

2023
27-28 Ottobre

MILANO

Grand Hotel Villa Torretta
Milan Sesto
Via Milanese, 3
20099 Sesto San Giovanni (MI)

SIFE
SOCIETÀ ITALIANA
FISSAZIONE ESTERNA

CONGRESSO NAZIONALE SIFE

Rigenerazione Ossea con tecniche di fissazione interna ed esterna.
Prevenzione e trattamento delle infezioni ossee in traumatologia

Presidente del Congresso
Dott. Alexander Kirienko
Istituto Clinico Humanitas - Rozzano

Chiodo endomidollare nella ricostruzione ossea in oncologia *Intramedullary nail in bone reconstruction in oncology*

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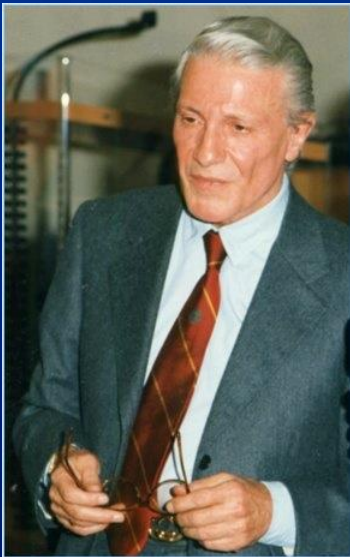


SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Istituto Ortopedico Rizzoli di Bologna
Istituto di Ricovero e Cura a Carattere Scientifico



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA





Mario Campanacci

- Oncologic Orthopaedics
- Medical Oncology Department
- Pathology
- Oncology Research Laboratories

Primary Bone Sarcomas

Incidence of all malignant bone tumors: less than 1 new case/100,000/year

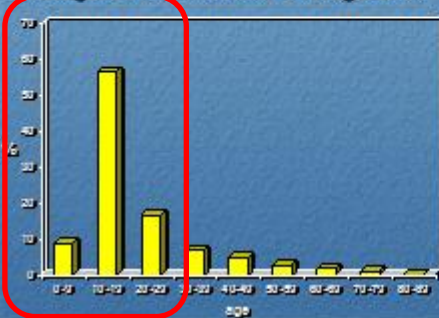
Osteosarcoma: (30%), approximately 150 new cases/year in Italy

