Periprosthetic Fractures in TKA

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Learning outcomes

• Incidence & Risk factors

• Patient evaluation

• Classifications

• Treatment

• Complications
Incidence

• After primary TKA: up to 2.5%
• After revision TKA: up to 38%
  Schuetz, 2013

• Many patients have poor bone quality and osteoporosis

• Common and increasing in frequency
  Meek, JBJS Br 2011
Incidence

**Tibial**
- 0.3% - 0.5%

**Patellar**
- 0.6%

• Complication rate following treatment of PPF up to 40%
• 1 year mortality from 4.6 – 13%

(Toogood, 2015)
Risk factors

Patient Related (intrinsic)

- **Osteoporosis**: the most important single contributor
- Inflammatory arthropathy
- Advanced age / dementia
- Female gender (in 80%)
- Chronic steroid usage
- Multiple co-morbidities
- Neuromuscular disorders; frequent falls.
- BMI & Malnutrition
Risk factors
Procedure / implant related (extrinsic)

- Plate and hardware removal
- Previous osteotomy
- **Notching**
- Central box preparation for stabilized implants
- **Revision procedures**
- **Osteolysis**
- Loose/ Malaligned implants
  - Stress shielding
- Manipulation
Anterior Femoral Notching?

Controversial
Anterior Femoral Notching

Case series

- Healy et al, JBJS-A 1993
- Figgie et al, JOA 1990
- Aaron et al, CORR 1987
- Culp et al, CORR 1997
- Merkel et al, JBJS-A 1986
- Cain et al, CORR 1986
- Sisto et al, CORR 1985
- Hirsh JBJS-A 1981
Does notching the anterior femur predispose to fracture? 

In Vitro

- 3 D finite element model
- 3 factors affected stress concentration
  - **Larger** notches (>3mm) $\rightarrow$ increase stress
  - **Sharper** corners $\rightarrow$ increase stress
  - **Proximity** of notch to prosthesis $\rightarrow$ the closer the notch the higher the stress (Zalzal et al., JOA 2006)

Fig. 1. Femoral notch geometry and position.
Does notching the anterior femur predispose to fracture?

**In Vivo**

- Cadaveric study
- Notching ↓ **bending** strength by 18%
- Notching ↓ **torsional** strength by 39%

**Conclusion:** If you notch or alter postop protocol and **avoid MUA** of a notched knee

(Lesh et al., JBJS A 2000)
Does notching the anterior femur predispose to fracture? In Vivo

- Retrospective study **670 TKAs**
- Some notching in **180 knees** (27%)
- 20% of the notches were >3 mm
- **2 SC Fx** in 670 knees (0.3%)
- Only I was notched & the other wasn’t
- **No correlation** was found
- **Multifactorial**
- **Remodeling and stress redistribution**

(Ritter et al, JOA 1988)
The Effect of Femoral Notching During Total Knee Arthroplasty on the Prevalence of Postoperative Femoral Fractures and on Clinical Outcome

- **1089** TKAs, Fup 5.1 years
- Femoral notching in **325** (29.8%)
- 2 Fx in femora without notching
- **No difference** with respect to the occurrence of
  - SC Fx,
  - ROM,
  - KSS, KS function, or
  - Pain

(Ritter et al, JBJS A 2005)
Risk of periprosthetic fracture after anterior femoral notching

- 200 TKAs, 9 years
- 41% (72) with notching
- Tayside; 4 grades
- 1 with G II notching (9 years postop)
- 2 showed no notching.
- **No relationship** between minimal ant notching & SC Fx in TKA

(Gujarathi et al, Acta 2009)
Classification
Classification

Location:

• Femur
• Tibia
• Patella
Supracondylar Periprosthetic Femoral Fractures
Classification

- Several
- Displacement
- **Lewis and Rorabeck** included integrity of prosthesis into classification

