

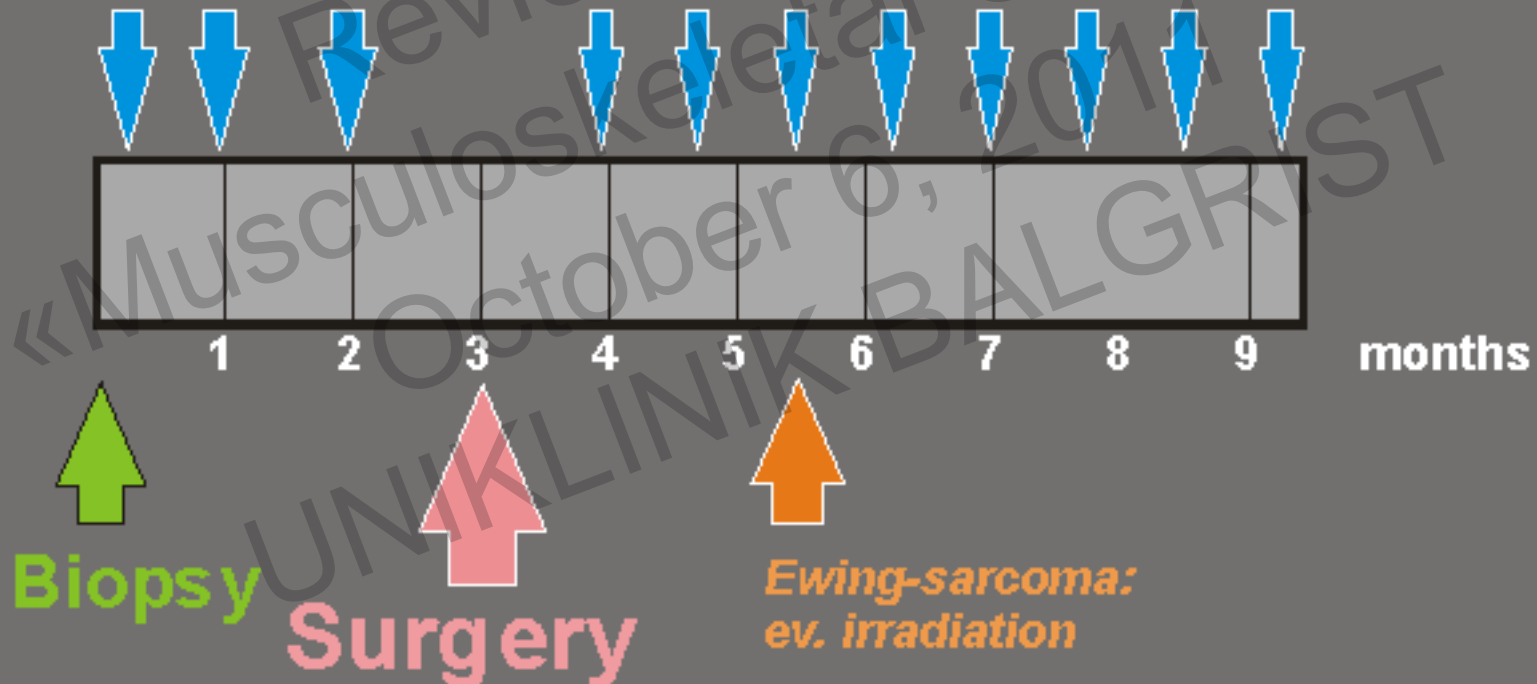
# *Treatment of Malignant Bone Tumors*

**Pediatric Orthopedic Department  
University of Basel, Switzerland**

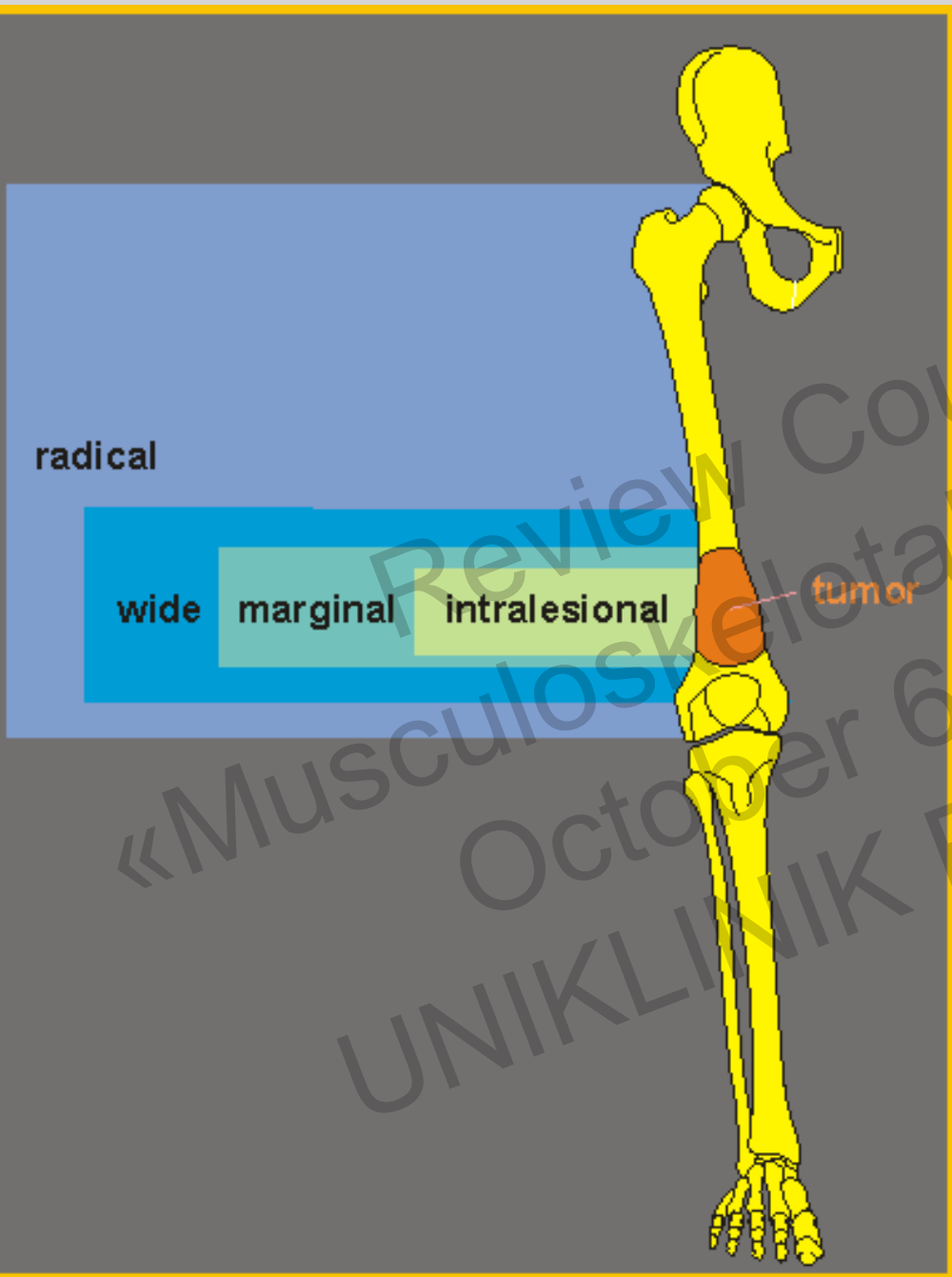


# Treatment Concept in high-grade malignant bone tumors (osteosarcomas, Ewing-sarcomas)

## Chemotherapy

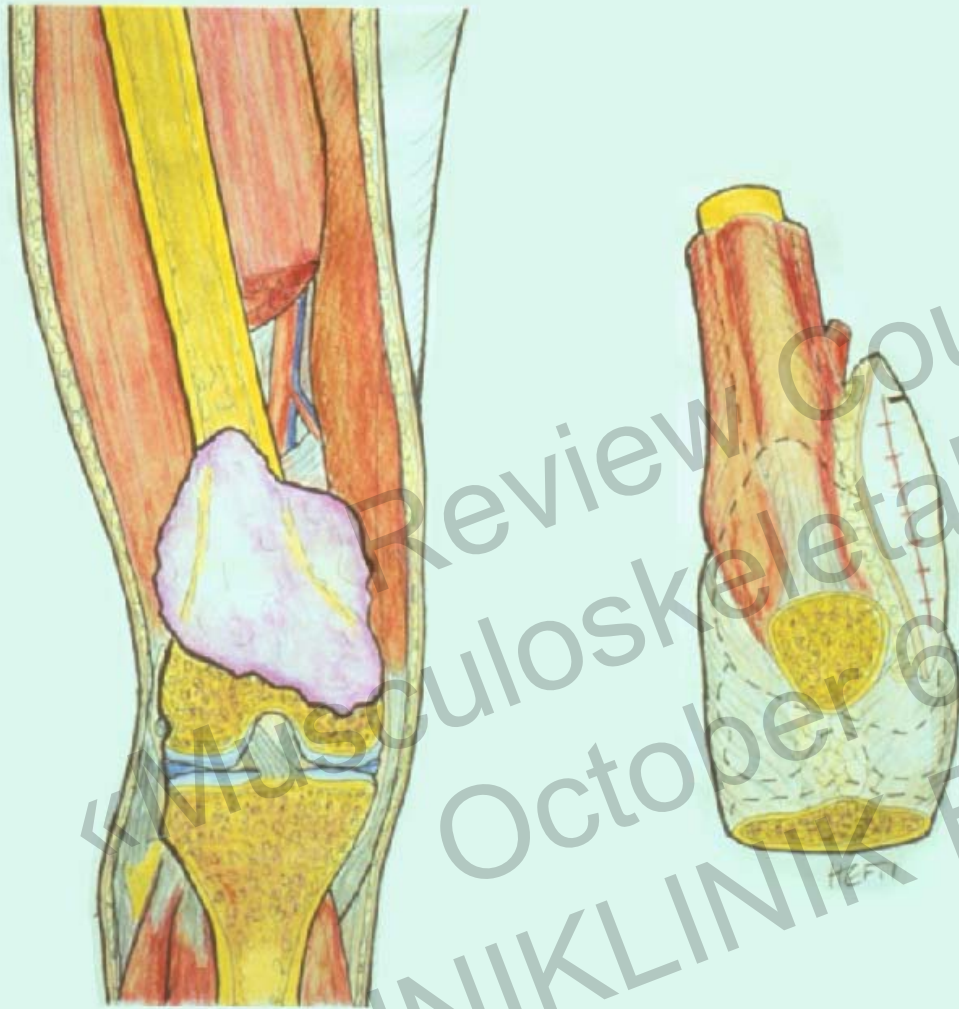


