

OSTEOGENIC SARCOMA



Hsin-Nung Shih M.D.

PROFESSOR

DIVISION OF JOINT RECONSTRUCTION

DEPARTMENT OF ORTHOPEADIC

CHANG GUNG MEMORIAL HOSPITAL

CHANG GUNG UNIVERSITY, COLLEGE OF MEDICINE

TAIWAN

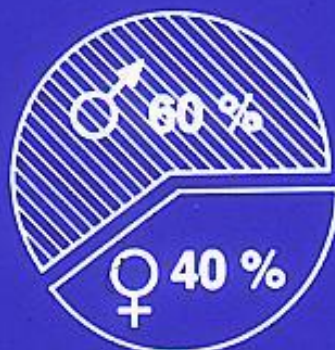


Osteogenic Sarcoma

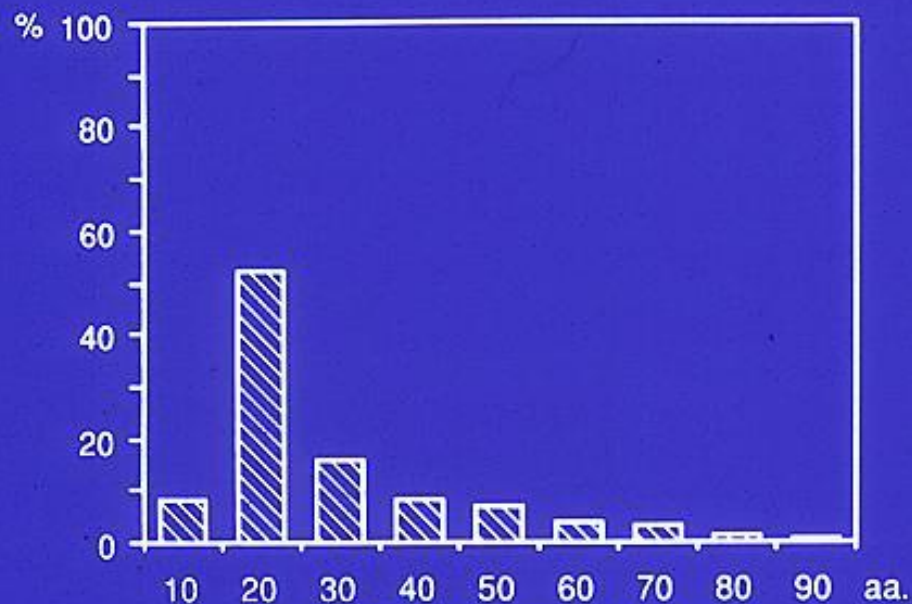
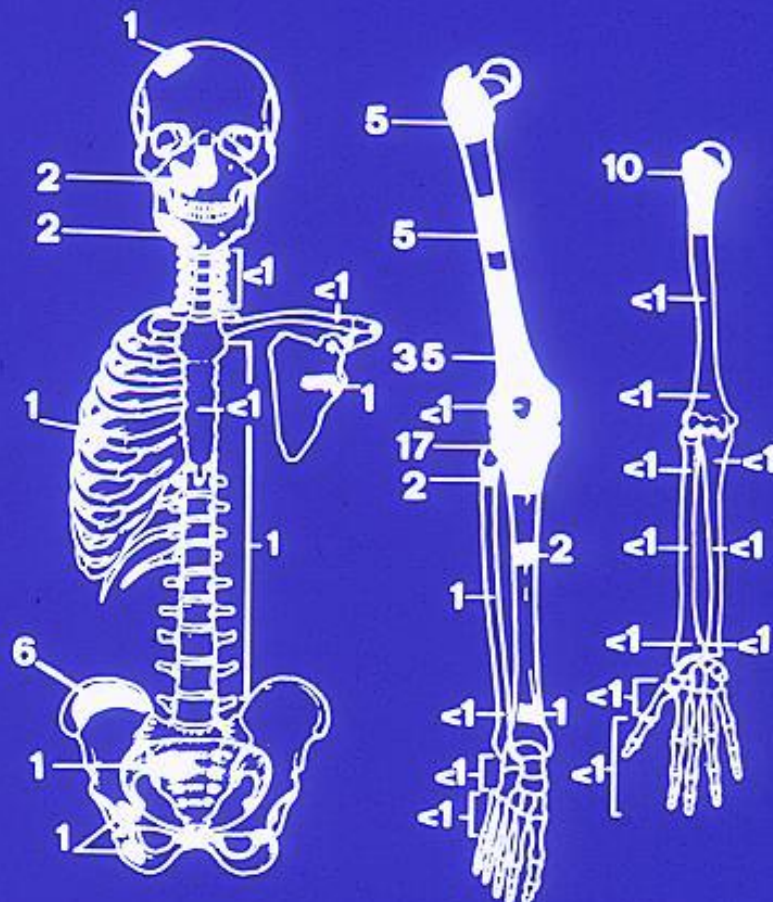
- ❖ Second most common primary malignant bone tumor
- ❖ Variable in its radiologic and morphologic presentation
- ❖ OGS may cause diagnostic confusion or mistaking it for a benign tumor

OSTEOSARCOMA

2525 cases



M : F = 1.5 : 1

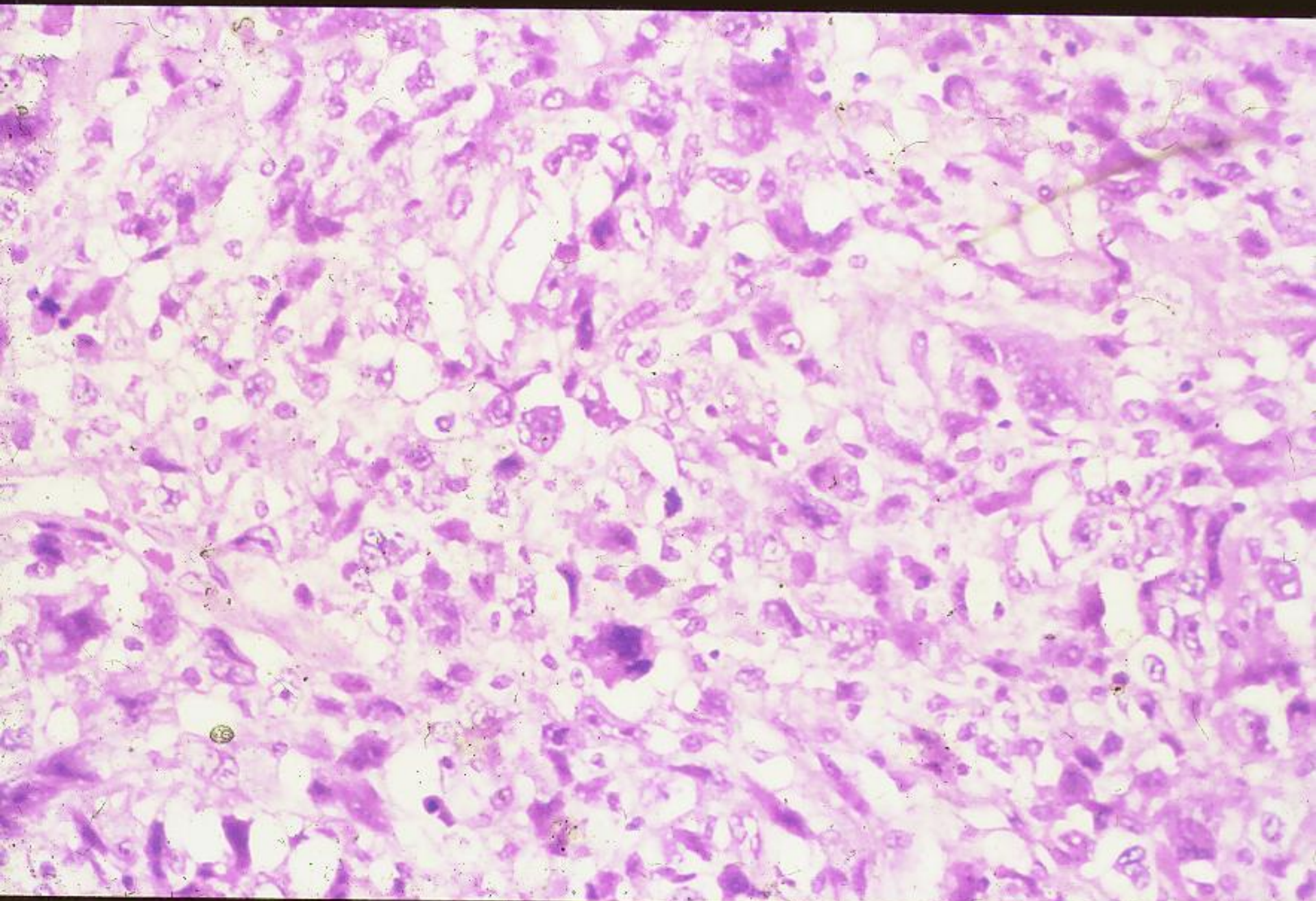


AGE IN YEARS (BY DECADE)

FIG. 7-99. OSTEOSARCOMA: INCIDENCE DATA.