Table 1: Supracondylar Periprosthetic Fractures: Classification Systems

<table>
<thead>
<tr>
<th>Study</th>
<th>Type/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neer et al</td>
<td>Type I</td>
<td>Undisplaced (&lt;5 mm displacement and/or &lt;5° angulation)</td>
</tr>
<tr>
<td></td>
<td>Type II</td>
<td>Displaced &gt;1 cm</td>
</tr>
<tr>
<td></td>
<td>Type IIa</td>
<td>With lateral femoral shaft displacement</td>
</tr>
<tr>
<td></td>
<td>Type IIb</td>
<td>With medial femoral shaft displacement</td>
</tr>
<tr>
<td></td>
<td>Type III</td>
<td>Displaced and comminuted</td>
</tr>
<tr>
<td>DiGiola and Rubash</td>
<td>Group I</td>
<td>Extra-articular, undisplaced (&lt;5 mm displacement and &lt;5° angulation)</td>
</tr>
<tr>
<td></td>
<td>Group II</td>
<td>Extra-articular, displaced (&gt;5 mm displacement or &gt;5° angulation)</td>
</tr>
<tr>
<td></td>
<td>Group III</td>
<td>Severely displaced (loss of cortical contact) or angulated (&gt;10°); may have intercondylar or T-shaped component</td>
</tr>
<tr>
<td>Chen et al</td>
<td>Type I</td>
<td>Nondisplaced (Neer type I)</td>
</tr>
<tr>
<td></td>
<td>Type II</td>
<td>Displaced and/or comminuted (Neer types II and III)</td>
</tr>
<tr>
<td>Lewis and Rorabeck</td>
<td>Type I</td>
<td>Undisplaced fracture; prosthesis intact</td>
</tr>
<tr>
<td></td>
<td>Type II</td>
<td>Displaced fracture; prosthesis intact</td>
</tr>
<tr>
<td></td>
<td>Type III</td>
<td>Displaced or undisplaced fracture; prosthesis loose or failing</td>
</tr>
</tbody>
</table>
Classifications of SC periprosthetic fractures

I. Lewis and Rorabeck

**Type I:**
Non displaced fracture
Prosthesis stable

**Type II**
Displaced fracture
Prosthesis stable

**Type III**
Any fracture with a loose or failing prosthesis
Epiphyseal segment length

II. Su and associates
Patient Evaluation
Patients fall into 2 broad categories

• **Older** frail patient, minor trauma, loose implants
  → **Revision** TKA

• **Younger** patient, higher energy trauma, functioning and well fixed implants
  → More amenable to **fixation**
Patient evaluation

• History and Examination

• Pre fracture knee pain, instability and stiffness

• Status of the soft tissues

• The neurovascular status

• Medical co-morbidities (optimization)

• Infection Workup
Patient evaluation

- Plain x rays, include entire femur
- CT scan
  - Delineate the fracture pattern
  - Assess bone quality
  - Look for osteolysis
  - Look for implant loosening
How implant is stable
Sometimes it is Difficult

• Pre fracture symptoms

• Pre-fracture x-rays

• Stress views

• CT

• MARS (MRI with metal artifact reduction sequence)
Stress films
X-ray can be deceiving
Goals of treatment

• To achieve a well fixed functioning TKA:
  • Well aligned (perfect) union of fracture
  • Stable TKA
  • Functional ROM

• May be difficult to achieve with ORIF using a plate or IM nail
Goals of treatment

Successful treatment if:

• Absence of knee pain
• Fracture union in <6 months
• ROM = 0-90%
• Return to normal ambulatory status

(Cain et al, CORR 1986)
Technically challenging

- Osteoporotic bone
- Short distal segment for fixation
- Inadequate or inappropriate treatment makes things worse
Decision Making Parameters

1- Stability of the Prosthesis
2- Fracture Classification
3- Length of the epiphyseal fragment
4- Type of the Prosthesis
5- Quality of the Bone
6- Co-Morbidity of the Patient
Non Operative

Advantages
• Traction / casting / bracing
• Eliminates surgical risks

Disadvantages
• Decubitus ulcers
• Pneumonia
• DVT/PE
• Diffuse muscle atrophy
• Loss of motion
• Malunion / nonunion
Non operative treatment

• Role is minimal
• Non displaced + stable implants
• Patients absolutely cannot tolerate surgery
• High risk of pseudoarthrosis, malunion & non union
Operative