Ewing's Sarcoma: less than 100 new cases/year in Italy

Classic Osteosarcoma 2,555 cases



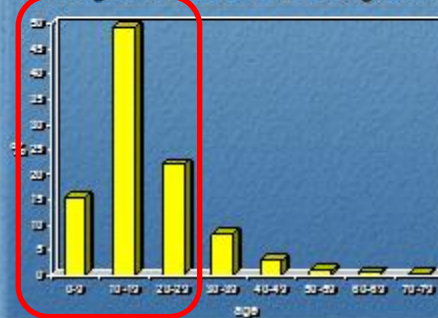
Average: 21 - Median: 17 - Range: 2-83



Ewing Sarcoma 1,440 cases

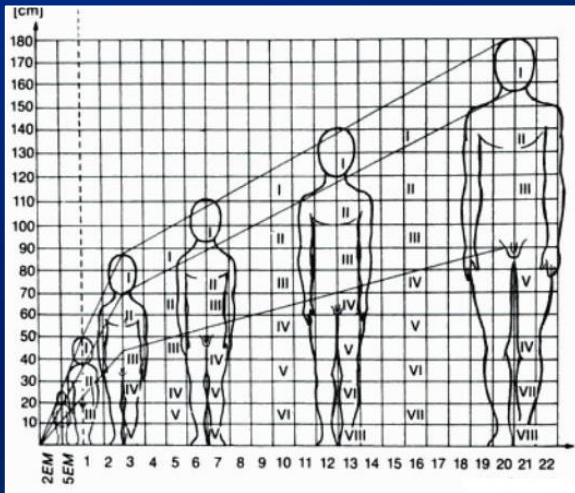


Average: 18 - Median: 16 - Range: 0-75



Pediatric Patients

- Small dimension (bone and soft tissues)
- Bone Immaturity
- Residual Growth



1 year

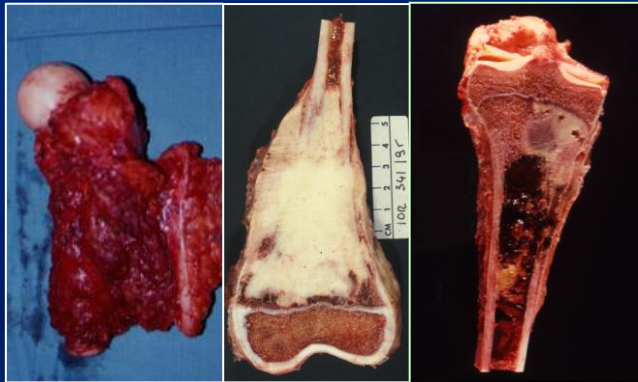
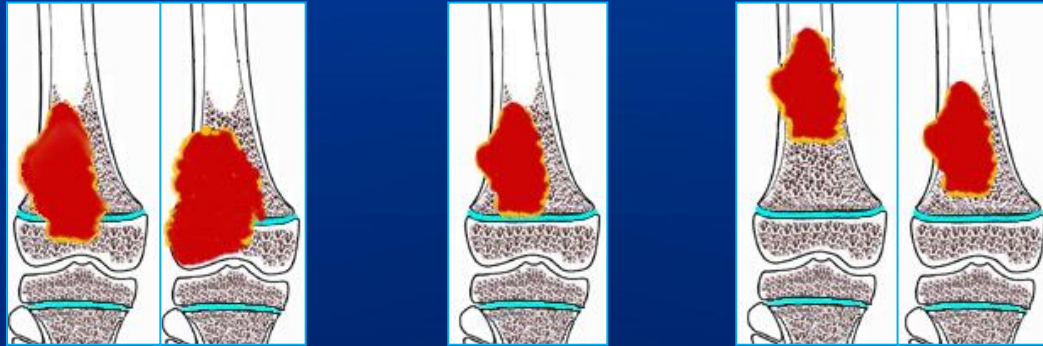


10 years

Residual Growth

... the growth plate ...

... is removed or damaged by Resection ...



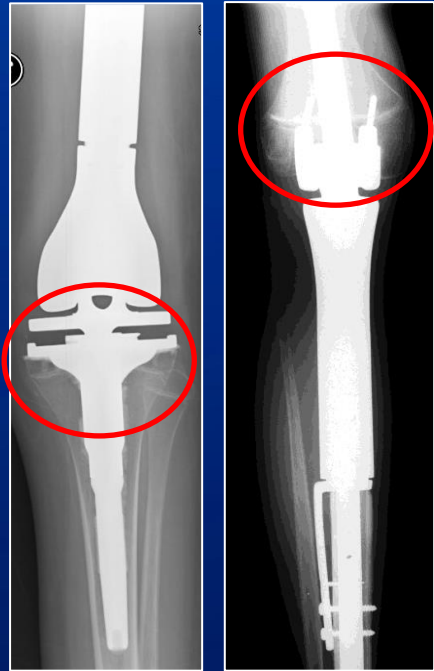
Osteoarticular



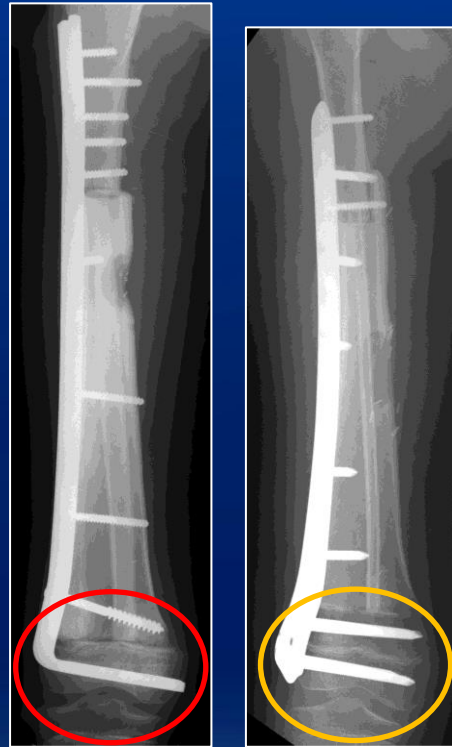
Intercalary

Residual Growth ... the growth plate ...

... damaged also by Reconstruction ...



