

12<sup>th</sup> International  
Symposium on  
Limb Salvage

Bone Tumors and Soft Tissues Sarcomas  
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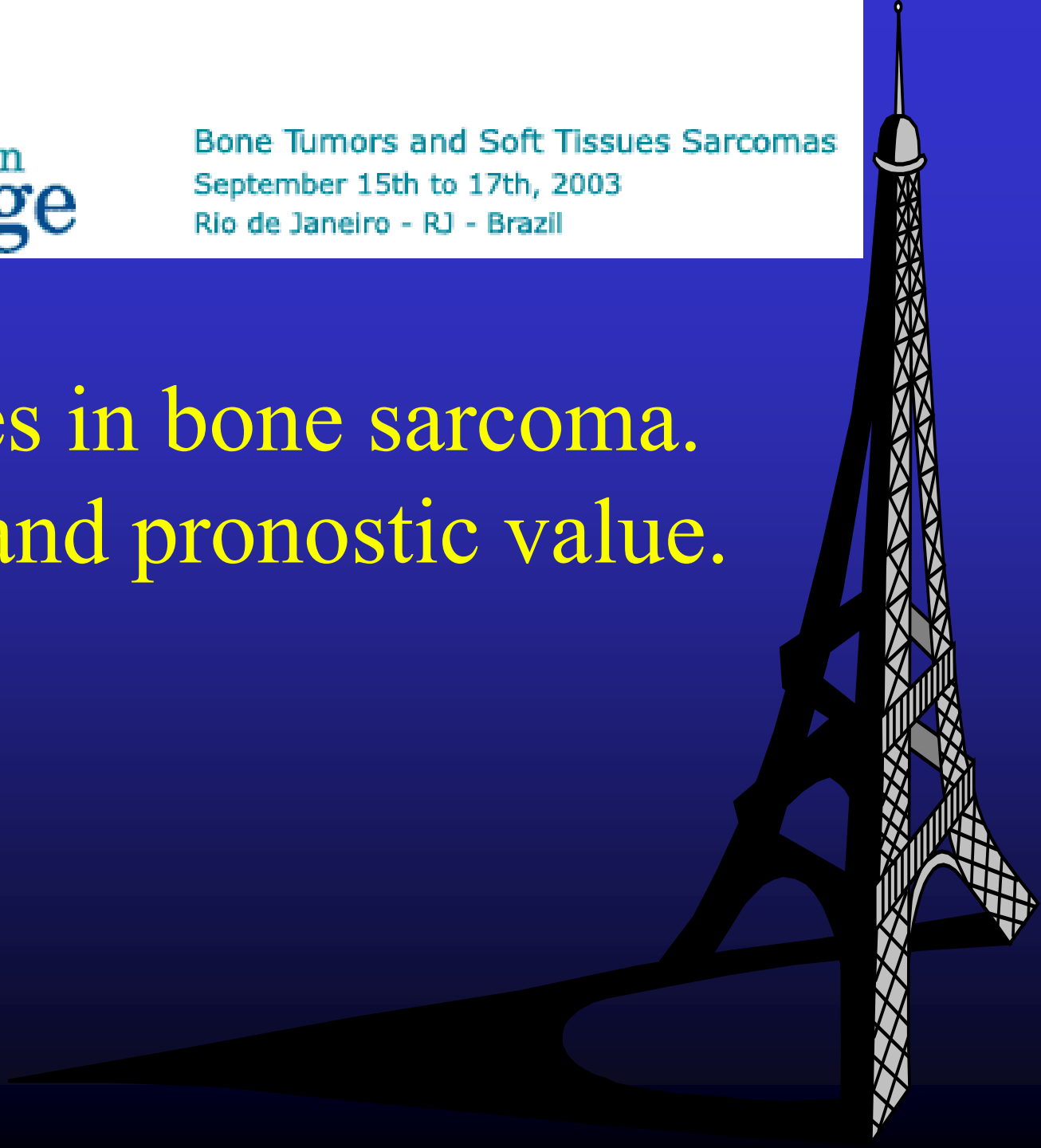
**Skip metastases in bone sarcoma.  
Epidemiology and pronostic value.**

