

Irradiation and Reimplantation of Bone

What Works and What Doesn't

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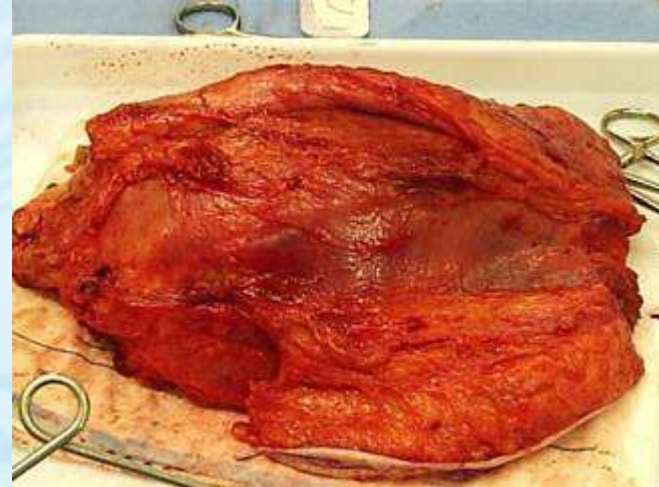


Indication/ Technique

- Described by Uyttendaele 1988 (Spira 1968);
- Increasing world experience;
- Advantage :
 - perfect fit, otherwise like allograft
- Indications:
 - No other easy reconstruction
 - Bone solid (not weaken by tumour invasion)
- Contra-indications:
 - Weak bone
 - Need for post op RT

HOW TO DO IT !

- Remove tumour
- Clean bone – removing macroscopic tumour
- Immerse in Vancomycin solution



HOW TO DO IT !

- Wrap in sterile bags



- Take to radiotherapy
 - Min = 30 min
 - 90 Gy

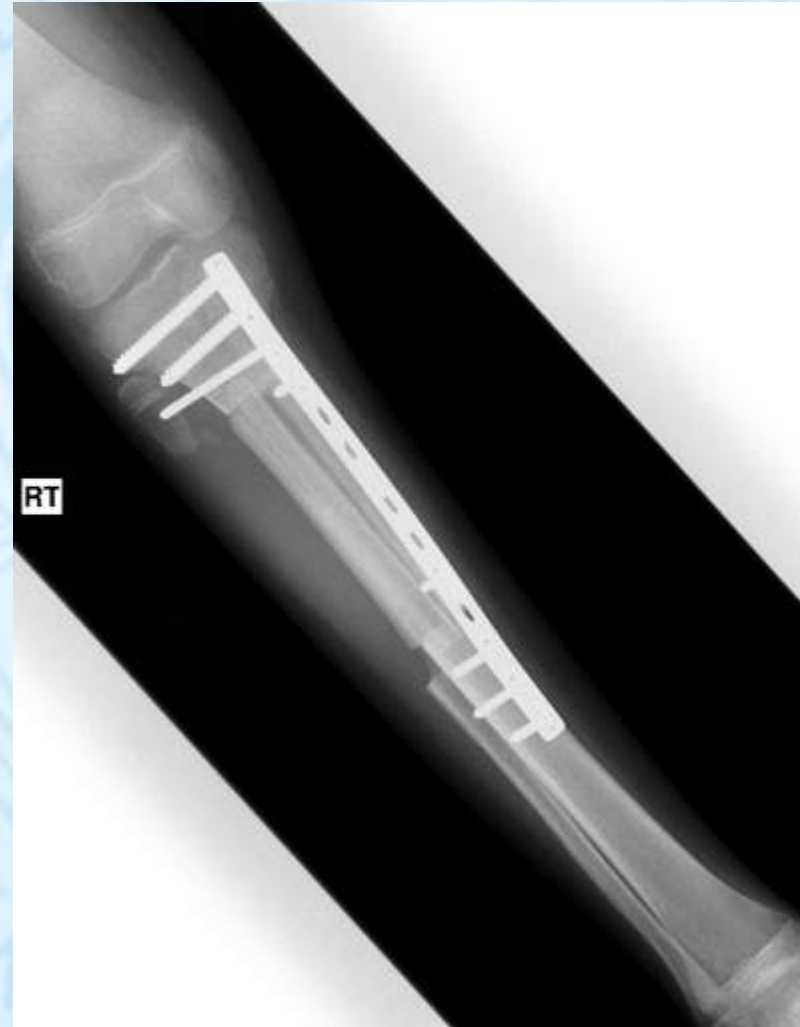


If possible add a fibular graft



How to do it

- Reimplant it



35 cases (1995 – 2007)