# *Types of resection*



wide or radical	<b>R0</b>
marginal	<b>R1(R2)</b>
intralesio- nal	<b>R2</b>

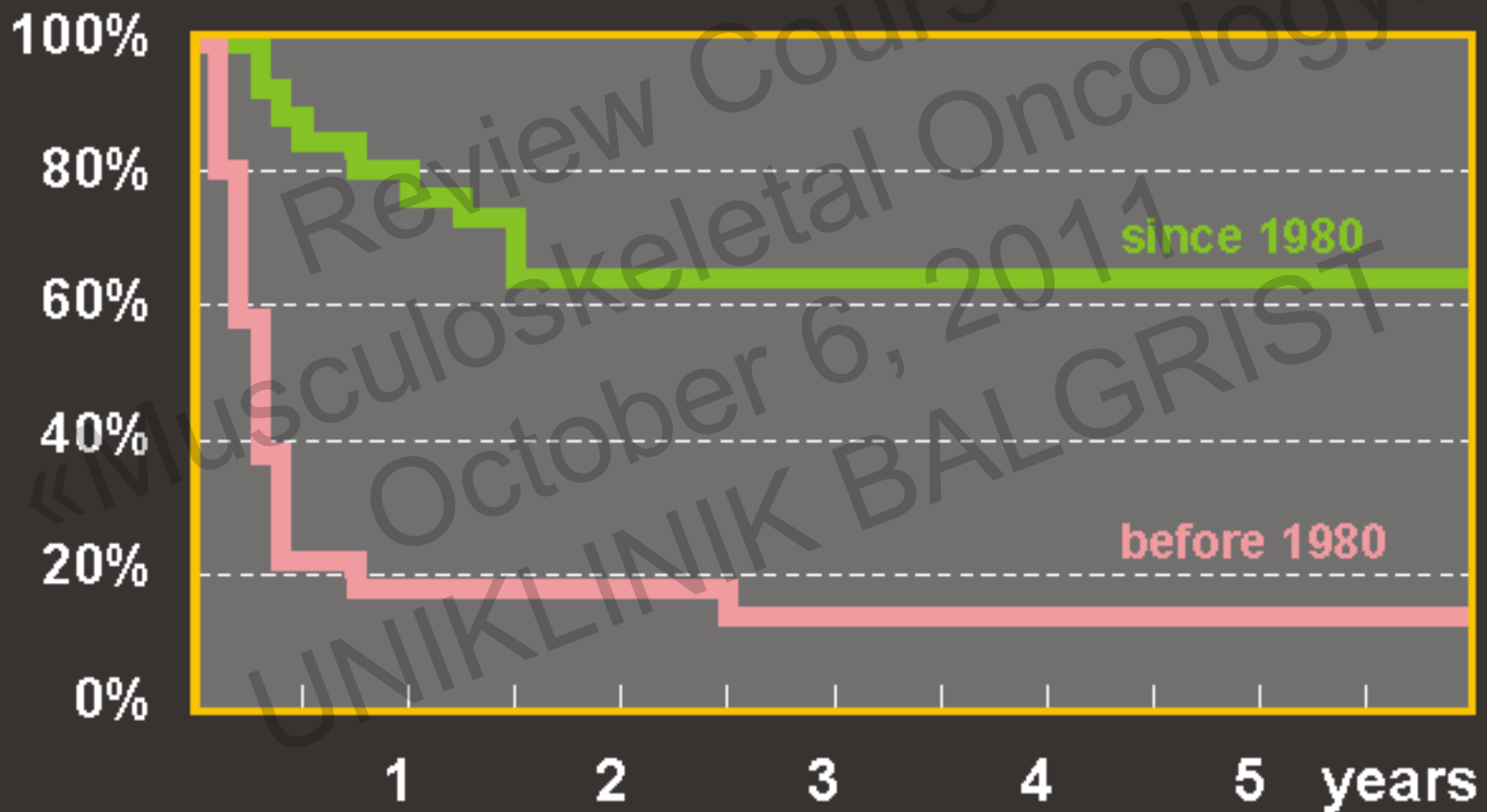
***Principle of  
wide  
resection***



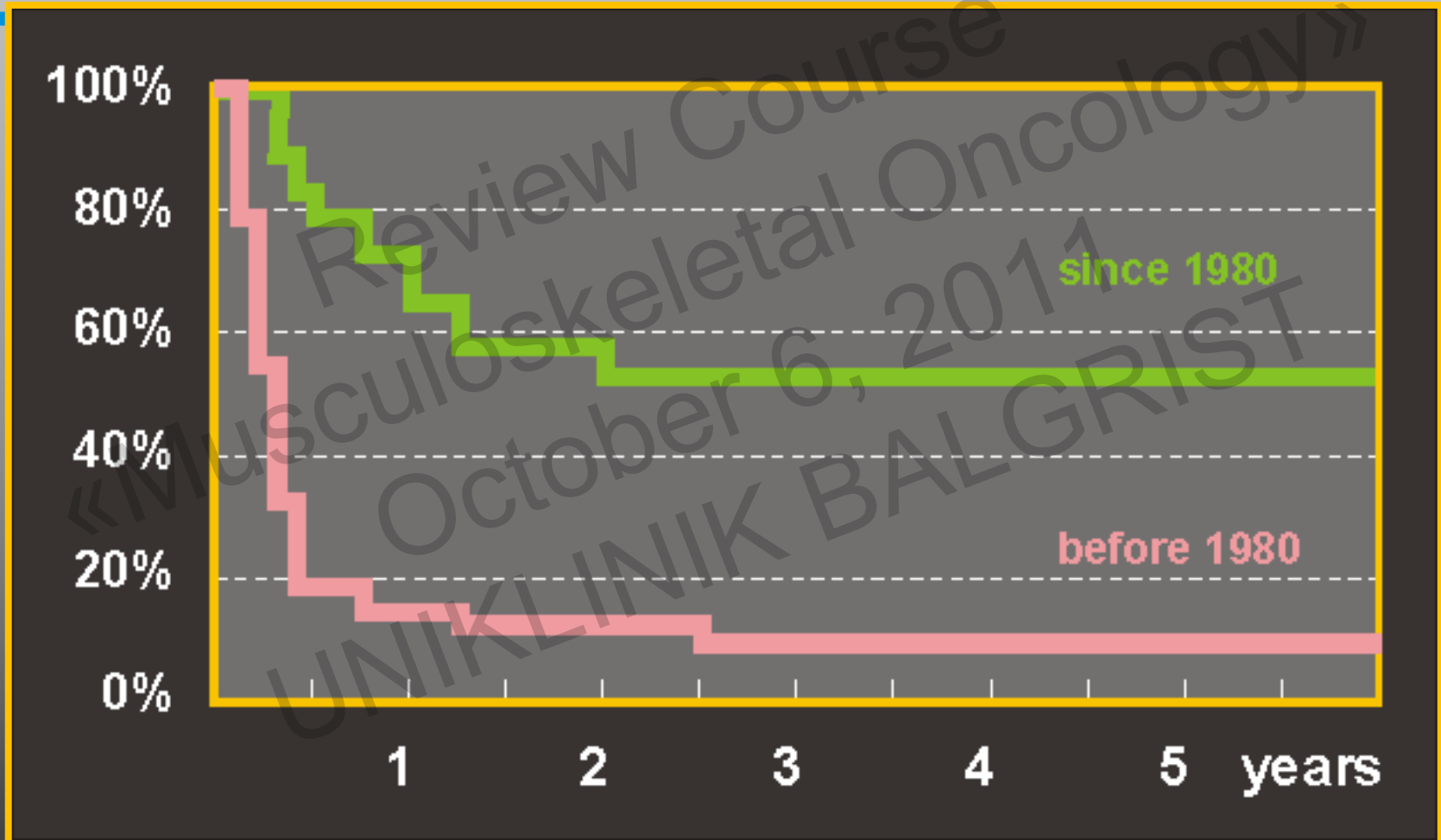
**Frontal section**

**resected  
piece**