Osteoarticular

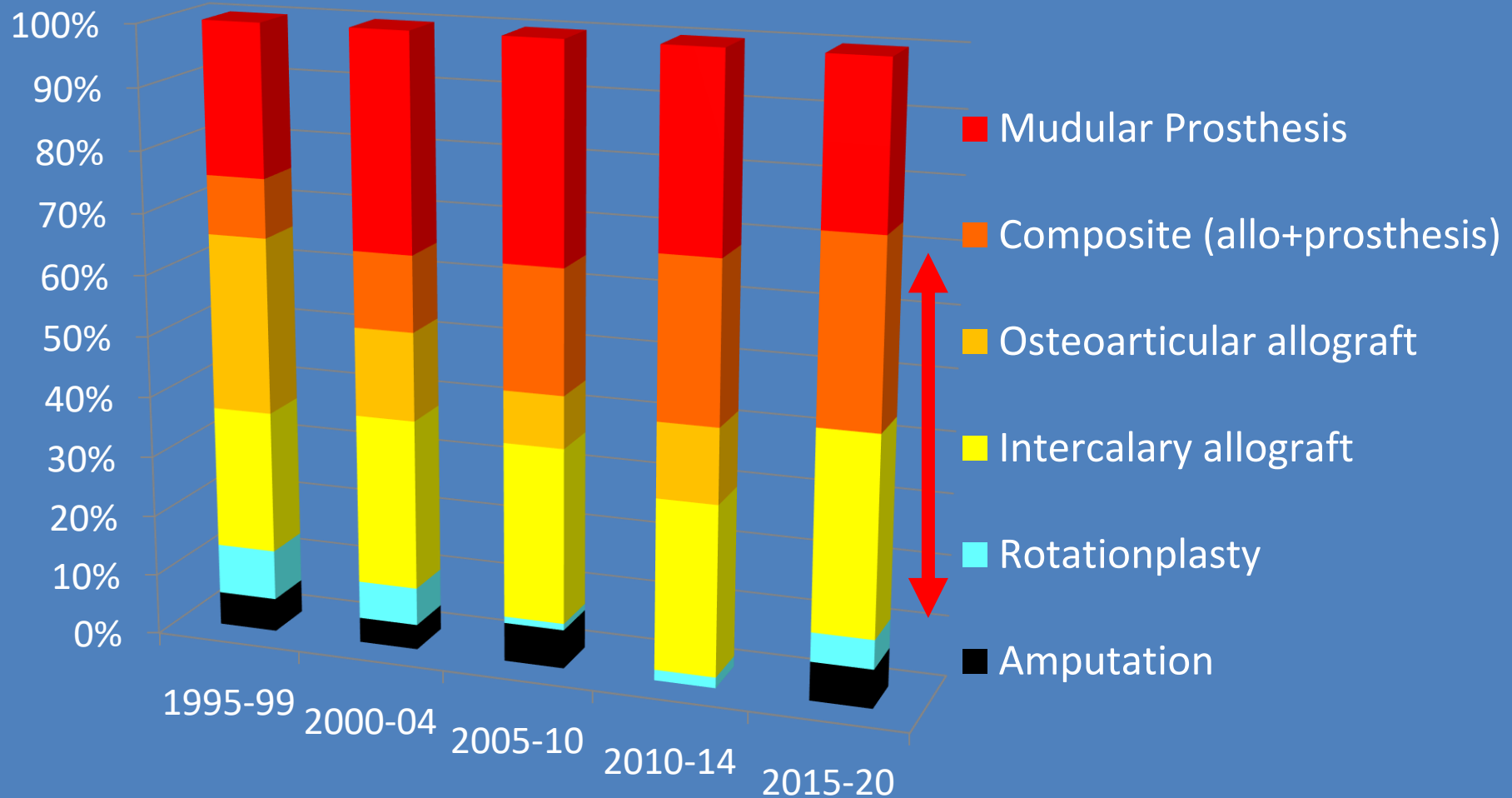


Intercalary



evolution of Oncological Surgery in Children at Rizzoli 0-14 years - 1995/2020

Biological Reconstruction



Indications have changed over the years

purpose of resection-reconstruction on children:

- save growth plate (if possible),
- save joint (if possible)
- save bone stock (*future revision*)

each surgery is "experimental"

from errors and problems
we have evolved the reconstructive techniques



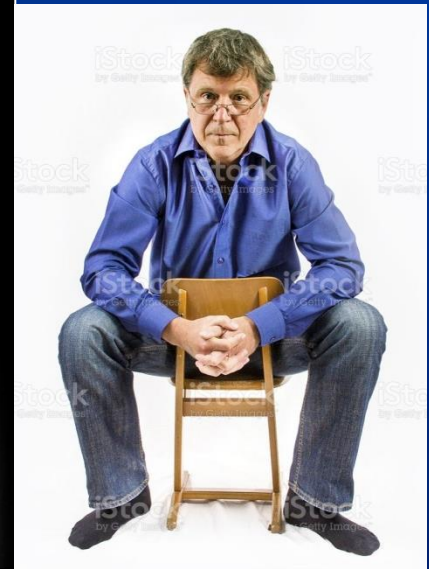
The child grows up – Reconstruction doesn't



10 years
140 cm – 35 kg



23 years
185 cm-92 kg



Which is the best way to face the late length discrepancy in bone sarcoma patients?