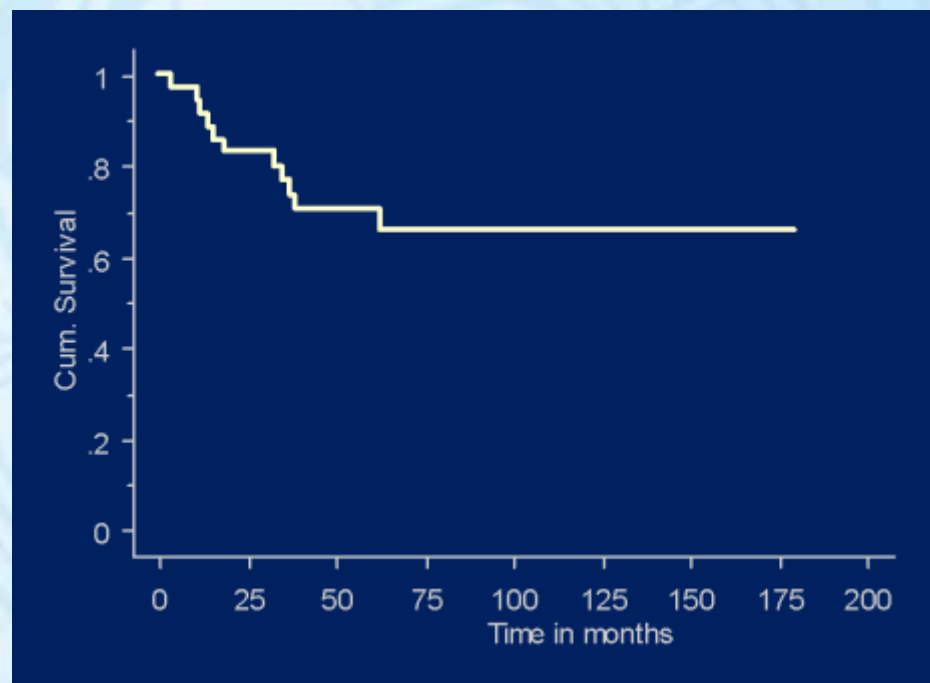
- 15 pelvis;
 - 5 P1 (ilium)
 - 10 P1/2 (ilium + acetabulum)
- 11 diaphyseal;
 - 8 tibia (all with VFG)
 - 2 femur (both with cement)
 - 1 humerus (NVFG)
- 6 total bone;
 - 3 scapula
 - 2 humerus
 - One 4th metacarpal (concert pianist)
- 3 distal tibia (one fused joint, 2 not)

