

Primary Extradural Tumours and Metastasis of the Spine

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Denmark**

Klassifikation af ekstradurale spinale tumorer

- **Benigne**

Osteokondrom
Osteoid osteom
Osteoblastom
Aneurysmatisk
knoglecyste
Kæmpecelletumor
Hæmangiom
Eosinofilt granulom
Neurofibrom

- **Primære maligne**

Chordom
Pagetic Sarcoma
Kondrosarkom
Osteogent sarkom
Ewings sarkom
Plasmacytom
Myelom
Malignant Schwannoma

- **Metastaser**

”Abnormal” tumour behaviour in The Spine

- Aneurysmatic bone cysts
- Hemangioendothelioma
- Giant cell tumour
- Osteochondroma
- Eosinophilic granuloma

When to suspect a primary bone tumour of the spine ?

- Solitary tumour
- Pain
- Neurology
- Age

Vertebral Plaques

Osteomyelitis
Ewing Sarcoma
Lymphoma
Aneurysmal bone Cyst
Acute Leukemia
Metastatic lesion
Eosinophilic granuloma (Langerhans Cell Histiocytosis)

Extradural Primary Tumours of the Spine

- Detection (X-ray, MRI/CT, blood tests) locally.
- Biopsi, classification and treatment by Sarcoma Center (RH or Aarhus)

Cross disciplinary team:

- Oncologist, radiologist, orthopedic surgeons, pathologist, pediatrician

General Assessment in Extradural Spinal Tumors

- Clinical
- Full skeletal x-ray
- 99tc-MDP scan
- Pulmonary CT
- Ultrasound abdomen
- ESR, CRP, PSA, IgM, alk. phosphatase and white cell count
- Total spine MRI
- CT -spine
- WBB classification
- Tomita classification.
- Tokuhashi score
- GSTSG score

Diagnosis of Extradural Spinal Tumors

- CT guided biopsy
- FNA -fine needle aspirate
- Transpedicular trocal biopsy
- Extralesional én bloc resection

- Often immuno-histochemical stainings
- Subclassification of primary tumor

EXTRADURAL PRIMARY TUMOR

DIFFERENTIAL DIAGNOSIS

- Lymphoma/Plasmacytoma
- Spinal metastasis
- Spondylitis
- Osteonecrosis
- Osteoporotic fracture
- Ecchinococcus cysts
- **Intradural metastasis**