Pelvic Bone



Proximal Femur



Distal Femur



Proximal Tibia



Distal Tibia



Epiphysiodesis

Female, age 10 , Ewing



2008



2015

Epiphysiodesis

Often not enough

- Age
- Site
- Time

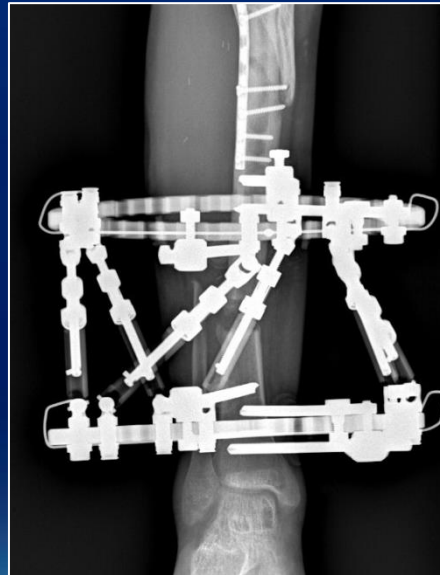


Secondary late lengthening

External fixator:

> risk of infection

low patient's compliance



Secondary late lengthening

External fixator:

> risk of infection

low patient's compliance



Secondary late lengthening

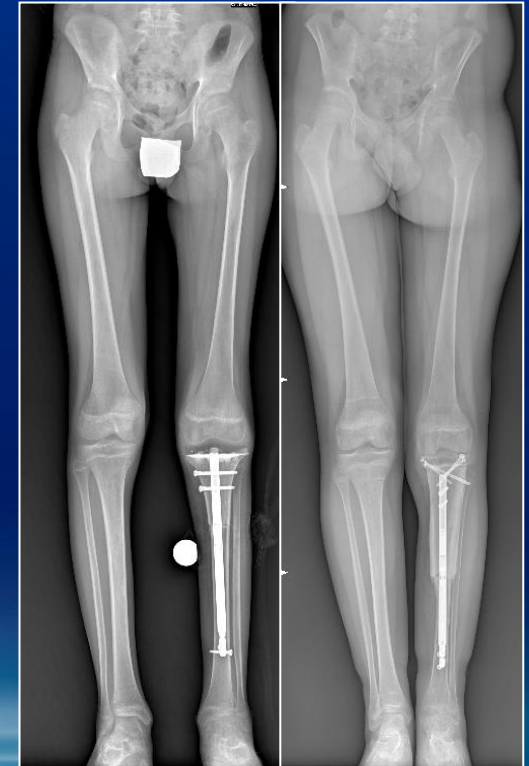
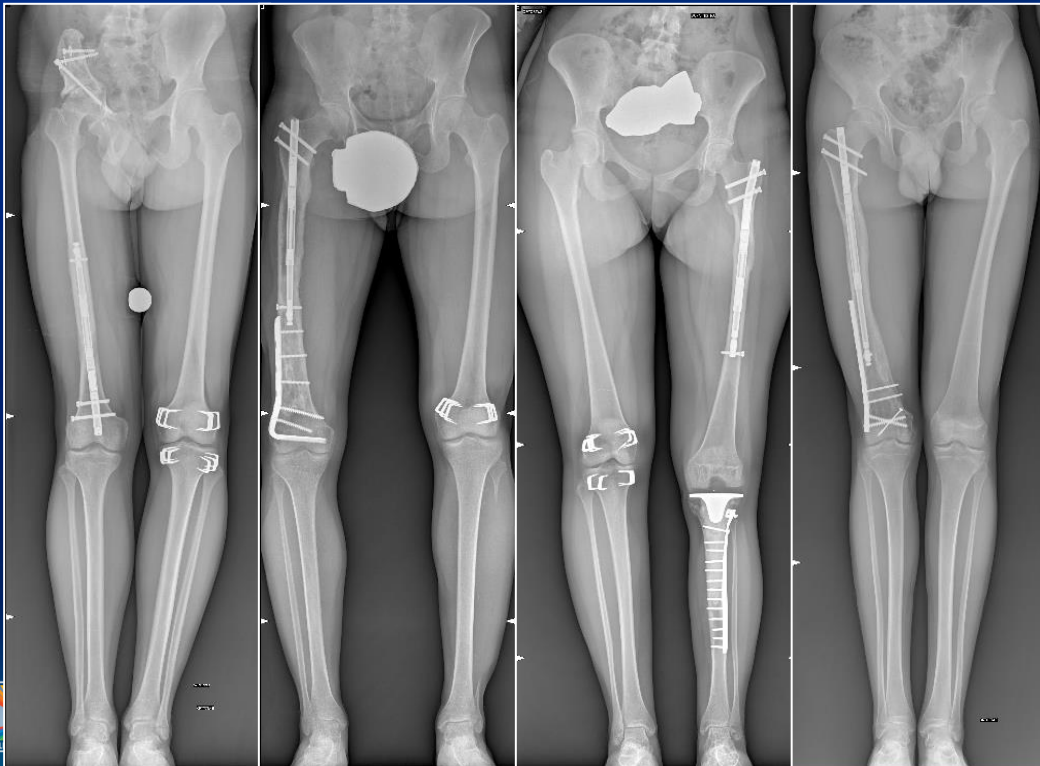
Magnetic Lengthening Nail PRECICE2® (Nuvasive)