Diagnoses

- Ewing's 15
- Osteosarcoma 13
- Chondrosarcoma 5
- Spindle cell sarcoma 2

- Survival 66% at 5 yrs

- LR – 3 patients,
 - all in soft tissues
 - two EWS
 - one OS



Complications

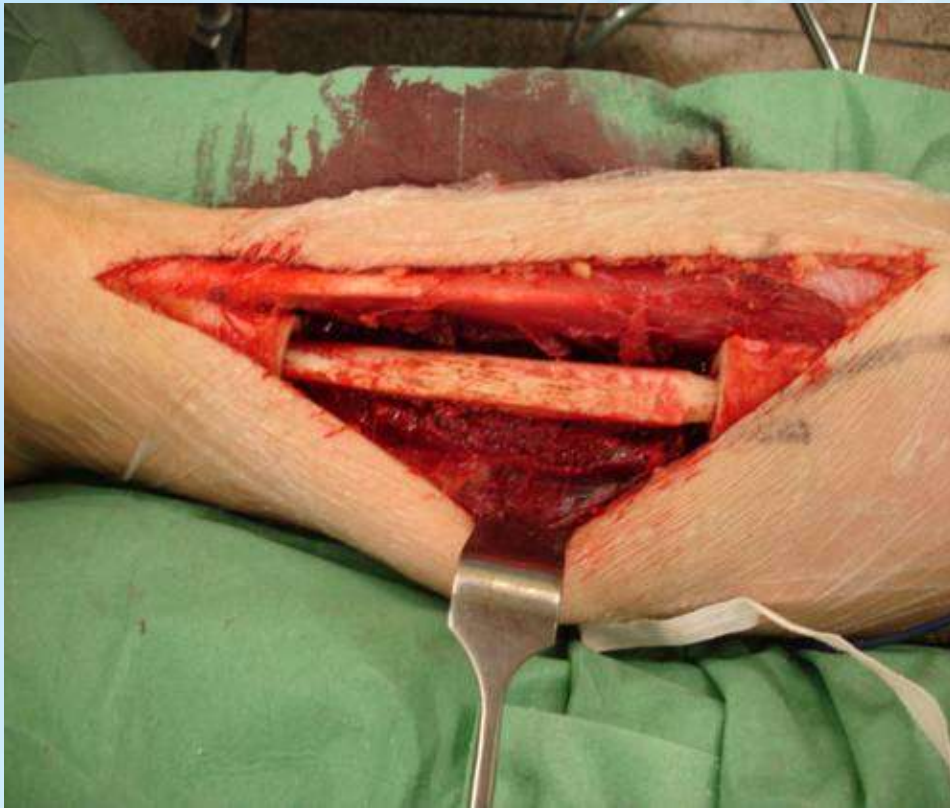
- Mean time to union = 16 weeks;
- Mean Follow-up 58 months;
- Non union in 3 (8.6%), diaphyseal
- Further surgery in 14 patients
 - 4 Infections (none since vanco solution)
 - 2 wound infections
 - 2 deep infection = girdlestone
 - Fractures and or graft resorption 6
 - 3 delayed unions
 - 3 non-unions

What works ?

- Total bone;
 - Scapula
 - Metacarpal
- Diaphyseal defects;
 - Mid tibia with VFG
 - Mid femur with cement
 - Mid humerus
- Distal tibia + fusion.

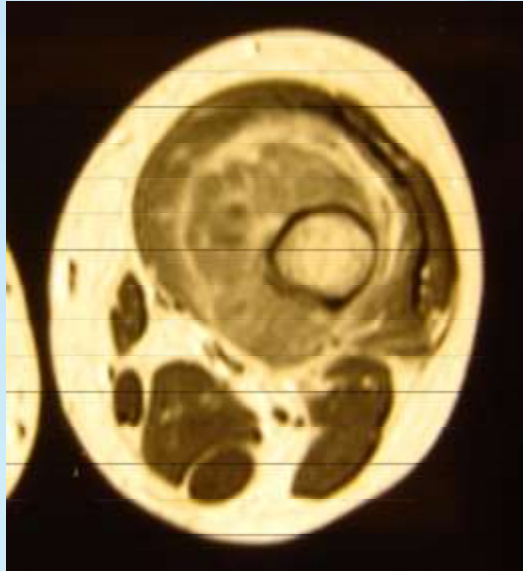


Mid Tibial Replacement Irradiate + Reimplant + Pedicled Fibula



6 months

Ewings Mid-Femur



Packed with cement
Screws in growth plate
removed at 8 weeks
Normal function 4 months

Ewing mid-femur



Mid humerus



Pelvis

- Initial good results – concerns over eventual bone resorption
- Should you do a THR at the time for P2 resections?

