Traumaplasty Debate: Knee Replacement is Preferrable

Andrew H. Schmidt, M.D.
Hennepin County Medical Center
University of Minnesota

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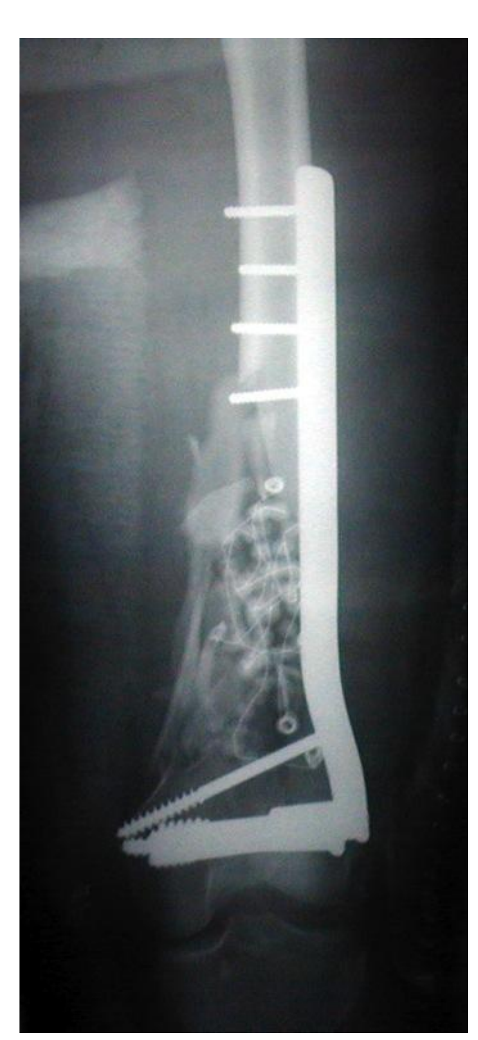
Disclosure of Off-Label and/or investigative Uses

None

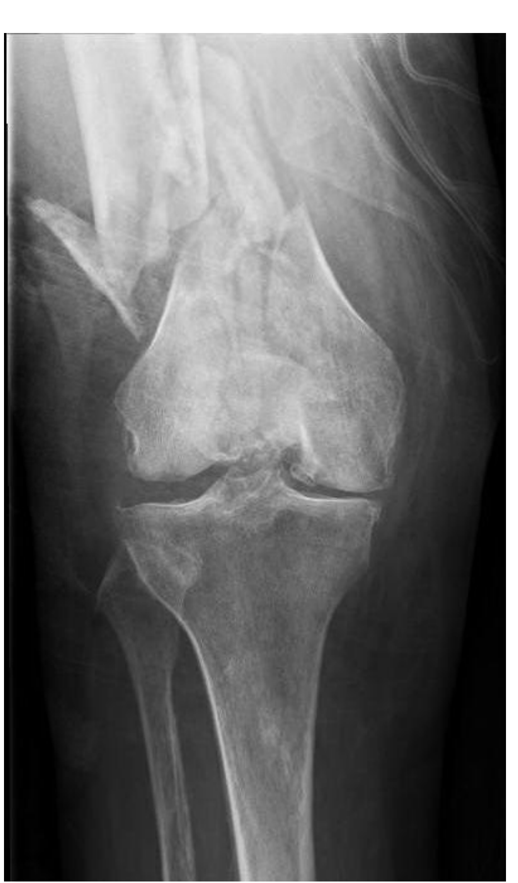
Distal Femur Fractures

- *Relatively* non-controversial injury
  - Well understood fracture patterns
  - Operative indications defined
  - Treatment principles straightforward



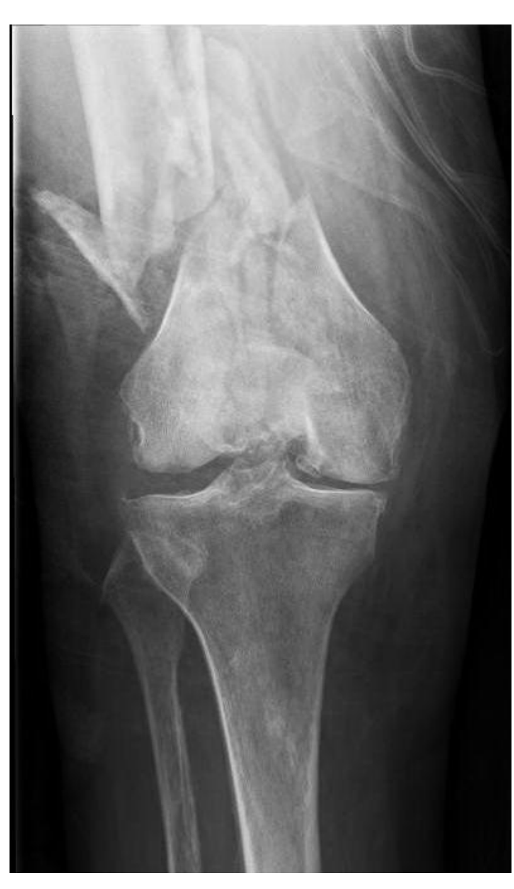
Goals

- Reconstruction of the articular surface
- Restoration of the mechanical axis
  - Length, alignment, rotation
- **Stable fixation**
- **Early return of function**



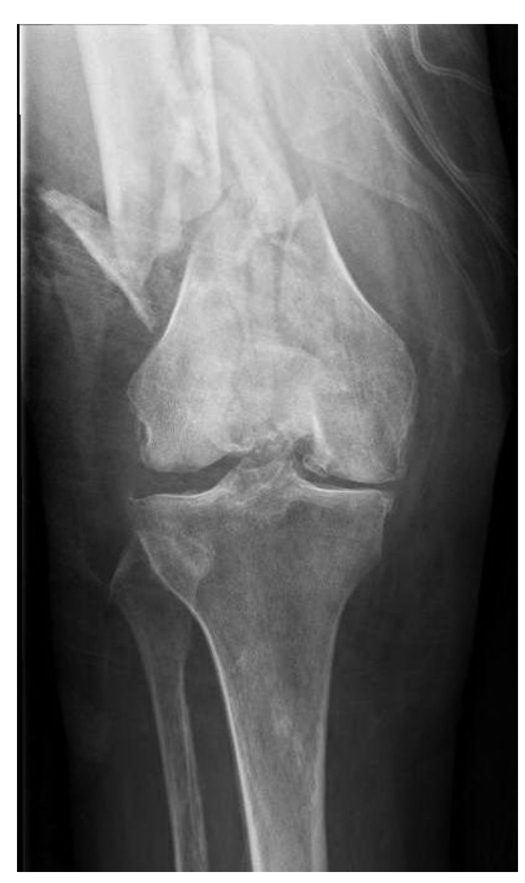
Goals

- Reconstruction of the articular surface
- Restoration of the mechanical axis
  - Length, alignment, rotation
- **Stable fixation**
- **Early return of function**
- *Imperative of immediate mobilization*
- *Complications poorly tolerated*
- *Reasonable cost*