Cases treated at the Rizzoli Institute 2014-2023: 44 cases

23 Oncological cases

19 after reconstruction for bone tumor in childhood

4 as a synthesis of primary reconstruction

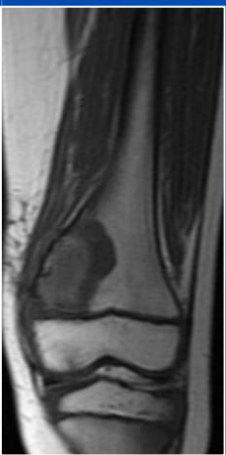


Pre-lengthening Planning

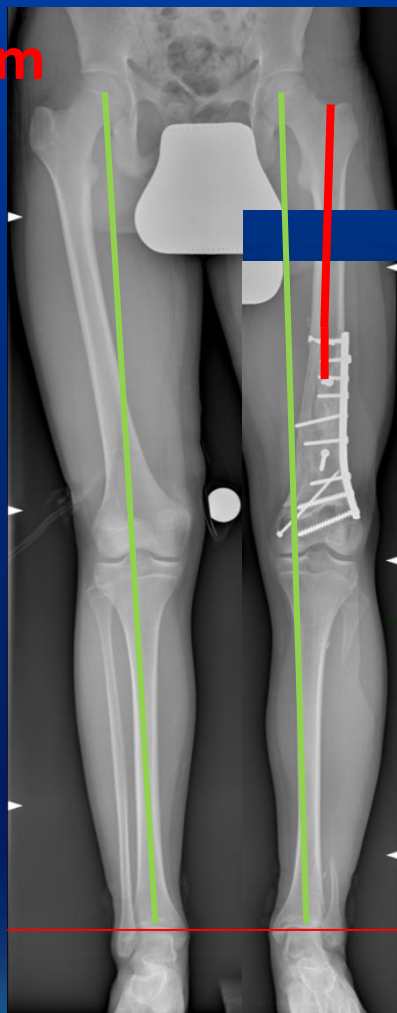
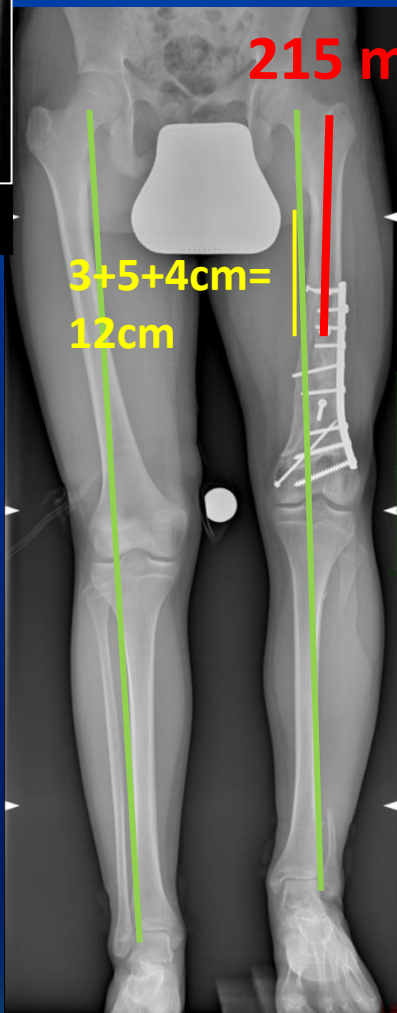
PREVIOUS RECONSTRUCTION