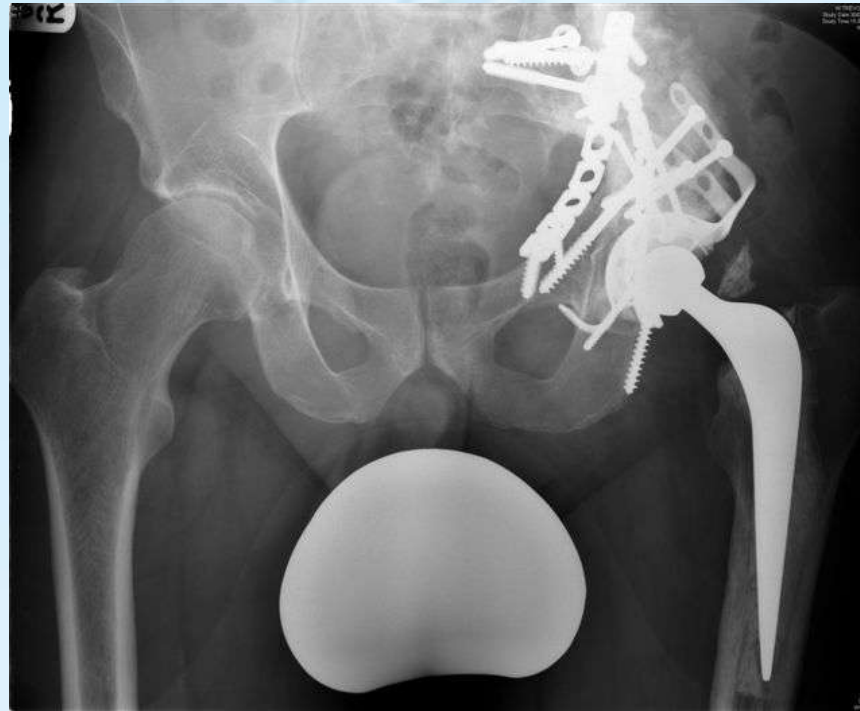


P1 pelvis tumour –
6 yrs



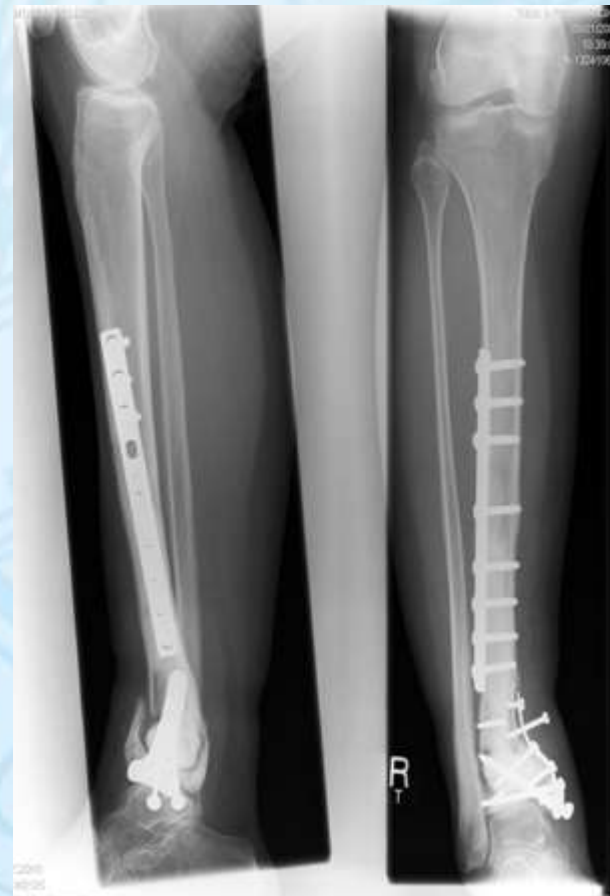
P1, 2 pelvis tumour –
6 yrs

8 years post-op



What doesn't work ?

- Distal tibia + preserving joint



Conclusions

- Irradiation and reimplantation is a useful technique;
- Cheap;
- Safe;
- Allograft with a better fit and less complications;
- Useful in diaphysis / pelvis / odd situations;
- If filled with bone / cement / plate may last ;
- If used alone will crumble eventually;
- AVOID if bone is weak, or if RT is needed.

Thank you