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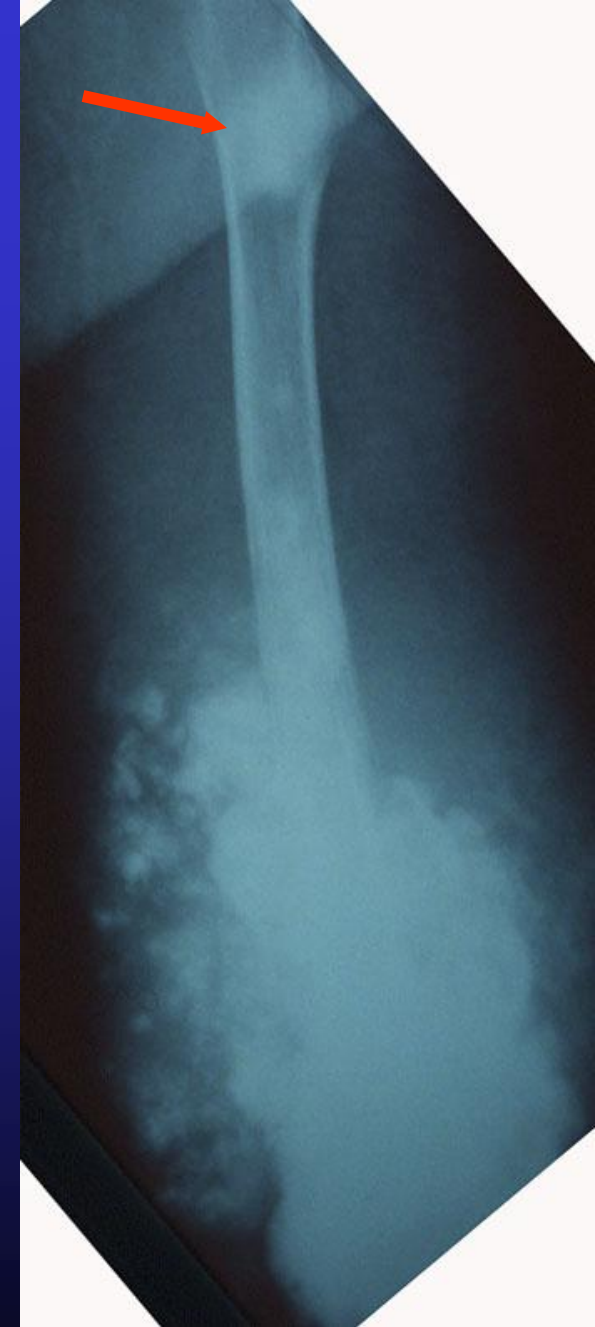
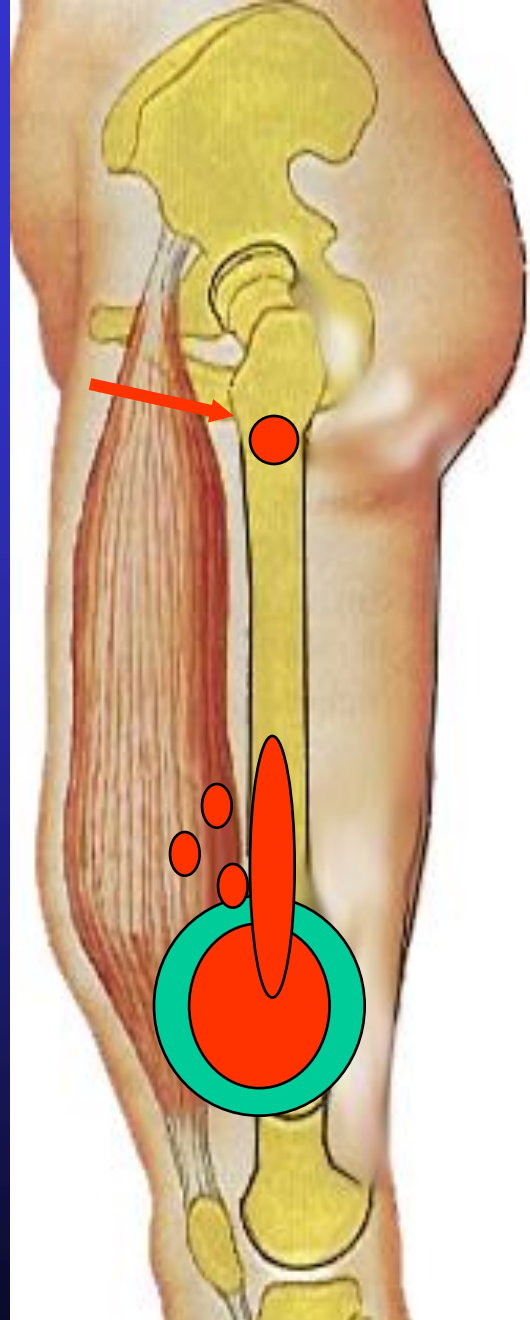
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# Introduction

- 30 years ago Enneking described **Skip metastases** but till now few papers have tried to evaluate their actual incidence prognostic value and surgical implications that is the aim of this retrospective study



# Material.

- 512 patients with bone sarcoma of limbs, scapula or innominate bone
- (265 OS ,135 CS, 130 EW)
- ,have been treated and/or followed up by the same team in 23 years.
- 503 of these were treated by limb salvage.

# Method.

- Preoperative screening of patients included standard X rays, CT and bone technetium scan in all cases and MRI in 350 cases.
- Diagnosis of skip was made on preoperative screening and confirmed by postoperative histologic examination .
- This research was supplemented by careful examination of imaging of patients who suffered of regional relapse after surgery.
- Median follow up is 13 years (minimal 2) . Four disease free survivors have been lost for follow after 3 years.

# Results

- Frequency : 21 skip metastases (4%) have been observed.
- 12 out of 265 patients with Ostéosarcoma (5%)
- Out 130 patients with Ewing's sarcoma 8 (6%) presented with skip lesions
- Out 135 chondrosarcoma only one
- Most of the skip lesion were unique but 3 patients had 2 and one 3 skip.

