Long term results of composite prosthesis-allograft in tumor surgery. The adverse effects of radiotherapy and chemotherapy

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Introduction

In Creteil we implanted our first massive composite prosthesis allograft (MCP) in 1984.

We hoped that MCP could permit a better muscle anchorage and that restoration of bone stock would decrease the loosening risk of prosthesis.

- The aims of this study is to verify if these advantages are clinically relevant.
- And to precise the effect of adjuvant therapies on late results in order to discuss the optimal indications of this material

The allografts

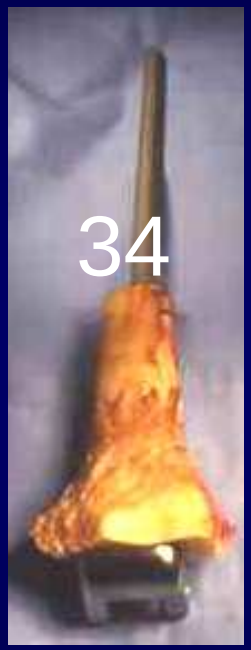
- All allografts of this study were provided by the bone bank of Creteil :
- Sterile harvesting,
- Cryopreservation by -40°
- Irradiation before implantation **25 Kgray**)
- Selection of graft on plain X rays without immunologic matching.
- 3 months quarentaine before implantation.

Technique

Prothesis first cemented into the allograft
Then composite prosthesis cimented into the bone

78 patients

Locations were proximal femur (20), distal femur (34), proximal tibia (19) upper humerus (5).



- Median follow up of 19 years **(12 to 24)**

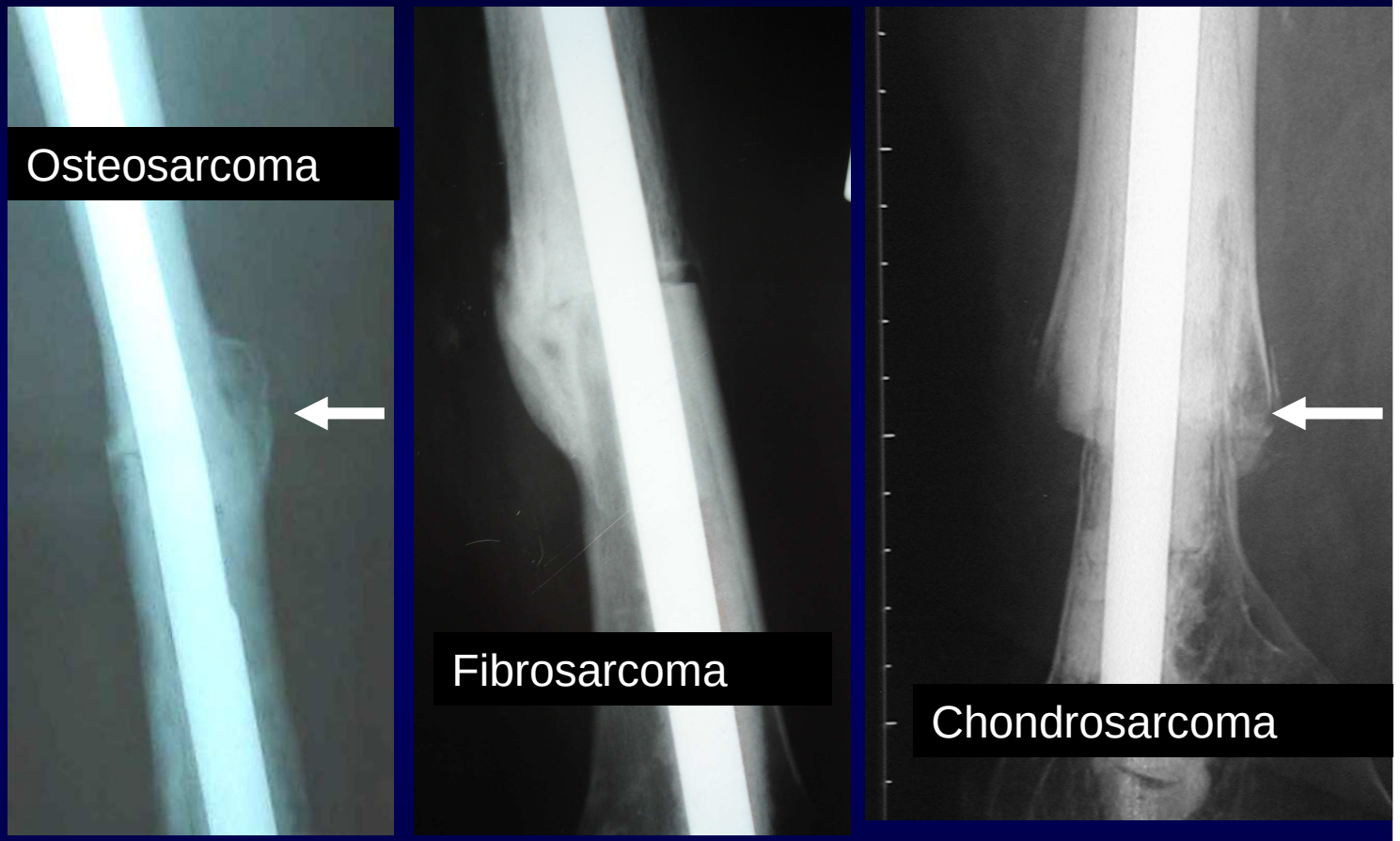
78 patients
48 males and 30 females median age 17

- The tumors were
- osteosarcoma (46),
- Ewing's (10),
- fibrosarcoma, MFH (10),
- chondrosarcoma (7).