Surgical Methods in Extradural Spine Tumors

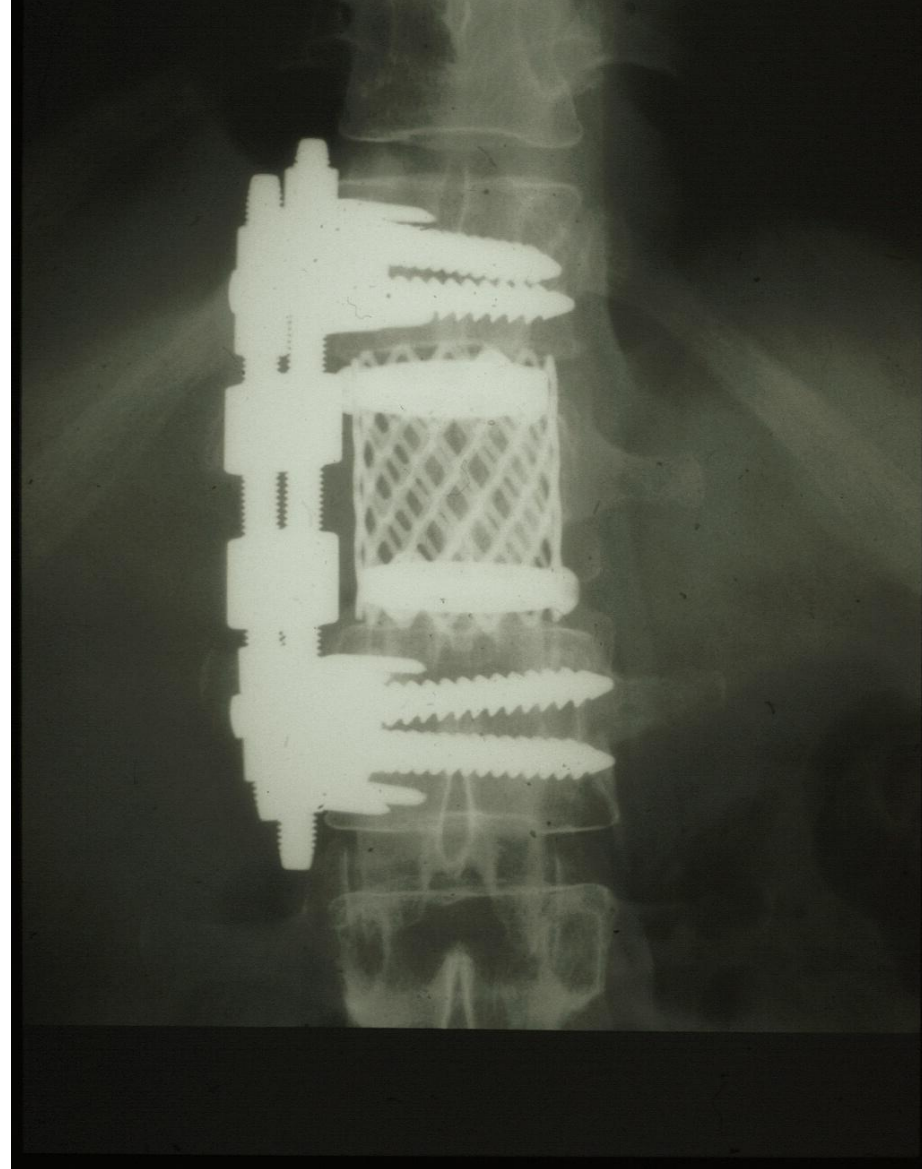
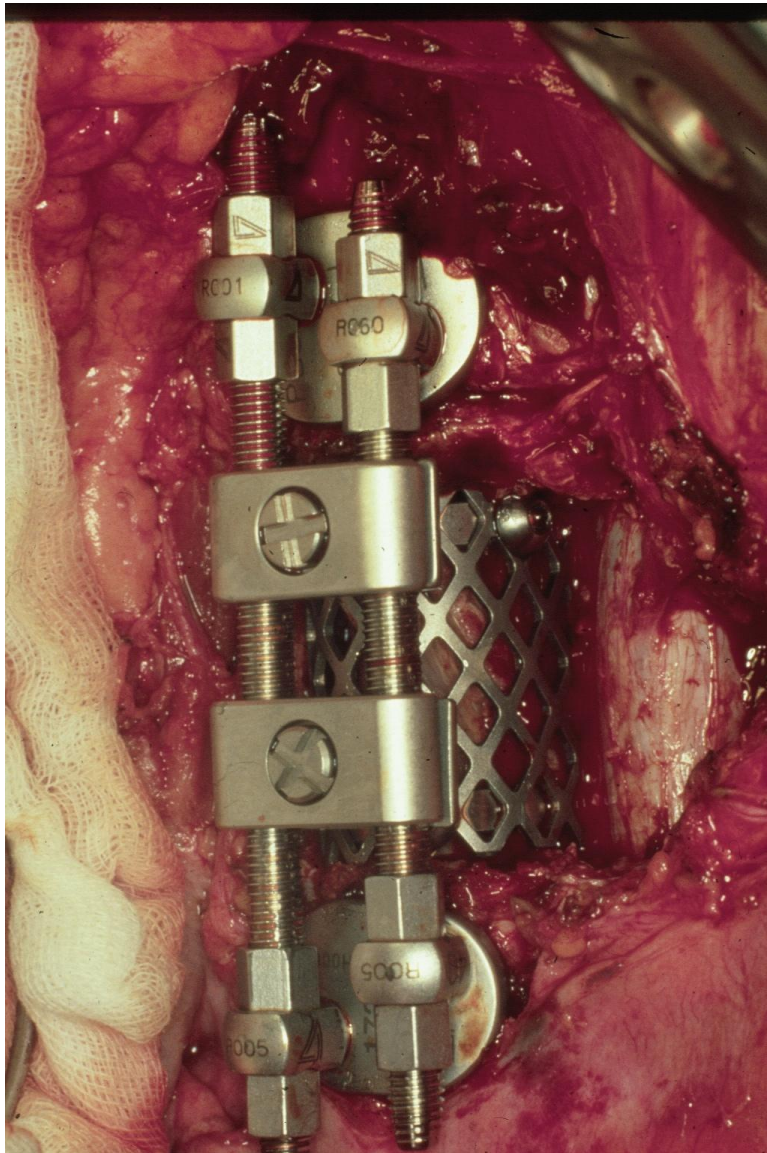
- Laminectomy
- Curettage
- Piecemeal resection
- Intralesional *én bloc* resection
- Extralesional total *én bloc* resection