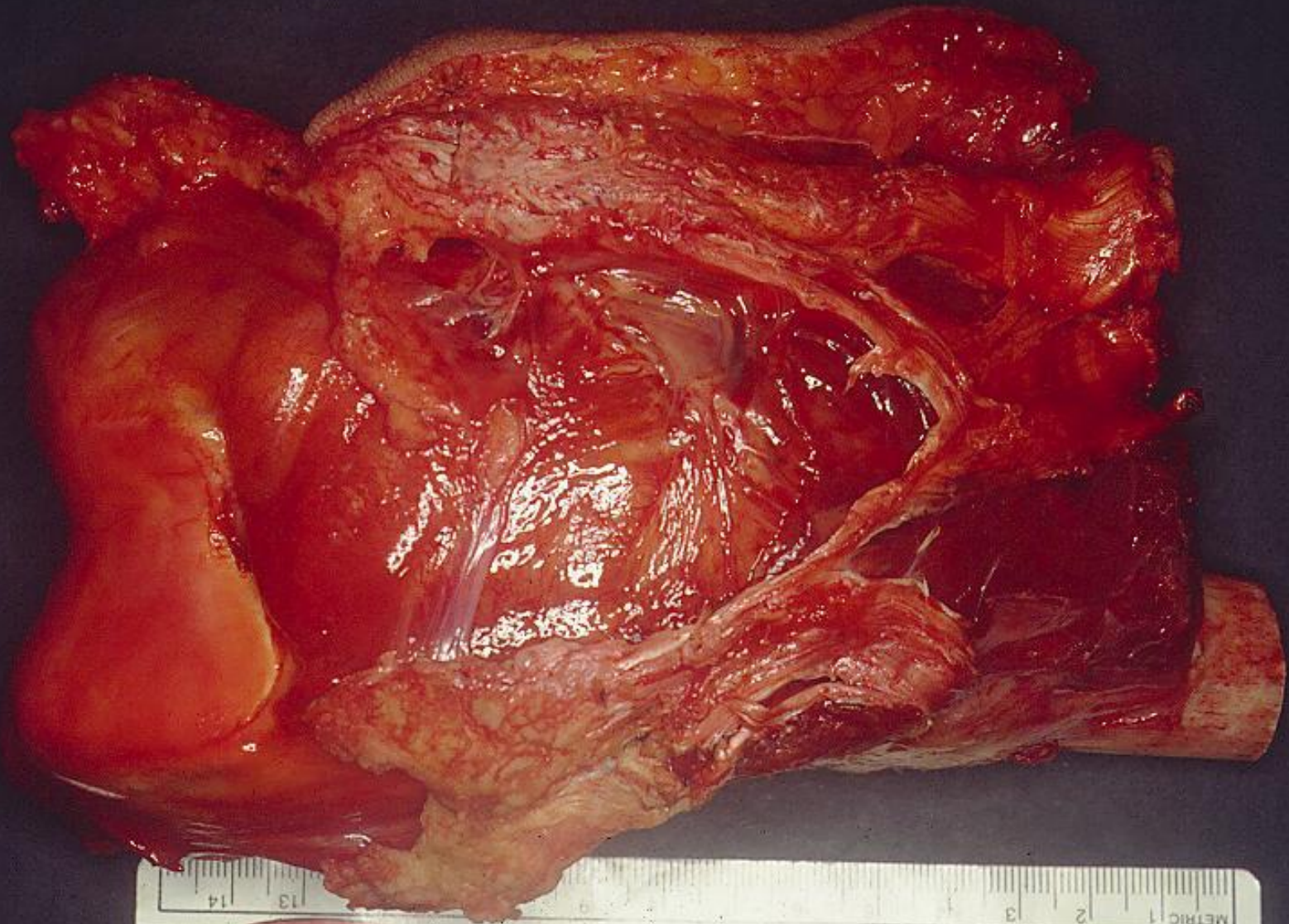




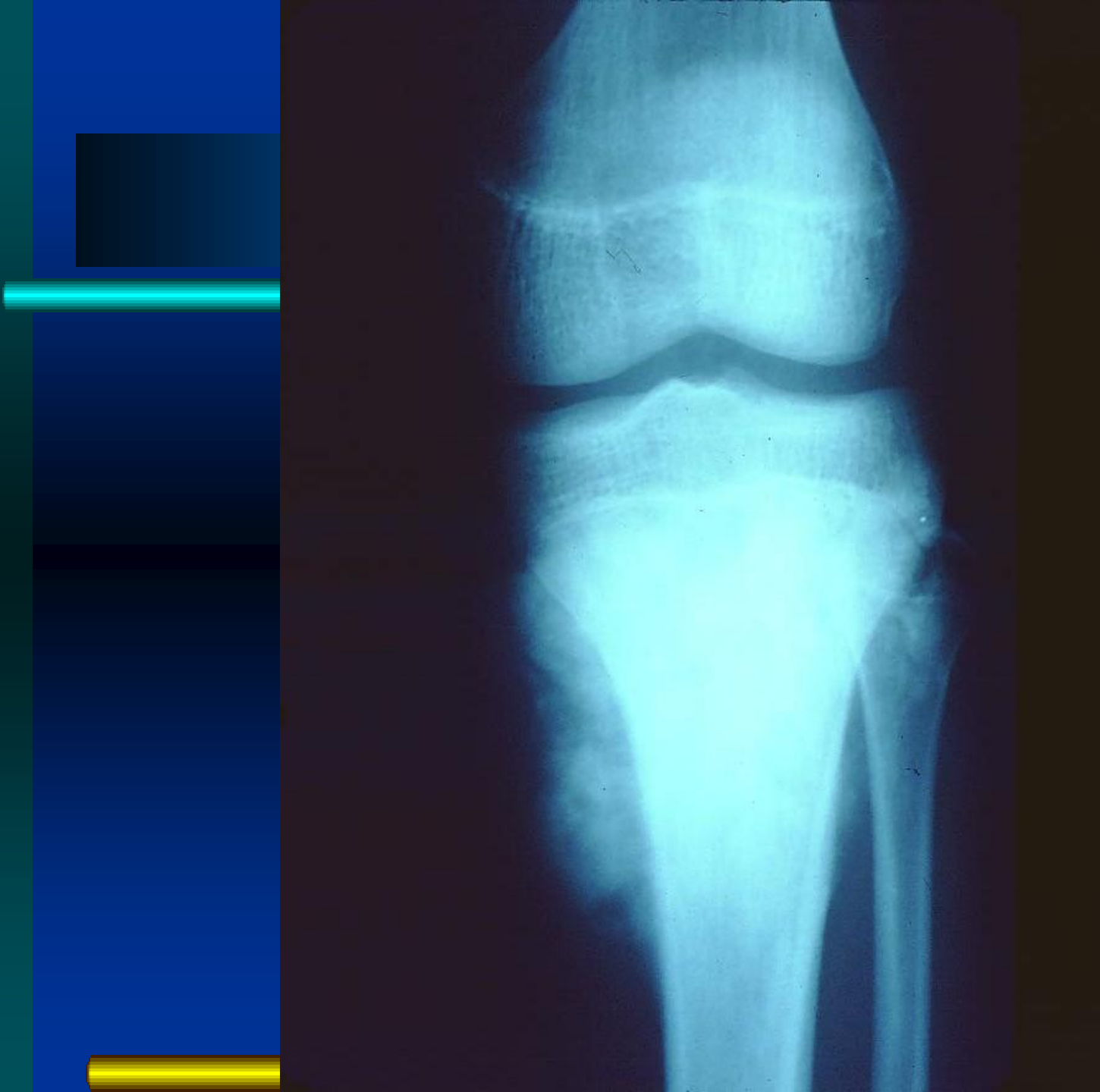


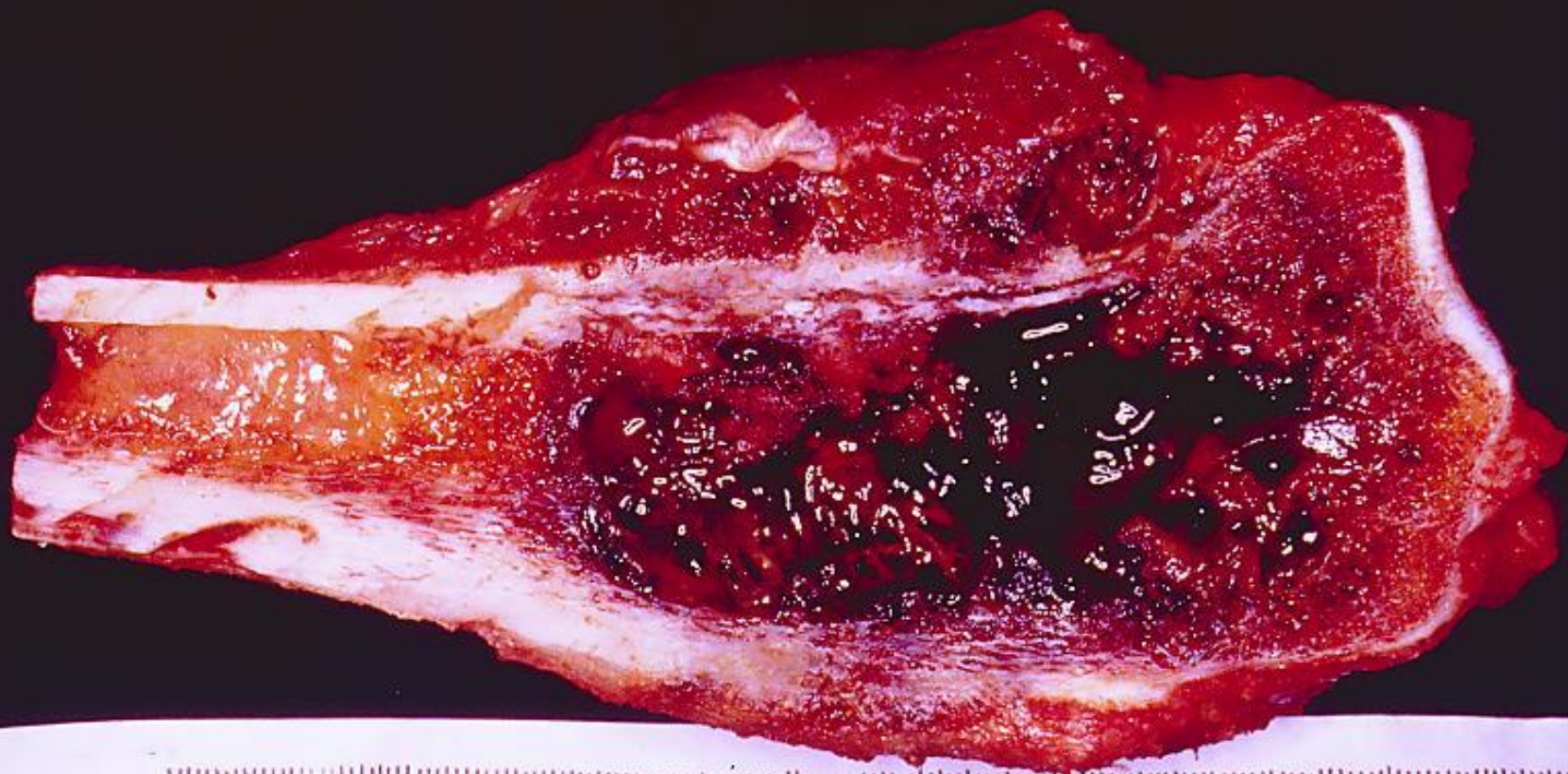


597-2632



METRIC 1 2 3 4 5 6 7 8 9 10 11 12 13 14
SCANLAN INTERNA ST. PAUL, MINNESOTA 55107 / USA
910 563-3628
INCHES 1 2 3 4 5









Osteogenic Sarcoma

Capsule Summary

Incidence	15% of primary bone tumors
Age	15-25 Y/O (85%<30Yrs)
Signs	pain, swelling, pathologic fracture
Skeletal distribution	<ul style="list-style-type: none">❖ 54% knee rarely in spine, ribs and phalanges❖ 90% metaphyseal❖ 9% diaphyseal
Radiologic features	
Gross pathology	
Histology	

Osteogenic Sarcoma

Modern Classification

I.	Primary, high-grade, intramedullary OGS	75%
II.	Multifocal OGS	1-2%
III.	Secondary intramedullary OGS	5-7%
IV.	Solitary, low-grade, Intramedullary	4-5%
V.	Intracortical OGS	0.2%
VI.	OGS of the bones of the jaw	6%
VII.	Juxtacortical OGS	7-10%

J.M. Mirra 1989



Osteogenic Sarcoma

Serologic Findings: Alk-P

- ❖ ↑Alk-P (<50%) Initial
- ❖ After treatment
prognostic indicators

Osteogenic Sarcoma

Differential Diagnosis

- ❖ Callus
 - ❖ Osteoblastoma
 - ❖ Pseudomalignant osteoblastoma
 - ❖ Aneurysmal bone cyst
 - ❖ Chondroblastoma