60 patients received chemotherapy

and 21 chemotherapy and radiotherapy.

Bone healing



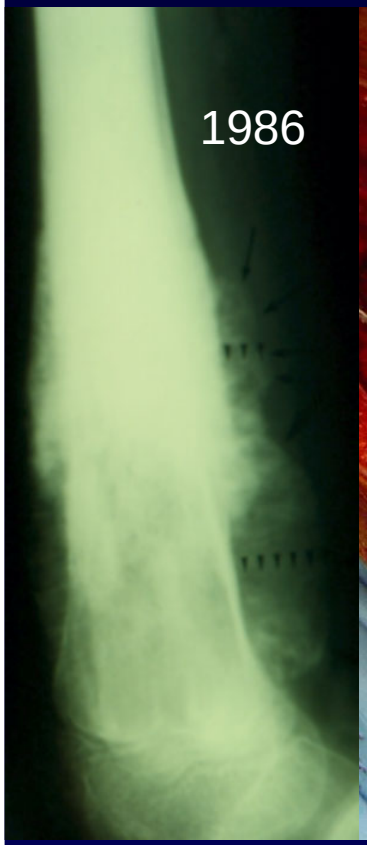
Long Term Results

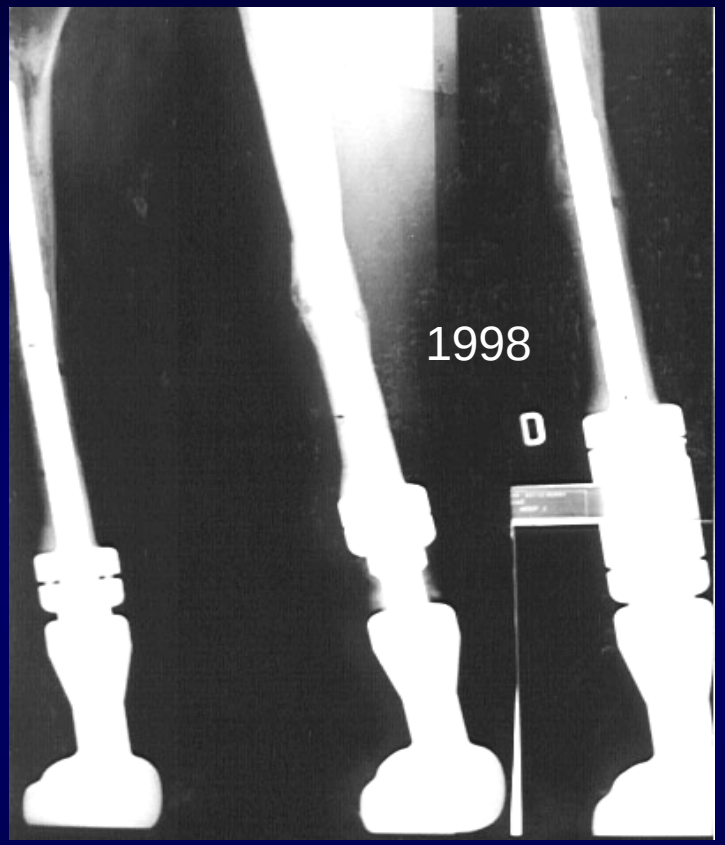
- With a median follow up of 19 years (12-24) , all patients have been reoperated for
- Lengthening,
- Wear of prosthesis,
- Loosening,
- Resorption of allograft,
- Infection (21) or tumour recurrence (2).

Infection or tumour recurrence.

- 21 patients suffered of deep infection 7 of them were secondary amputated).
- 2 other were amputated for tumour (1 local recurrence and 1 post irradiation sarcoma).

Secondary Lengthening





- The healing of the graft permit a longer anchorage for the stem of the expanding prosthesis.
- Secondary lengthening 8 centimeters