Followed by reconstruction of spinal columns

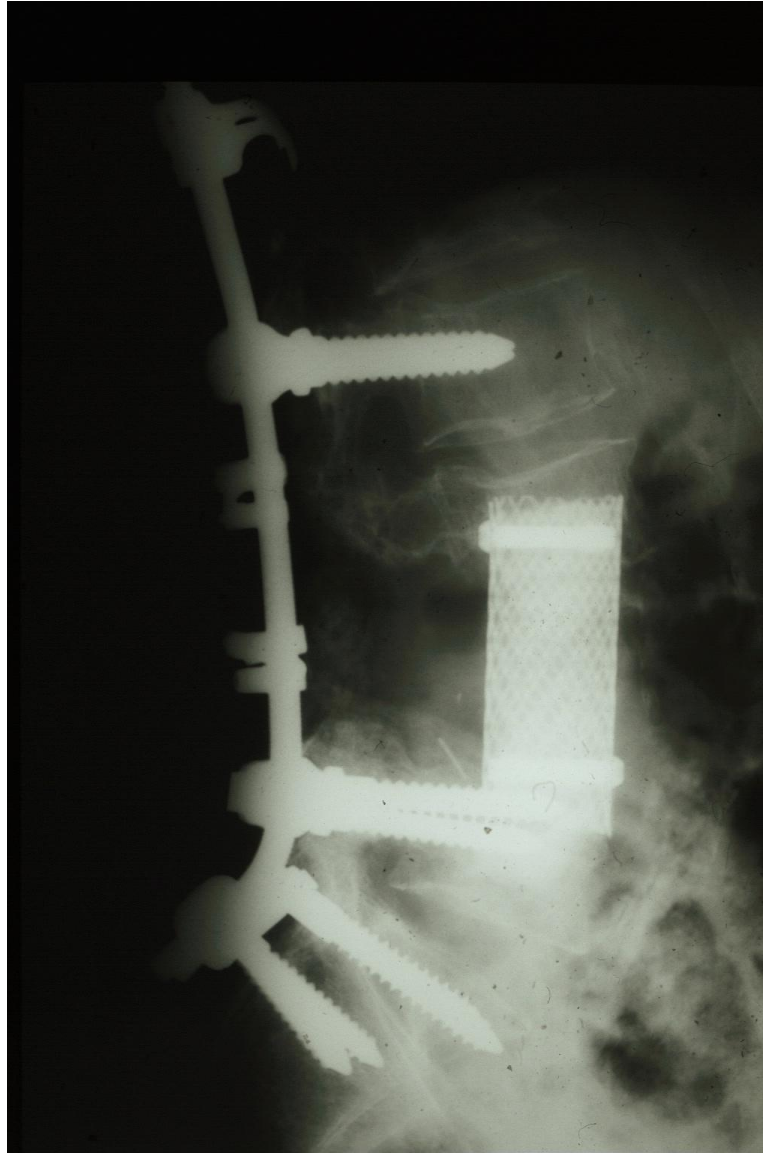
Radiotherapy

- Preop, perop or postoperative
- Intraoperative radiotherapy (IORT)
- Fractionated external radiotherapy (FERT)
- **Incidence of radiation myelopathy:**
 - 0.2 – 0.5%/50Gy
 - 5%/57 – 61Gy
 - 50%/68 – 73 Gy