 - ❖ Giant cell tumor
 - ❖ Ewing's sarcoma
 - ❖ Chondrosarcoma
 - ❖ Mesenchymal chondrosarcoma
 - ❖ Fibrosarcoma
-

Osteogenic Sarcoma

Clinical work-up and management

- ❖ Systemic approach
- ❖ Pre-op bone scan
- ❖ Pre-op CT scan or MRI
- ❖ Biopsy
- ❖ Pre-op chemotherapy
- ❖ Radical surgery
- ❖ Post-op chemotherapy

Principle of OGS Treatment

❖ Pre-op evaluation

- ❑ Plain X-ray: local + chest
- ❑ Chest CT
- ❑ Local: CT scan or MRI
- ❑ Bone scan

❖ Biopsy

❖ Neoadjuvant chemotherapy

❖ Radical surgery

- ❑ Amputation or Limb-salvage surgery

❖ Post-operative chemotherapy

❖ Other treatment

Osteogenic Sarcoma

Clinical Course

- ❖ High-grade biologic malignancy
- ❖ 85% lung metastasis
(diagnosis \pm surgical intervention)
- ❖ Die within 2 yrs without
chemotherapy (\pm Radiotherapy)

Osteogenic Sarcoma

Consideration of Limb Salvage

- ❖ Age
- ❖ Staging
- ❖ Location
- ❖ Sizing
- ❖ Grading
- ❖ Biopsy wound
- ❖ Pathologic fracture
- ❖ Reconstructive material

*Technique Demand

Orthopedic Oncology

- ❖ **Local control of non-metastatic**
- ❖ **Classic high-grade osteosarcoma**

Local therapy	20%
+ chemotherapy	70-90%
disease-free survival > 5 yrs	50-70%

1970-1990 Rosen G.