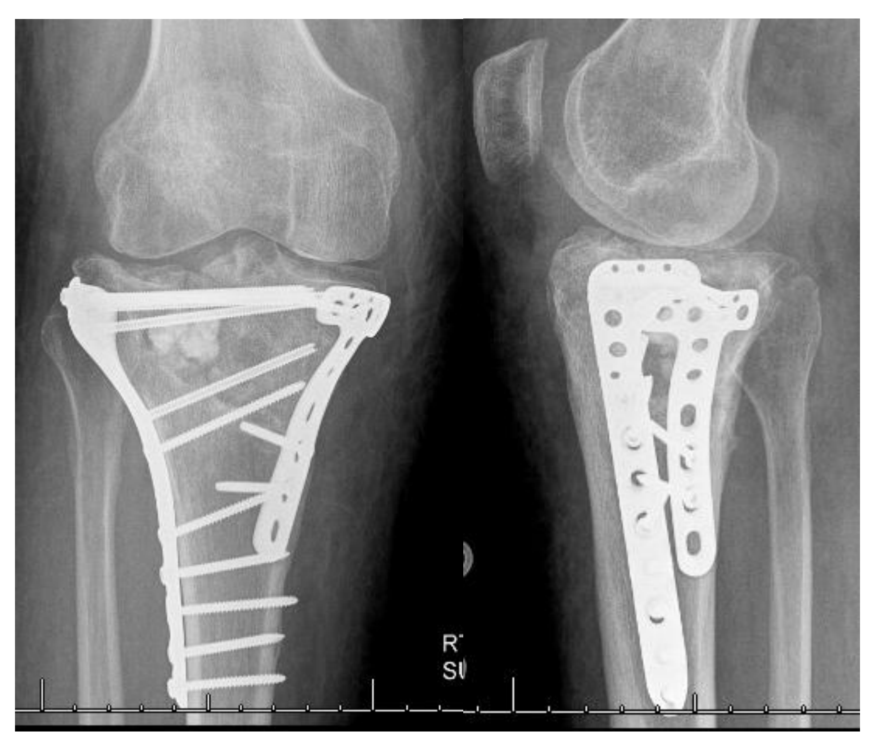
Unique Problems of the Elder

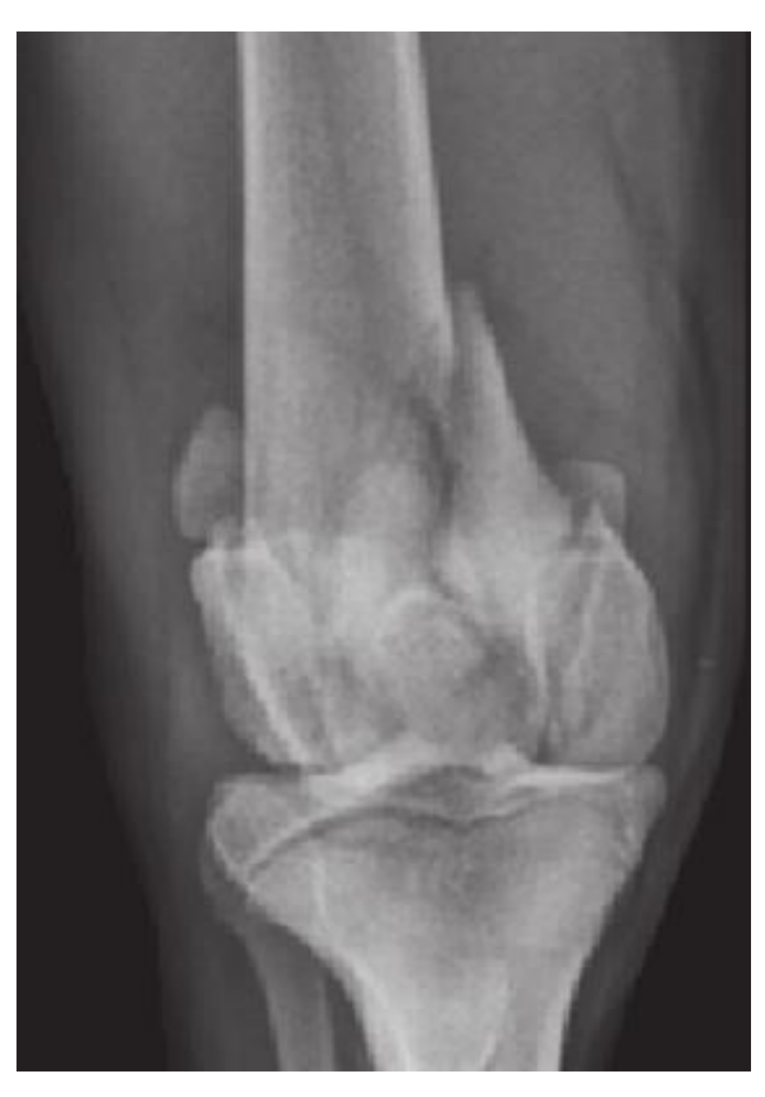
- Osteopenic bone
- Increased incidence pre-existing OA
- Poor balance and strength
  - Inability to protect wt-bearing
- Lack of social support
- More likely to be dependent on others for cares



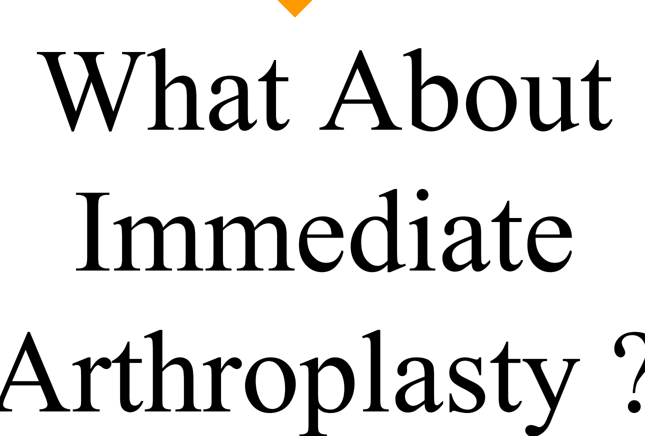
Things Don’t Always Work…

- Malreduction
- Loss of Fixation
- Early infection – hardware removal
- PTOA





Increased incidence of fixation failure and need for revision surgery, likely lengthy period of NWB following surgery



In many instances, knee arthroplasty is the best option

- Joint resurfacing treats the articular damage
- Opportunity to correct alignment
- Varying degrees of constraint that can accommodate ligament imbalance.
- Stems that can bypass metaphyseal regions.
- Immed Wt-bearing typically allowed

Naylor B, Butler J, Bradham AA, Gresham N, Schwab JM, Garrett J. The Role of Immediate Arthroplasty in Elderly Tibial Plateau Fractures. *Orthopedic Reviews*. 2025;17. doi:10.52965/001c.143563