78 composite allograft protheses
Resorption of allograft in 51 patients

51 resorptions
25 minor,
16 severe
10 major

Complications are correlated with adjuvant therapies

The 21 irradiated patients suffered of

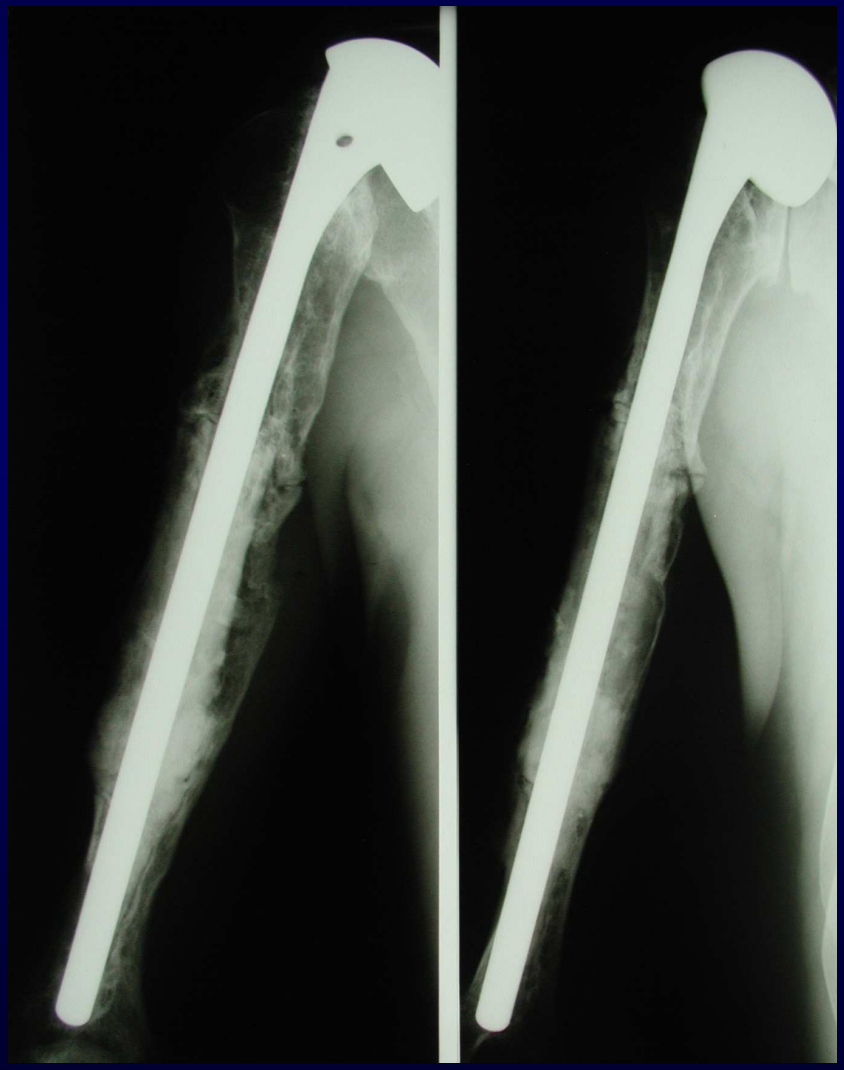
15 non union

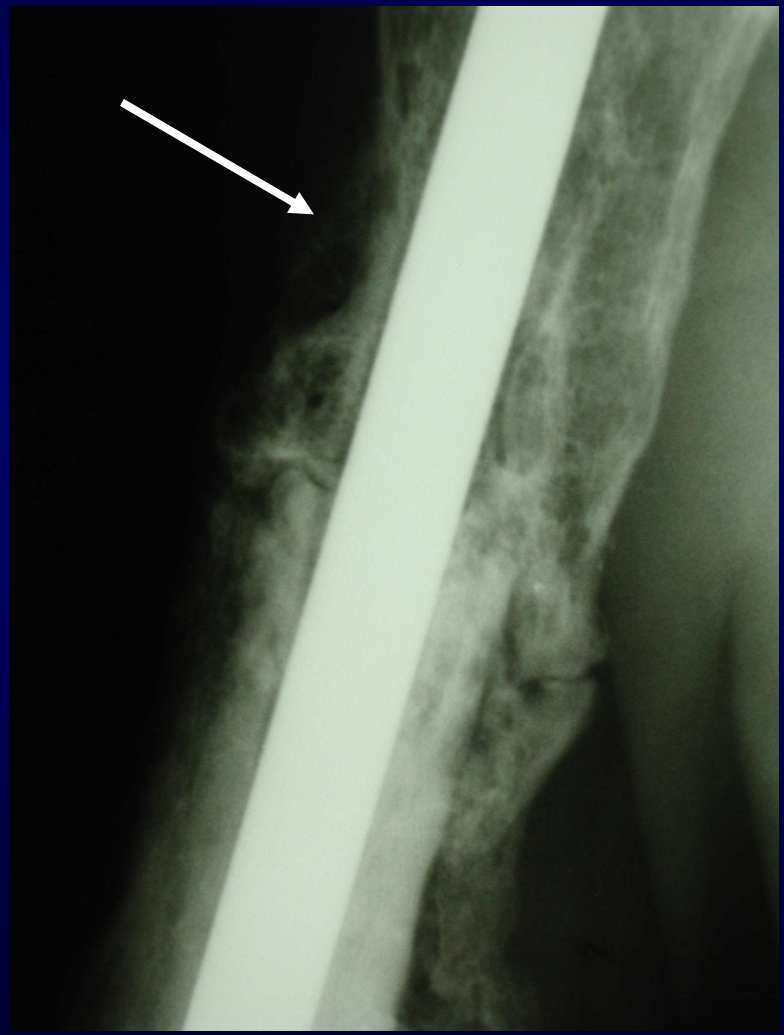
18 secondary fractures

8 secondary major resorptions

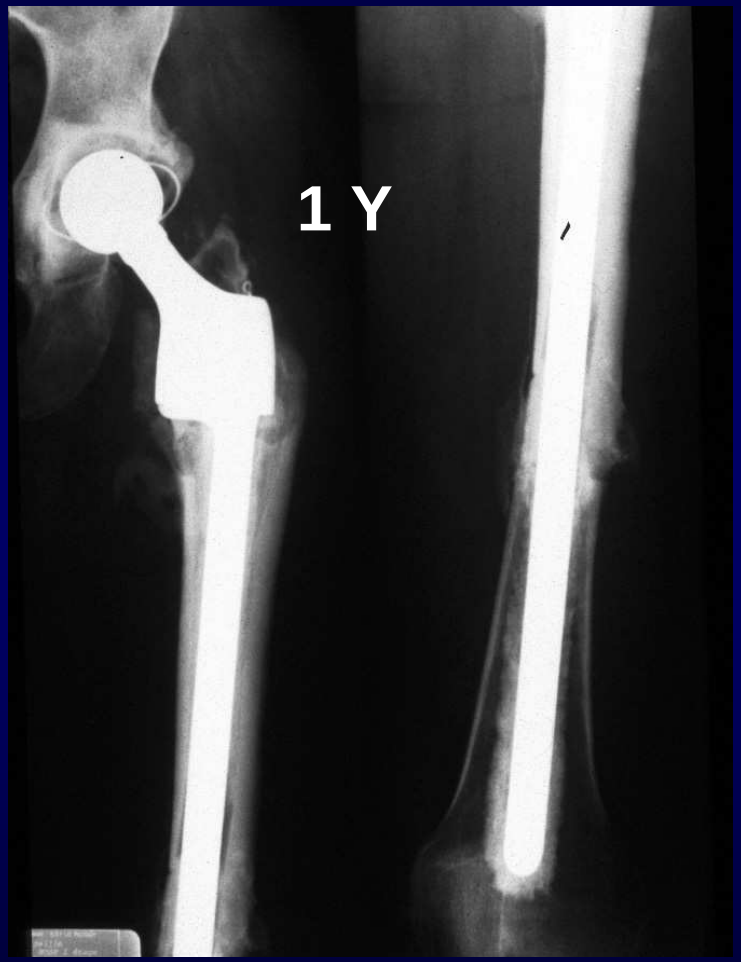
and 11 deep infections resulting in 6 amputations.