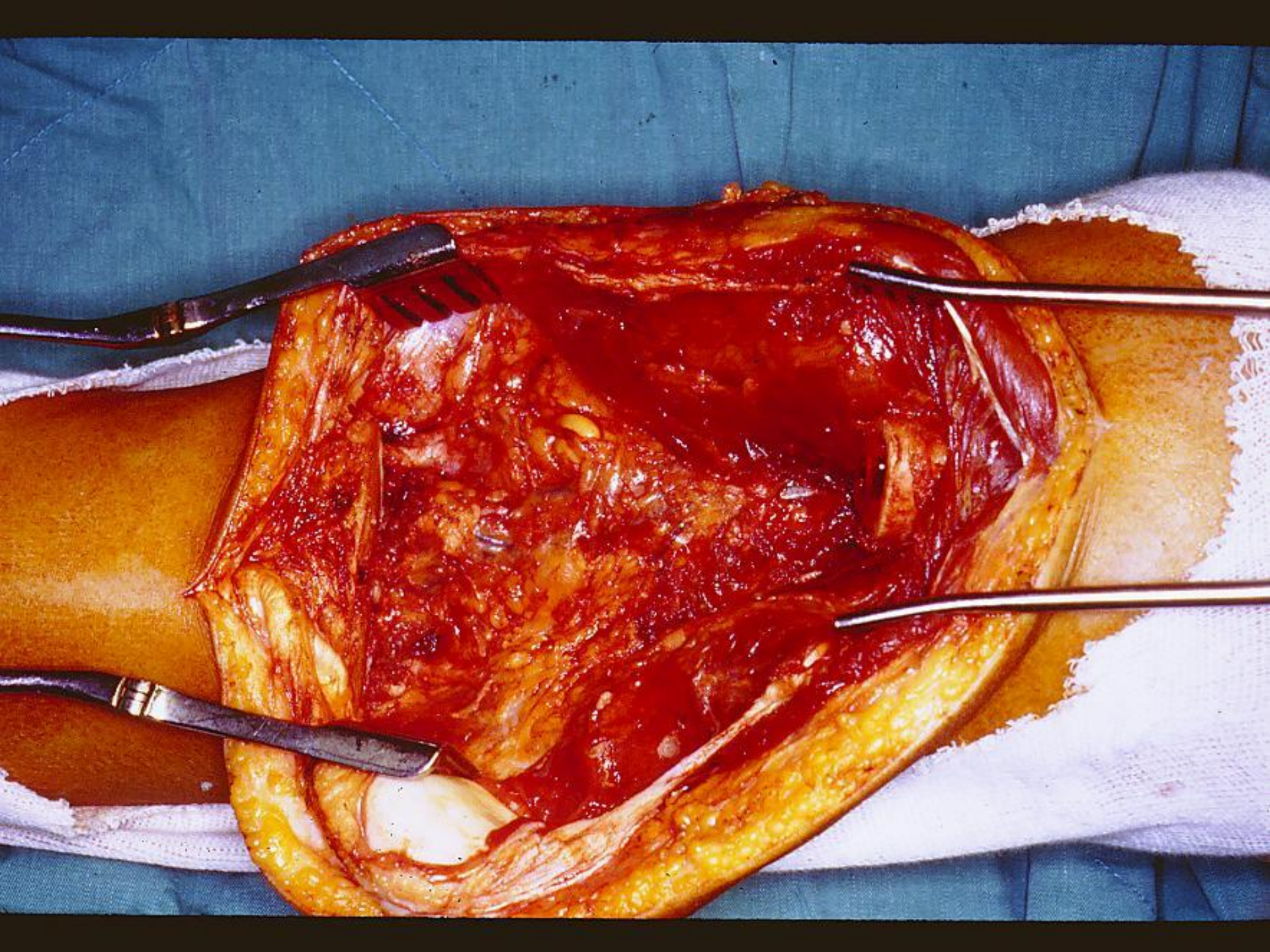
Orthopedic Oncology

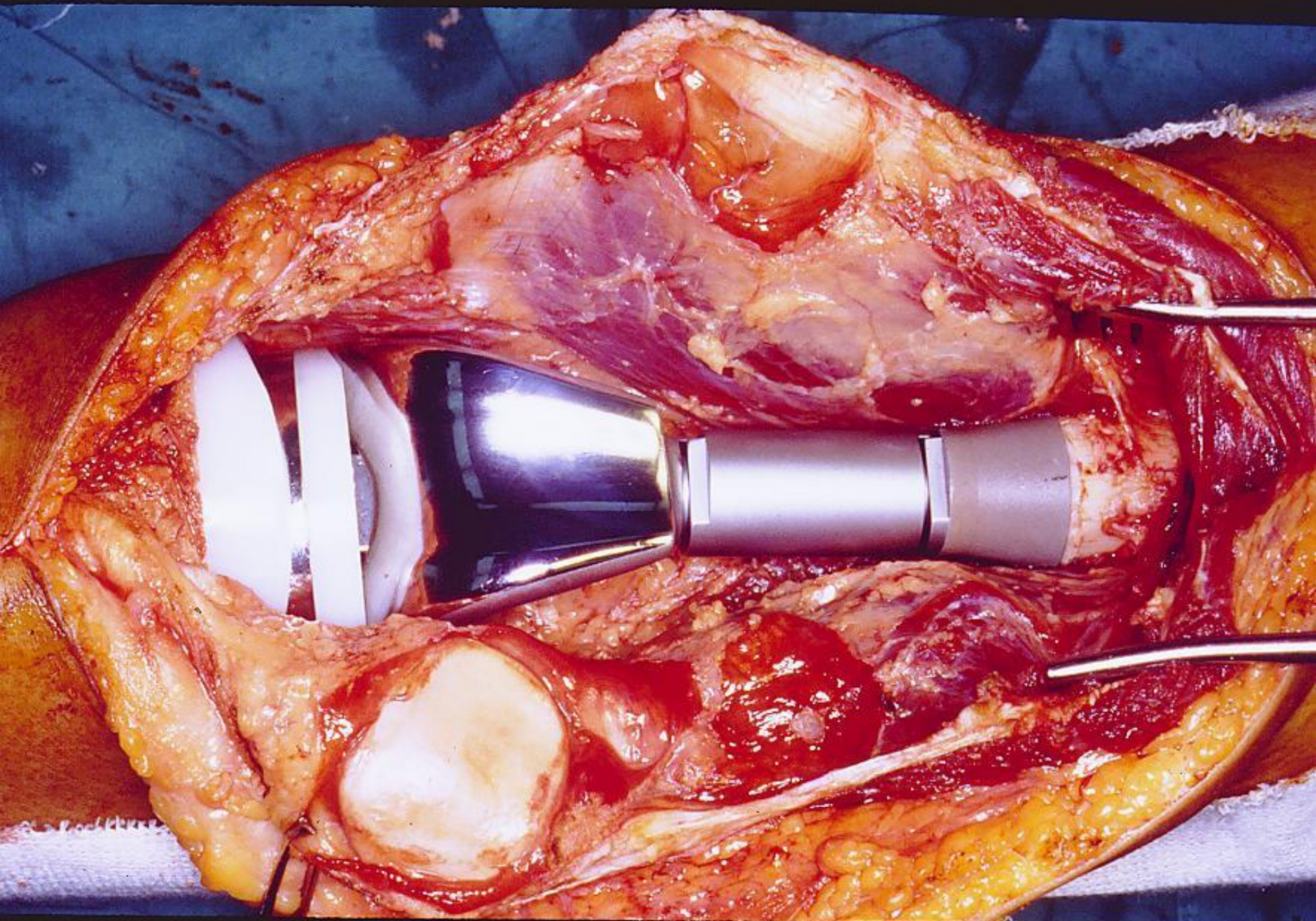
Limb-salvage vs. Amputation

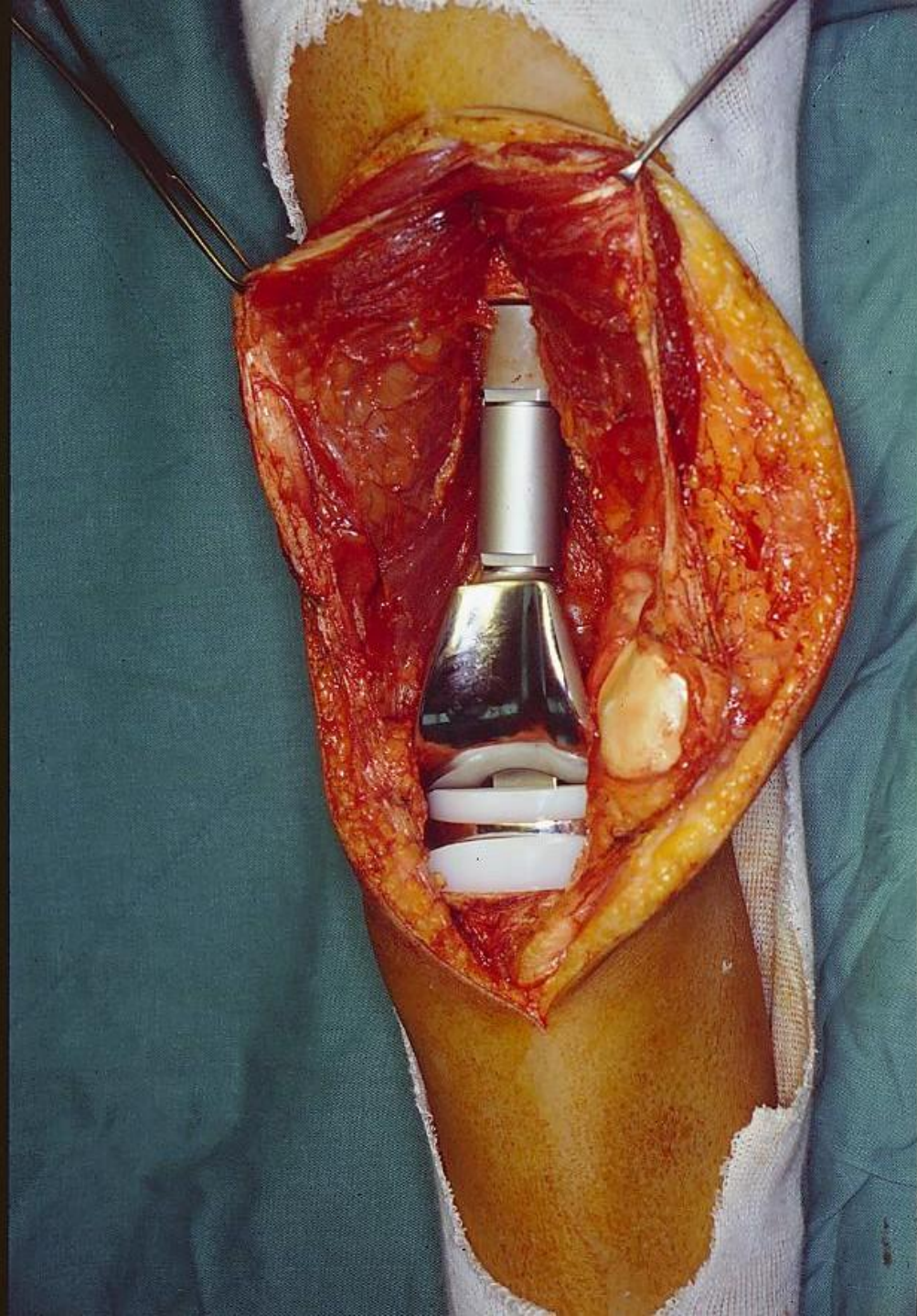
Osteosarcoma N=227, distal femur

- | | |
|--------------------|---------------|
| ❖ Local recurrence | Similarity |
| ❖ Survival rates | No difference |
| ❖ Indications | |