General

The Role of Immediate Arthroplasty in Elderly Tibial Plateau Fractures

Brandon Naylor, D.O.[1], Justin Butler, D.O.[2], Anita A Bradham, B.A.[1], Natalie Gresham, B.S.[1], Joseph M. Schwab, M.D.[1], Jeffrey Garrett, M.D.[1]

[1] Total Joint Specialists, Northside Hospital, [2] The Core Institute

Keywords: Tibial Plateau Fracture, Total Knee Arthroplasty, Acute Arthroplasty, Periarticular Knee Fracture

https://doi.org/10.52965/001c.143563

Orthopedic Reviews

Vol. 17, 2025

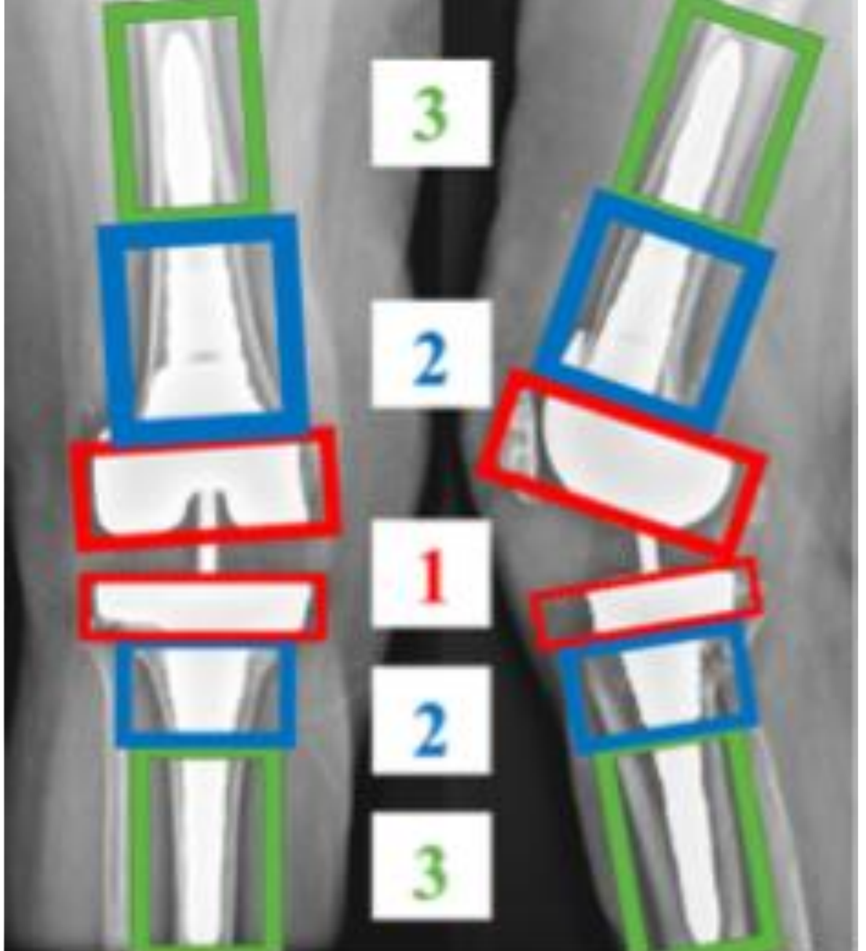


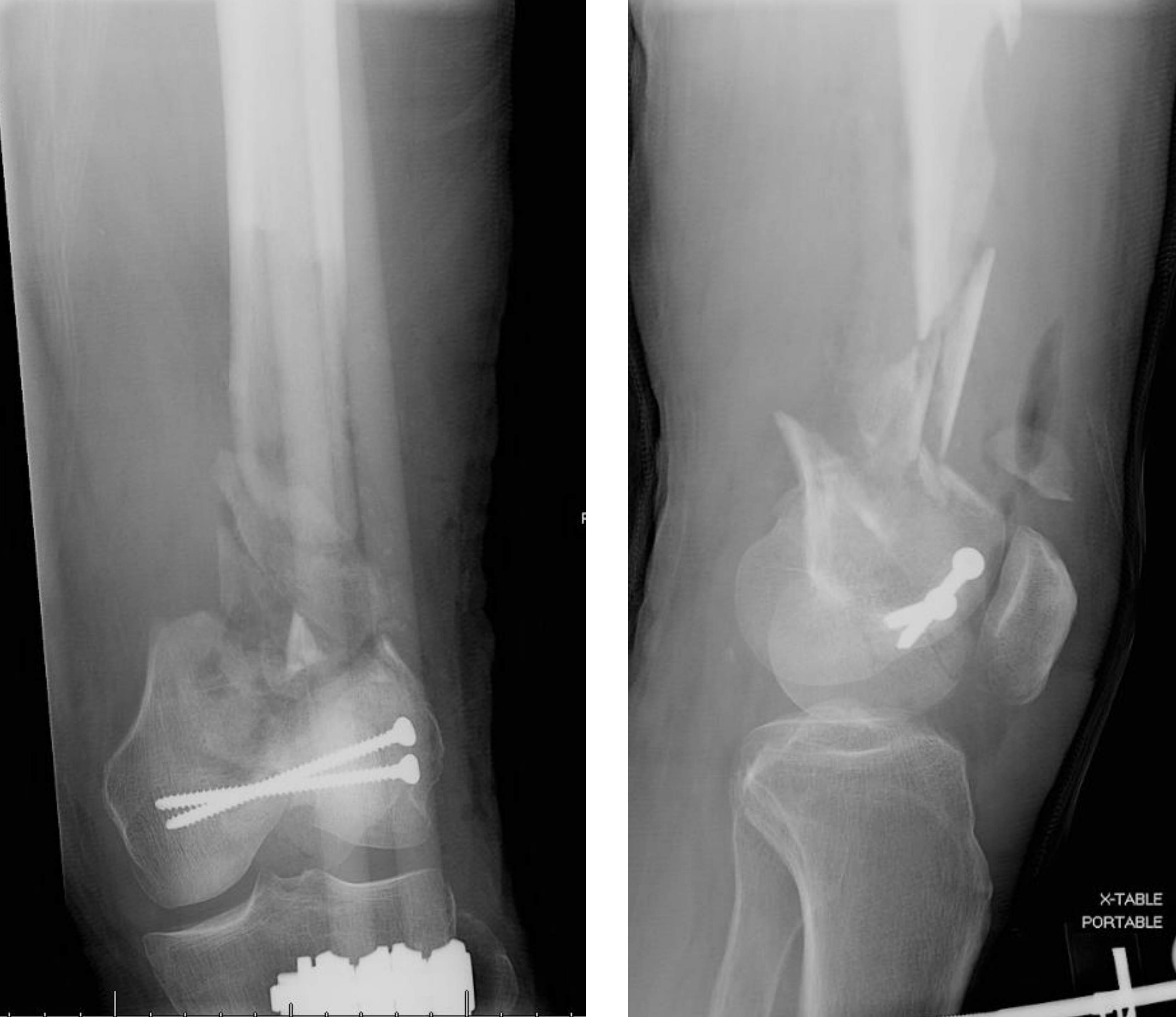
Fig. 4. Zonal fixation concept in revision total knee arthroplasty. Zone 1 (red) epiphyseal reconstruction with cemented femoral and augmented tibial components utilizing a rotating platform. Zone 2 (blue) metaphyseal fixation with cones in the femoral and tibia. Zone 3 (green) diaphyseal fixation press fit stemmed components.

