

Surgical revision for failed total ankle arthroplasty

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When TAA fails....

2 surgical options:

- Removal → new TAA
- Removal → fusion



TAA removal → new TAA

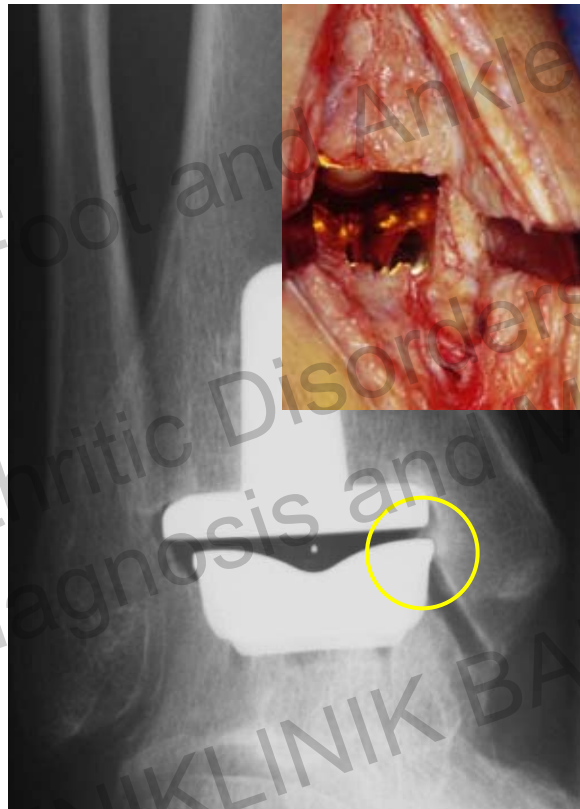
- **Limited indications!**

- **Requirements**

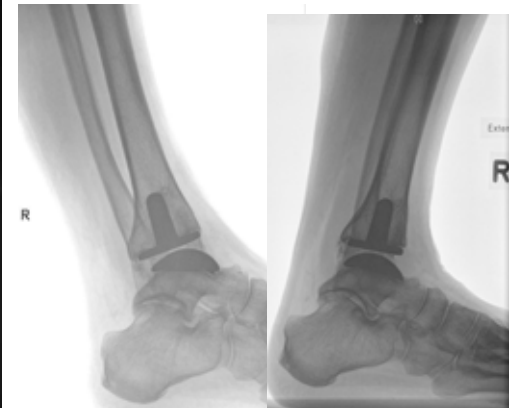
- failure's cause is well understood
- good ankle (ie TAA) motion
- good reasons for trying to keep ankle motion with new TAA
- reasonable bone stock
- limited number of previous ankle surgeries
- well informed patient wants it



Oversized component(s)



Downsizing
talar component
from 5 to 4



- A.B., 45 yrs old
- 5 months postop → intra-articular medial pain

Postop 10 years
VAS 0-1 (4)

Oversized component(s)



- R.N., 53 yrs old
- 1 year postop, intra-articular medial pain

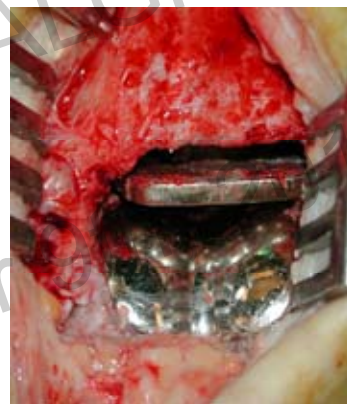
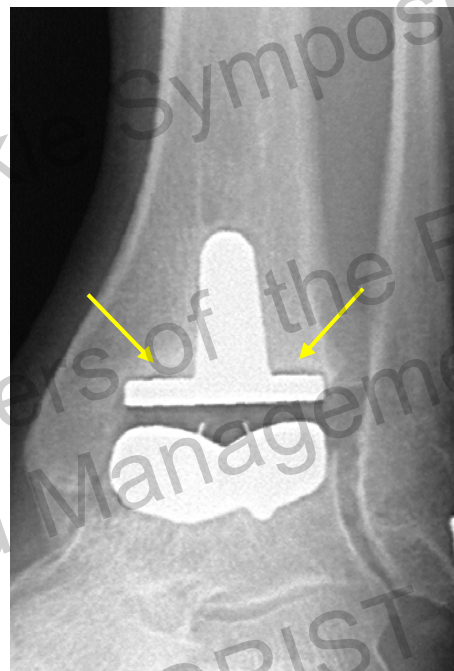
Aseptic loosening



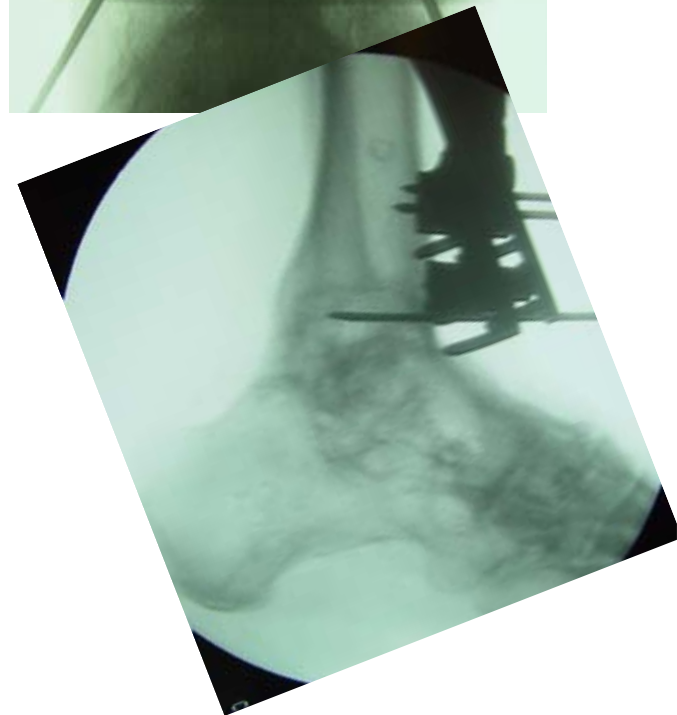
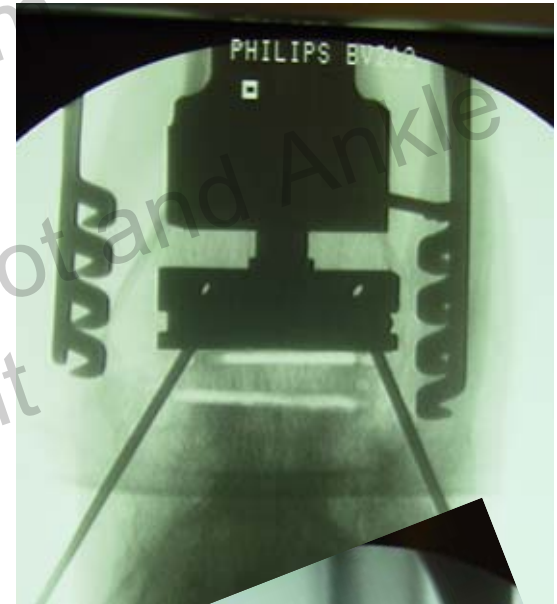
- H.W., 51 yrs old
- 6 months postop → diffuse pain