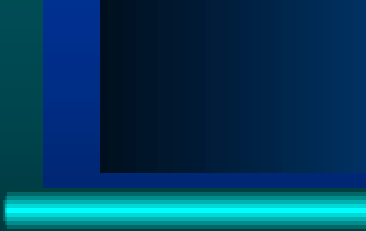
MA SIMON, HJ MANKIN 1986, JBJS

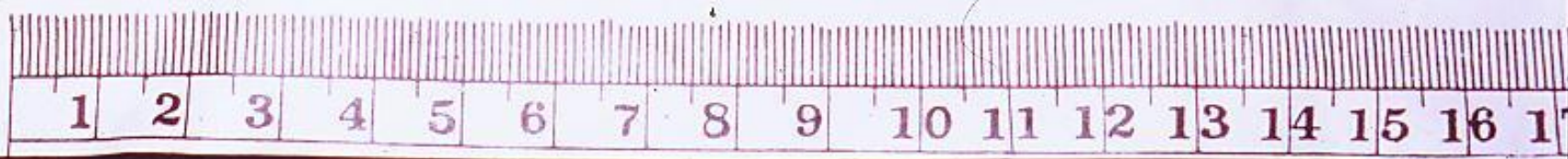
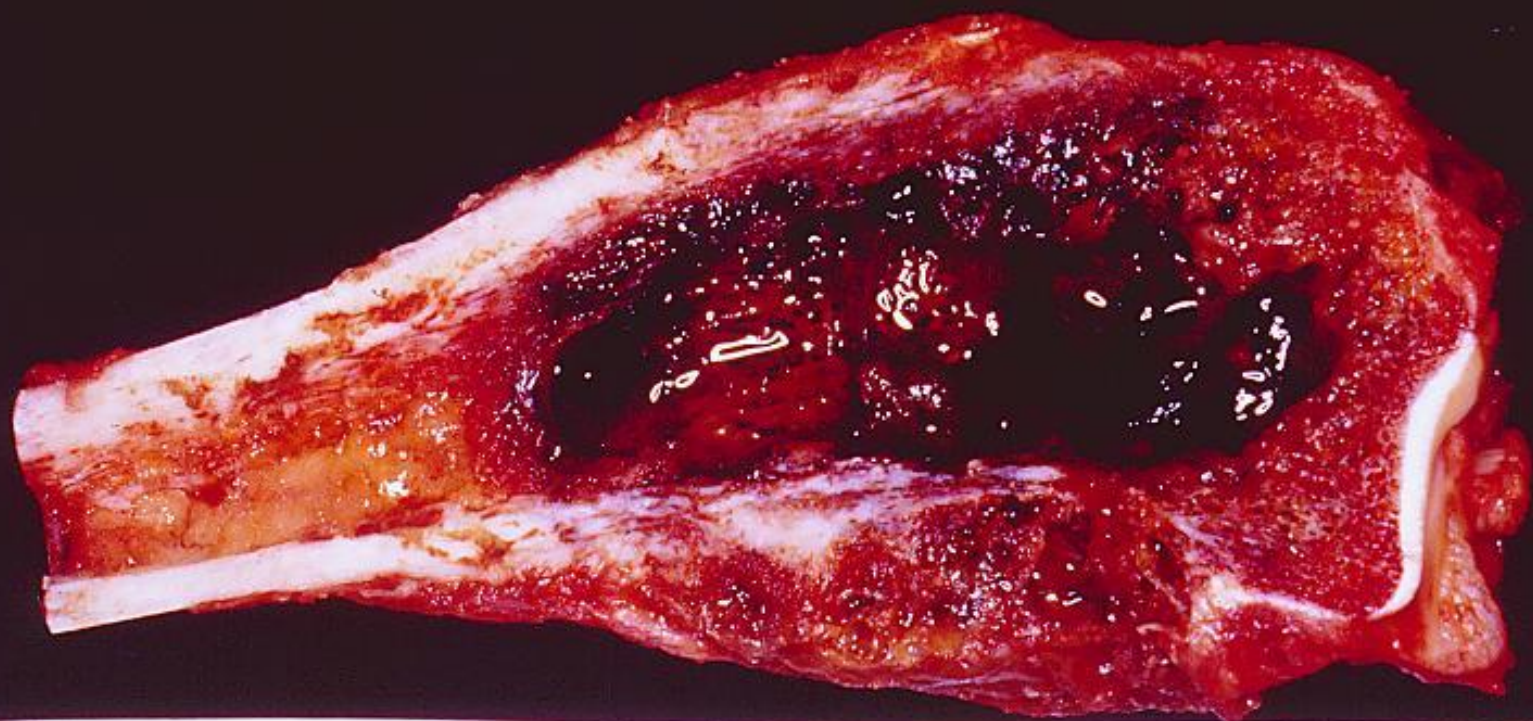