Case Example

- 89 yo male, admitted to Trauma after head-on MVA.
- Initially hypotensive, stable with fluids and 1 unit of blood.
- Alert
- Isolated injury to left leg.
- 10 cm open wound anterior thigh with obvious femur fracture.

PORTABLE

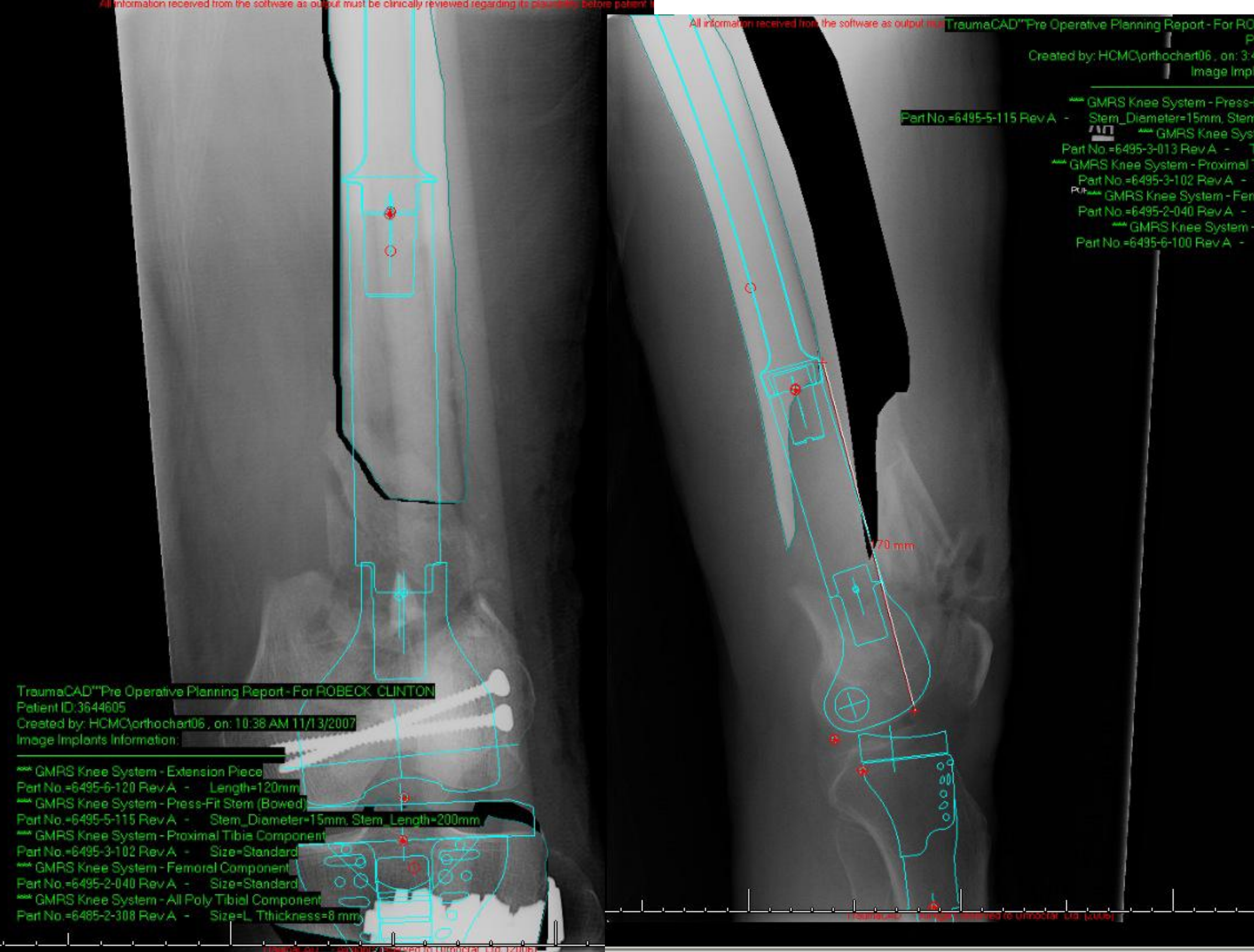
- Taken to OR for “Damage – Control”
  - I&D of wound
    - Multiple devitalized cortical fragments removed.
    - Condyles unstable, repaired with lag screws to try to reapproximate articular surface.
  - Knee – spanning external fixator applied.