Revision for failed TAA



Aseptic loosening

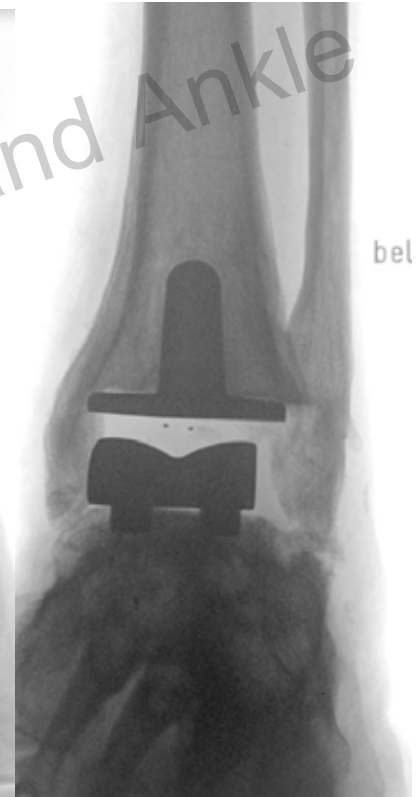
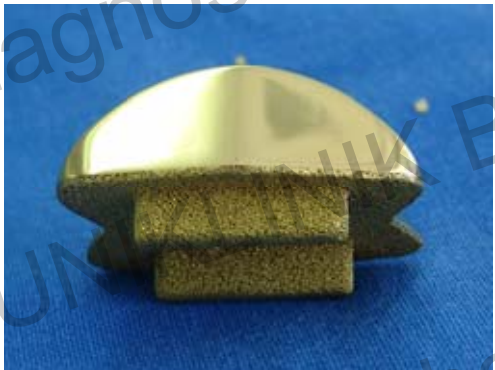


- W.H., 48 yrs old
- ankle fusion 10 years ago
- desarthrodesis → TAA

Revision for failed TAA



- chronic pain, suspicion of aseptic loosening
- our recommendation: fusion
- patient didn't accept it



- 1 year after revision with Buechel-Pappas™ (full-thickness talar component)
- significant better, but not painfree



maximal extension

maximal flexion

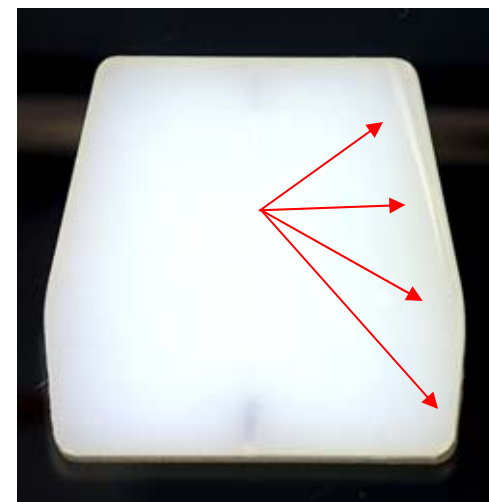
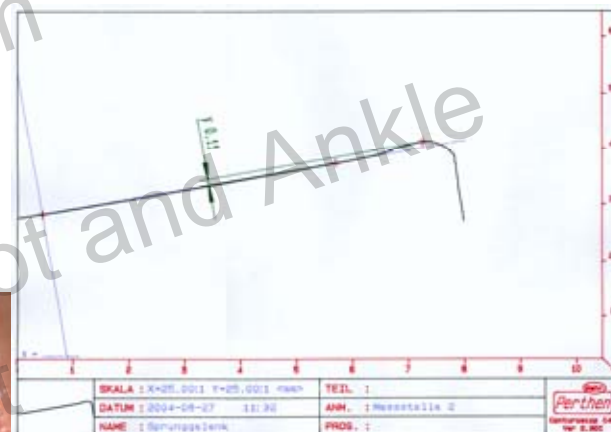
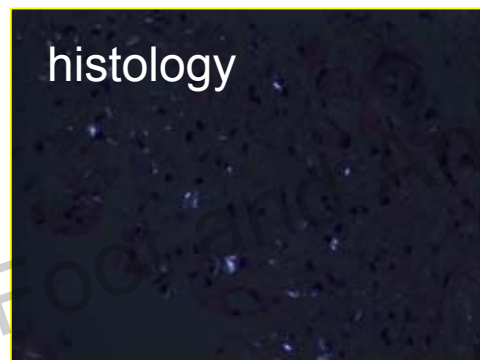
- 3 yrs postop
- still significant better, but not painfree!
- ankle ROM: 4° !!!

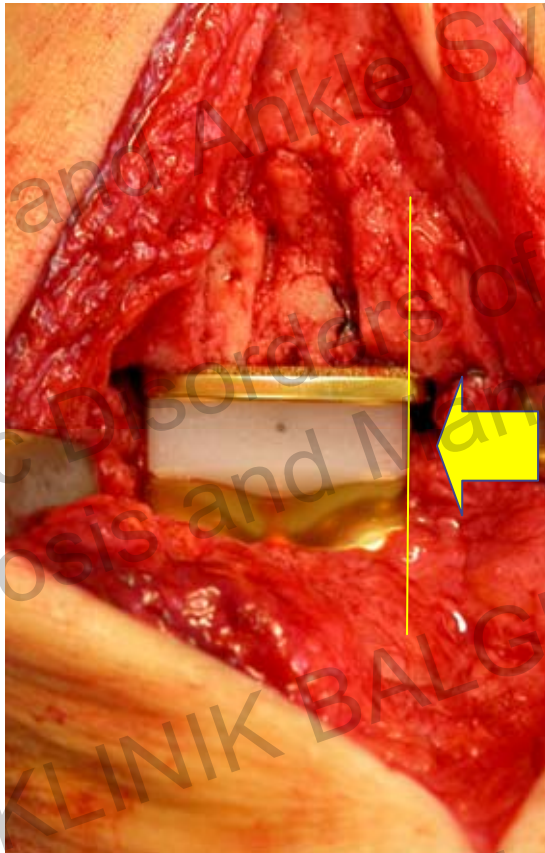
TAA malalignment (1)