• Treatment of choice

• Unless patient is too sick to undergo surgery
  
  ➢ ORIF
  
  ➢ Retrograde IM nail
  
  ➢ Revision TKA
  
  ➢ Distal Femoral Replacement
Distal femoral fracture

• Most common

• Deforming forces at the metaphysis

• Component usually well fixed
Condylar Buttress Plates

Use has decreased in favor of more rigid fixation
DCS / Blade Plate

- Fixed angle devices
  - Condylar Screw Plate
  - Condylar Blade Plate
Conventional Plating

- DCS or Blade Plate or Condylar Buttress plate
- High incidence of **non union, malunion or mechanical failure**

- Althausen et al, JOA 2003
- Farouk et al, JOT 1999
- Garnavos et al, Acta 1994
- Figgie et al, JOA 1990
- Culp et al, CORR 1987
- Merkel et al, JBJS-A 1986
- Hirsh et al, JBJS-A 1981
Locked Plating
Advantages

• Minimal devascularization of Fx fragments

• Particular advantage in osteopenic bone

• In LISS system, screws lock in plate; bone is fixed at each point like an internal fixator
ORIF: Non Locking plates vs. Locking plates

<table>
<thead>
<tr>
<th>Complication</th>
<th>Non-locking</th>
<th>Locking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42%</td>
<td>12%</td>
</tr>
<tr>
<td>Malunion</td>
<td>47%</td>
<td>20%</td>
</tr>
<tr>
<td>Nonunion</td>
<td>16%</td>
<td>0%</td>
</tr>
<tr>
<td>Blood loss</td>
<td>more</td>
<td>less</td>
</tr>
<tr>
<td>ROM</td>
<td>less</td>
<td>more</td>
</tr>
<tr>
<td>X-ray alignment</td>
<td>worse</td>
<td>better</td>
</tr>
</tbody>
</table>

(Large et al., JOA 2008)
Locked Plating

• Biomechanically superior to non locked plates
  ➢ Wilkens et al, JOT 2008
  ➢ Marti et al, JOT 2001

• Improved distal fixation, especially in osteopenic bone
  ➢ Zlowodski et al, JOT 2004
  ➢ Kregor et al, Injury 2004
  ➢ Ricci et al, Injury 2007
  ➢ Kregor et al, JOT 2001
Locked Plating Vs Conventional

• Systematic review of literature

• Lower non union and reoperation rates over conventional plating

(Herrera et al, Acta Orthop 2008)
Locked Plating

• Do not leave short segment of bone between tip of stem and plate → interprosthetic fracture

• Better than IMN with ipsilateral THA
IM Nailing
IM Nailing

Advantages

• Minimizes soft tissue dissection

• Reaming to stimulate healing

• Maintenance of fracture haematoma & osseous blood supply

• High union rates,

• Use the TKA scar
More stable in medial comminution than locked plates
IM Nailing

- Can be used for more proximal fractures as well
2 Distal interlocking screws

Sufficient distal bone to allow purchase with minimum 2 distal locking screws
IM Nailing

- Systematic review of literature
- Highest union rates reported in literature
- Possible selection bias

(Herrera et al, Acta Orthop 2008)
IM Nailing
Contraindications

- Long preexisting THA IM stem
- Extremely distal fracture, minimum of 2 distal locking
- Severe comminution
- Loose TKA components
- Femoral component with closed intercondylar box
- Revision femoral component with a stem
IMN Drawbacks

• Adequate distal bone for screws

• Posterior location of entrance risks anterior cortex perforation

• Excessive force needed for insertion

• Damage to nail during insertion

• Not recommended with ipsilateral THA

• Interprosthetic fracture
IM Nailing Drawbacks

• Compatible femoral component: open box

• Space available should be 1 mm larger than the nail

• Modification of component with diamond burr (2-3 min)

• Debris affecting longevity of component; third body wear

(Maniar et al, JOA 1999)
### Table 2
Intercondylar Opening of Femoral Total Knee Component, by Manufacturer and Model