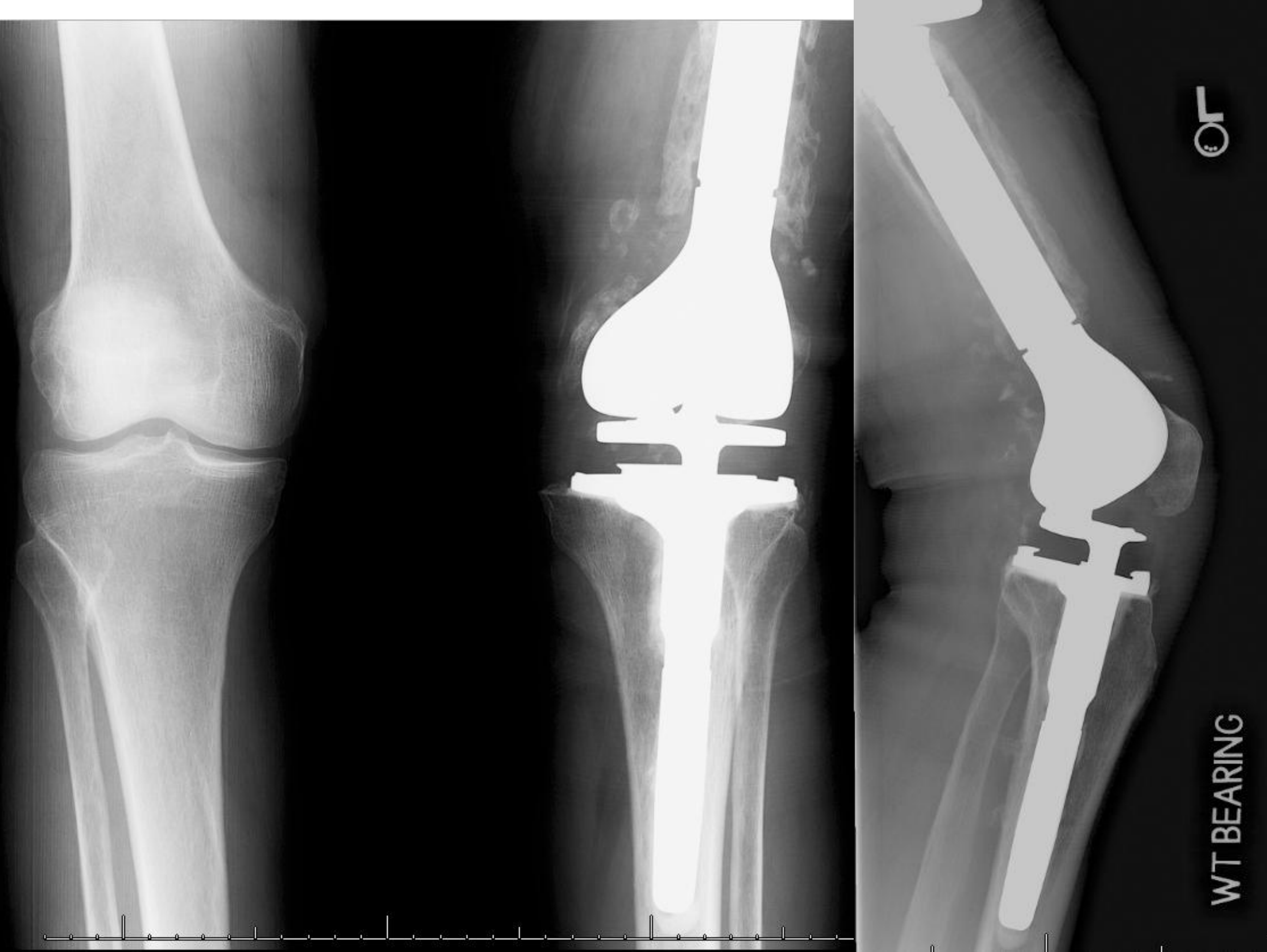

X-TABLE
PORTABLE

- Planned repeat I&D in 3-4 days, but patient unstable in ICU and wound very benign.

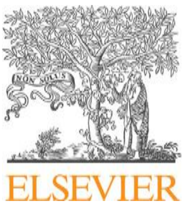
2 weeks later

- Out of ICU
- Alert, cooperative, anxious to move ahead with recovery.
- Healed anterior knee wound.
- Pin sites slightly red, but no drainage.
- Time to make a decision…


All information received from the software as output must be clinically reviewed regarding its plausibility before patient
TraumaCAD™Pre Operative Planning Report - For ROBECK, CLINTON
Patient ID:3644605
Created by: HCMC\orthochart06 , on: 10:38 AM 11/13/2007
Image Implants Information:
*** GMRS Knee System - Extension Piece
Part No.=6495-6-120 Rev A - Length=120mm
*** GMRS Knee System - Press-Fit Stem (Bowed)
Part No.=6495-5-115 Rev A - Stem_Diameter=15mm, Stem_Length=200mm
*** GMRS Knee System - Proximal Tibia Component
Part No.=6495-3-102 Rev A - Size=Standard
*** GMRS Knee System - Femoral Component
Part No.=6495-2-040 Rev A - Size=Standard
*** GMRS Knee System - All Poly Tibial Component
Part No.=6485-2-308 Rev A - Size=L, Tthickness=8 mm
170 mm
Part No.=6495-5-115 Rev A -
Part No.=6495-3-013 Rev A -
Part No.=6495-3-102 Rev A -
Part No.=6495-2-040 Rev A -
Part No.=6495-6-100 Rev A -


WT BEARING

The Journal of Arthroplasty xxx (2025) 1–7



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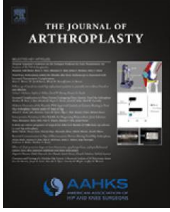

Increased Utilization of Total Joint Arthroplasty for the Treatment of Distal Femoral Fractures

Tyler C. Nicholson, MD [a, *], Cole M. Patrick, MD [b, c], Mikel C. Tihista, MD [b, c], Michael M. Polmear, MD [b, c], Richard L. Purcell, MD [b, c], Nata Parnes, MD [d, e]

- ABOS Part II Oral Examination Case List Database queried between the years 2003 and 2021.
- Proportion of DFF treated with arthroplasty increased 0.28% per year ($P < 0.001$) overall and 1.2% per year ($P < 0.001$) among arthroplasty-trained surgeons.

The Journal of Arthroplasty xxx (2025) 1–7

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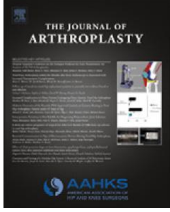

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- Medical and surgical complications occurred at a significantly higher rate after arthroplasty compared to ORIF (31.5 versus 20.9%, P < 0.001; 29.0 versus 17.5%, P < 0.001, respectively).
- Reoperation and readmission were also higher following arthroplasty (10.8 versus 6.2%, P¼ 0.002; and 16.5 versus 9.3%, P < 0.001, respectively).

ORIGINAL ARTICLE

Open Reduction Internal Fixation Versus Distal Femoral Replacement (DFR) for Treatment of OTA/AO 33C Fractures in the Elderly: A Review of Functional Outcomes and Cost Analysis

Andrew Caines, MD, Andrew Adamczyk, MD, MSc, FRCSC, Ryan Mahaffey, MD, FRCPC, and Michael Pickell, MD, MSc, FRCSC

- Functional outcomes similar
- Increased acute costs of PFR are offset by shorter hospitalizations and less need for post-acute care and/or re-operations

J Orthop Trauma • Volume 39, Number 12, December 2025

ORIGINAL ARTICLE

Outcomes After Distal Femur Replacement for Fracture: A Multi-Institutional Retrospective Review

David C. Landy, MD, PhD,[a] Jeffrey A. Foster, MD,[b] Wyatt G. S. Southall, BS,[c] Austin T. Gregg, BS,[d] Stephen T. Duncan, MD,[c] Michael T. Archdeacon, MD,[e] William T. Obremskey, MD, MPH,[f] Joshua M. Lawrenz, MD,[f] Christopher Lee, MD,[g] Michael S. Sridhar, MD,[h] Arun Aneja, MD, PhD,[d] and the "DFR Research Group"

- Retrospective cohort study 12 trauma centers
- The primary outcome (PJI).
- Secondary outcomes included reoperation, 1-year mortality, and function.

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- DFR for native and periprosthetic DFF was associated with a PJI rate of 5.8%.
- 1-year mortality 27.0%,
- Reoperation rate was 16.6%.
- 55 % of patients returned to their baseline function.

J Orthop Trauma • Volume 37, Number 1, January 2023

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- 27 ORIF and 12 DFR patients > 65 with OTA/AO Type C fractures

J Orthop Trauma • Volume 37, Number 1, January 2023

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- DFR more expensive (61K vs 44K USD)
- A larger portion of DFR patients were able to mobilize postoperatively
- Subacute length of stay being longer in ORIF patients.