- Z.M., 46 yrs old
- 6 weeks postop

Revision for failed TAA





- components are aligned
- cavity of cyst if filled

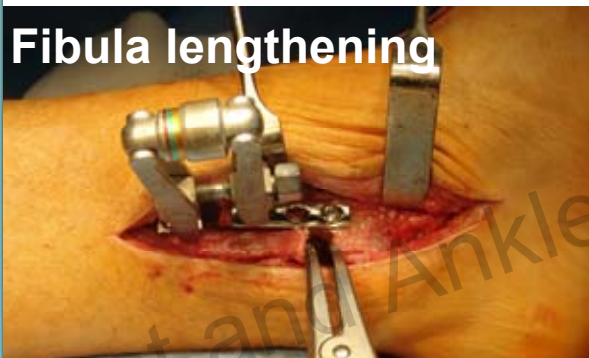
TAA malalignment (2)



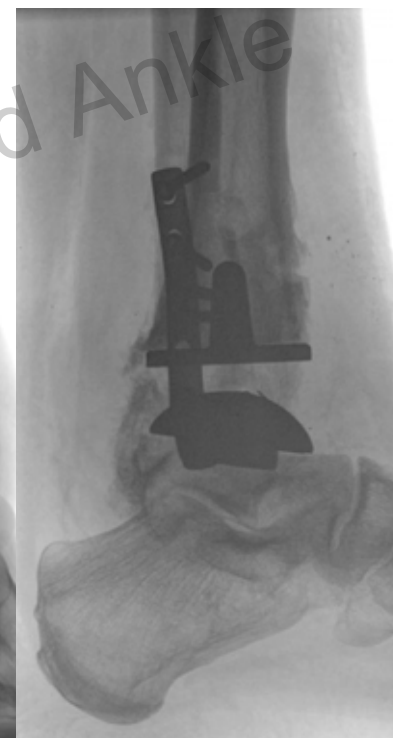
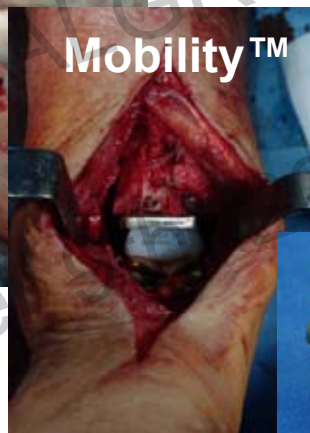
- T.P., 47 yrs old, 2 yrs postop
- chronic pain

Revision for failed TAA

Fibula lengthening



Mobility™



- better but not painfree



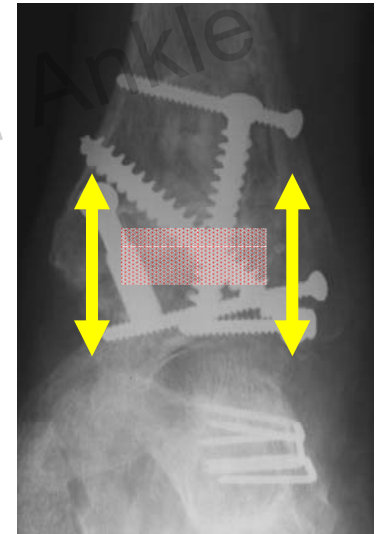
PB™

TAA removal → fusion

- **More efficient salvage than TAA regarding pain**
- **Depending on residual bone stock...**
 - need to include a subtalar fusion
 - need to use homolog bone grafting
 - higher risk of pseudarthrosis
- **Residual bone stock is depending from**
 - TAA design
 - TAA „age“
 - yearly (or 2 years) follow up for a life time!

Best TAA designs...

- **Leave malleolar joints intact**
 - 2 strong „supporting“ columns (malleoli)
 - direct contact malleoli-talus for fusion
 - no significant shortening/correct rotation
- **Only „resurface“ the talar dome**
 - sufficient talar bone stock left for screw fixation
→ subtalar joint can be left intact!