Minor RESORPTION



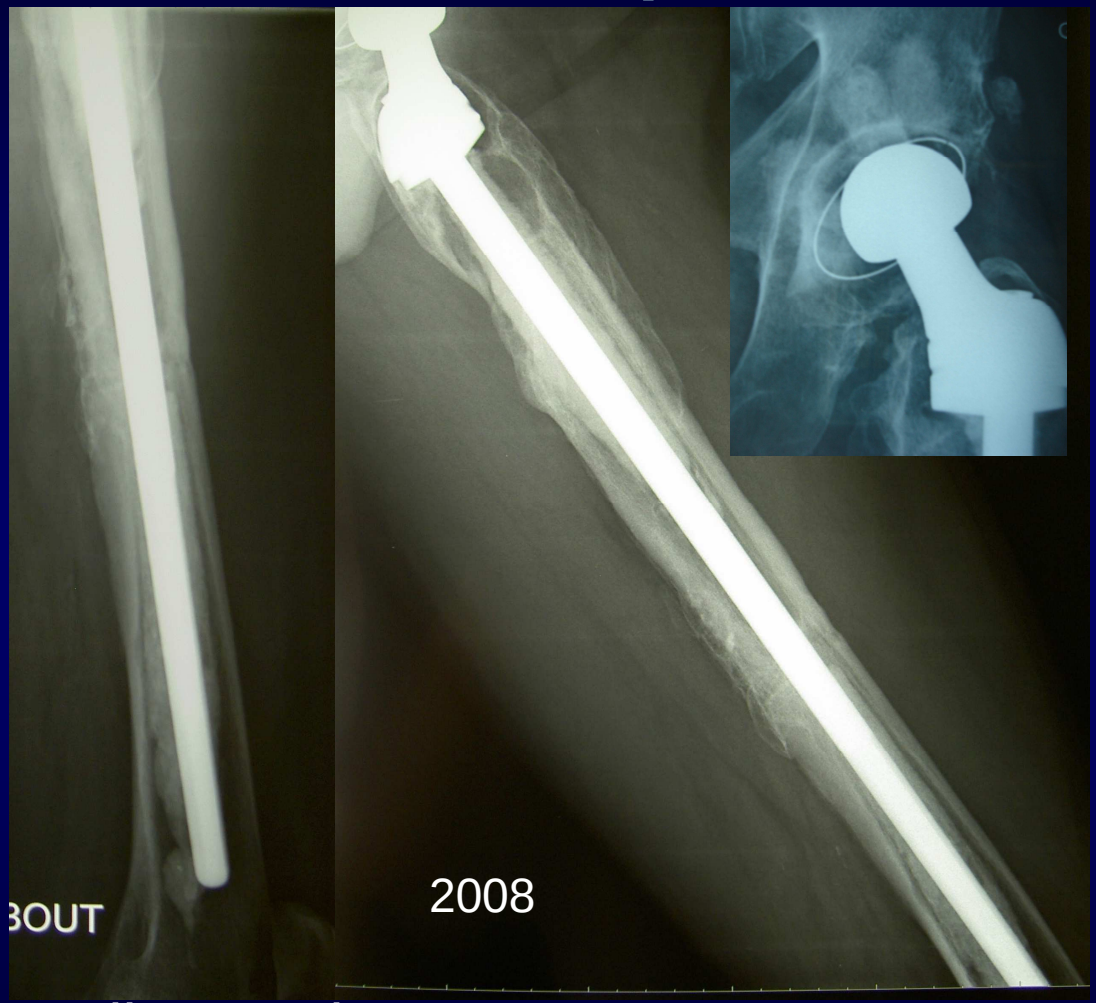


12 years EVOLUTION



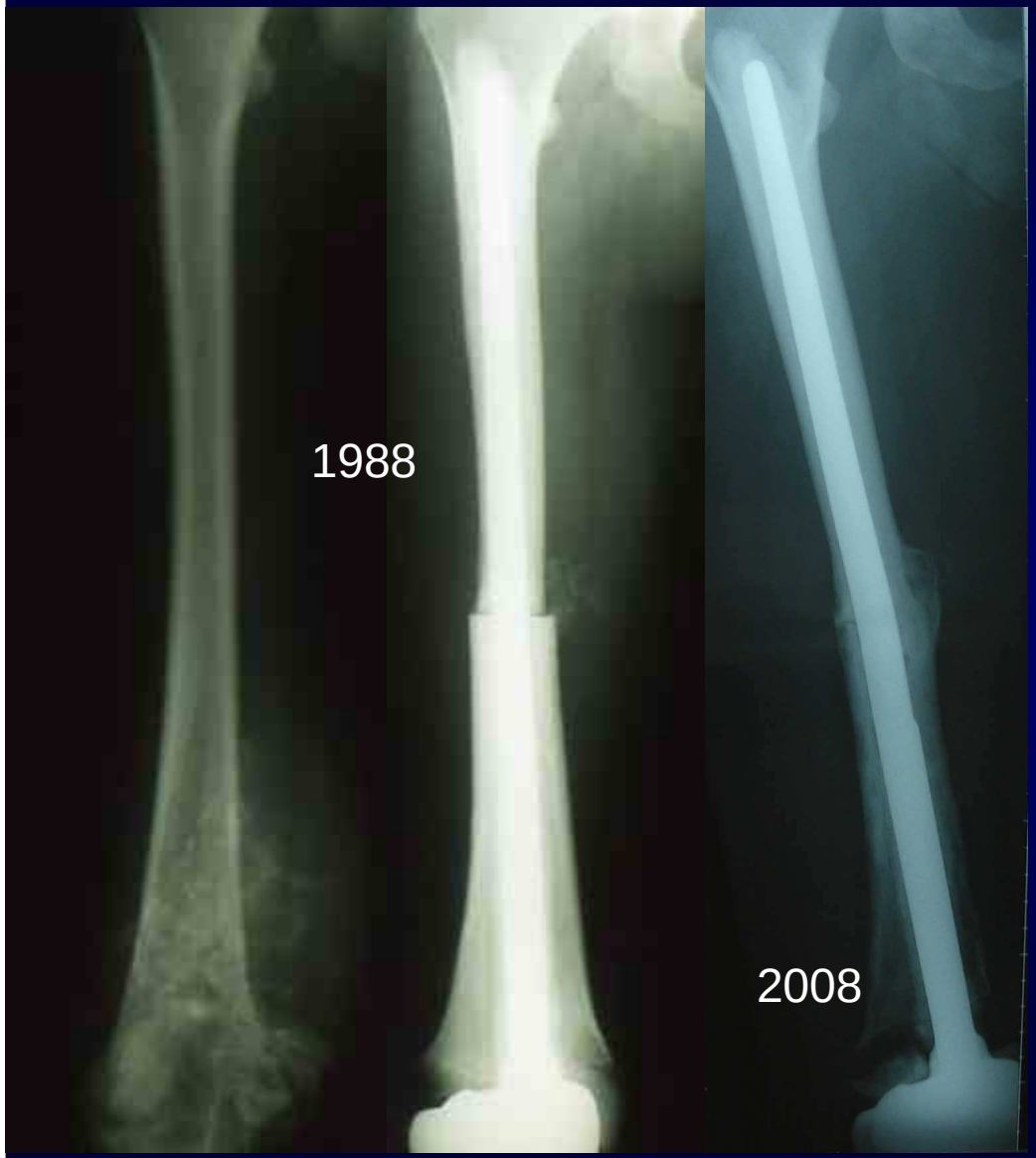
Chondrosarcoma. No adj.