- Enough space to insert the nail?
- Surgical approach (anterograd vs retrograd nail)
- Nail size
- Osteotomy seat (viable bone)
- Previous synthesis: cut the plate? remove screws?

«Reverse Planning»



OGS, 7 yrs



15 yrs, -5cm



2/2014: -5cm



10/2018



Previous Reconstruction

F, 4 years, osteosarcoma



2005



2006

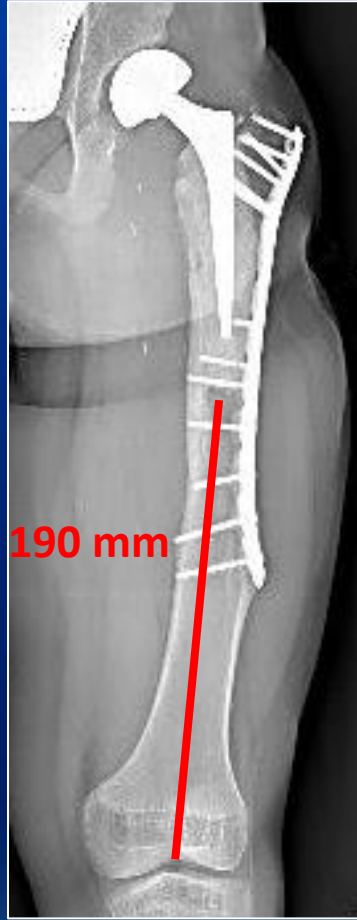


2007



2014, 14 yrs, -5 cm

Previous Reconstruction



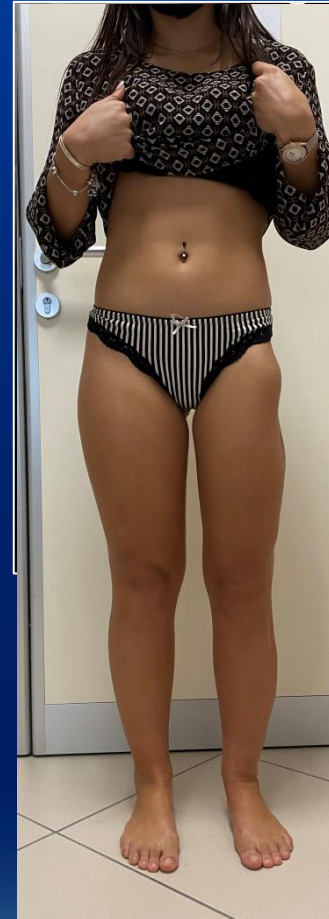
2014, 14 yrs, -5 cm

Previous Reconstruction

avoid abrupt transition between tip of the nail and synthesis of previous reconstruction



2016



2018

2014, 14 yrs, -5 cm

Osteotomy through Viable Bone



7 years, osteosarcoma

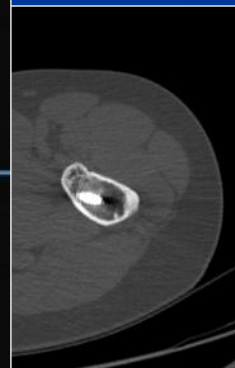
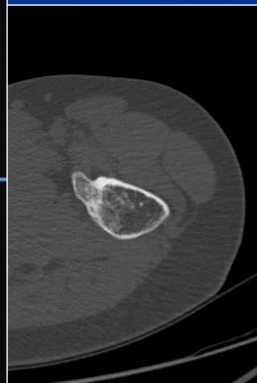
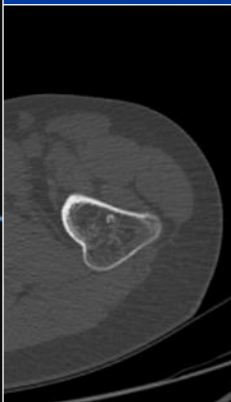
Osteotomy through Viable Bone



7 years, osteosarcoma

- 7 CM

Planning: site of osteotomy (previous reconstruction)