Tips and Tricks

- Length
  - Templating, xray of opposite leg
- Rotation
  - Linea aspera is a potential anatomic marker
  - Cut tibia first, set rotation of femur off of the tibia

Linea Aspera as Rotational Landmark for Tumor Endoprostheses: A Computed Tomography Study

Benjamin E. Tuy, MD, Francis R. Patterson, MD, Kathleen S. Beebe, MD, Michael Sirkin, MD, Steven M. Rivero, MD, and Joseph Benevenia, MD

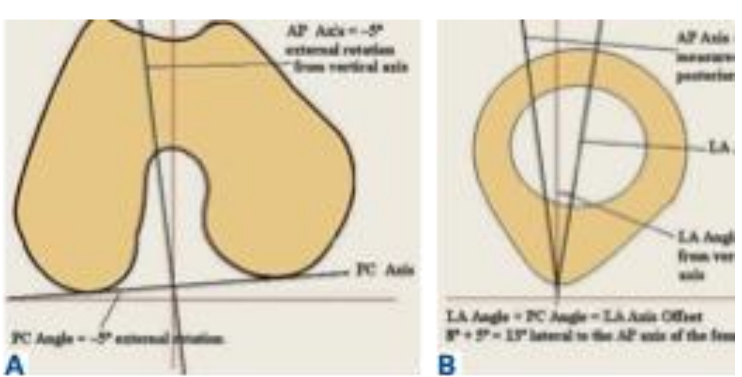


Figure 2. Free body diagram of relationship of (A) posterior condyle axis and pos condyle angle to (B) anteroposterior and linea aspera axes of femur. Abbreviations: AP, anteroposterior; LA, linea aspera; PC, posterior condyle.

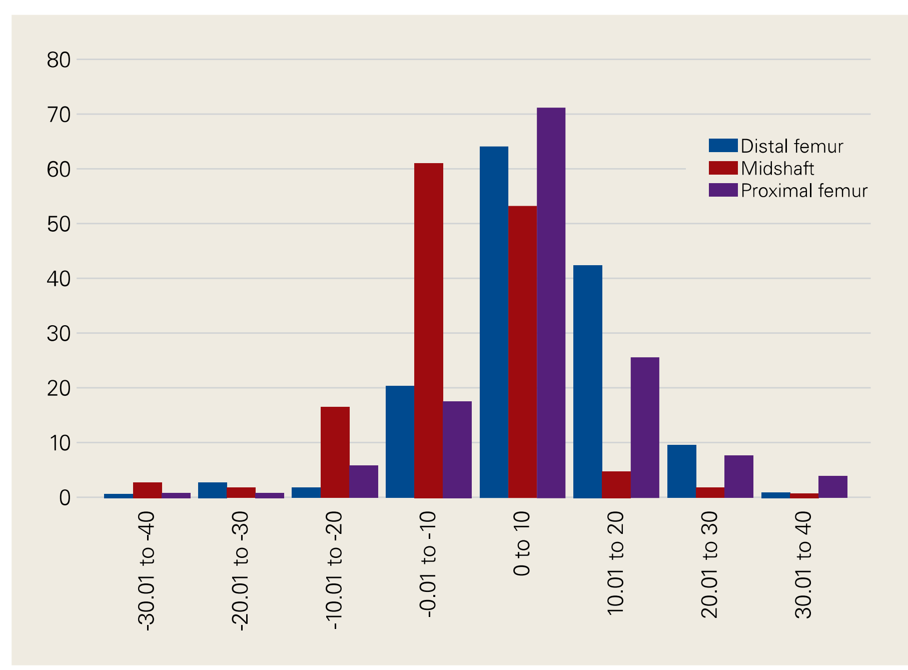
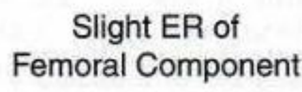
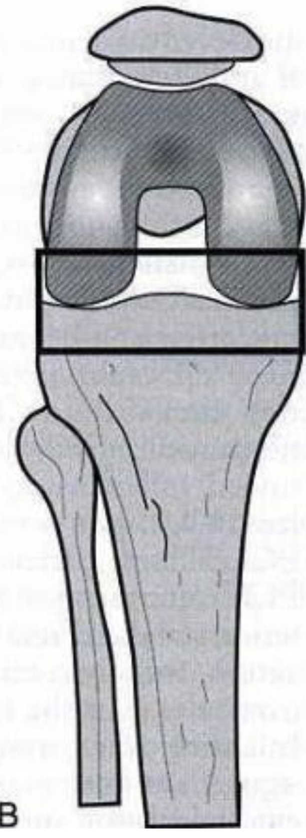


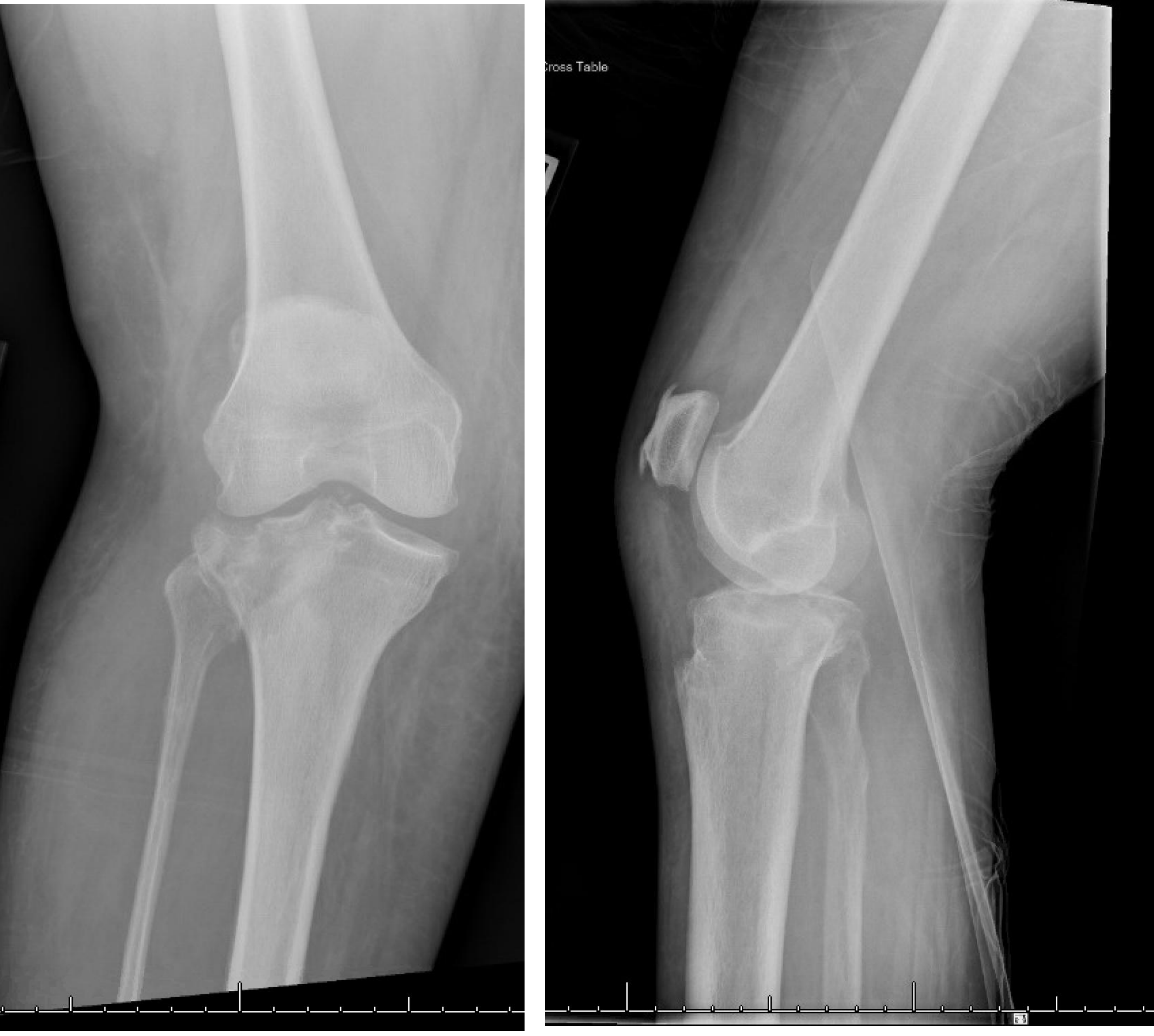
Figure 5. Distribution of linea aspera axis offset for proximal, midshaft, and distal femur.