17 Years follow up



- Chondrosarcoma no adjuvant therapy.
- Wear of the acetabulum

20 years evolution

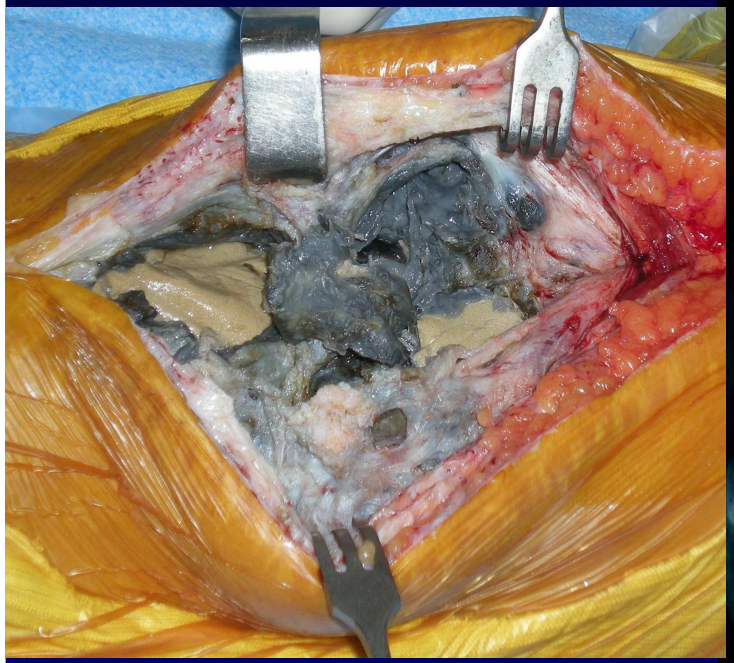


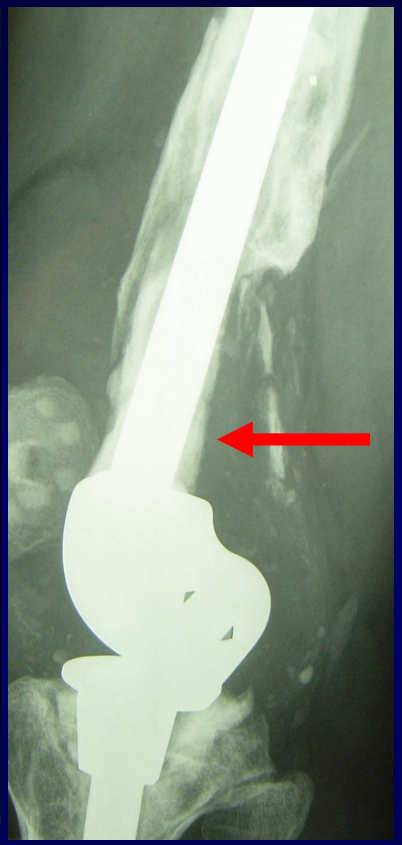
- High grade osteosarcoma
- High dose chemotherapy
- CDFS
- No radiotherapy
- Excellent graft evolution
- Excellent fonction

24 Y F U (no adjuvant treatment)

- No severe nor major resorption were observed despite 3 exgange of knee prothesis