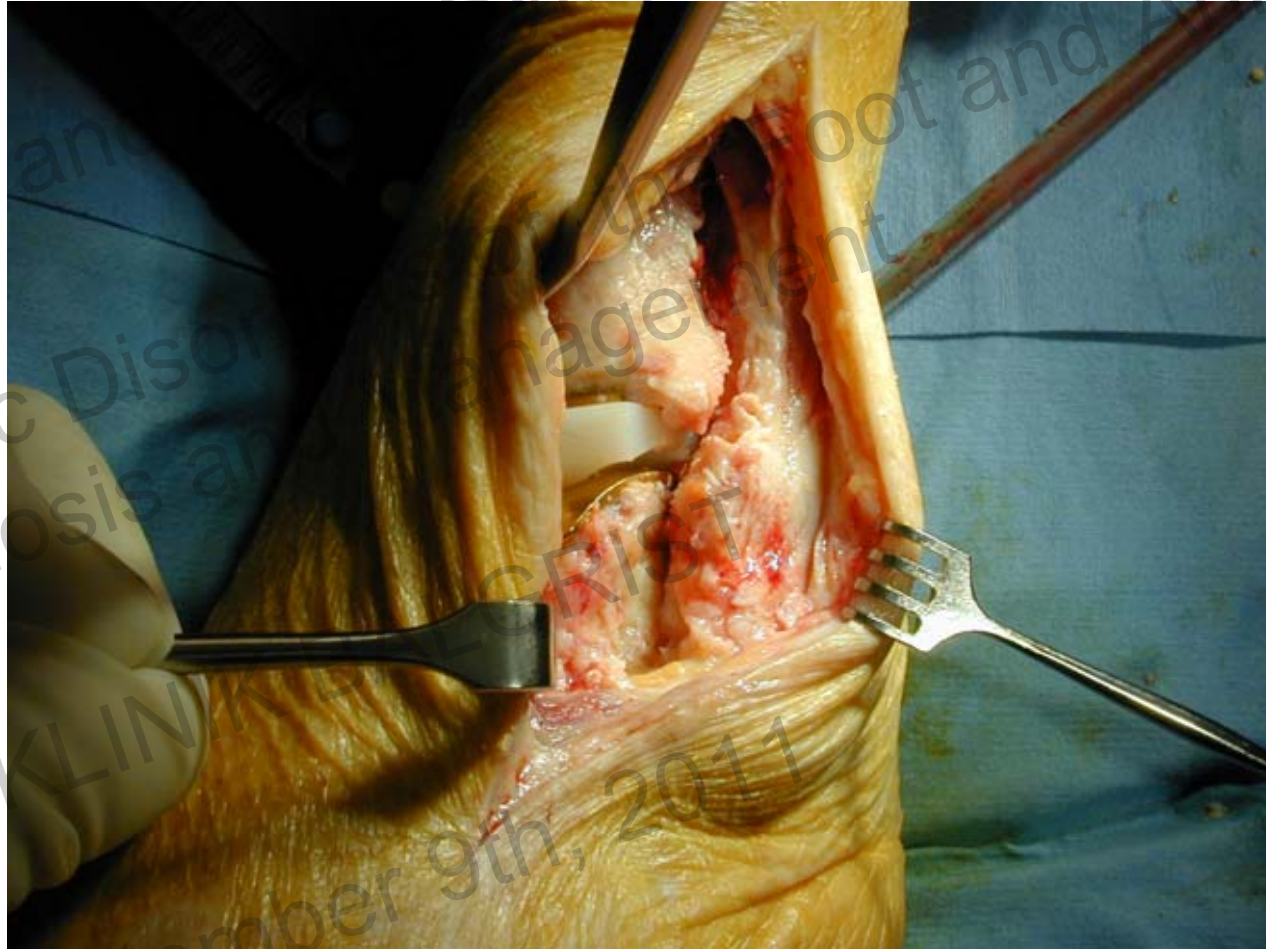


Surgical approaches

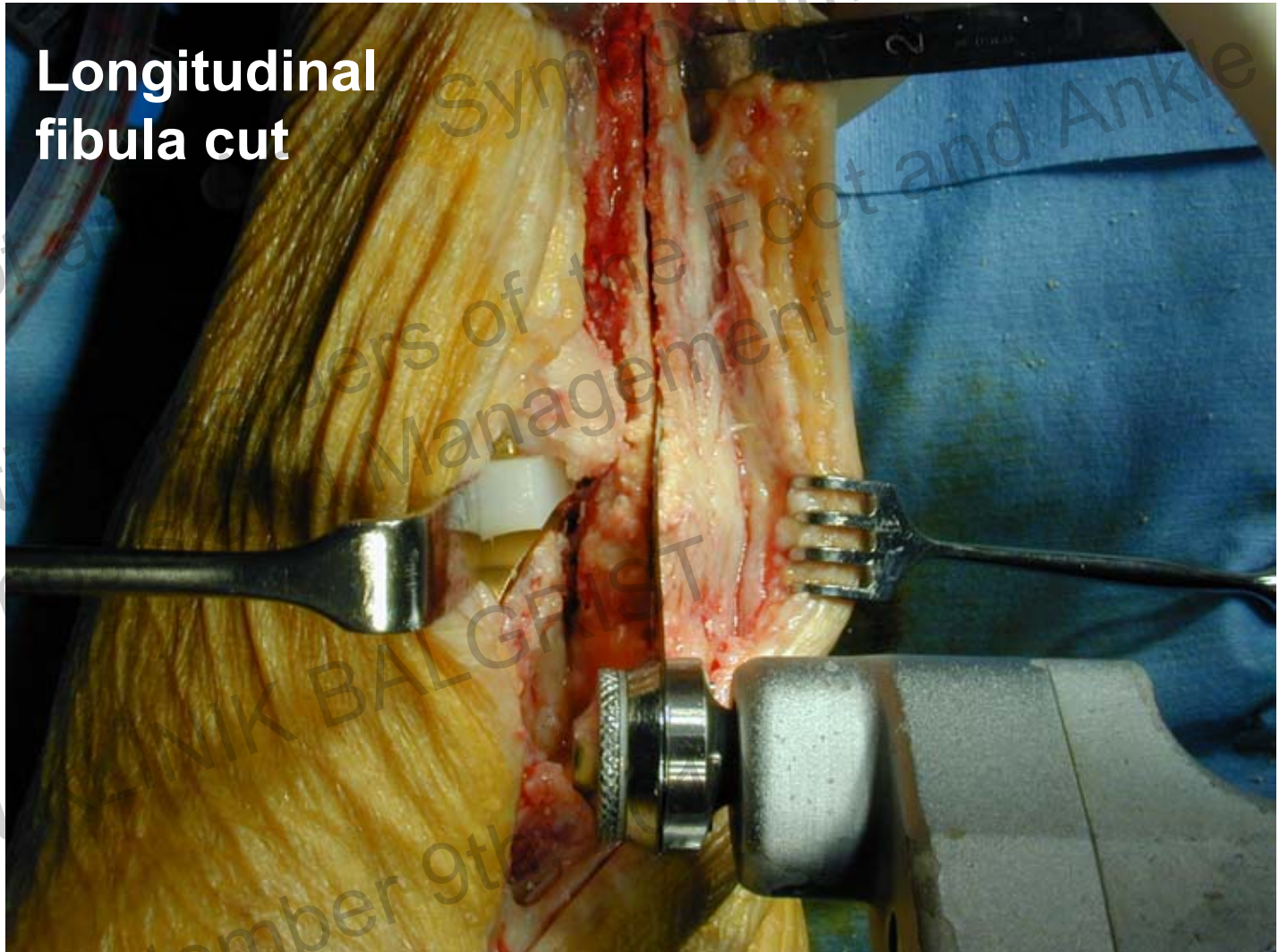
- Antero-lateral
- Anterior



Antero-lateral approach



**Longitudinal
fibula cut**

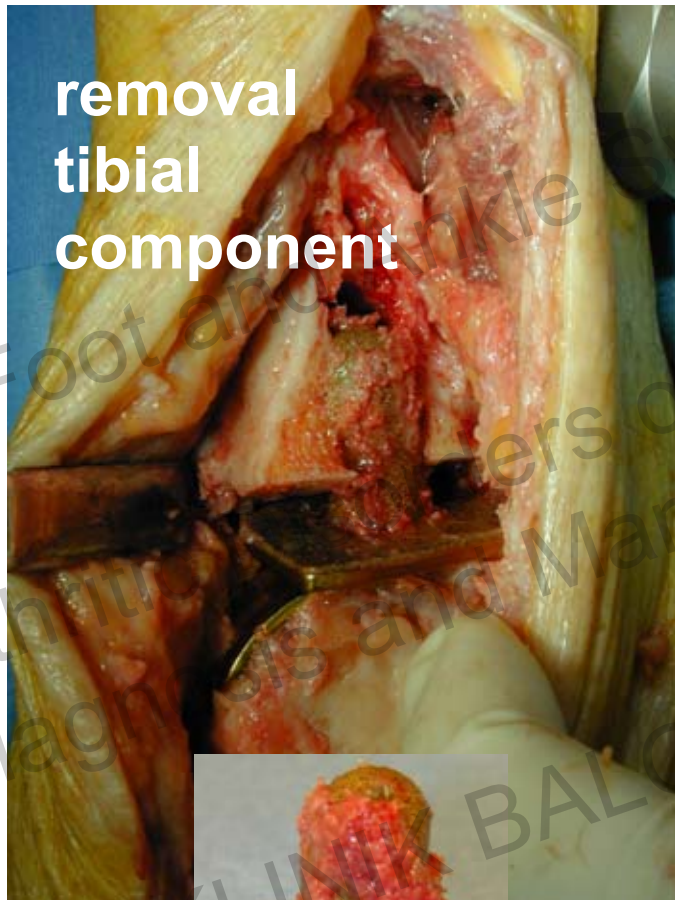


Revision for failed TAA



Revision for failed TAA