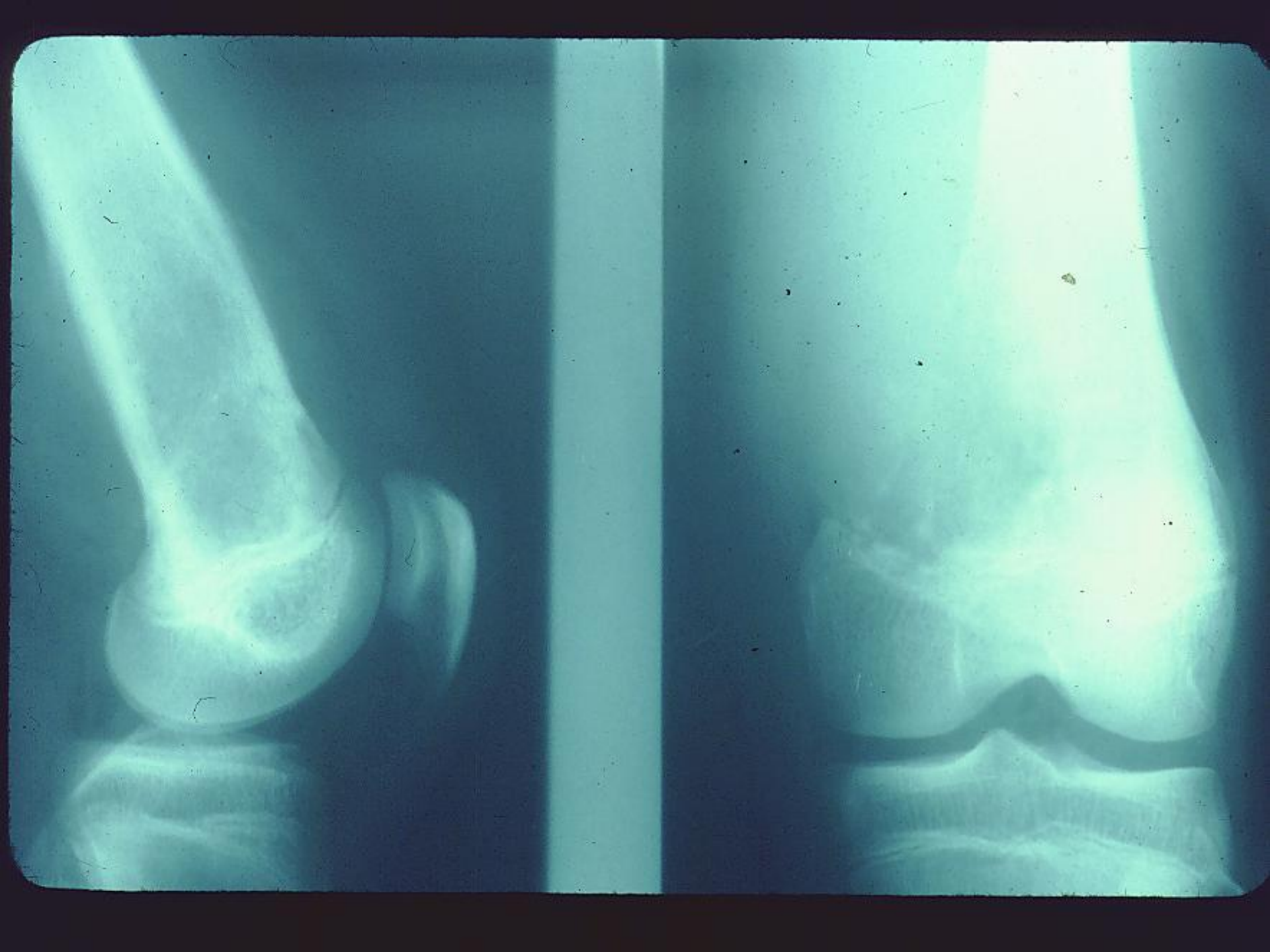








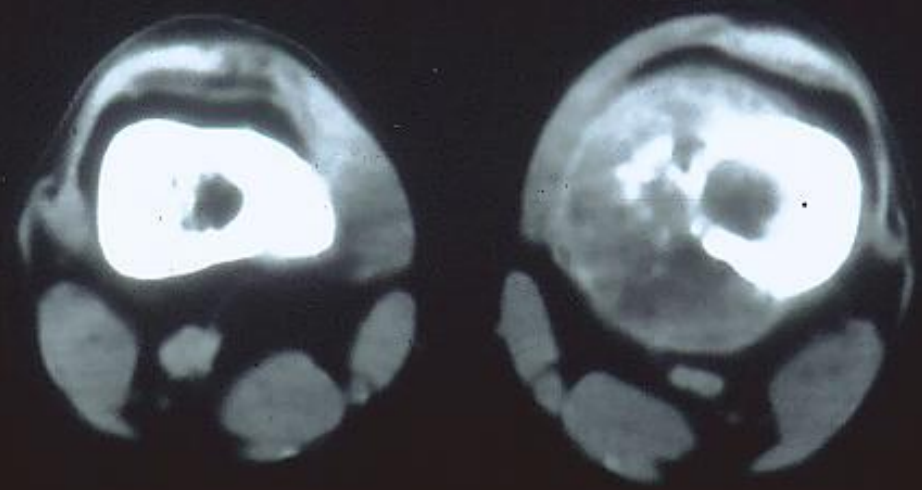




PRS 1
-69.5MM
IMAGE 22
+C

HOU EAN LOONG 14
3142008
12 JUL 89
320 ENL

DFOV 40.0
X 00
Y 00
STND



R

L



Resection Arthrodesis of the Knee for Osteosarcoma: An Alternative When Mobile Joint Reconstruction Is Not Feasible

Hsin-Nung Shih, MD; Lih-Yuann Shih, MD

(Chang Gung Med J 2005;28:411-20)

Background:

Wide resection and mobile joint reconstruction are preferable for treating an osteosarcoma around the knee. In certain situations, resection arthrodesis or an amputation is suggested.

Methods:

In the past decade, 86 patients with an osteosarcoma around the knee were treated surgically in our institution. Wide resection and endoprosthetic reconstruction were performed in 35 patients, resection arthrodesis was performed in 36 patients, and an amputation was performed in 15 patients. The oncological and functional results were compared. Special attention was paid to the indications, techniques, and complications of patients receiving resection arthrodesis.

Results:

Extensive tumor involvement was the main reason, followed by inappropriate previous treatment, for precluding mobile joint reconstruction. The local recurrence rates were similar among the 3 groups (11.4% for the endoprosthetic group, 11.1% for the arthrodesis group, and 6.7% for the amputation group). The 5-year survival rate was 39% for the arthrodesis group, which was significantly lower than that of the endoprosthetic group (60%, $p = 0.040$), although it was higher than that of the amputation group (13%, $p = 0.056$). Major complications were found in 7 patients receiving resection arthrodesis (7/24, 29%), and these included nonunion, infection, and allograft fracture. Functional results for the arthrodesis patients were inferior to those of the endoprosthetic patients, but most patients were grateful for preservation of the limb despite certain handicaps.

Conclusions:

The importance of early and proper planning of treatment cannot be overstressed when treating osteosarcomas. Resection arthrodesis offers a durable reconstruction alternative to amputation in a special group of patients when extensive resection precludes mobile joint reconstruction.