# 5-year survival in osteosarcomas



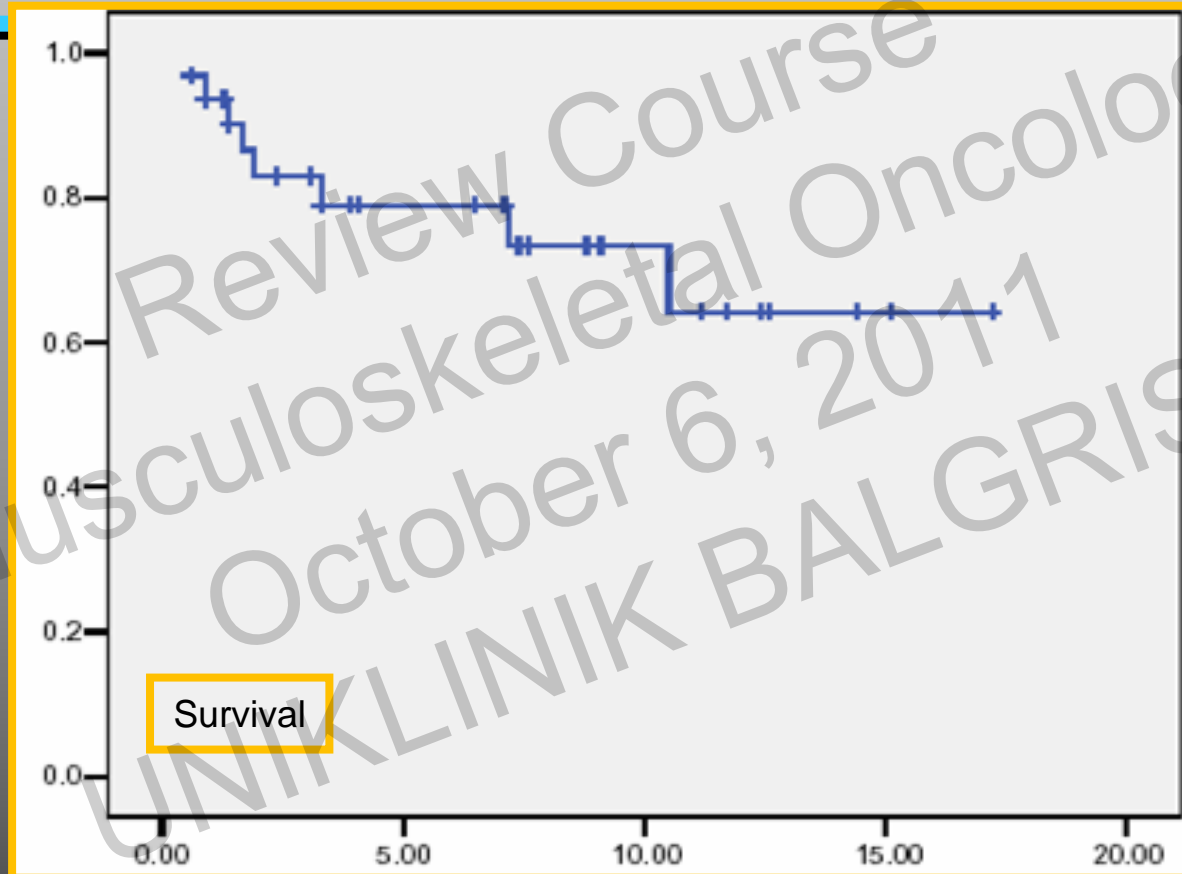
# 5-year survival in Ewing-sarcomas



# Results in Ewing-sarcomas (n = 32) UKBB Basel

Overall survival = 75%

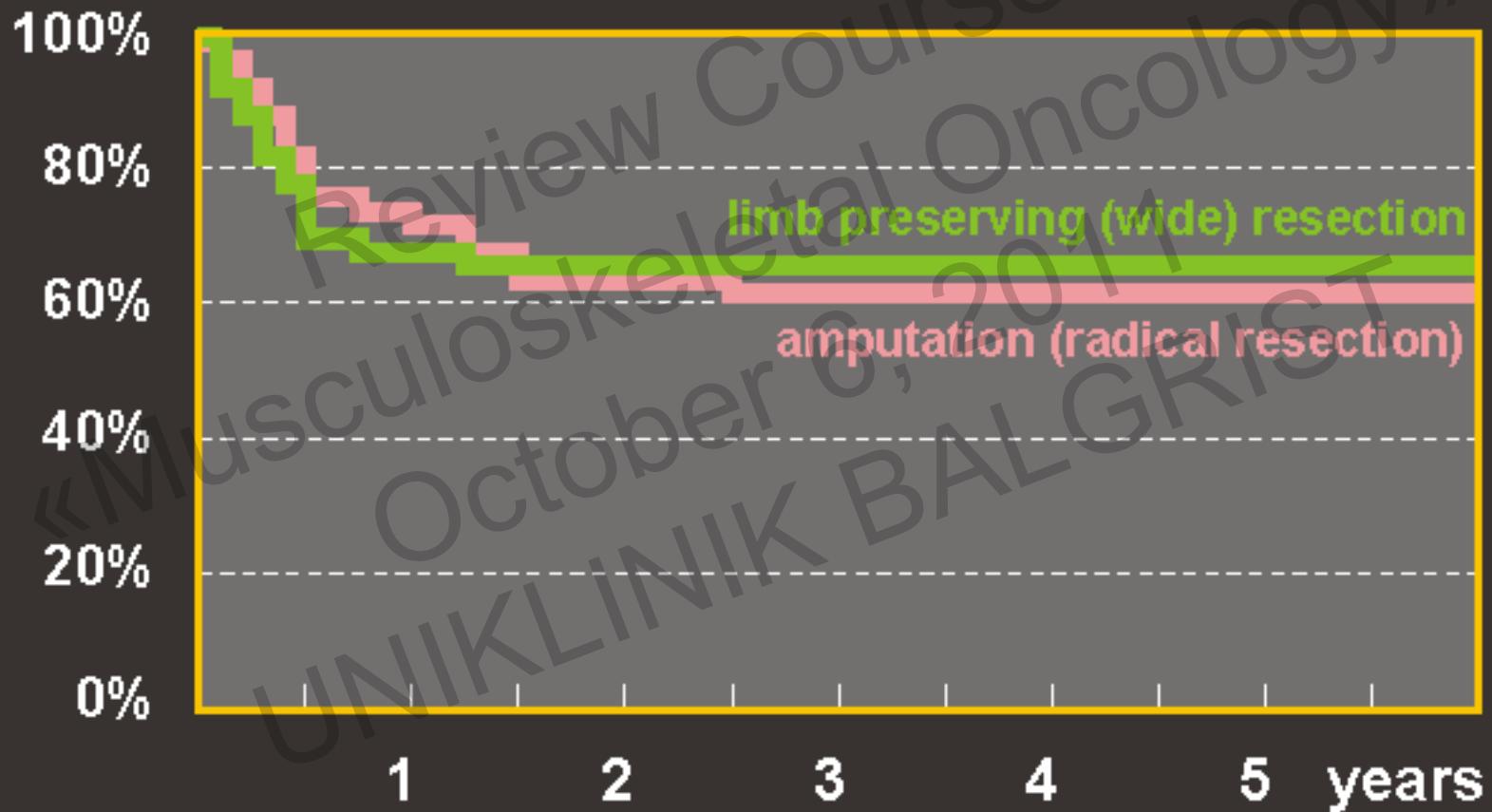
*Krieg, Paulussen, Hefti: Results of treatment of Ewing's sarcomas at a single institution in Switzerland - Birmingham 2008)*