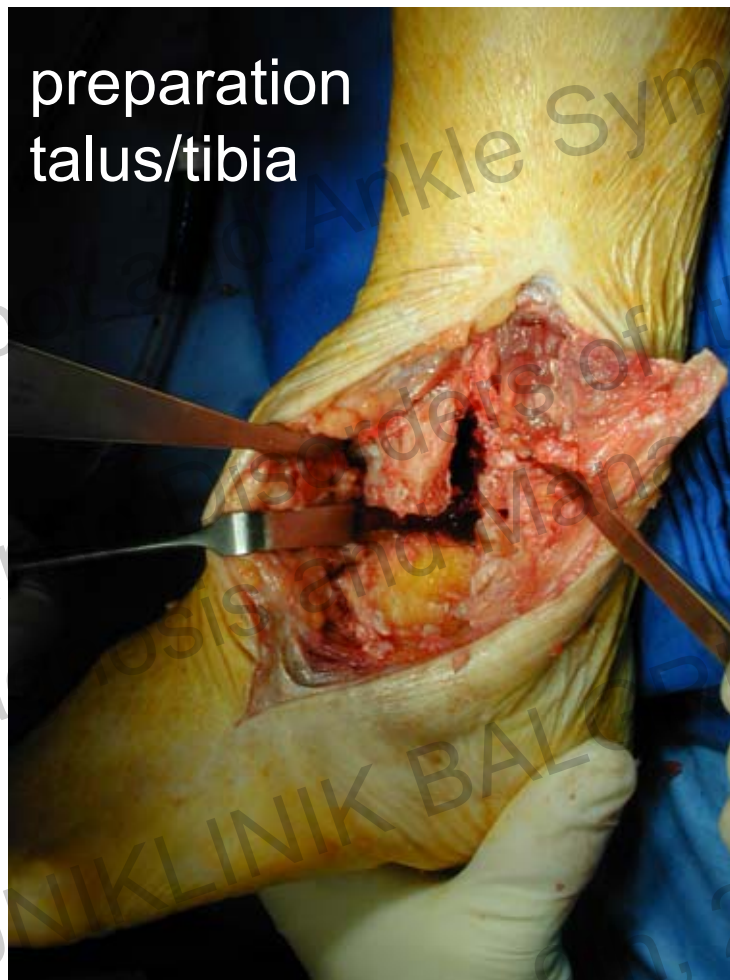
**removal
tibial
component**



**removal
talar
component**



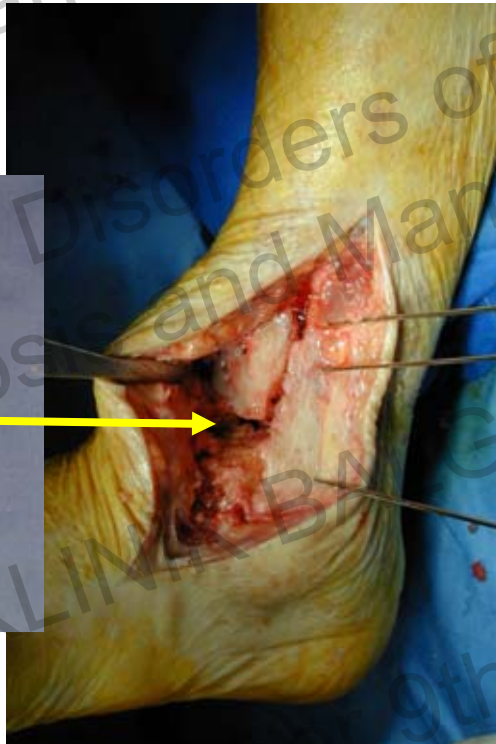
Revision for failed TAA



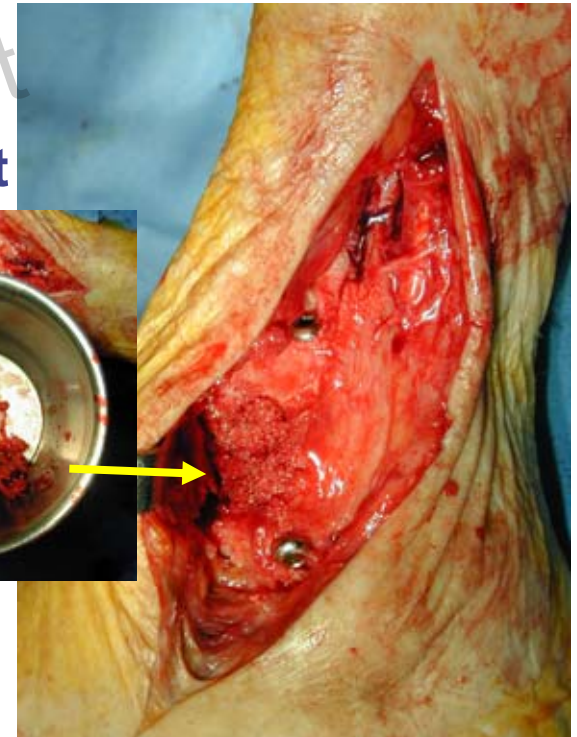
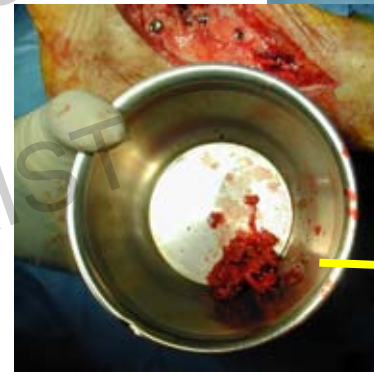
● Autolog bone grafting

