttress plate → only if increased stability required

DISPLACED FRACTURE



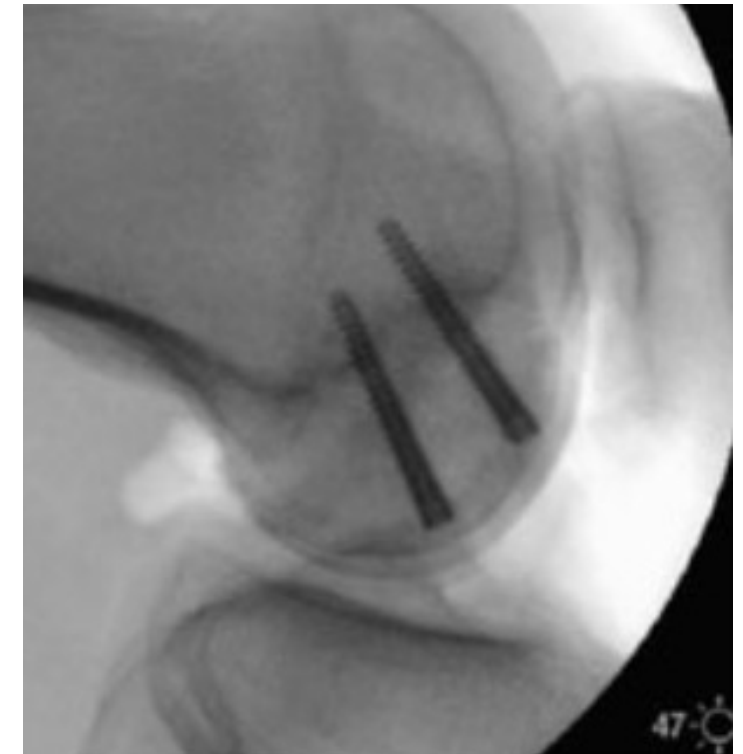
Anterior approach



> [Eur J Trauma Emerg Surg.](#) 2010 Oct;36(5):477-9. doi: 10.1007/s00068-010-0014-0. Epub 2010 Apr 27.

Hoffa fracture: fixation using headless compression screws

V Borse ¹, J Hahnel ², A Cohen ²





No weight bearing for 8 weeks

Early rehabilitation

Prevention of extension lag

> [Cureus](#). 2022 Apr 4;14(4):e23829. doi: 10.7759/cureus.23829. eCollection 2022 Apr.

The Functional and Radiological Outcome of Hoffa's Fracture Treated With Cannulated Cancellous Screws

[Ajay Kurahatti](#)¹, [Hariprasad Seenappa](#)¹, [Arun H Shanthappa](#)¹, [Nagakumar J S](#)¹



TAKE HOME MESSAGE



Surgical treatment +++

Retrograde screwing is a valid and safe option

Except for small fragment (type lib, IIc)

THANK YOU