# Skip in osteosarcoma : all on long bones

## 8 preop diagnosis



Proximal tibia T

Distal femur T

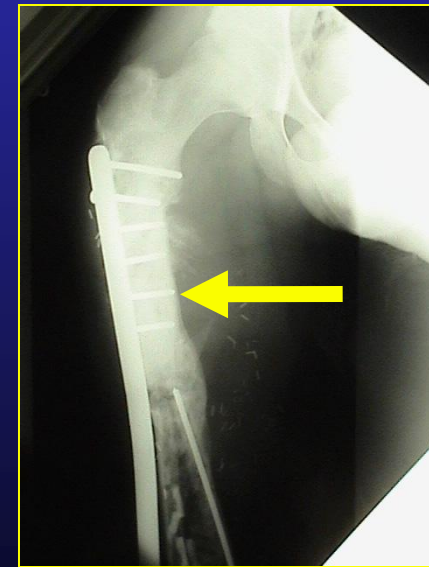
Diaphyseal skip

Distal tibial skip



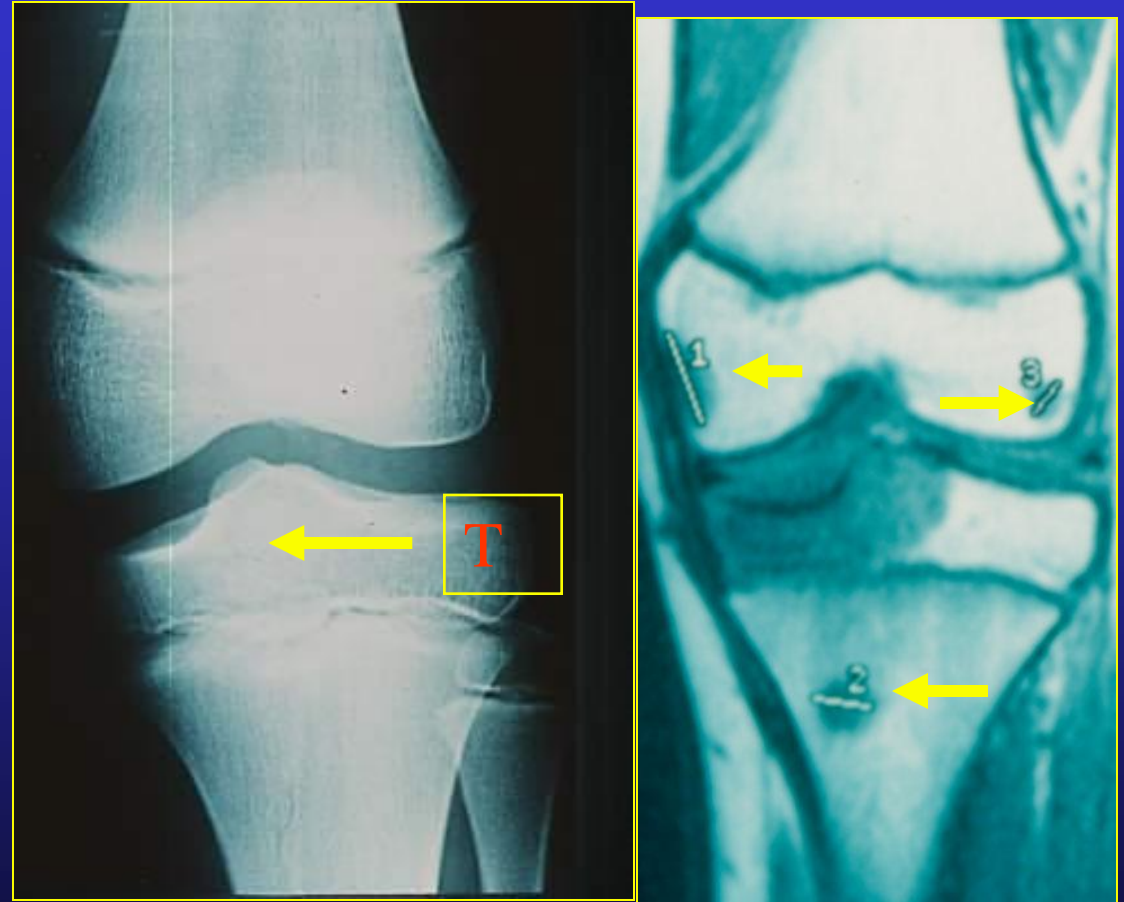
# Skip in osteosarcoma

- 4 patients did not benefit of an efficient preoperative screening (no total bone MRI)
- the diagnostic of skip metastase was done only after a local recurrence (one after transtibial amputation)



# Skip in Ewing's sarcoma

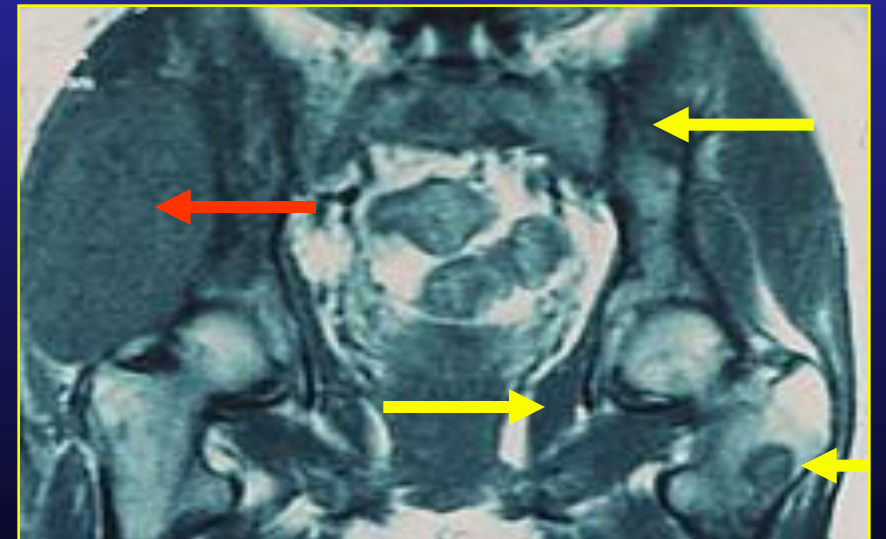
- Out 130 patients with Ewing's sarcoma 8 (6%) presented with skip lesions.
- Only two for a long bone primary (tibia).
- One patient had three skip on the same knee