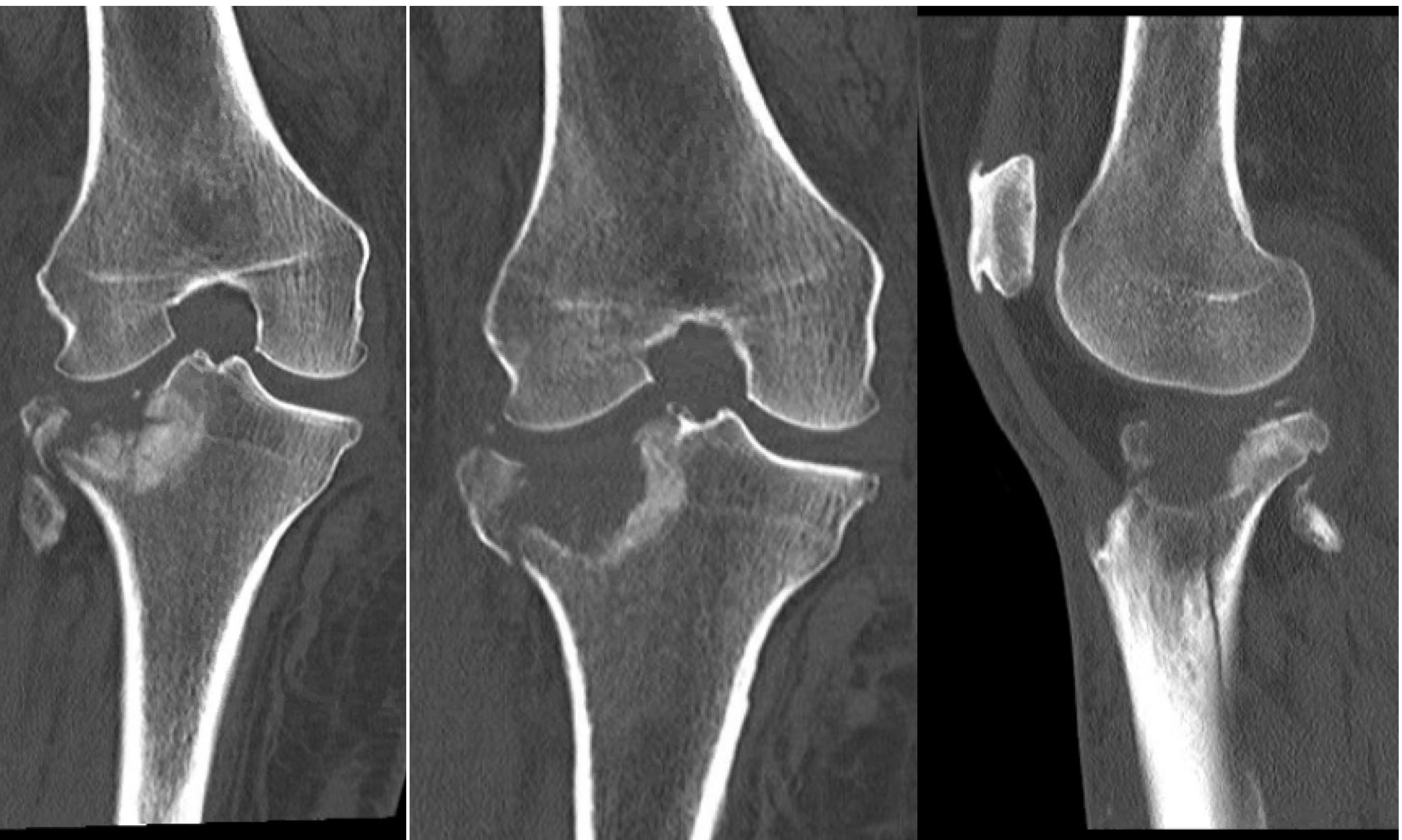




Internal Rotation of Femoral Component
Trapezoidal Flexion Gap
• Lateral patellar tracking/tilt
• Loose lateral compartment
A
Slight ER of Femoral Component
Rectangular Flexion Gap
• Central patella tracking
• Balanced medial and lateral flexion gaps
B