5 year survival rate = 79 %

10 year survival rate = 73.4 %

# Survival rate according to type of resection





# *Options for reconstruction*

- **autologous bone**
  - extracorporal irradiation
- **homologous bone (allograft)**
  - combination with autologous bone
- **endoprotheses**
  - combination with allograft
- **special techniques** (Joint transfer, rotationsplasty etc.)

# Options for reconstruction

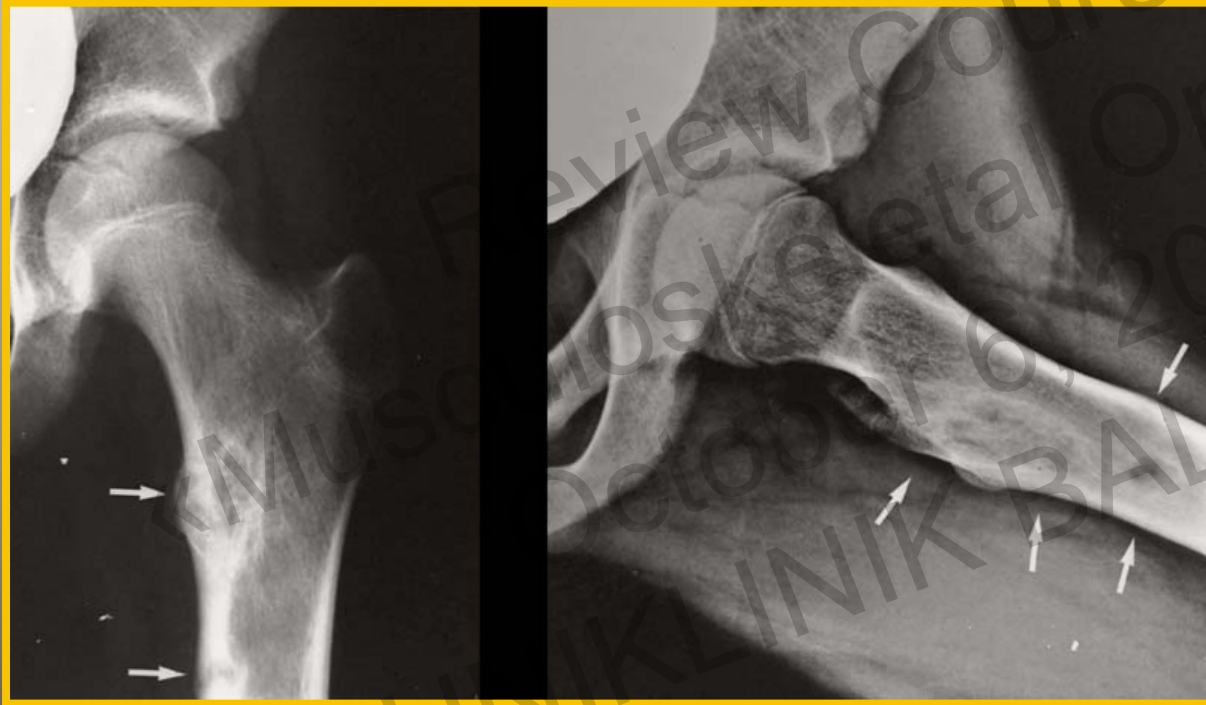
- **autologous bone**
  - extracorporal irradiation
- **homologous bone (allograft)**
  - combination with autologous bone
- **endoprotheses**
  - combination with allograft
- **special techniques** (Joint transfer, rotationsplasty etc.)

# Options for reconstruction

- **autologous bone**
  - non-vascularized
  - vascularized
  - extracorporal irradiation

Review Course  
«Musculoskeletal Oncology»  
October 6, 2011  
UNIKLINIK BALGRIST