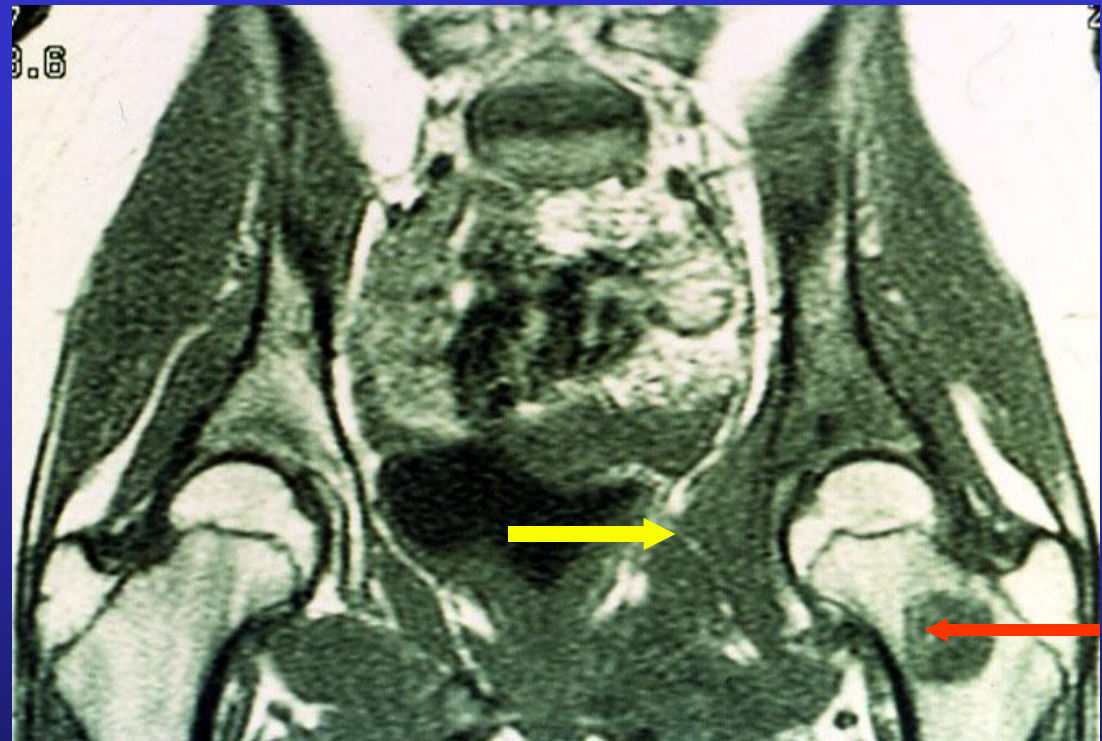
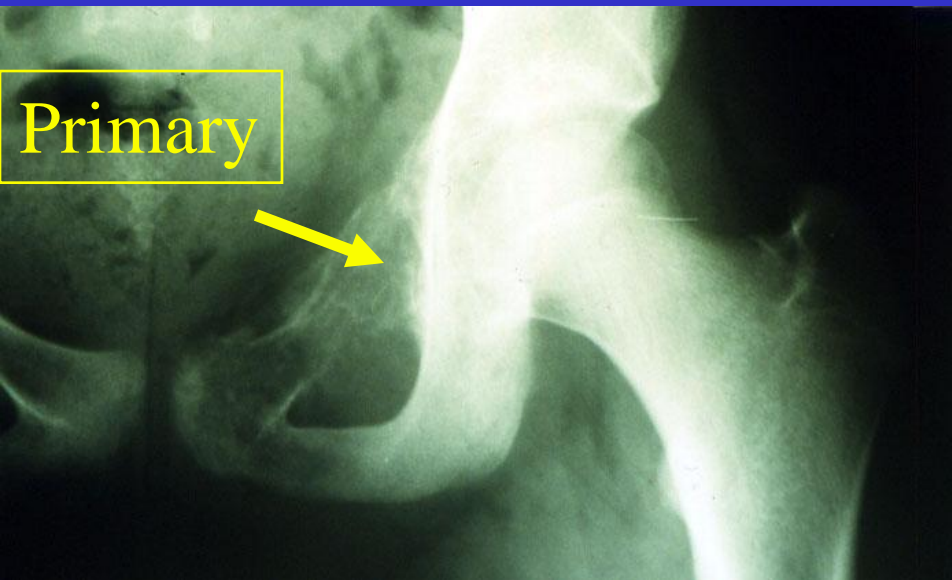


# Skip in Ewing's sarcoma

- The 6 other have been discovered on preoperative MRI of Ewing's sarcoma of innominate bone .
- In half of these patients the skip lesions could not be seen on X Rays, CT and Technetium Scan.