4/2019



5/2019



8/2019



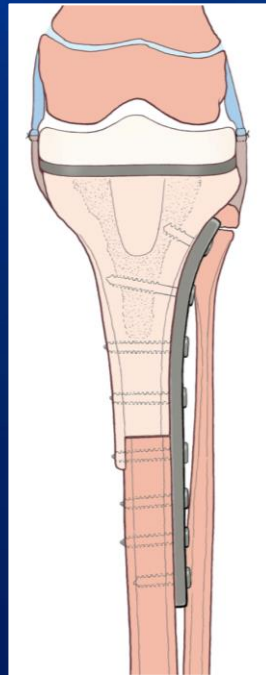
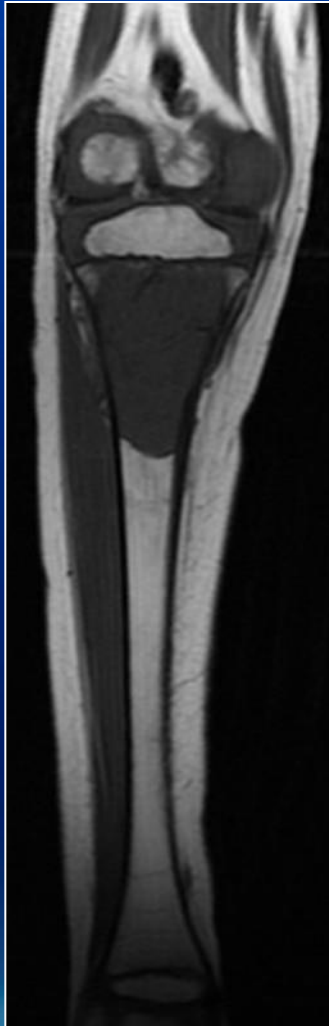
7/2020



1/2023

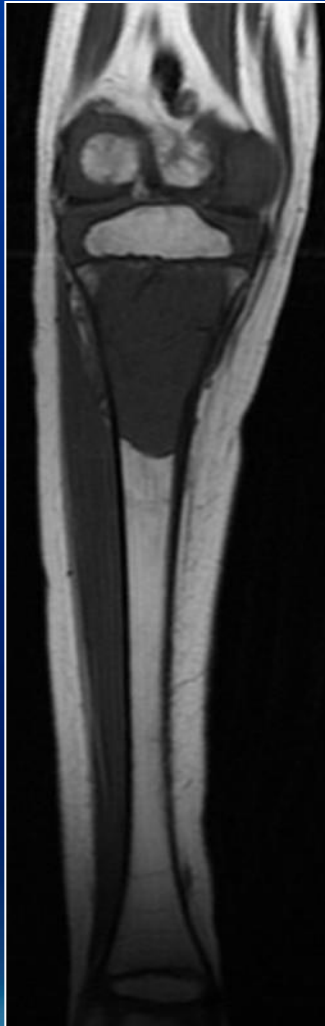
Future:??....

6 years old. Osteosarcoma proximal tibia



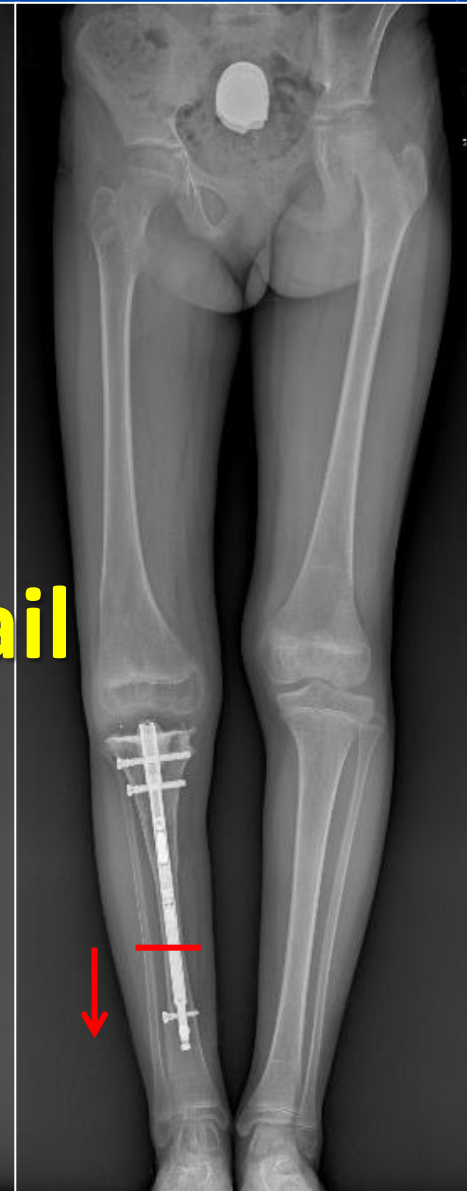
Future:??....