Se:1001
Im:1001

G0.80#0.60+0.50.R5F0.5,C*1.0*1.0

YEH, LAN, HUI
Study Date: 2004/11/15
Study Time: 下午 02:06:08
MRN: 10313154



R

C498
W919



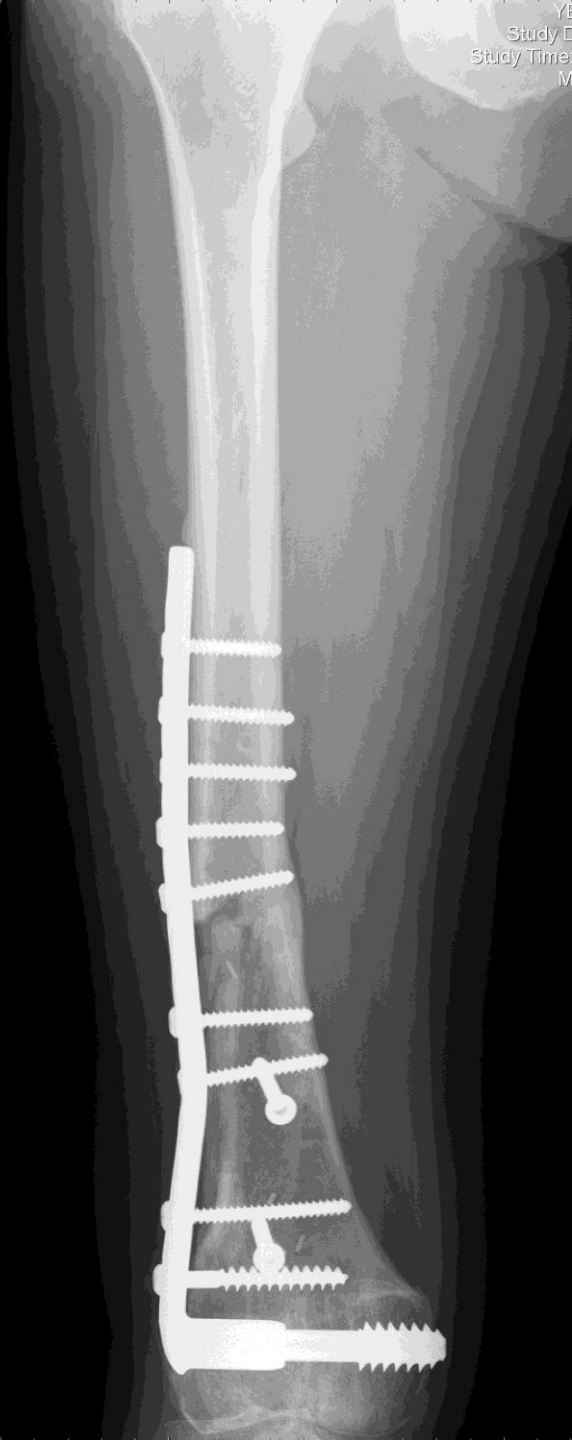
Se:1
Im:1

YSe:2
Study Elm:1
Study Time:
M

YEH, LAN, HUI
Study Date:2005/11/1
Study Time:下午 02:03:10
MRN:10313154

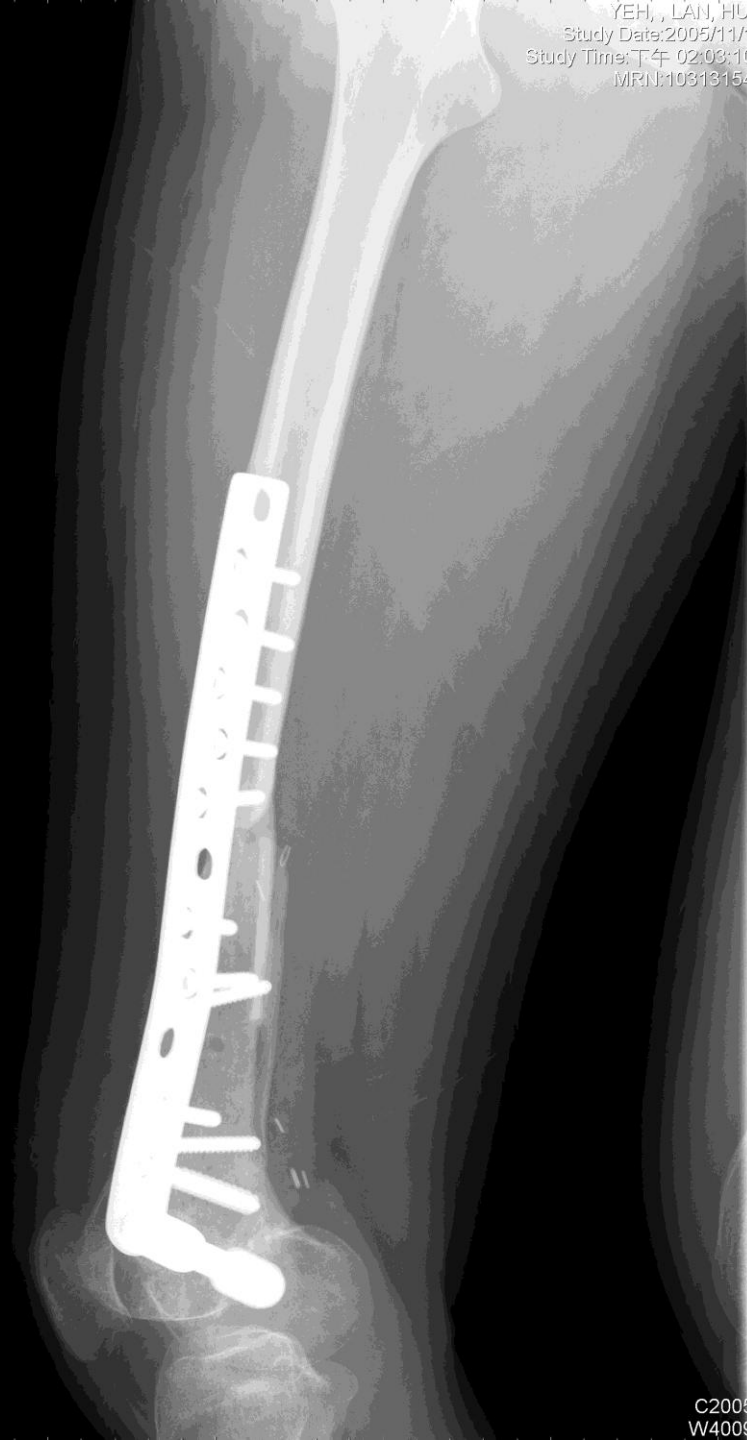
AP
R

T13



RL
R

T13



C2005
W4009



Sr-2

m1

15.2508
Study Date: 20080918
Study Time: 17:04:59.02
10/18



R
3B05

C.G.M.H.L. XRAY1 -2
10484784
LU H010 LUNG M
10.24.1897 11
12.16.2008 16.39.52
C.286
W.286

Sr-4

m1



R
3B05

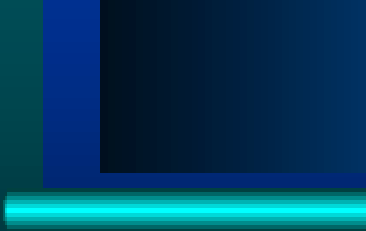


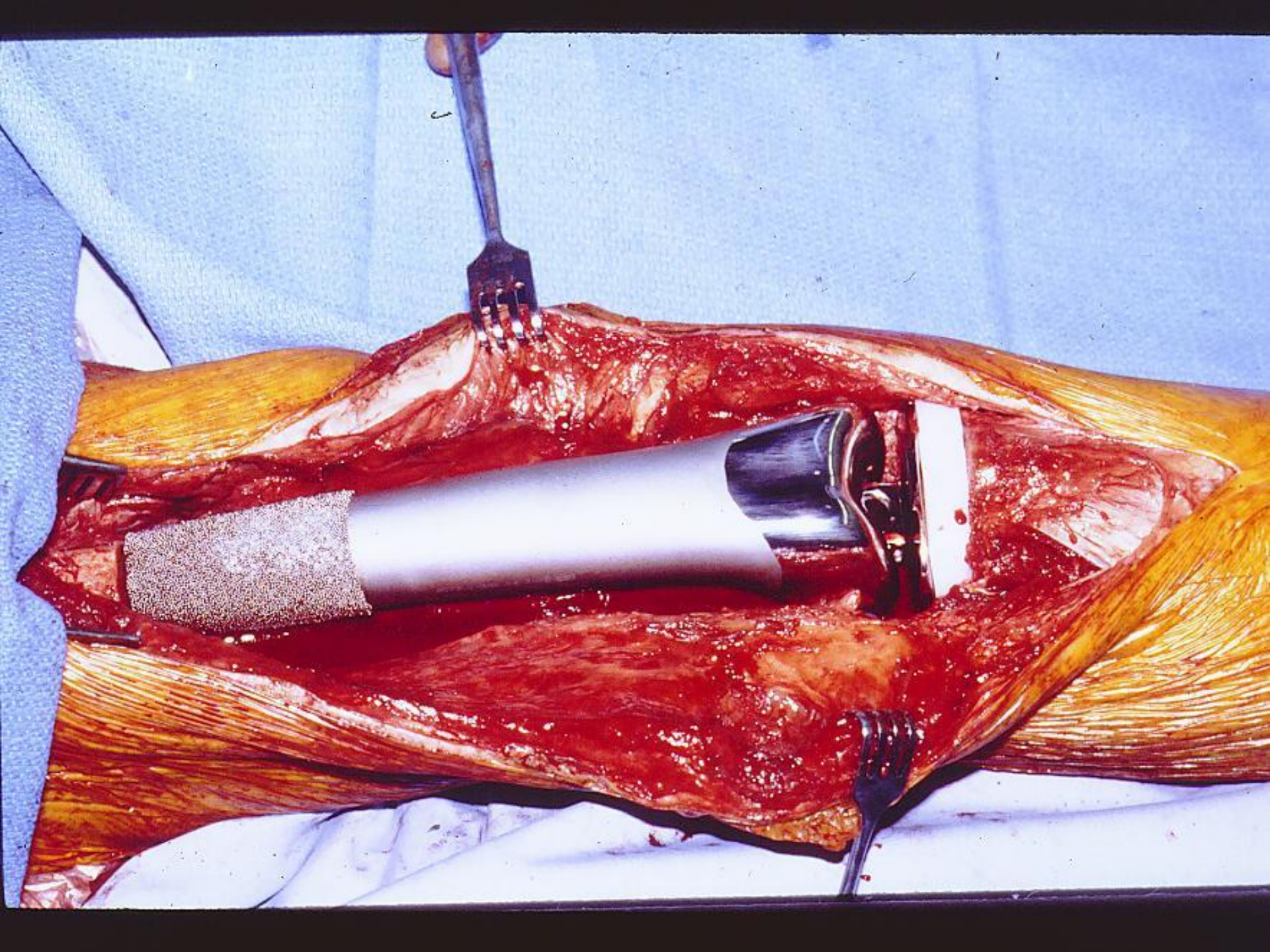
R
A-P
3A37

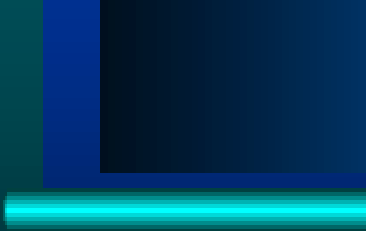


R
3A37

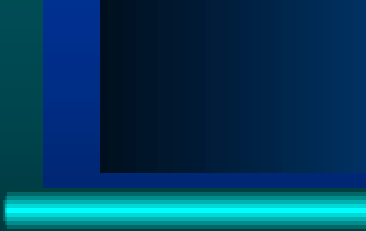






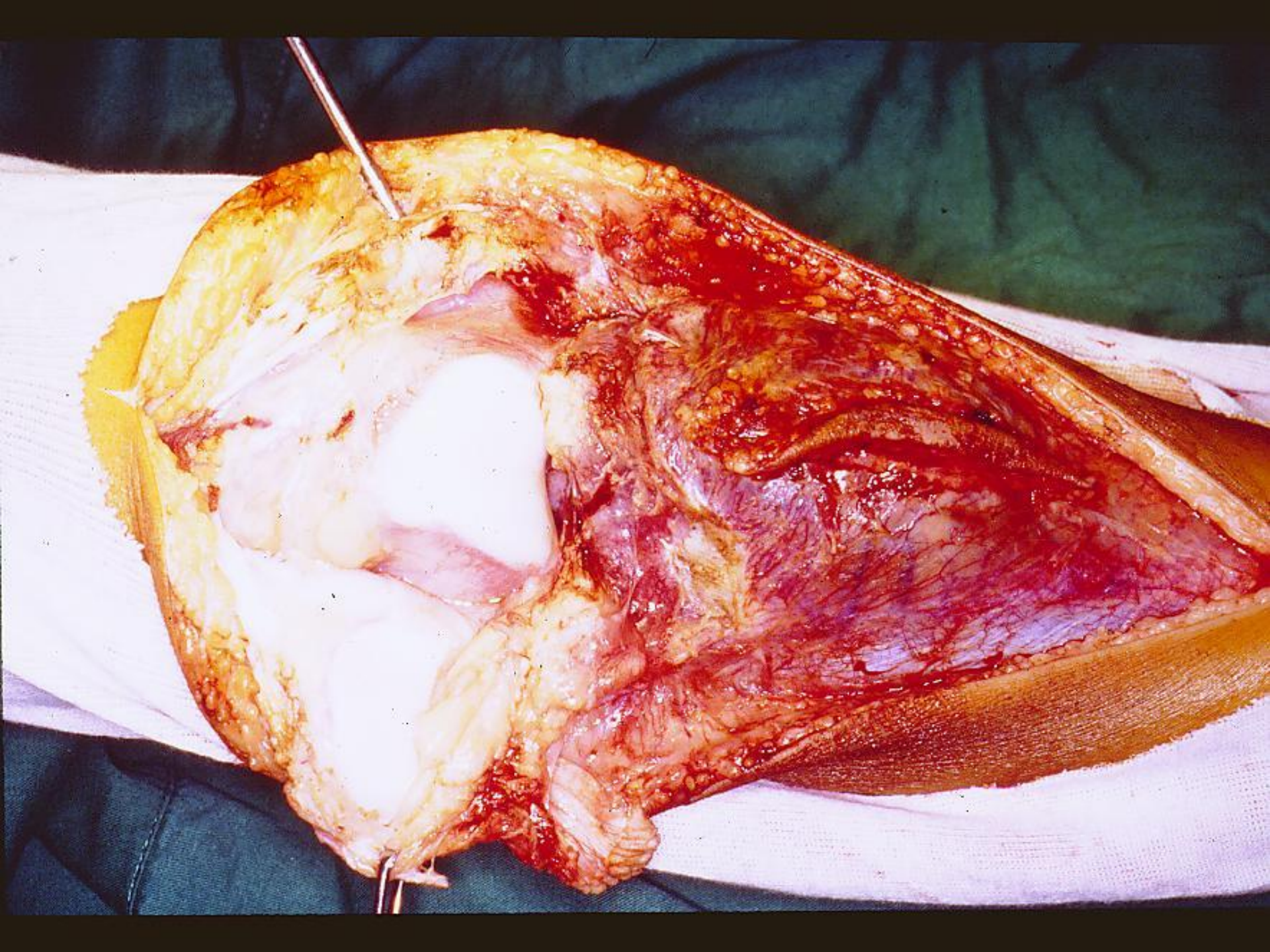


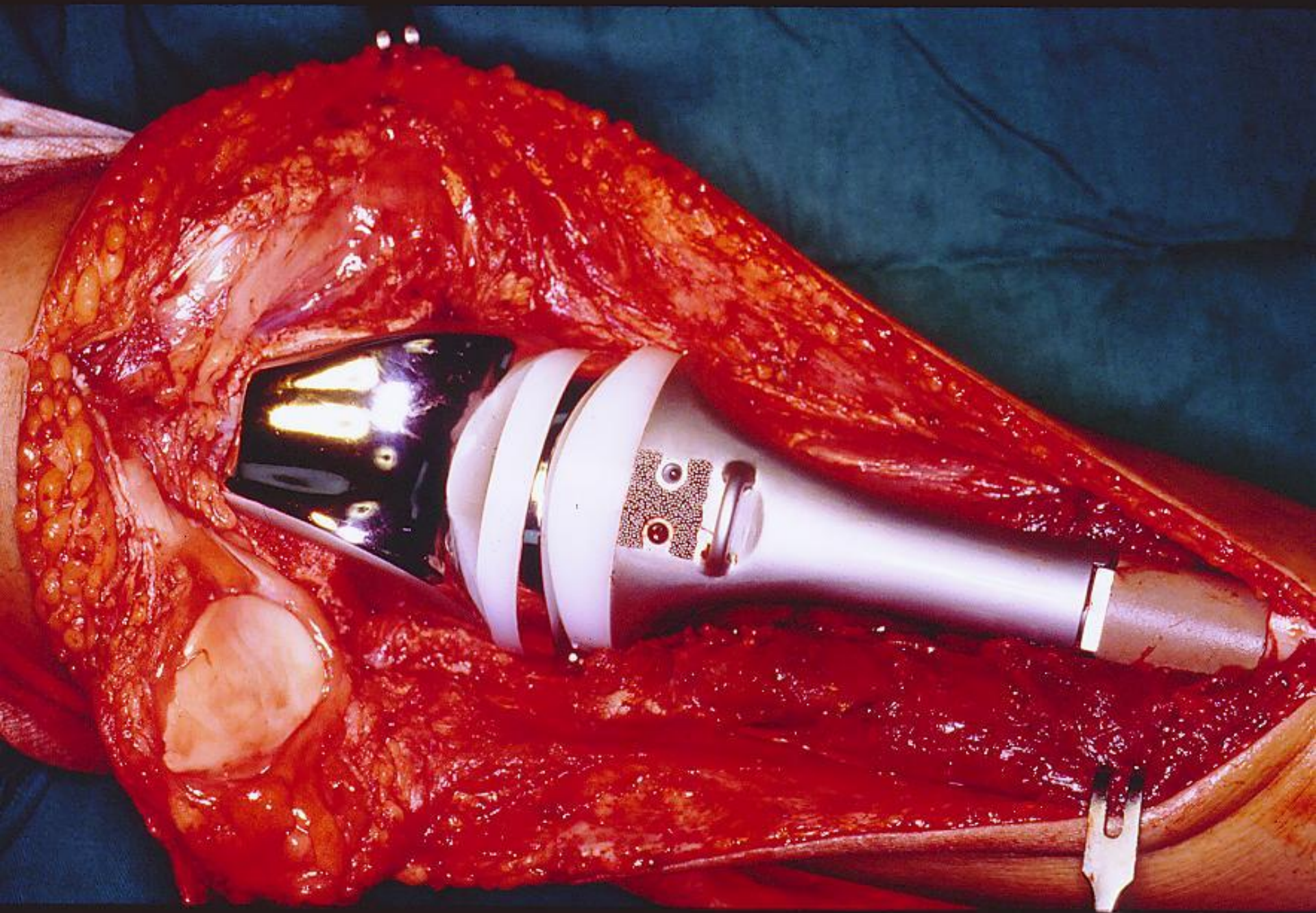


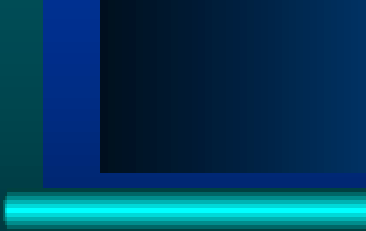


R











Transient neurological disturbances induced by the chemotherapy of high-dose methotrexate for osteogenic sarcoma

Klu, Mee-Chou; Liaw, Chuang-Chi; Yang, Tsai-Shen; Lai, Gi-Ming; Hsl, Shin-Nun; Lu, Chin-Song

Anti-Cancer Drugs 1994,5,p.480-482

Temporary neurologic abnormalities were observed in one out of 23 patients undergoing chemotherapy with high-dose methotrexate (HD-MTX) for osteogenic sarcoma. This patient developed sequential symptoms including alternative hemiparesis, dysarthria and altered consciousness 5 days after the second course of HD-MTX (8 gm/m² by 6 h continuous infusion) with leucovorin rescue. Laboratory evaluations disclosed normal electrolytes, hemograms and non-toxic serum MTX levels at the onset of the symptoms. Computed tomography of the brain was normal but electroencephalography showed focal theta and delta slow waves over the right temporal-parietal-occipital area. The neurological symptoms resolved completely within 72 h.