- fibula
- cancellous bone from calcaneum (iliac crest)

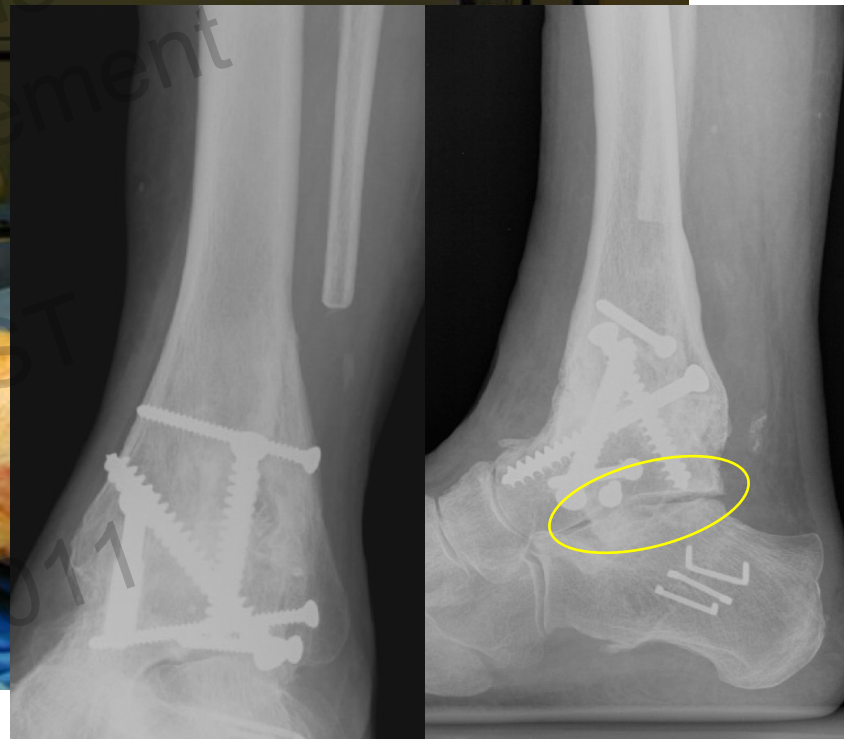
fibula



iliac crest



Revision for failed TAA



1 year postop

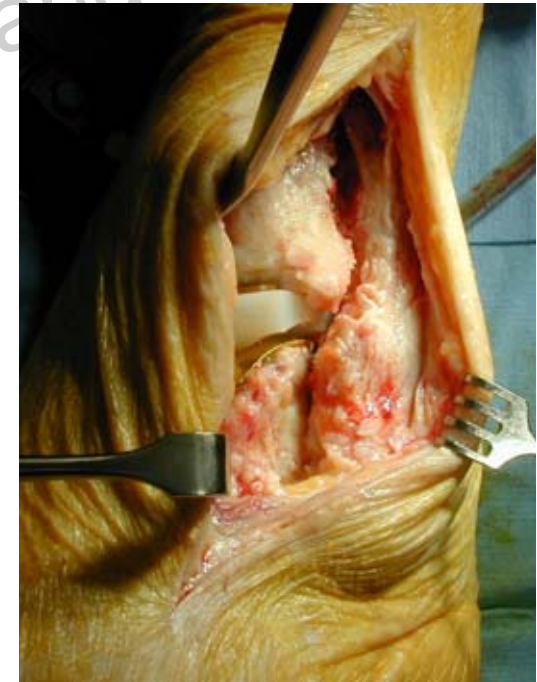
Antero-lateral approach

• Advanges

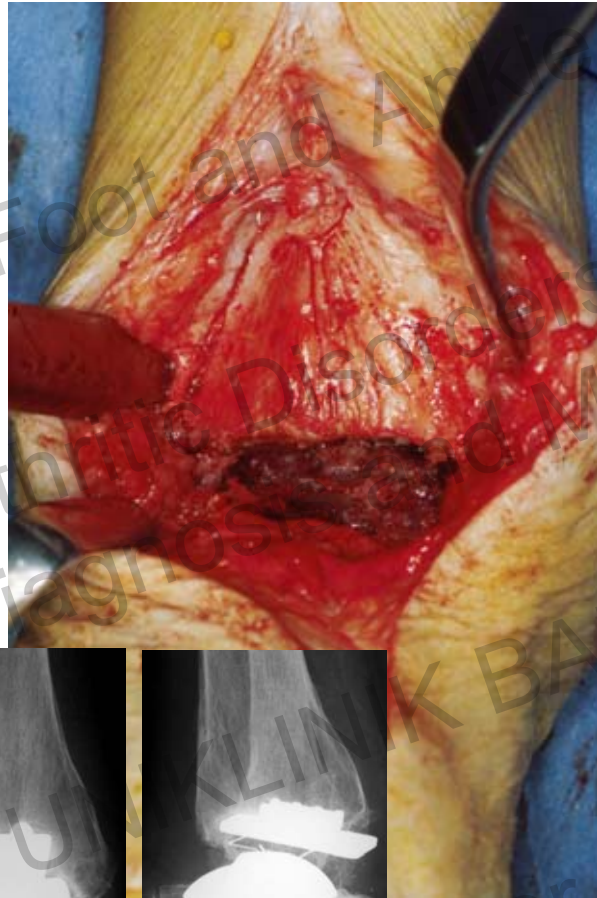
- wider ankle exposure
- fibula bone graft alone might be sufficient
- TAA removal from lateral
i.e. anterior tibia cortex left intact

• Disadvantages

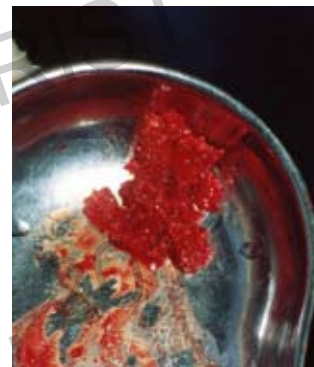
- fibula osteotomy → less stable arthrodesis
- medial malleolar joint difficult to prepare
- new approach/skin incision