# *Low-grade chondrosarcoma*



S.M. f., 13+6



# Options for reconstruction

*autologous bone (non vascularized fibula)*



# *Hemangiopericytoma*

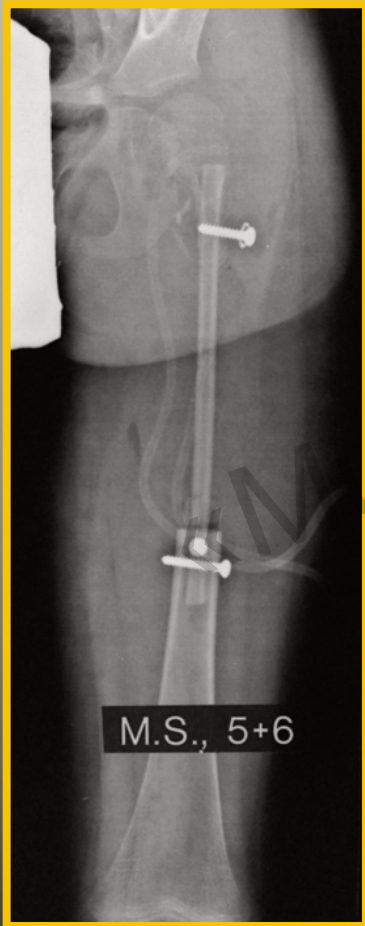
*(low-grade malignant tumor)*



M.S. m., 4+9

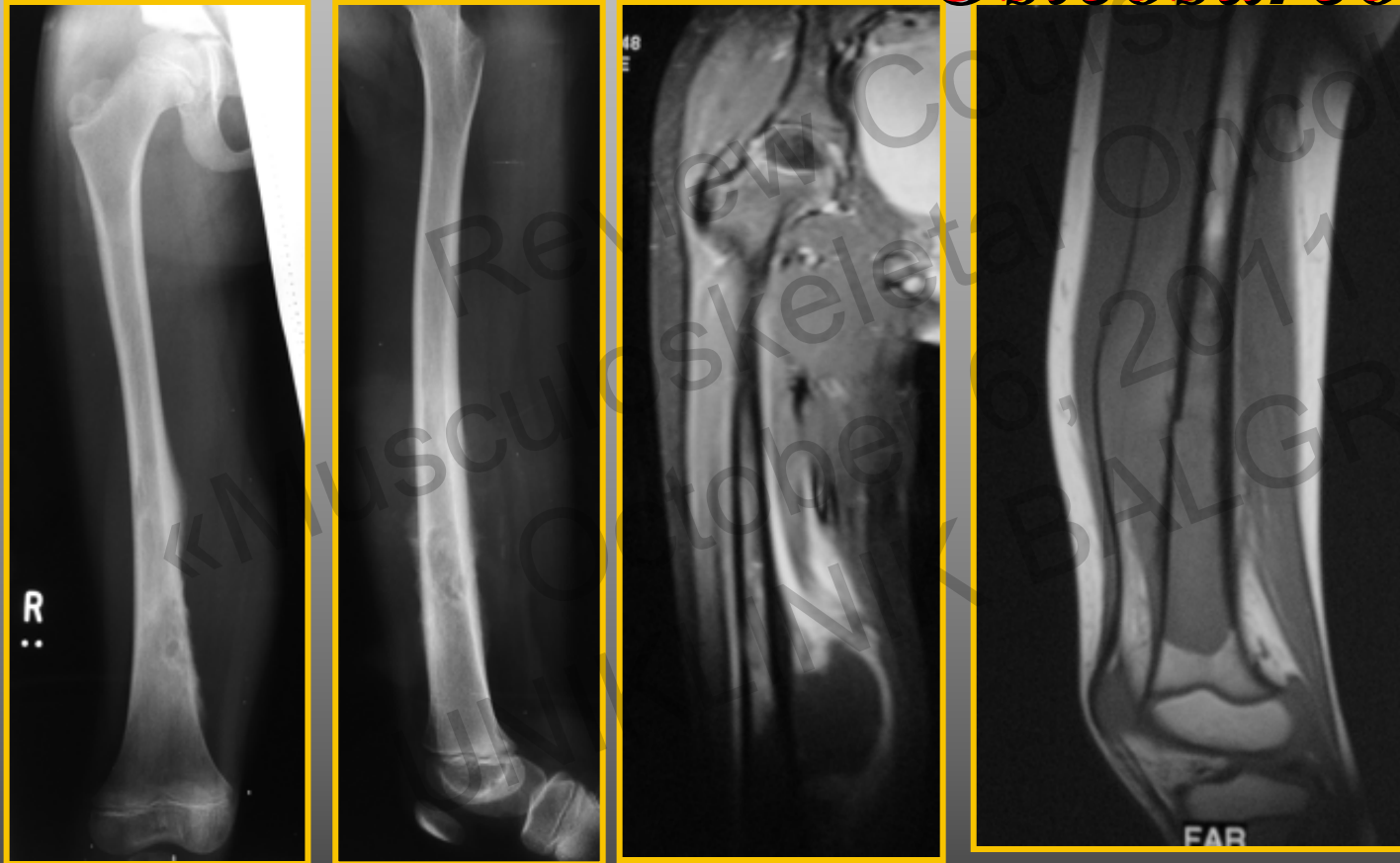
# *Options for reconstruction*

## *non-vascularized autologous bone*



# Options for reconstruction

## Osteosarcoma



K.O. m. 8 J.



# Options for reconstruction

## *vascularized autologous bone*

### ***Osteosarcoma***



K.O. m. 8 y.



6y. postop.



# *In which cases do we use vascularized instead of non-vascularized bone?*

- poor soft tissue coverage (forearm, lower leg, hand, foot)
- restricted possibilities for fixation (tumor close to the epiphysis)
- failure of non-vascularized bone (non-union)

# Options for reconstruction

- **autologous bone**
  - extracorporal irradiation
- **homologous bone (allograft)**
  - combination with autologous bone
- **endoprotheses**
  - combination with allograft
- **special techniques** (Joint transfer, rotationsplasty etc.)

# Options for reconstruction

*extracorporeal irradiation and reimplantation*

## *Ewing-sarcoma*



D.B., m. 7 y.



# Options for reconstruction

*extracorporeal irradiation and reimplantation*

## *Ewing-sarcoma*



D.B., m. 7 y.

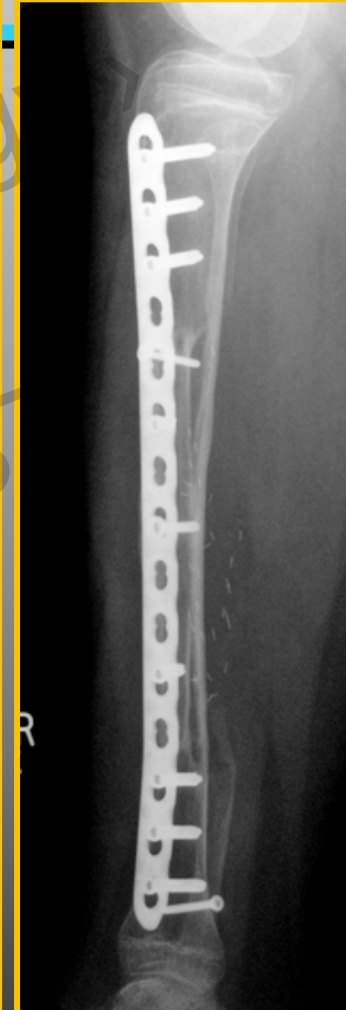
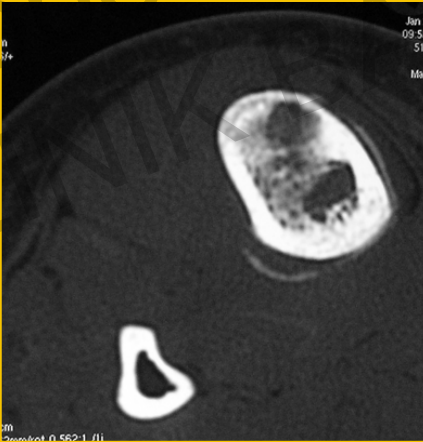
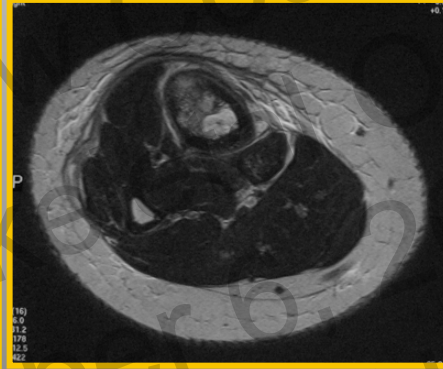


6 months postop..

# Options for reconstruction

*extracorporeal irradiation and reimplantation (in combination with vascularized fibula)*

## *Adamantinoma*



L.T., w. 12J.

6 Mon. postop.

# Options for reconstruction

- autologous bone
  - extracorporal irradiation
- homologous bone (allograft)
  - combination with autologous bone
- endoprotheses
  - combination with allograft
- special techniques (Joint transfer, rotationsplasty etc.)

# Options for reconstruction

## allograft



## Fibro-cartilaginous mesenchymoma



V.K. m., 12+2



2 y. postop



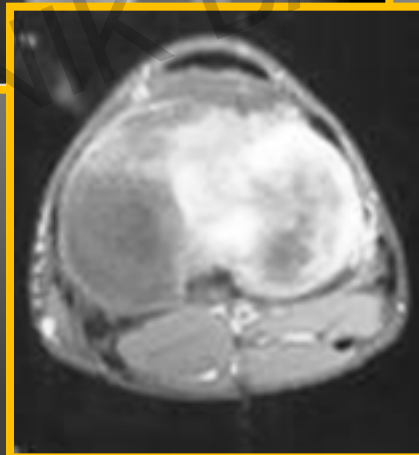
4 y. postop



# Options for reconstruction

- autologous bone
  - extracorporal irradiation
- homologous bone (allograft)
  - combination with autologous bone
- **endoprotheses**
  - combination with allograft
- special techniques (Joint transfer, rotationsplasty etc.)

# ***Osteosarcoma***



S.J., m., 19 years

# MUTARS<sup>®</sup> tumor endoprostheses

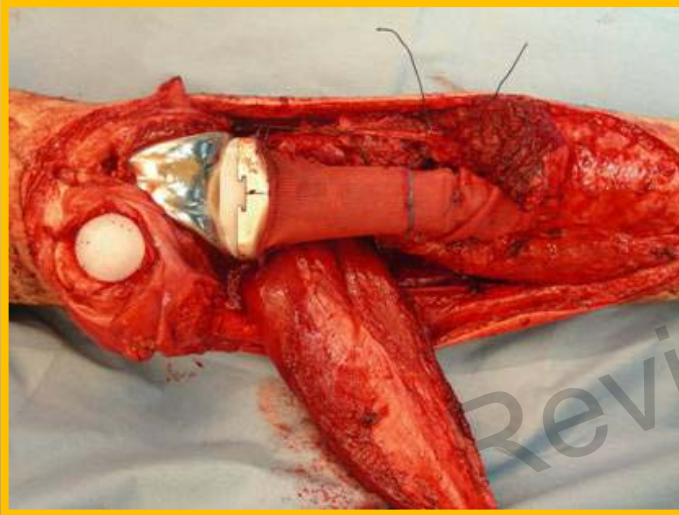
Universität Kinderental



- modular system
- rotating hinge knee joint
- antiinfectious silver coating
- attachment tube