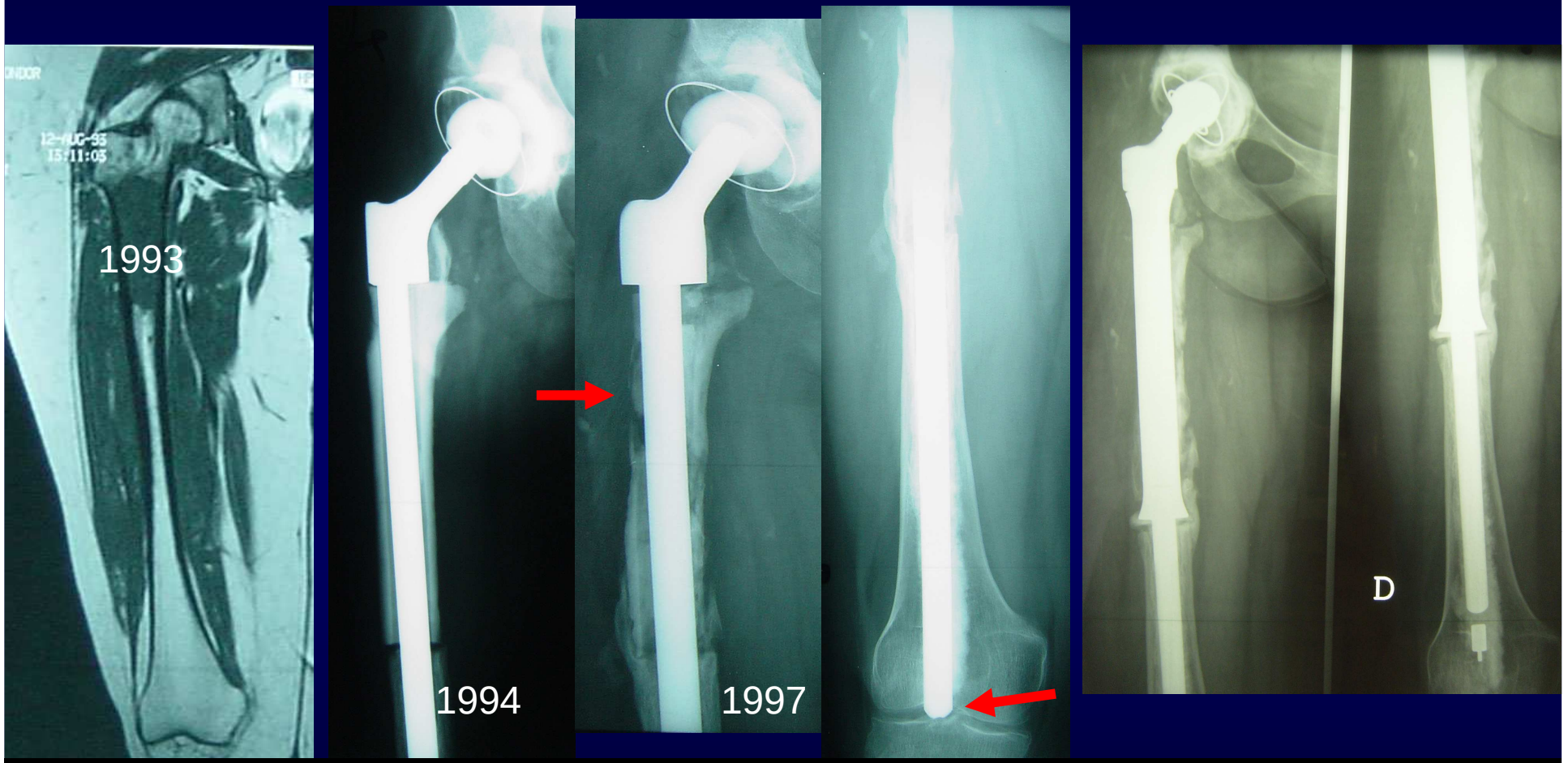
Wear of prosthesis





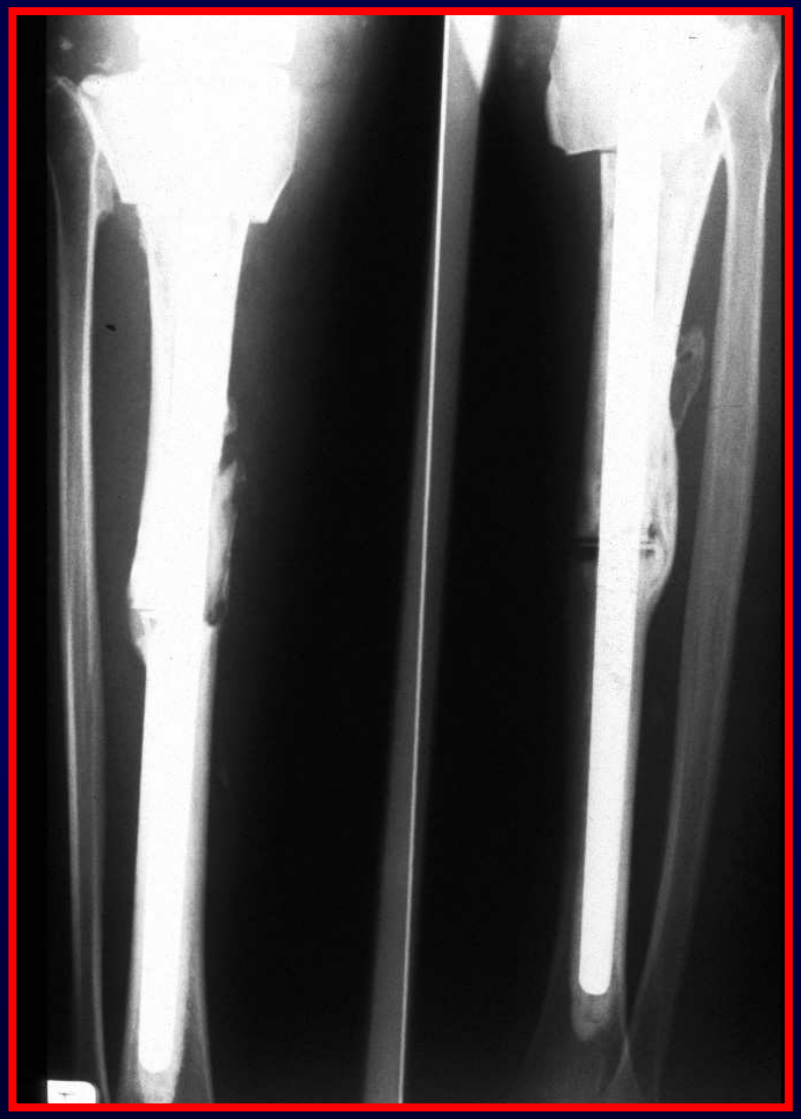
- Liberation of wear particules sometimes induced a bone resorption near the articulattion or distally around the stem.