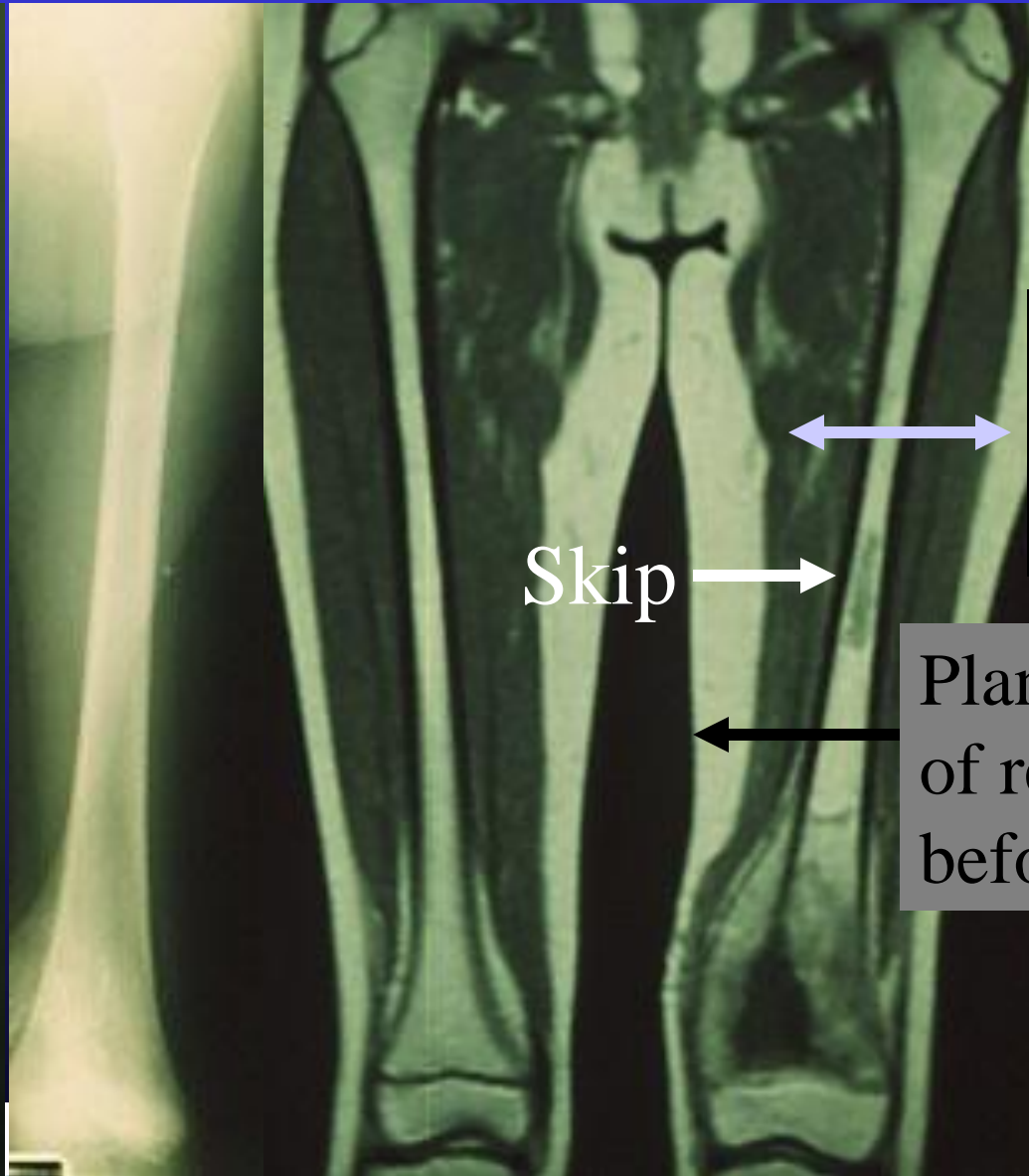
# Femoral skip metastase of Ewing' of pubic



In this 13 years old girl preoperative RMI pointed out a **femoral skip** that was not apparent neither on CT nor on bone scinti.

# Consequence of skip lesion distal femur OS

Osteosarcoma in a girl of 11 .