ANTERIOR CORPORECTOMY

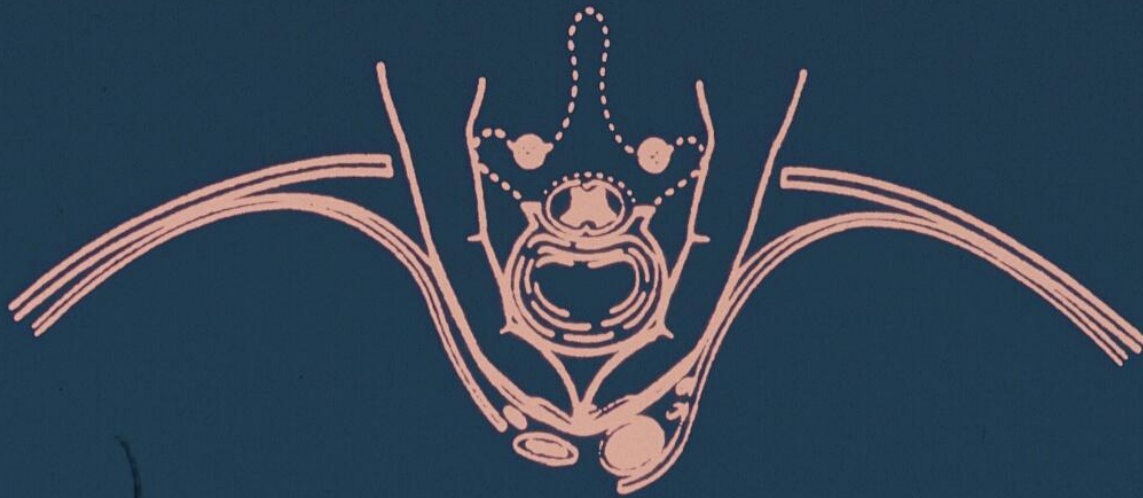


Total vertebratomy and reconstruction



Rene Louis

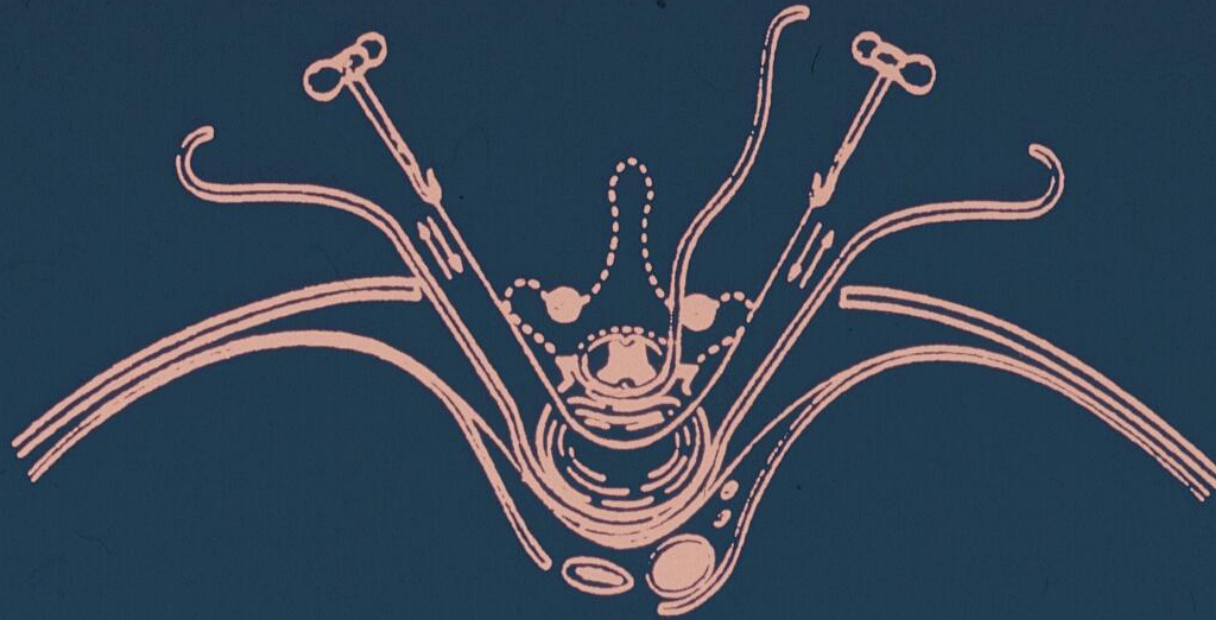
TOMITA TECHNIQUE