<table>
<thead>
<tr>
<th>Company</th>
<th>Model</th>
<th>Smallest Intercondylar Diameter (M/L or A/P) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomet</td>
<td>AGC sizes 55 - 80</td>
<td>17.0 - 22.0</td>
</tr>
<tr>
<td></td>
<td>Maxim PCR sizes 55 - 80</td>
<td>13.0 - 15.0</td>
</tr>
<tr>
<td></td>
<td>Maxim PCS open box sizes 55 - 80</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Ascent PCR sizes XS - XXL</td>
<td>17.0 - 23.0</td>
</tr>
<tr>
<td></td>
<td>Ascent PCS open box sizes XS - XXL</td>
<td>20.0</td>
</tr>
<tr>
<td>Kirschner</td>
<td>Performance</td>
<td>14.0</td>
</tr>
<tr>
<td>DePuy/Johnson &amp; Johnson</td>
<td>AMK Cruciate Retaining 1488, 1688 sizes 1 - 5</td>
<td>14.2 - 21.5</td>
</tr>
<tr>
<td></td>
<td>AMK 1489 Series sizes 1 - 5</td>
<td>14.5 - 20.6</td>
</tr>
<tr>
<td></td>
<td>AMK Congruency Posterior Stabilized 1956 sizes 1 - 5</td>
<td>13.2 - 17.2</td>
</tr>
<tr>
<td></td>
<td>AMK Posterior Stabilized (diverging box) 1866</td>
<td>13.25</td>
</tr>
<tr>
<td></td>
<td>AMK Universal 1489</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>AMK Coordinate Ultra</td>
<td>Closed box</td>
</tr>
<tr>
<td></td>
<td>LCS sizes Small - Large+</td>
<td>13.6 - 22.0</td>
</tr>
<tr>
<td></td>
<td>LCS Complete sizes Small - Large+</td>
<td>14.4 - 21.9</td>
</tr>
<tr>
<td></td>
<td>PFC Sigma Cruciate Retaining</td>
<td>17.4</td>
</tr>
<tr>
<td></td>
<td>PFC Sigma Posterior Stabilized</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>PFC Sigma TC3 Cruciate Substituting</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>PFC Modular Cruciate Retaining</td>
<td>19.9</td>
</tr>
<tr>
<td></td>
<td>PFC Modular Cruciate Substituting</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>PFC TC3</td>
<td>Closed box</td>
</tr>
<tr>
<td>Wright Medical</td>
<td>Advantim PCR</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>Advantim Open Housing Posterior Stabilized</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Advantim Closed Housing Posterior Stabilized</td>
<td>Closed box</td>
</tr>
<tr>
<td></td>
<td>Advance Medial Pivot (PCR)</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>Advance Posterior Stabilized</td>
<td>Closed box</td>
</tr>
<tr>
<td></td>
<td>Axiom (PCR) sizes 55 - 85</td>
<td>14.0 - 22.0</td>
</tr>
<tr>
<td></td>
<td>Axiom (Posterior Stabilized) sizes 55 - 85</td>
<td>16.0 - 24.0</td>
</tr>
<tr>
<td>Howmedica/Osteonics</td>
<td>PCA sizes Small - X-large</td>
<td>12.0 - 16.0</td>
</tr>
<tr>
<td></td>
<td>Duracon</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>Omnifit</td>
<td>Closed box</td>
</tr>
<tr>
<td></td>
<td>Scorpio CR sizes 3 - 13</td>
<td>17.0 - 21.0</td>
</tr>
<tr>
<td></td>
<td>Scorpio PS sizes 3 - 13</td>
<td>17.0 - 21.0</td>
</tr>
<tr>
<td></td>
<td>Scorpio TS</td>
<td>Closed box</td>
</tr>
<tr>
<td>Centerpulse (Intermedics/Sulzer)</td>
<td>Natural, NKII</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Apollo PCR</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>Apollo Posterior Stabilized</td>
<td>Closed box</td>
</tr>
<tr>
<td>Zimmer</td>
<td>Insall/Burstein I sizes 55 - 72</td>
<td>15.5 - 18.8</td>
</tr>
<tr>
<td></td>
<td>Insall/Burstein II sizes 54 - 74</td>
<td>15.3 - 21.0</td>
</tr>
<tr>
<td></td>
<td>Miller/Galante I sizes Small - Large++</td>
<td>10.6 - 17.4</td>
</tr>
<tr>
<td></td>
<td>Miller/Galante II sizes 1 - 8</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>Nex Gen LPS sizes A - H Open Box</td>
<td>14.1 - 21.6</td>
</tr>
<tr>
<td>Smith &amp; Nephew</td>
<td>Genesis</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Genesis II</td>
<td>16.5</td>
</tr>
</tbody>
</table>