TKA Tibial Plateau Fracture


Cross Table



KAF
R

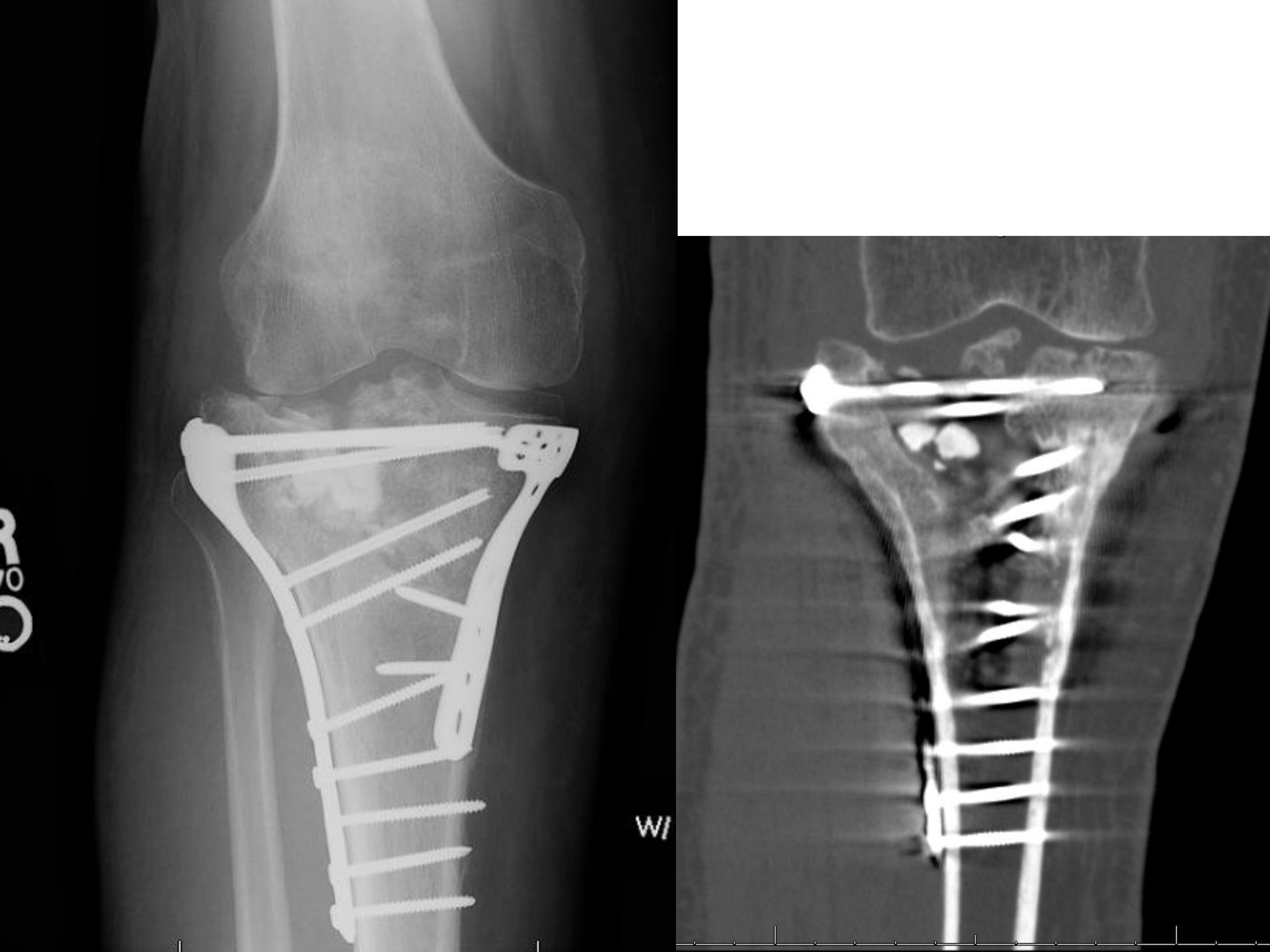
Portable

Cross Table

R
KAF

Portable

Supine

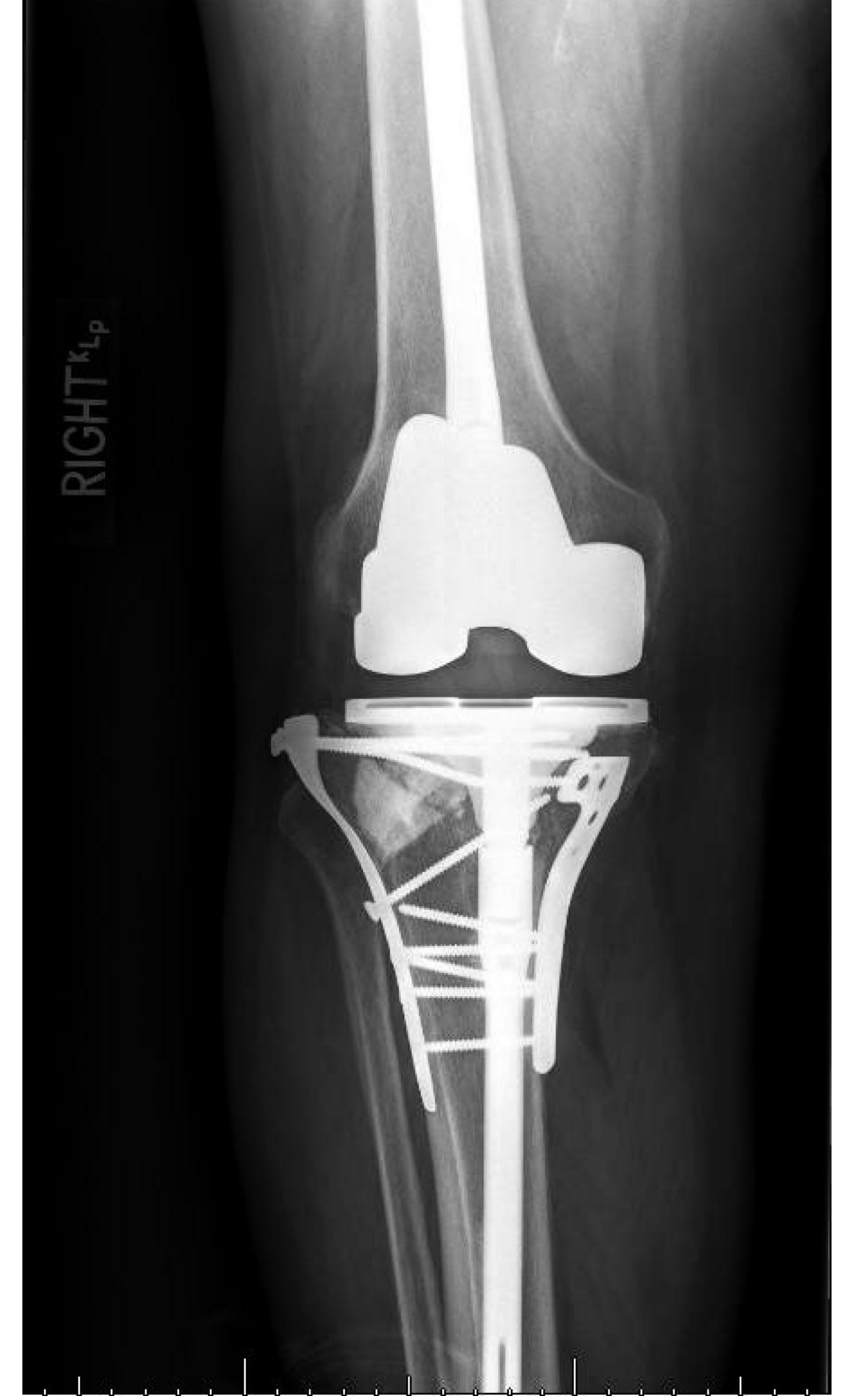


W/Weight

R

R

W/Weight


RIGHT

Clin Orthop Relat Res (2026) 00:1-13
DOI 10.1097/CORR.0000000000003854

Clinical Research

Acute or Delayed TKA for Tibial Plateau Fracture? An Observational Study From the Swedish Arthroplasty Register

Fredrik Olerud MD[1], Anne Garland MD, PhD[1], Annette W. Dahl PhD[2,3], Nils P. Hailer MD[1],
Olof Wolf MD, PhD[1]

- Data for all TKAs performed between 2014 and 2023 for acute tibial plateau fracture (n =152) or fracture sequelae (n = 950)
- TKA patients older, female, more often needed constrained implants
- Delayed TKAs greater risk of unplanned reoperation and underwent revision earlier with more infection-related revisions
- Acute TKAs underwent reoperation or revision later and with a higher proportion of revisions for me- chanical loosening

Summary

- Arthroplasty using stemmed implants and appropriate constraint can be done acutely to primarily manage distal femoral / proximal tibial fractures
- Primary advantage = immed WB
- Primary disadvantage = costs
- Outcomes seem similar

Thank You