International Orthopedics (SICOT) (1994) 18 291-298

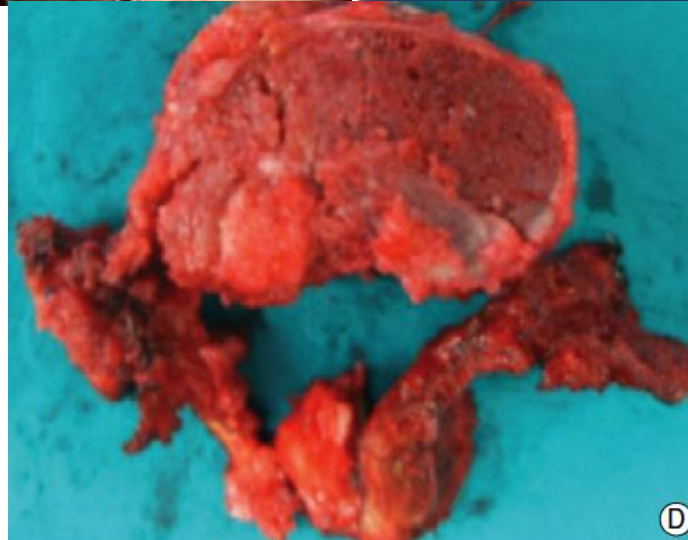
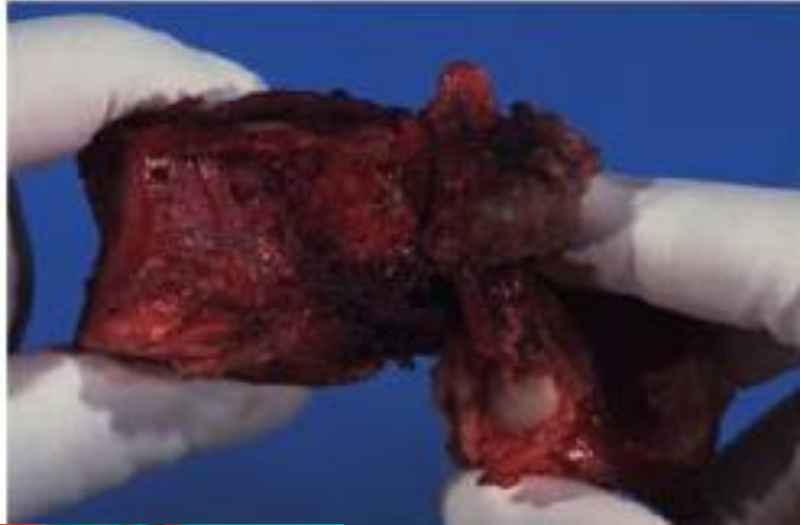
Layout: AV-Gruppen, Aarhus Kommunehospital, Denmark