Synchronous multifocal osteosarcoma: report of one case.

Acta Paediatr Taiwan. 2006 May-Jun;47(3):146-9.

Tsai MH, Yang CP, Jaing TH, Shih HN.

Synchronous multifocal osteosarcoma (SMOS), defined as more than one bone lesion at presentation, is a rare variant form of osteosarcoma. The onset is usually in childhood or early adolescence without pulmonary metastasis. The prognosis has been dismal. Whether SMOS represents a true multicentric origin or merely bone-to-bone metastases remains controversial. Here, we report a case of SMOS in a 10-year-old girl, with the dominant primary sclerotic tumor arising from the right distal femur. Despite aggressive chemotherapy and limb salvage surgery, she died of progressive multiple axial skeletal and symmetrical metaphyseal long bone diseases within one year after diagnosis. No pulmonary metastasis was found before she died.

Biochemical Marker of Bone Metabolism

Markers of bone formation

Serum

Alkaline phosphatase (ALP)

Bone-specific alkaline phosphatase

Osteocalcin

Procollagen I C-terminal extension peptide (PICP)

Other non-collagenous proteins (?)

Markers of bone resorption

Urine

Calcium

Hydroxyproline

Pyridinoline and Deoxypyridinoline

Cross-linked aminoterminal telopeptide type I collagen (INTP)

Serum

Cross-linked Carboxyterminal telopeptide type I collagen (ICTP)

Other non-collagenous proteins (?)

Osteogenic Sarcoma

Treatment

A Team Work



CHANG-GUNG MEMORIAL HOSPITAL LINKOU MEDICAL CENTER TAIWAN

THANK YOU !!