6 years old. Osteosarcoma proximal tibia



... to be lengthened

**Good morning!
Waking up a sleeping nail**



10/2014

11/2015

10/2016

6/2017

10/2018

11 years old.



6/5/2019



May 2019



August 2019



Polyethylene wear and knee instability



8-2019



2-2021



4-2021

13 years old



8-2019



2-2021



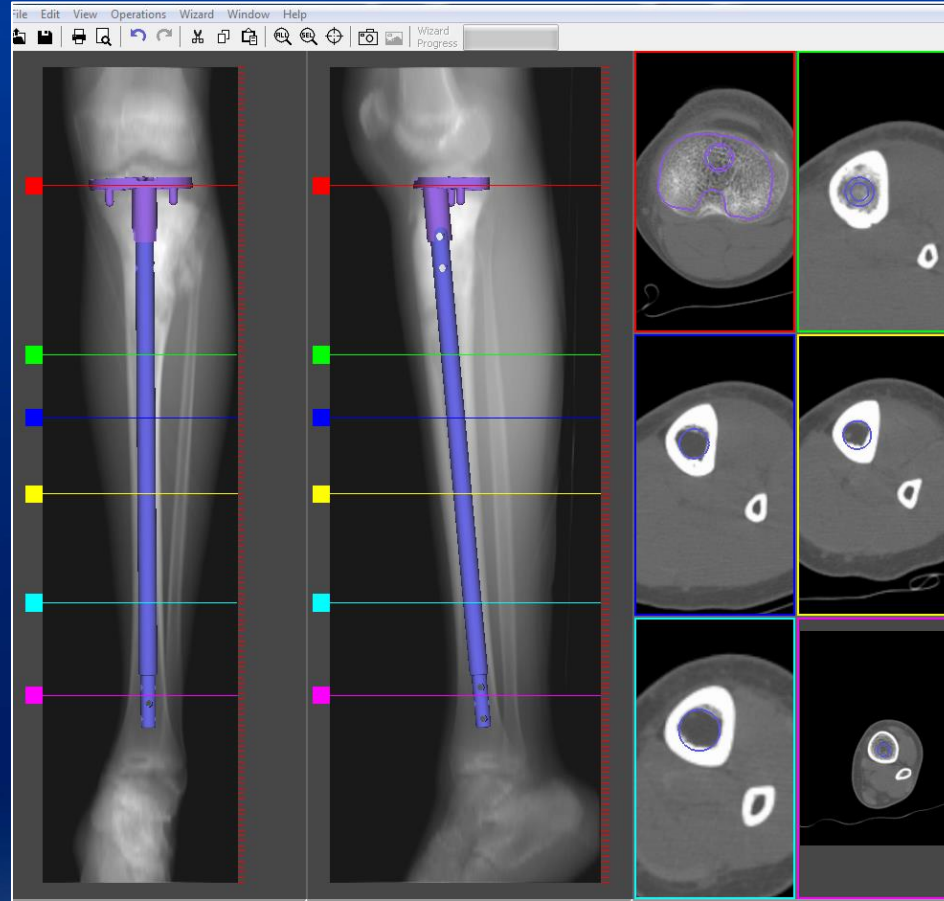
4-2021



5-2021

Future:??....

9 years old. Osteosarcoma proximal tibia





Compression on the osteotomy

pre-lengthening of the nail, shortened after synthesis (2 mm)



Magnetic lengthening nail after Oncological Surgery during childhood

Key Message

- Select patients (compliance)
- Accurate pre-operative planning
- Consider previous reconstruction
 - Access (anterograde/retrograde – femur/tibia)
 - Nail and site of osteotomy (viable bone)
 - Previous synthesis
- Possible chance for custom composites in very young children (*delayed lengthening*)

Grazie





2006-2 anni



2009-4 anni



2012-7 anni



2012



2014



2015-10 anni



2016-11 anni



2017-12 anni



2018-13 anni



2020-15 anni

2021-16 anni

2023-18 anni



3-2023



10-2023 (-3 cm)