TOMITA TECHNIQUE

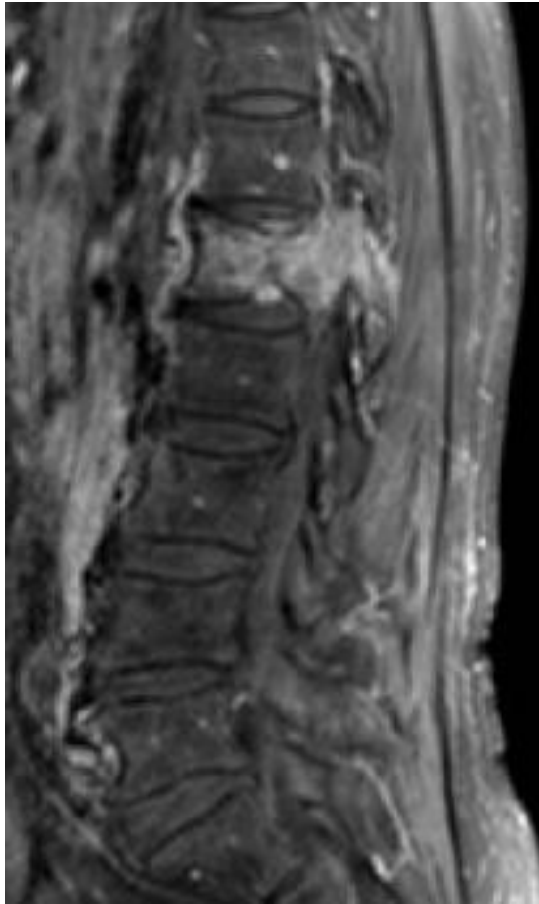


Layout: AV-Gruppen, Aarhus Kommunehospital, Denmark

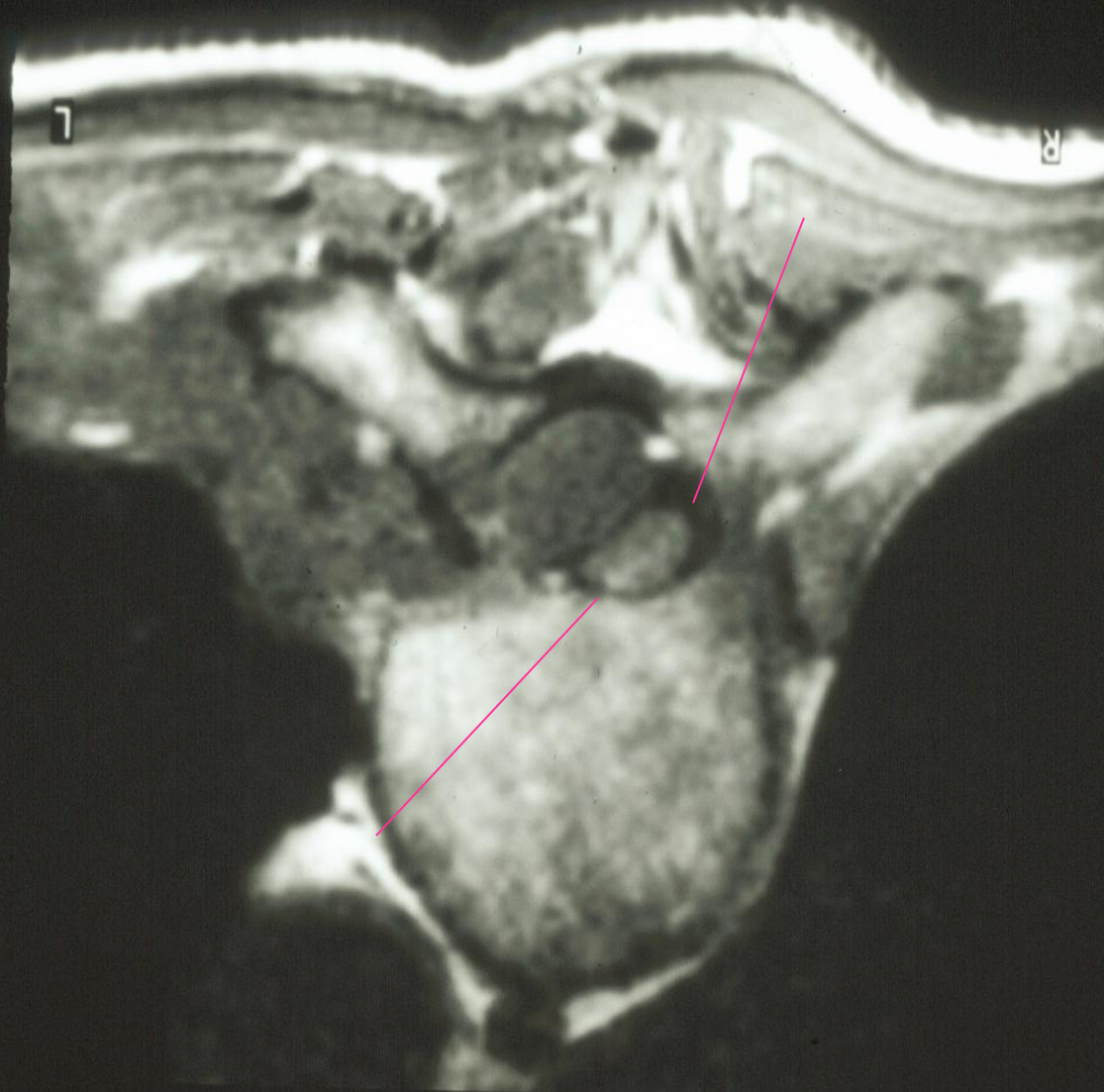
Lateral Extralesional en-Bloc Resection