(Kuzyk et al, JAAOS 2017)
Locked Plating Vs IMN ?
IMN or Locked Plating

- **No consensus** in the literature on best treatment of periprosthetic TKA Fx
- Possible selection bias
- Interpret the literature with caution
IMN Nailing Vs Plating

• IMN $\rightarrow$ greater axial strength
• Plating $\rightarrow$ greater torsional stiffness

➢ Giroozbachsh et al, JOT 1995
➢ Koval et al, JOT 1996
➢ Meyer et al, JOT 2000
➢ David et al, JOT 1997
➢ Ziowodzki et al, JOT 2004
IMN or Locked Plating


→ Non union is the range of **20%** for both nail and locking plate fixation

• Systematic review of 719 cases; nonunion rate similar for nail and plate but malunion rate significantly greater with nail (Ristevski, 2014)
Locked Plating Vs IMN

• Significantly greater radiographic union

• Lower rate of reoperation

  (Horneff et al, Orthopedics 2013)

• No statistically significant difference in ROM, operative time and time to union

• Statistically significant difference in intraop blood loss

• ORIF > IM Nail

  (Bezwada et al, JOA 2004)
IMN or Locked Plating

• **No consensus** in the literature on best treatment of periprosthetic TKA Fx

• Ipsilateral THA, closed box, very distal Fx

• Possible selection bias & Interpret the literature with caution
Nailed Cementoplasty

Cement augmentation used

• Vertebroplasty

• Impending pathologic fractures of femur and humerus

• Osteopenic intertroch Fx

- Schatzker et al, J Trauma 1978
- Strubl et al, JOT 1990
Nailed Cementoplasty

- Octogenarian with advanced osteoporosis
  & ASA 3 (5 patients)
- Stove pipe femur

(Bobak et al, JOA 2010)
Nailed Cementoplasty

- Reduce fracture
- Ream
- Cement plug
- No pressurization
- IMN without screws
- Simulates a cemented stem
- Immediate ROM & TTWB
- 100% healed by 4 months
Revision Total Knee Arthroplasty
Role of Revision TKA

1. Location: close proximity to the implant

2. Quality of bone: poor / osteoporosis / comminuted

3. Fixation: implant fixed to small piece of distal bone

Very little bone to work with for a plate or locking screws of a nail
Fracture location

• Fractures that closer to the implant better treated with revision

Rule of thumb:

• Distal to anterior flange of femur should be revised
Role of Revision TKA

Indications

• Fx with loose, unstable, or malaligned components

• Extremely distal or comminuted fractures

• Inadequate bone stock

• Salvage procedure after failure of previous methods
Revision Total Knee Arthroplasty

Advantages

• Stable fixation with diaphysis engaging femoral stem

• Early ROM & Early weight bearing

• Esp in elderly with concomitant medical problems and poor tolerance for immobilization
Stemmed revision
Revision TKA

• Stemmed implants / More constrained
• Additional fixation for deficient metaphyseal bone.

• Uncemented stems are preferred; cemented stems in patients with poor diaphyseal bone stock.

• Bone defects management e.g. augments, cones or Sleeves

(Kuzyk et al, JAAOS 2017)
Distal femur porous metal cone and a rotating-hinge revision prosthesis with noncemented stems.

(Kuzyk et al, JAAOS 2017)
The problem is

- Removing the femoral component may leave little bone for the reconstruction

- Problem accentuated in the elderly osteopenic patient or the patient with marked comminution
For these cases one might consider

- A tumour type prosthesis; Distal femoral replacement or endoprosthesi

- An allograft
Distal Femoral Replacement
Distal Femoral Replacement

• Severely comminuted Fx in Elderly
• Allows for immediate mobilization
• Good results in low demand patient
• Salvage device for elderly, sedentary patients
• No chance of non union or malunion
• Provides a stable, well aligned TKA
Distal Femoral Replacement
Distal Femoral Replacement

- 16 pt with distal femoral replacements
- **10 complications in 5 patients requiring additional surgery**
- Infection
- Fracture b/w THA stem & DFR stem
- Hip Fx
- Haematoma, then stem fracture