Definitive level of osteotomy

Planned Limit of resection before RMN

Skip

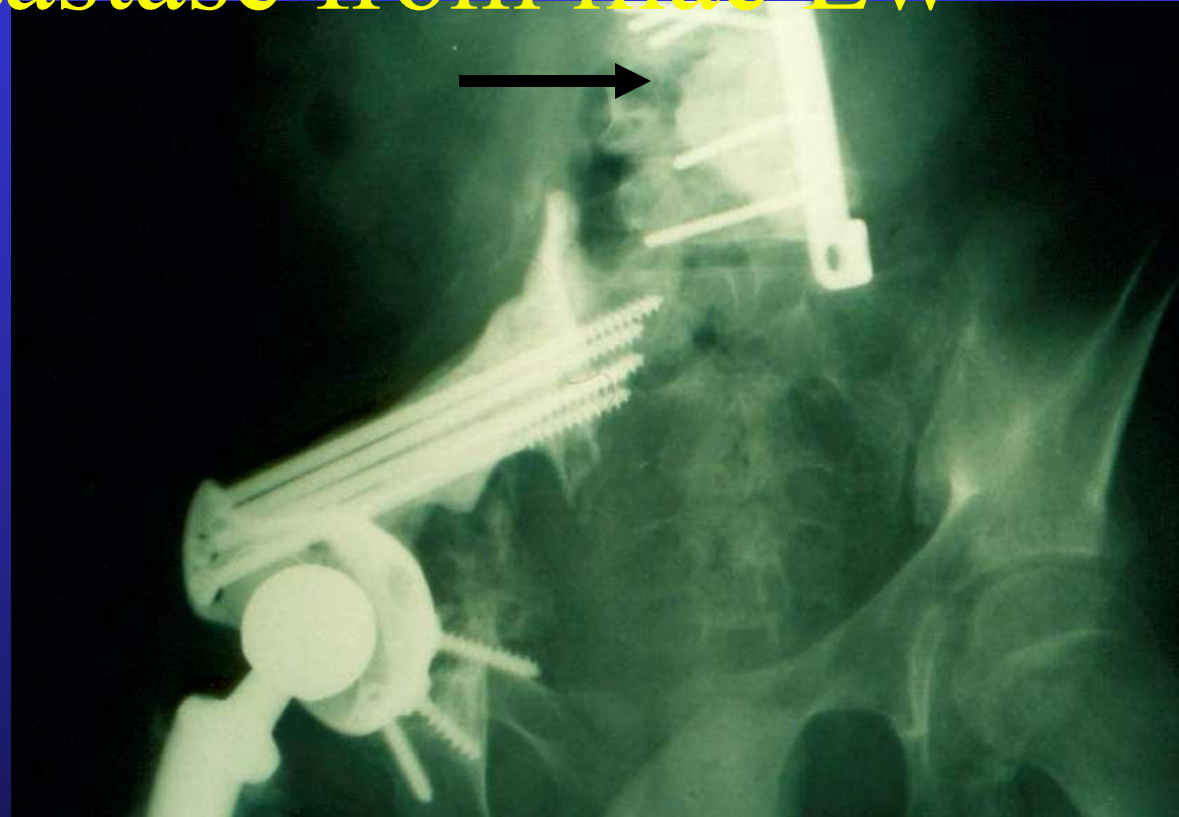
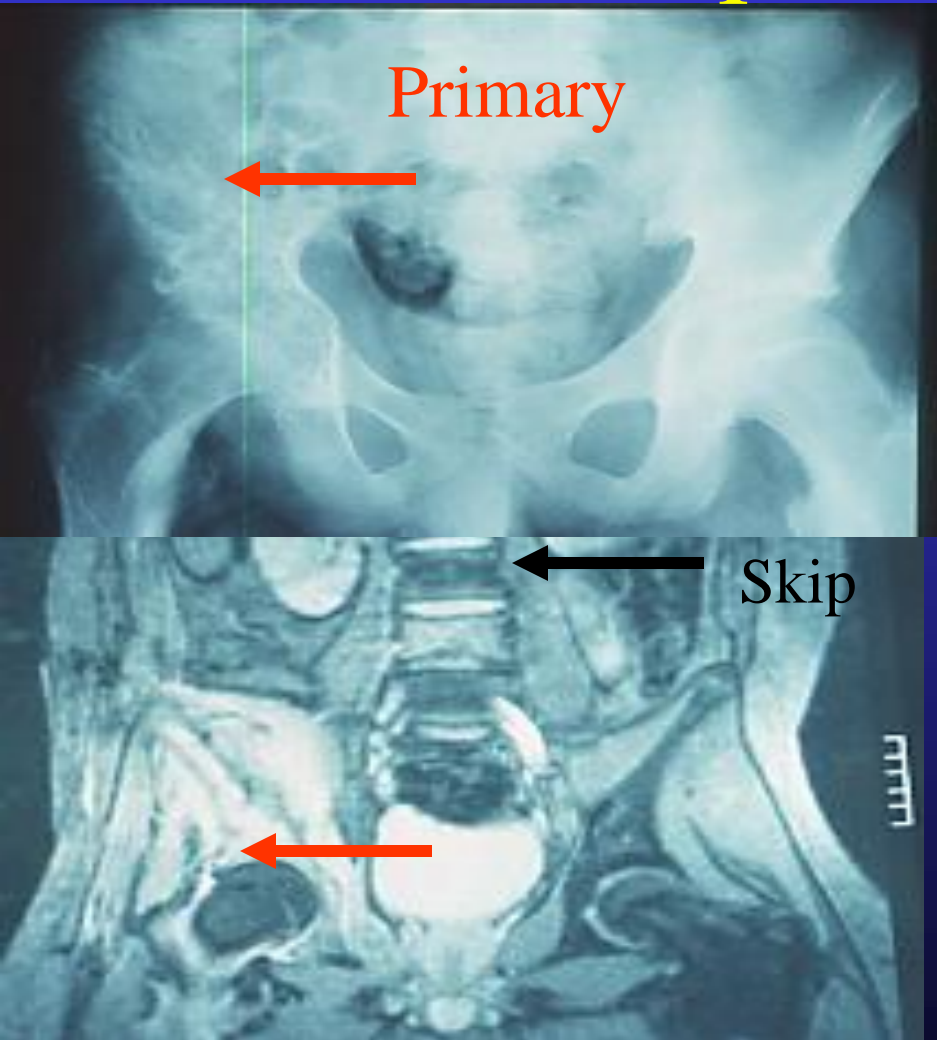
# Consequences and outcome

The wide resection of both lesions and a six drugs chemotherapy permits to obtain a long term disease free survival.