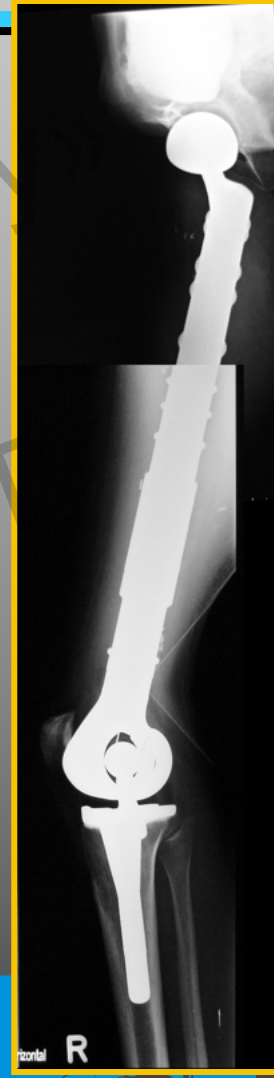
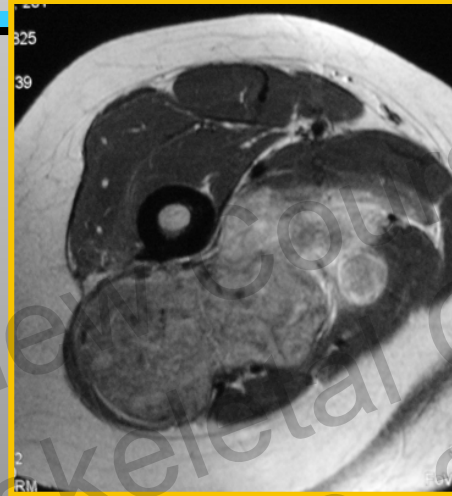
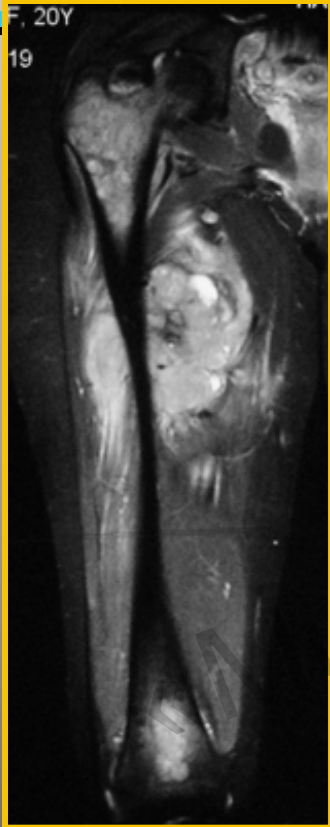


# *Endoprosthesis with attachment tube*



S.J., m., 19 years

# Options for reconstruction total femur endoprosthesis

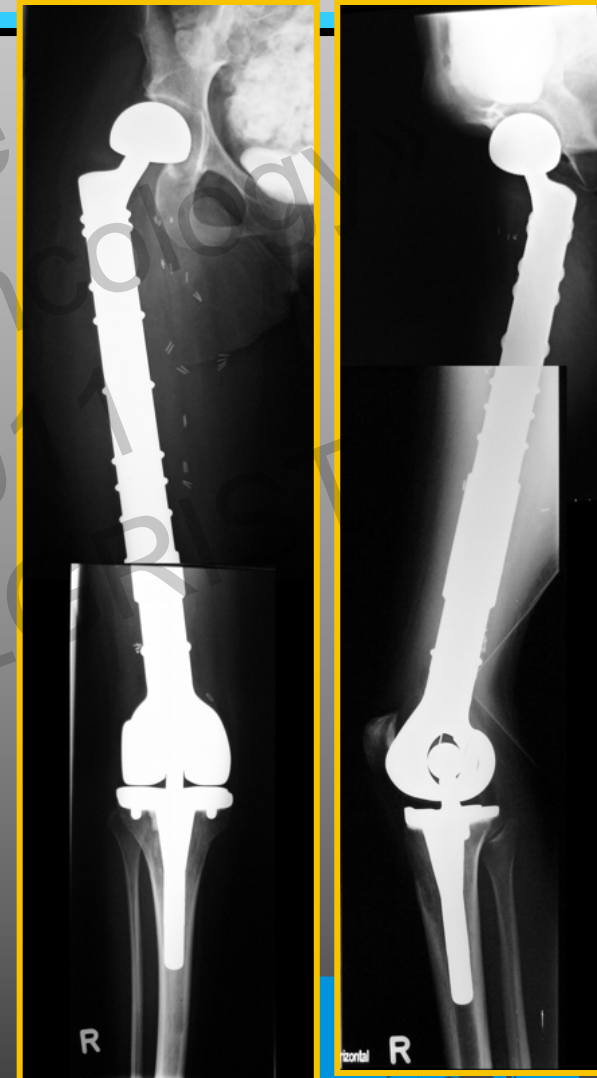
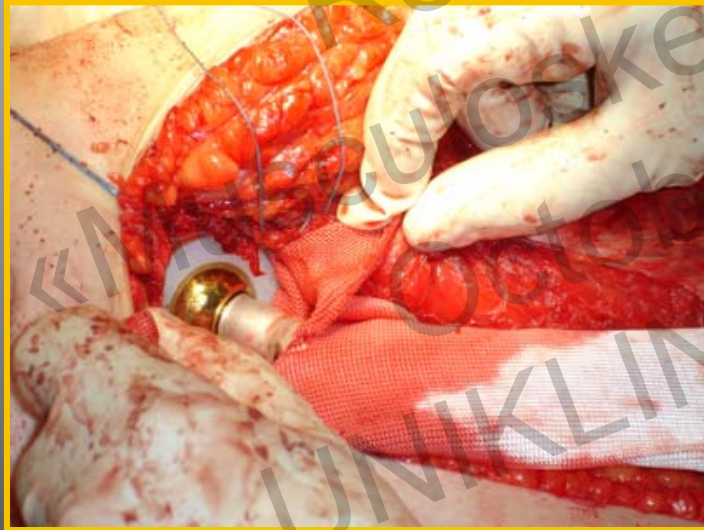


J.K. w., 20y.

***Ewing-sarcoma***



# Options for reconstruction *total femur endoprosthesis*

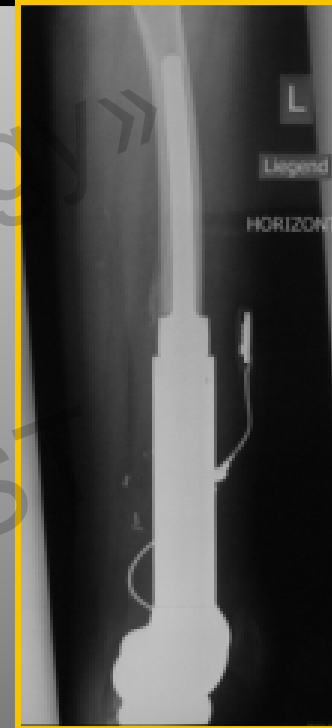
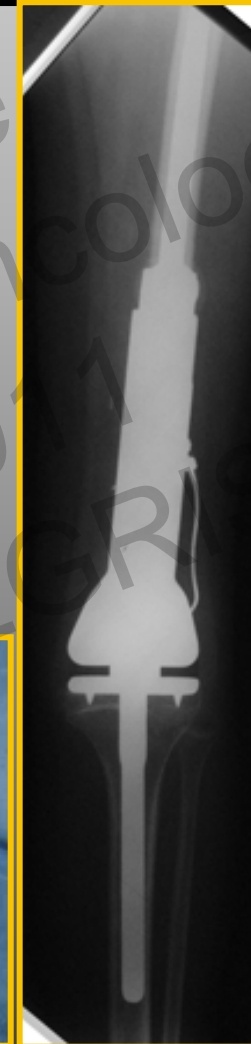
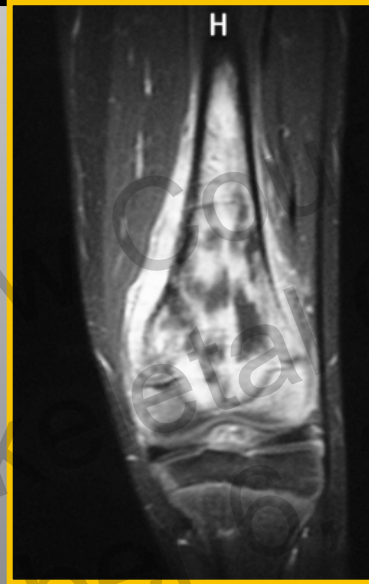


J.K. w., 20y. *Ewing-sarcoma*



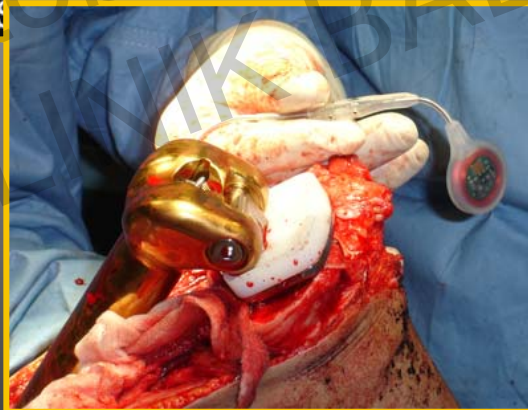
# Options for reconstruction

## expandable endoprosthesis (principle of Fitbone)



M.R. m., 12+3

*osteosarcoma*



# Mutars® Xpand

- non-invasive lengthening (via electromagnetic signal)
- lengthening modules as custom implants
  - maximal lengthening: 5cm





# Options for reconstruction

- autologous bone
  - extracorporal irradiation
- homologous bone (allograft)
  - combination with autologous bone
- endoprotheses
  - combination with allograft
- special techniques (Joint transfer, rotationsplasty etc.)