Anterior approach



pelvic bone



Revision for failed TAA

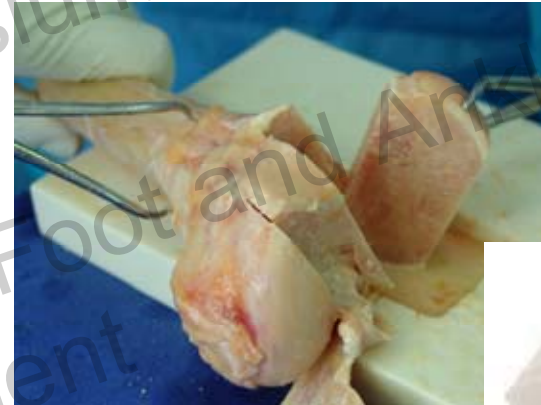


1 year postop

Bone grafting

- **Autolog**

- calcaneum
- fibula (with antero-lat approach)
- iliac crest



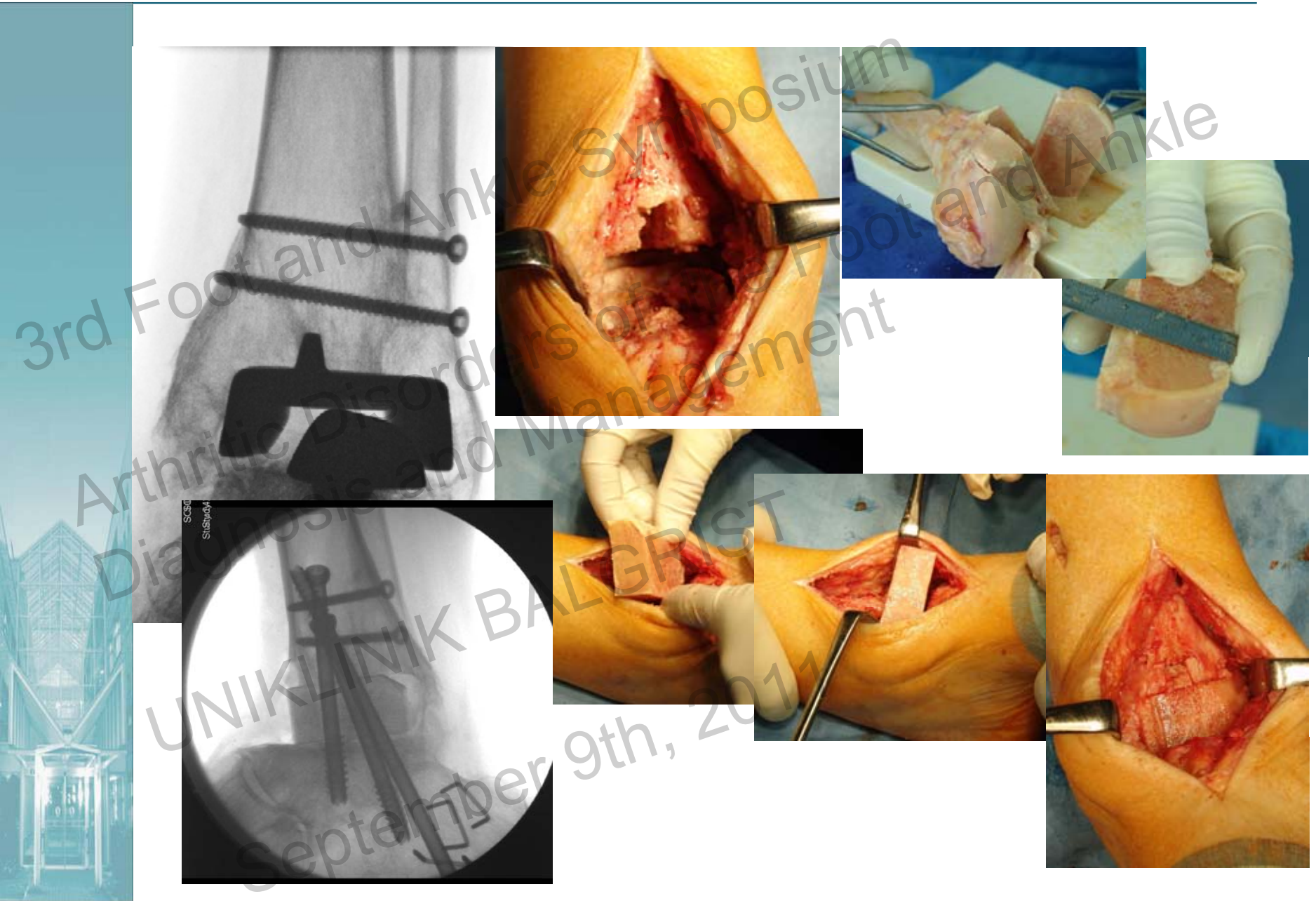
- **Homolog**

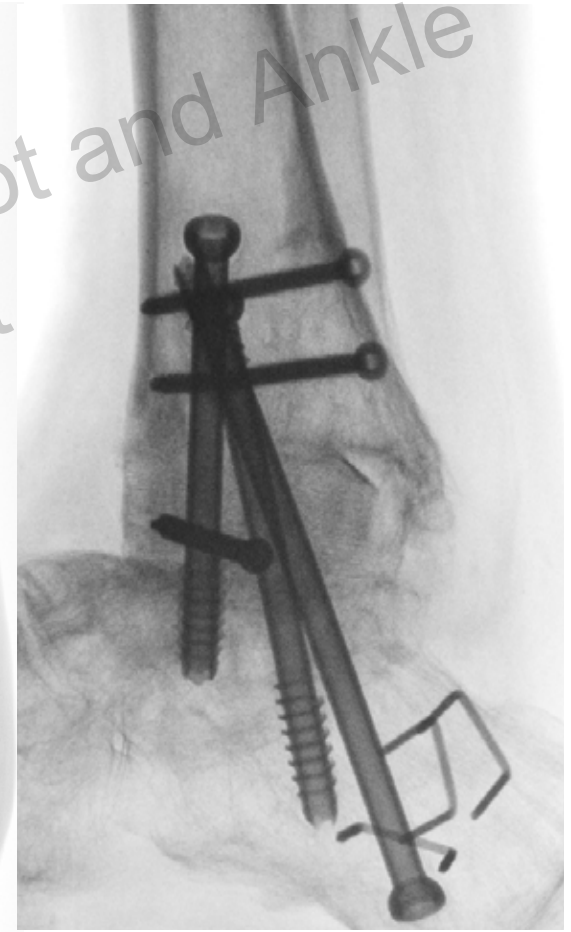
- fresh frozen bone (femoral head/condyle)
- cave: dried bone (Tutoplast®) not strong enough!
- longer time for integration/consolidation (→ CT)

- **Bone Morphogenic Protein („BMP“) ?**



Revision for failed TAA





6 months postop

Fixation

- **Internal fixation**

- screws
- nail: = + subtalar fusion!