Radiological aspect of skeletal reconstruction 66 months after resection

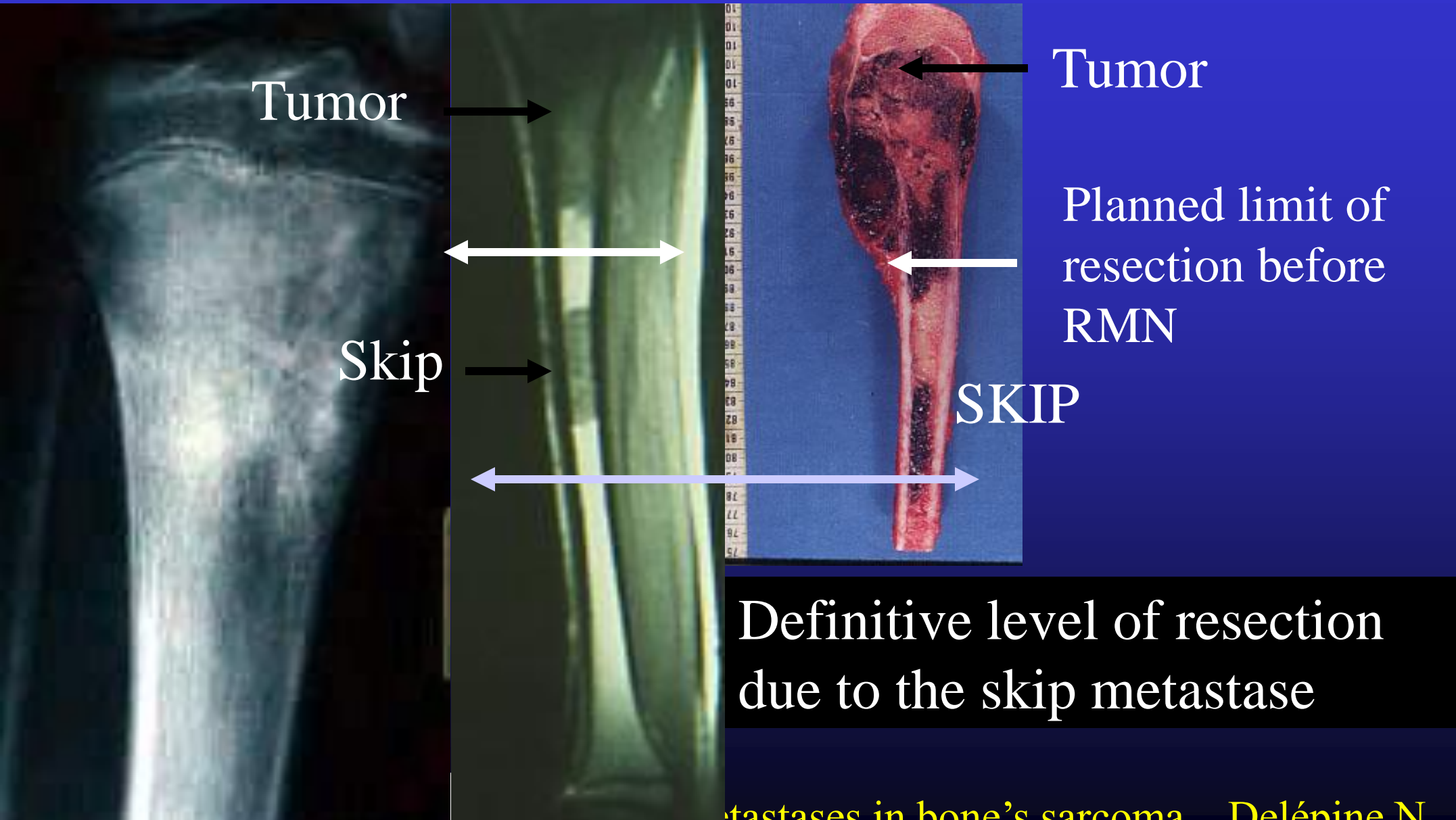


# Consequence and outcome of solitary lumbar skip metastase from iliac Ew



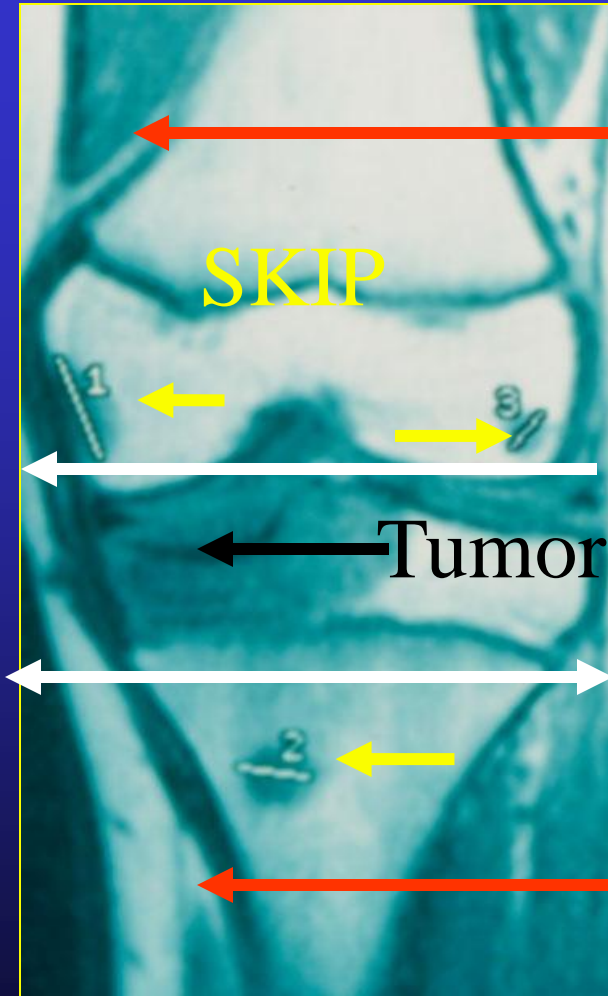
In this patient the MRI showed a solitary met of L4 that was resected. A long term remission was observed.