Mortazavi J et al, JOA 2010
Distal Femoral Replacement

Conclusion:

• Use as salvage tool for sedentary, elderly patients.
• Better than allograft b/c immediate weight bearing allowed and eliminates risk of nonunion
• Expensive !!!
Distal Femoral Allograft

- 12 consecutive periprosthetic fx
- All revised with distal femoral allograft
- Results (10 patients, 2 lost to fup)
  - Excellent 10%
  - Good 50%
  - Fair 30%
  - Poor 10%
- Mean fup 6 years, 9 of 10 still functioning well

Kassab et al, JOA 2004
Distal Femoral Allograft

Complications:
• 3 additional surgeries
• MCL repair and poly exchange
• Infection
• Eventually resulted in amputation
• Non union

Kassab et al, JOA 2004
Distal Femoral Allograft

Conclusion:

- DFA is a good alternative for treatment of periprosthetic femur Fx;
- Provides early stability, restoration of bone stock and fracture union

Kassab et al., JOA 2004
Problems with Allografts

- Infection rates (up to 10%)
- Fractures (6 - 26 months)
- Non union
- Resorption in all allografts
  - Some times massive
APC

• Maybe still considered for younger patients with comminuted distal femoral fractures,

• Its utility in elderly patients with distal femoral periprosthetic fractures has been largely abandoned for endoprostheses.
Tibial Periprosthetic Fracture
Tibial periprosthetic fracture

- Much less common (<1% of TKA)
- (Prevalence 0.4 – 1.7%)
- Tibial implant is usually loose (in contrast to femur)
- ORIF usually is difficult due to lack of bone for proximal fixation.
Felix Classification

- UCS is less frequently used than Felix classification

I Implant & plateau interface
II adjacent to stem
III distal to implant
IV tibial tubercle

Subtypes
A stable
B Unstable
C intraoperative
Management

I. Conservative therapy

Indications

• Intraoperatively stable undisplaced fractures which are and first seen at the postoperative radiograph

• Undisplaced fractures type II

How

• An adaptation of the postoperative weight bearing and radiographic controls
Surgical Management

Intraoperative fracture subtype C (type I-III)
→ Osteosynthesis +/− Revision stem systems

Loose tibial implant (subtype B)
→ All types Revision arthroplasty
Tibial Fractures Type IV

- Potentially catastrophic

Due to possible extensor mechanism disruption

**Extensor mechanism**

**Intact**
- Type IV A
  - Extension immobilization
- Type IV B
  - Revision surgery + fracture ORIF

**Disrupted**
- Operative treatment
Tibial Revision with Porous Metal
Tibial Revision with APC
Periprosthetic Patellar Fractures
Goldberg Classification

A, Type I: Marginal Fx, not involving implant, cement, or quadriceps mech.

B, Type II: Fracture involves implant, cement, or quadriceps

C, Type III: Inferior pole Fx
A = with pat ligament rupture;
B = without ligament rupture;

D, Type IV: Fracture-dislocation.
Management

**Type I**
- If intact extensor mechanism $\rightarrow$ conservative

**Type II**
- Stable implants $\rightarrow$ tension band / screw
- Loose implants $\rightarrow$ Tension band / screw + revision

**Type III**
- **Type III A** fractures with fixed implant are treated according to guidelines for the management of patellar tendon ruptures
- **Type III B**:
  - stable $\rightarrow$ conservative
  - loose $\rightarrow$ revision
Complications

• In a systematic study analyzing complications of 415 periprosthetic femur fractures herrer et al. observed:
  • 9% pseudoarthroses / non unions
  • 4% mechanical complications
  • 3% infections

• With an overall revision rate , reaching 13%

(Herrera et al , Acta Orthop 2008)
Take Home Messages

• The technical goal of achieving a well aligned, stable knee may be very difficult

• Elderly; Quick surgery, minimal blood loss, Rapid mobilization & immediate FWB

• Locked plating in extreme distal fractures / interprosthetic fractures/ Closed box prosthesis

• IMN with compatible component, enough distal bone
Take Home Messages

• Need an implant system which can compensate for large segments of bone

• Preoperative planning critical in determining length of distal segment which must be replaced

• Interpret literature with caution

Decisions are more important than incisions