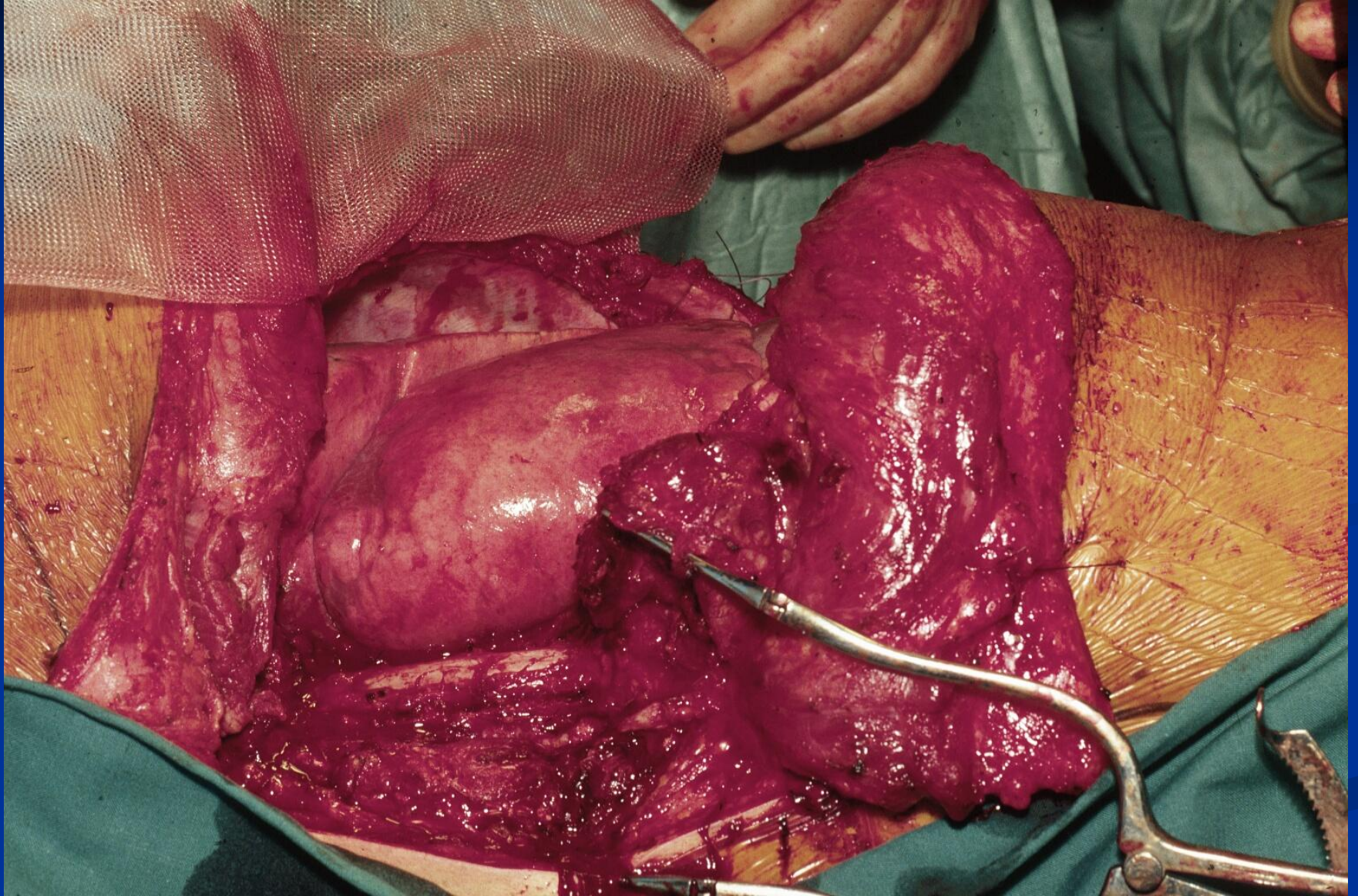
Lateral Extralesional en-Bloc Resection

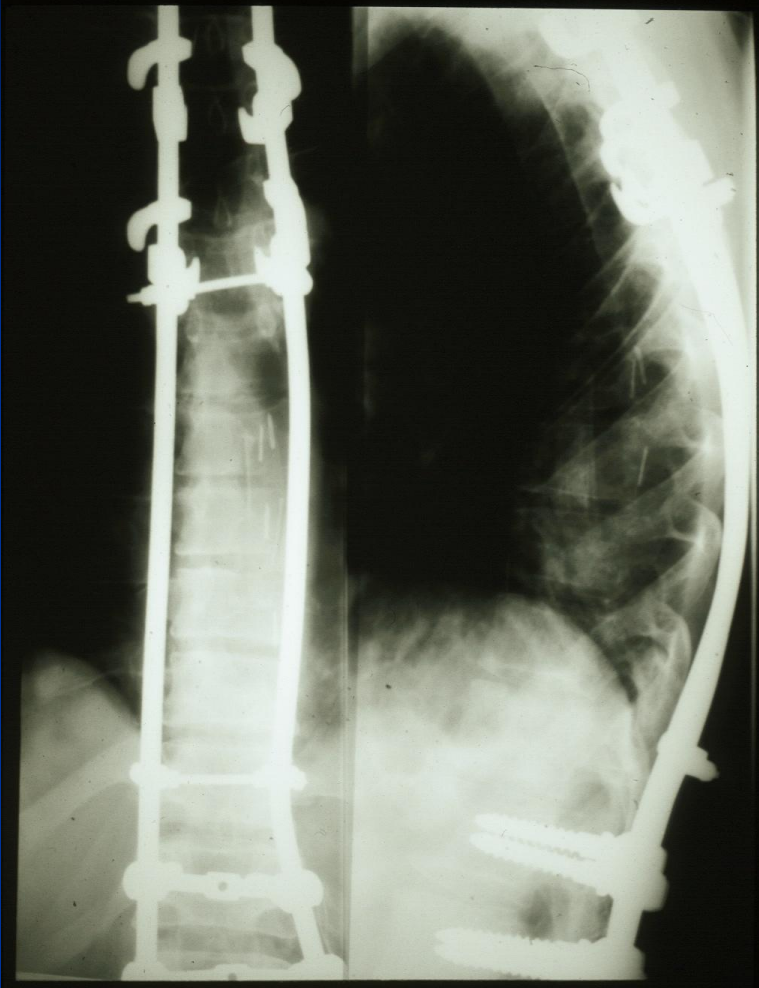


The Aarhus - EN BLOC RESECTION



TOTAL EN BLOC RESECTION