- **External fixation**

- classical external fixator
- Ilizarow fixator



Multiple cysts



- S.H., 52 yrs old
- 5 yrs postop, chronic pain

Revision for failed TAA



- 1 year after revision
- Pain on VAS = 0-1

Autolog bone grafting (pelvis)

Ankle deformity (varus/valgus)

- 76 yrs old female
- varus deformity



Revision for failed TAA



1 year postop
VAS=0

Aseptic loosening



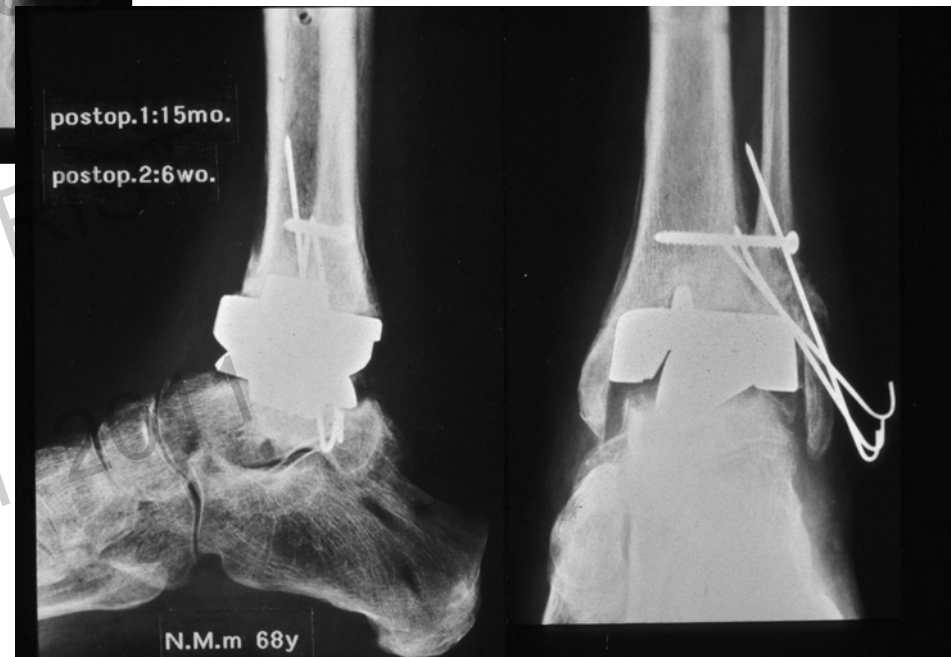
- N.M., 66 yrs old

Revision for failed TAA



Revision:

- bigger tibia (4→5)
- Achilles lengthening 2 cm



1 year postop

Revision for failed TAA





4 years postop:

- subsidence talar component
- major loss of talar bone

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Revision for failed TAA



Iliac crest graft



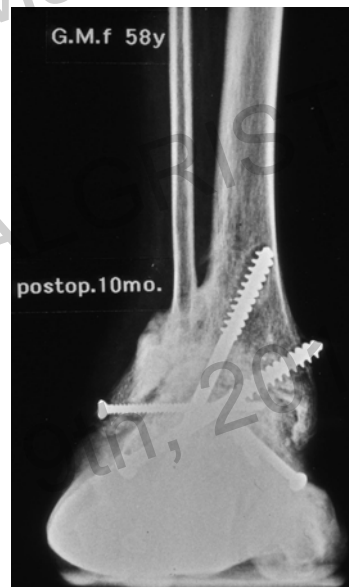
Fusion's rate after failed TAA

- own retrospective study
- review of all 317 TAA performed until 2005
- 12 (3.5%) TAA removed for fusion
 - 1 case performed outside, excluded



Results (n=11):

- **Ankle joint**
 - 9 fused
 - 2 pseudarthrosis (1 asymptomatic, 1 fused after re-arthrodesis)
- **Subtalar joint had to be fused in 5 cases (bone stock!)**
 - 4 fused
 - 1 pseudarthrosis



Results: subjective (n=11)

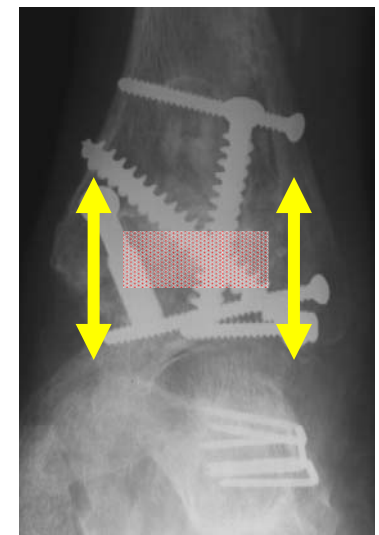
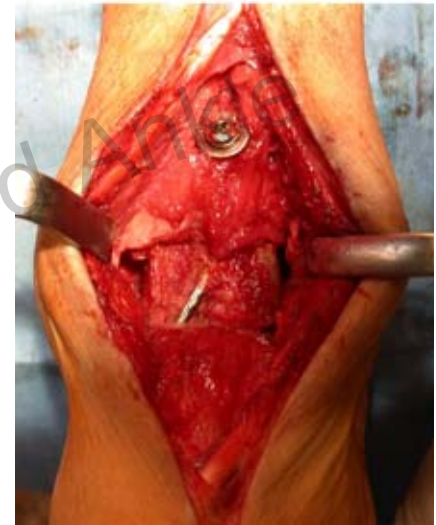
- 10 patients satisfied with endresult
1 patient with painful subtalar pseudarthrosis
- All patients satisfied with hindfoot position



Fused ankle after
Agility™ removal

Fusion for failed TAA...

- = very efficient salvage!
- Depending on the type of TAA / bone stock, subtalar joint must be included in the fusion
- Best TAA designs for fusion
 - = leaving malleolar joints intact + only resurfacing of talus dome
 - 2 strong „supporting“ columns (malleoli)
 - defect is easily filled with bone
 - no significant shortening
 - subtalar joint can mostly be „saved“



Change TAA or fuse...?

Don't forget:

- **multiple surgeries**

- the more surgeries, the bigger the risk of chronic pain
- even if surgery objectively successful !

- **fusion**

- success rate is high
- better results than TAA regarding pain
- long term results quite good

- **initially**

- mostly choice between 2 **good** options: fusion or TAA
- if TAA fails, the 2nd good option („fusion“) is still open!



➔ **Salvage for failed TAA**

- mostly fusion
- new TAA only for few well selected cases

Revision for failed TAA



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