Chemotherapy, Resorption, Fracture of graft, Loosening

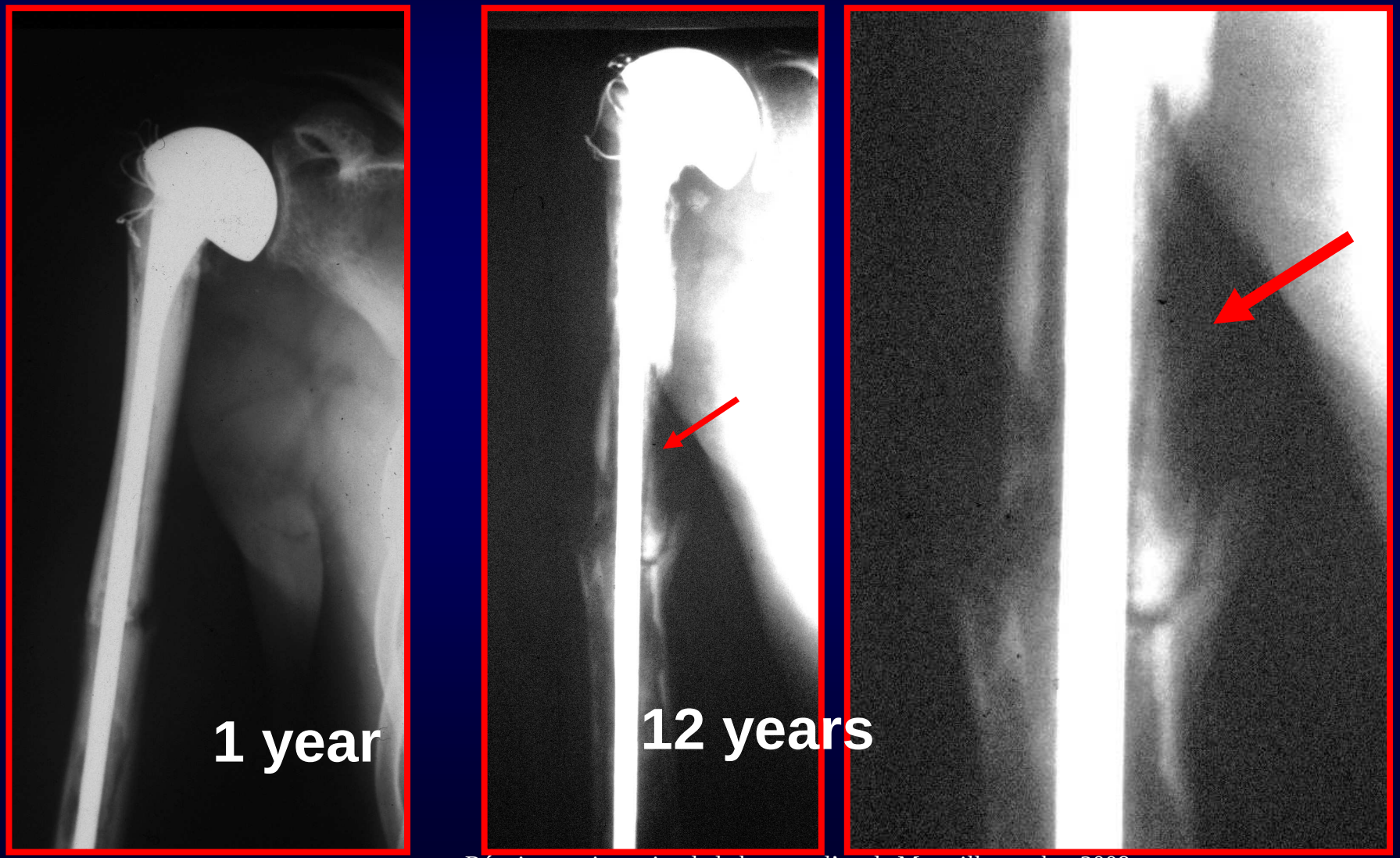


- High grade OS High dose chemotherapy. Mal union and Resorption of graft induced loosening of prothesis

RADIOTHERAPY:
non union, major resorption, fracture



MAJOR RESORPTION



At last evaluation the function (EMSOS criteria) is rated:

excellent in 31,
good in 23,
fair in 12,
poor in 12.

Conclusion

- MCP permits a better muscle re insertion and gives usually a better function than massive prosthesis.
- This advantage is more evident for upper femur and proximal tibia and humerus especially when a long resection is necessary.
- With long follow up the loosening risk of MCP does not seem different from that of massive metallic prosthese.

Conclusion

- MCP permits a better muscle re insertion and gives usually a better function than massive prosthesis but are threatened by non union during chemotherapy and massive osteolysis and fracture after irradiation.
- When radiotherapy can not be avoided, a massive custom made prosthesis should be preferred to MCP.