# Options for reconstruction *rotationplasty*



I.B. m., 9+6

*osteosarcoma*

# Options for reconstruction

## *rotationplasty*

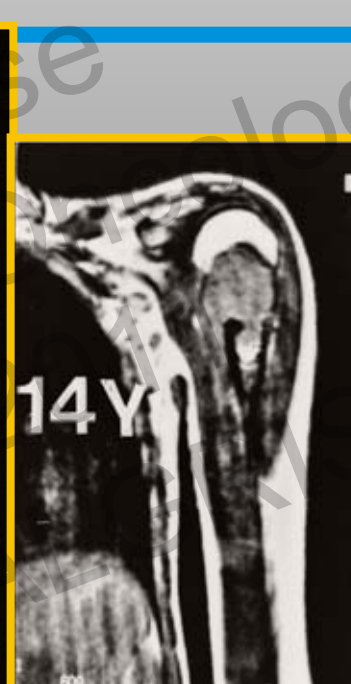
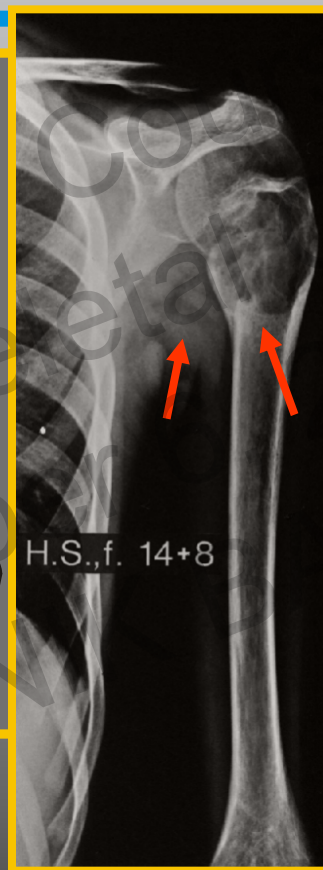
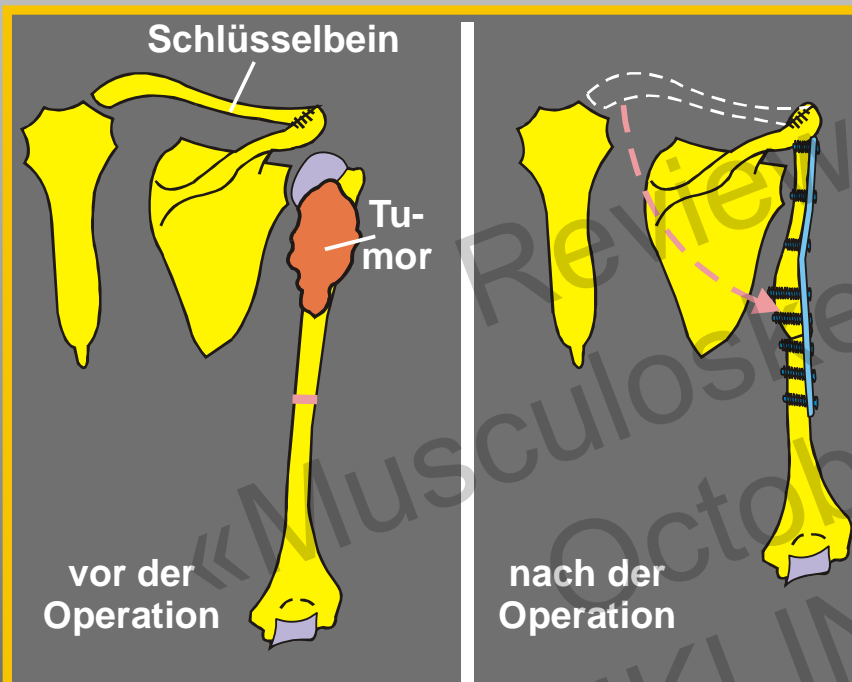


I.B. m., 10+5

*osteosarcoma*

# Options for reconstruction

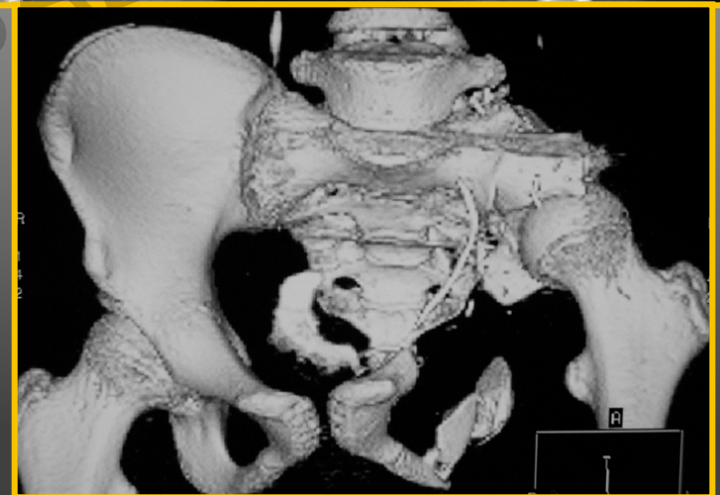
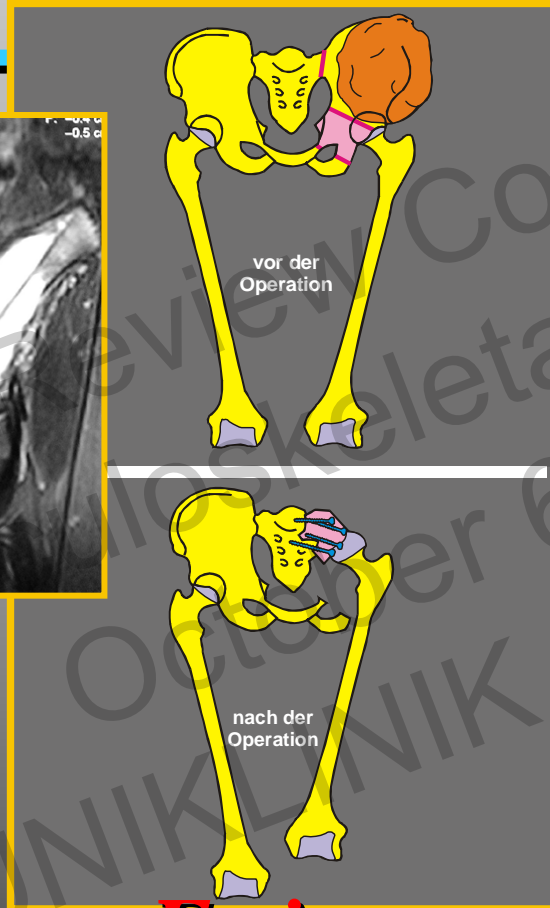
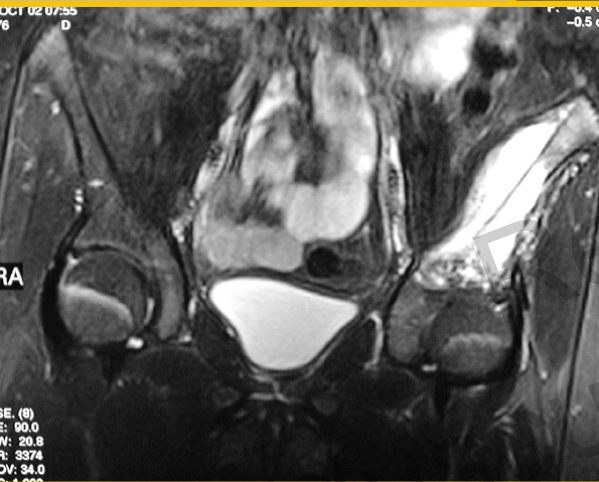
## Clavicula-pro-humero-plasty



