Enmeshed impacted bone allograft for femoral revision: A 10 years (7-17) follow-up study

H. MIGAUD, F. GIRAUD, C. JARDIN, A. DUQUENNOY
Orthopaedic department C,
University hospital of Lille, France
Pitfalls of impaction bone grafting

1) Subsidence and initial stability related to impaction strength

2) Postoperative femoral fracture

3) Non controlled cement/graft penetration
1) Impaction bone allografting reinforced and protected from excessive cement penetration by an intramedullar metallic mesh

2) Stability whatever the bone loss by --> distal fixation over bone loss area
Goals of the method:

- Bone grafting protected by mesh: reinforcement and protection from excessive cement penetration (2/3 prox)
  --> Reconstruction

- Longer stem cemented in the normal host femur by 1/3 distal
  --> Stability
Pitfalls of method:

- Longer stem $\rightarrow$ stiffness $\rightarrow$ stress shielding
  $\rightarrow$ *Never observed + Low rate of subsidence (none > 4.5 mm)*
Pitfalls of method:

• Longer stem --> stiffness --> stress shielding
  --> Never observed + Low rate of subsidence (none > 4.5 mm)

• Mesh and graft incorporation.
  --> Good in all but a septic case
Pitfalls of method:

- Longer stem --> stiffness --> stress shielding
  --> *Never observed + Low rate of subsidence (none > 4.5 mm)*
- Mesh and graft incorporation.
  --> Good in all but a septic case
- **Fretting mesh / stem**
  --> *No osteolysis related to the mesh*
The reasons for bone grafting?
1) Impaction bone grafting give long-term favorable results

Success is not compromised by severity of bone loss

French Orthopaedic Society experience: 1398 revision THA investigated (158 impaction bone grafting)
No graft

Impaction

1398 revision THA
n = 748 Slight bone loss
1398 revision THA
n = 520 Moderate bone loss
1398 revision THA
n = 80 Severe bone loss
2) Success of impaction even in case of severe bone loss
Our experience (1986-1994)
Patients

• 38 hips (29 patients /15 H, 14F)
• Mean follow-up = 10 y. [7-17]
• 6 iterative loosening, 1 septic
• No patient lost for follow-up (3 deceased)
Bone loss
French Orthopaedic Society rating

Grade I
N = 0

Grade II
N = 3

Grade III
N = 28

Grade IV
N = 7
Intraoperative complications

• 5 fractures of the major trochanter
• 3 femoral shaft fractures
Postoperative complications

- 1 deceased (DVT)
- 1 dislocation
- 1 infection (evolution of a previously infected case) (Girldstone procedure)
- No postoperative femoral fracture
Merle d'Aubigné Hip rating

Pre-operative

- Excellent: 8
- Very good: 12
- Good: 16
- Fair: 8
- Poor: 12
- Bad: 16

Follow-up

- Excellent: 14
- Very good: 10
- Good: 2
- Fair: 9
- Poor: 3
- Bad: 1
X-rays: Subsidence

- Assessed with a digitizer [Orthographics]
- **12 hips** had subsidence < 3.5 mm (mean 1.9 ± 1.1 mm) --> non significant
- **1 hip** had 4.4 mm non progressive after 10 y. and without clinical symptoms
Survivorship

- Three reoperations
  - 1 Girldstone because of infection at 4 years:
  - 1 cup exchange related to wear without femoral osteolysis
  - 1 femoral revision at 10 years because of recurrence of femoral osteolysis related to a severe cup wear (Male 48 years old): conversion to cementless with Metal-on-Metal bearing components
12-year Survivorship

Reoperation for any reason
= 90.7% ± 0.6%

Reoperation because of femoral loosening
= 94.1% ± 0.5%
CONCLUSIONS

• Femoral reconstruction in every aseptic case
• No severe subsidence
• No postoperative femoral fracture
• Only one reoperation when performed for aseptic revisions at a mean 10 y. follow-up
• Best indication of impaction bone allografting = Bone loss with a continuous femoral shaft
CONCLUSIONS

• However a limited distal femoral perforation is not a contra-indication.
CONCLUSIONS

• Stem length adjusted to the severity of bone deficiency

When needed distal fixation
avoid migration prevent delayed fracture and do not
Thank you for your attention

Lille Capital of French Flanders