# Consequence of skip lesion from tibia(OS)



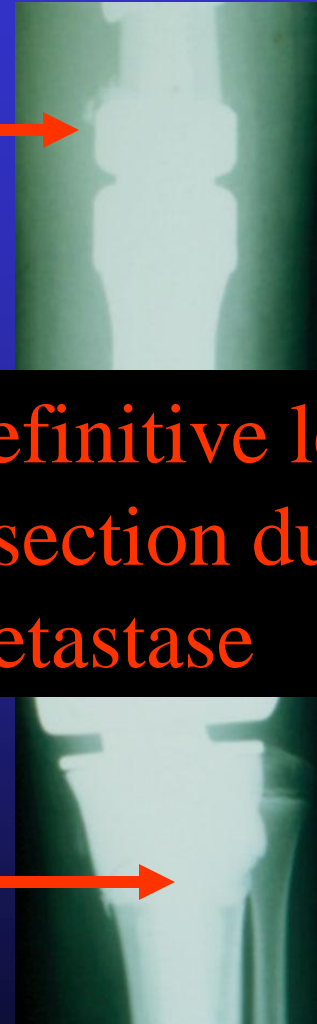
Definitive level of resection  
due to the skip metastase

# Consequence of skip lesion from tibia(EW)



Planned limit of resection before RMN

Definitive level of resection due to the skip metastase



# Prognostic value of skip

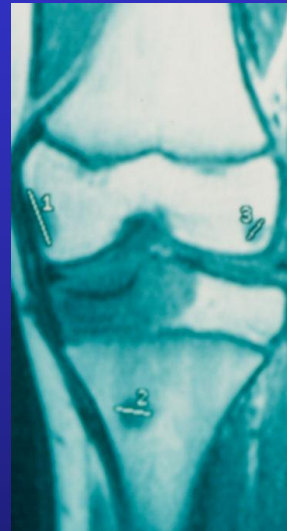
- In our patients the prognostic value of skip lesion was directly correlated with the efficacy of the chemotherapy protocol.
- when chemotherapy is suboptimal or some skip not resected the prognosis is dismal.





# Prognostic value of skip

- With our most effective protocols and when all visible lesion could be resected, the presence of skip lesions did not affect the disease free survival of our patients.



# Conclusion 1 :Prevalence

Skip metastases are rare in Osteosarcoma and Ewing's sarcoma (5%)

and very rare in chondrosarcoma (1%).

Pelvic Ewing's presents a very high risk of regional skip (20%).

# Conclusion 2: The prognostic value of skip is protocol dependant.

With effective preoperative screening and optimal chemotherapies the skip lesions are no longer adverse prognostic factor.

# Conclusion 3 :The best preoperative imaging method to point out a skip is MRI

This MRI must study the whole bone of the primary and the adjacent epiphyses

NMR of the whole bone is mandatory !  
Even before amputation



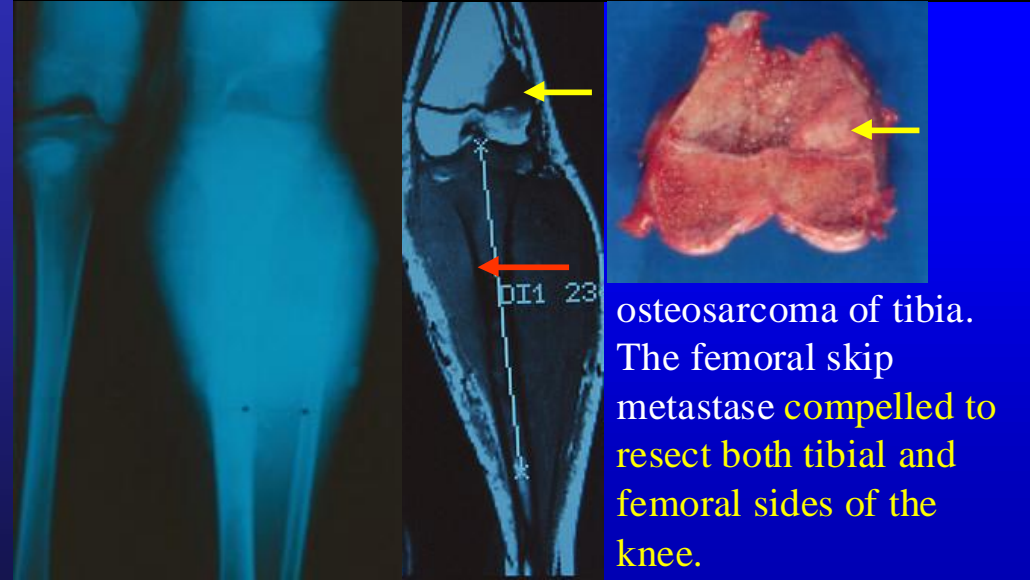
Osteosarcoma of distal fibula treated by leg amputation. The NMR of distal tibia ignored the skip lesion .



Local recurrence appeared after 7 years

2001

## Trans articular skip from tibia to condyle



International Congres on chemotherapy Paris February 2002

Modern imaging in bone Sarcoma

osteosarcoma of tibia. The femoral skip metastase compelled to resect both tibial and femoral sides of the knee.