H.S., f. 14+8

# Options for reconstruction

## *Hip joint transfer to the sacrum*



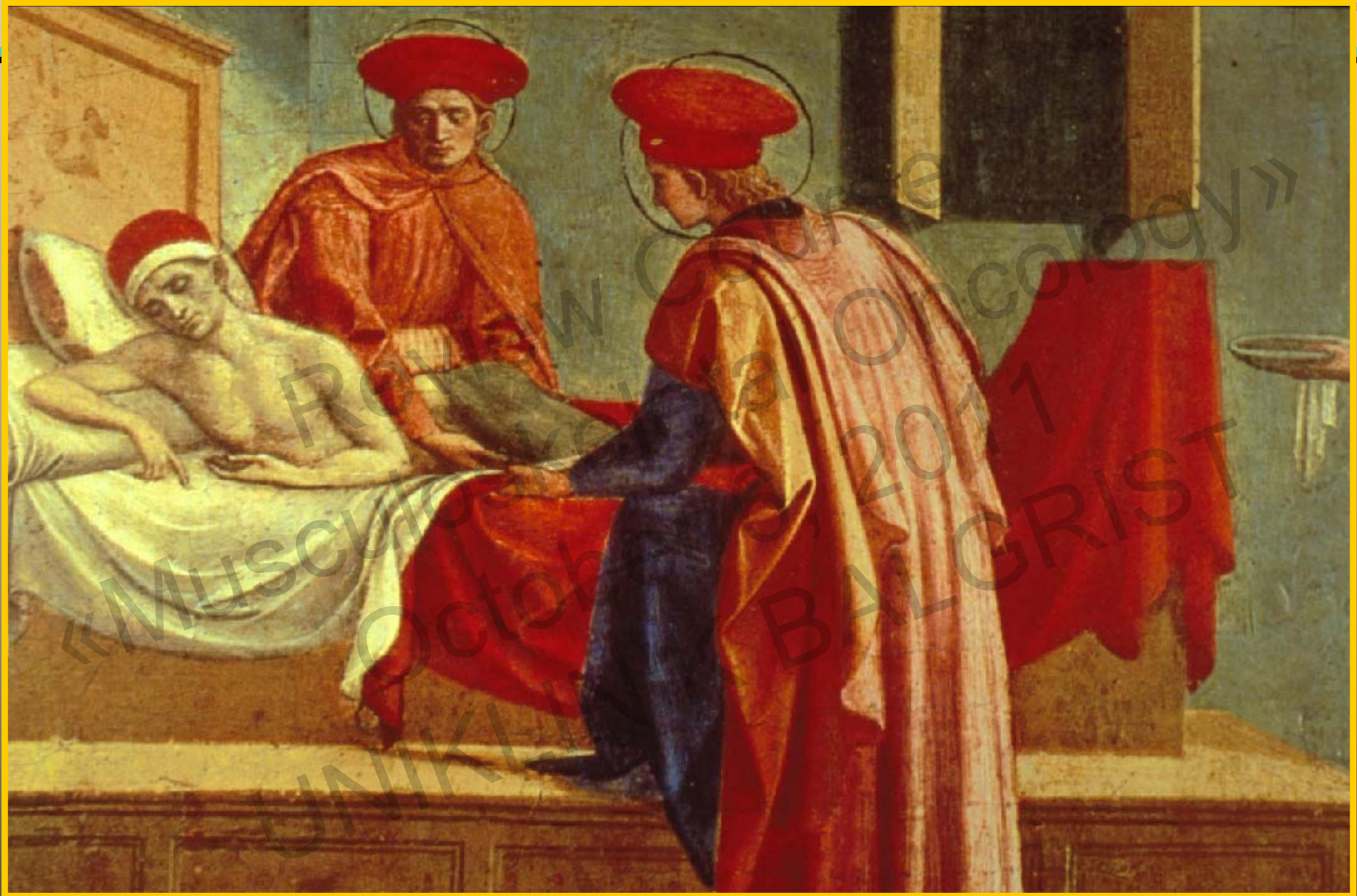
N. M., f., 13+4

***Ewing-  
sarcoma***

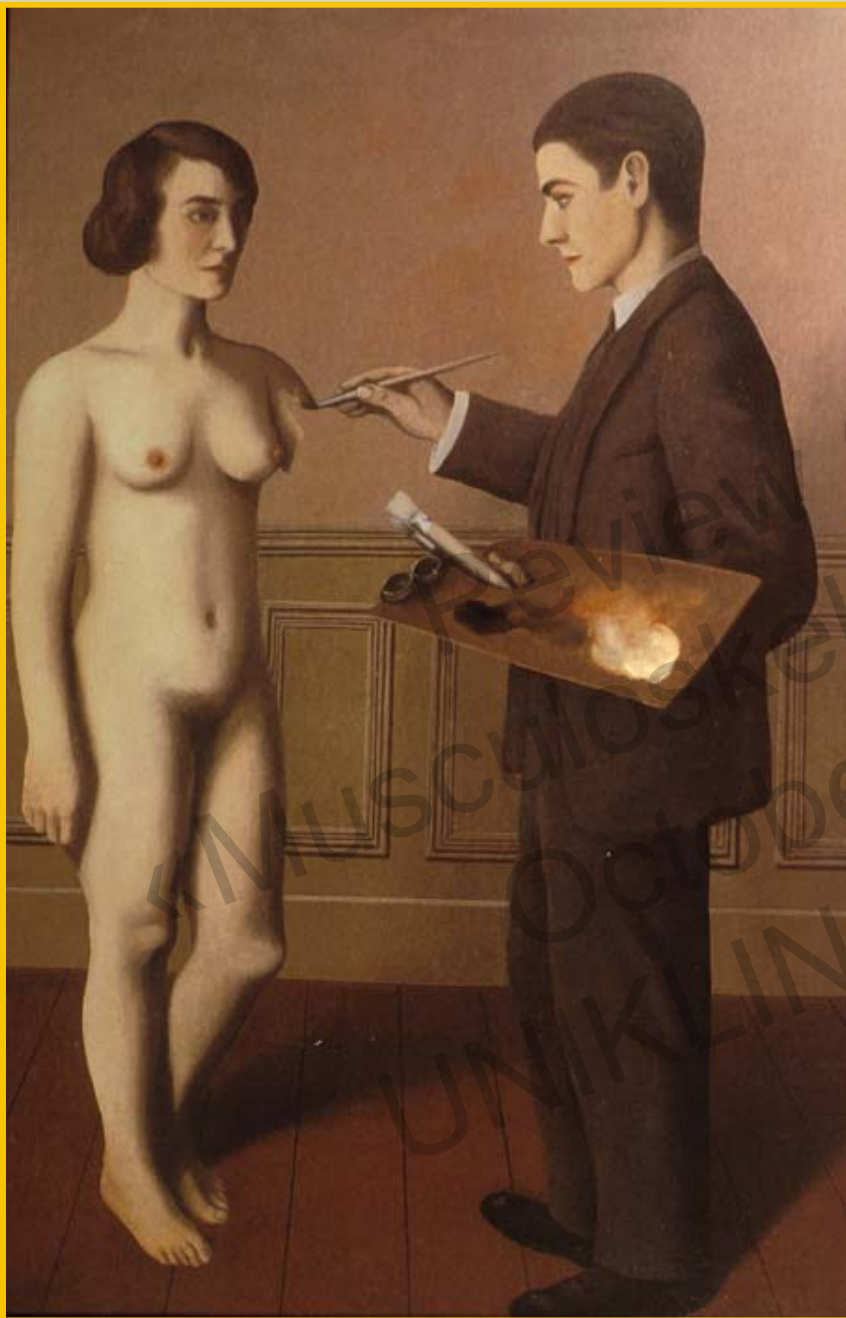


# Lengthening with Fitbone- nail after hip joint transfer

N. M., f., 19y.



**Cosmas and Damianus 300 AD**



René Magritte 1928:  
*La tentative de l'impossible*



# *Substitution of missing parts*