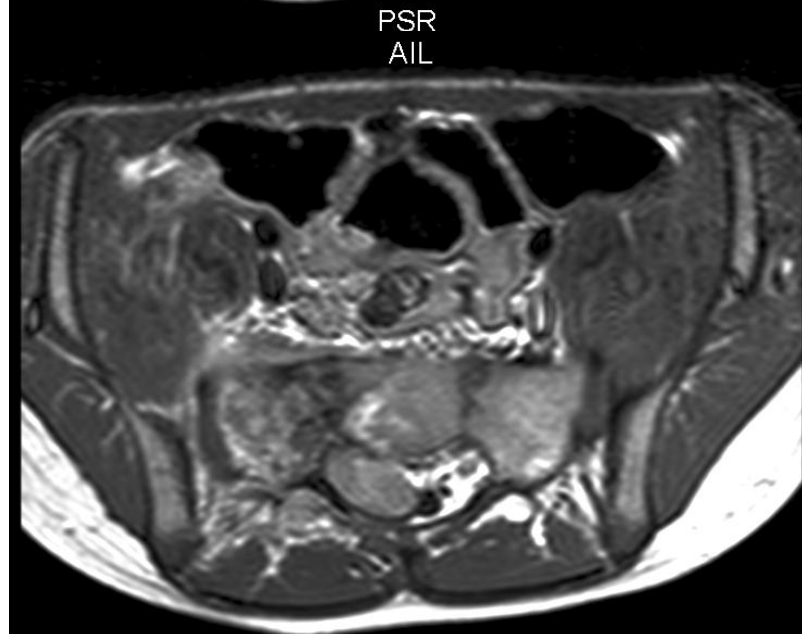
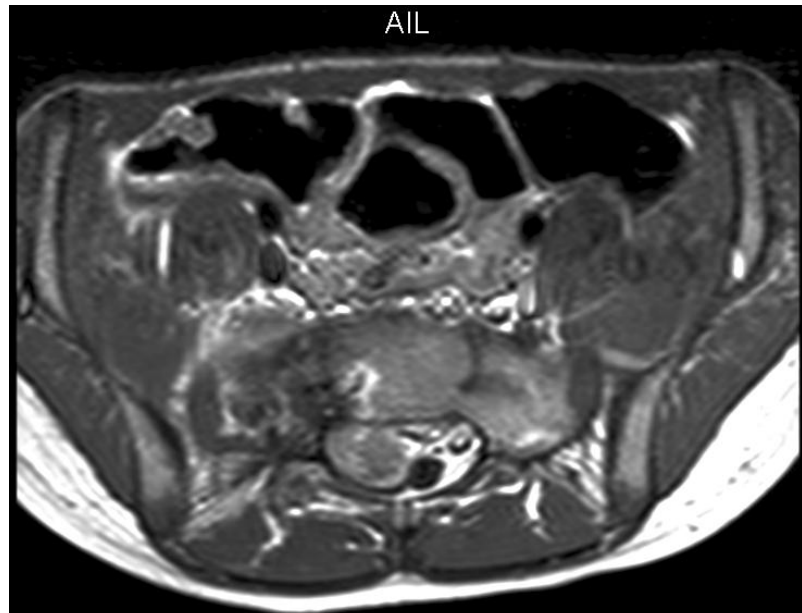




Ewing's Sarcoma
(Emil, 090703-*****)

Ewing's Sarcoma (Emil, 090703-****)

11-12-2009

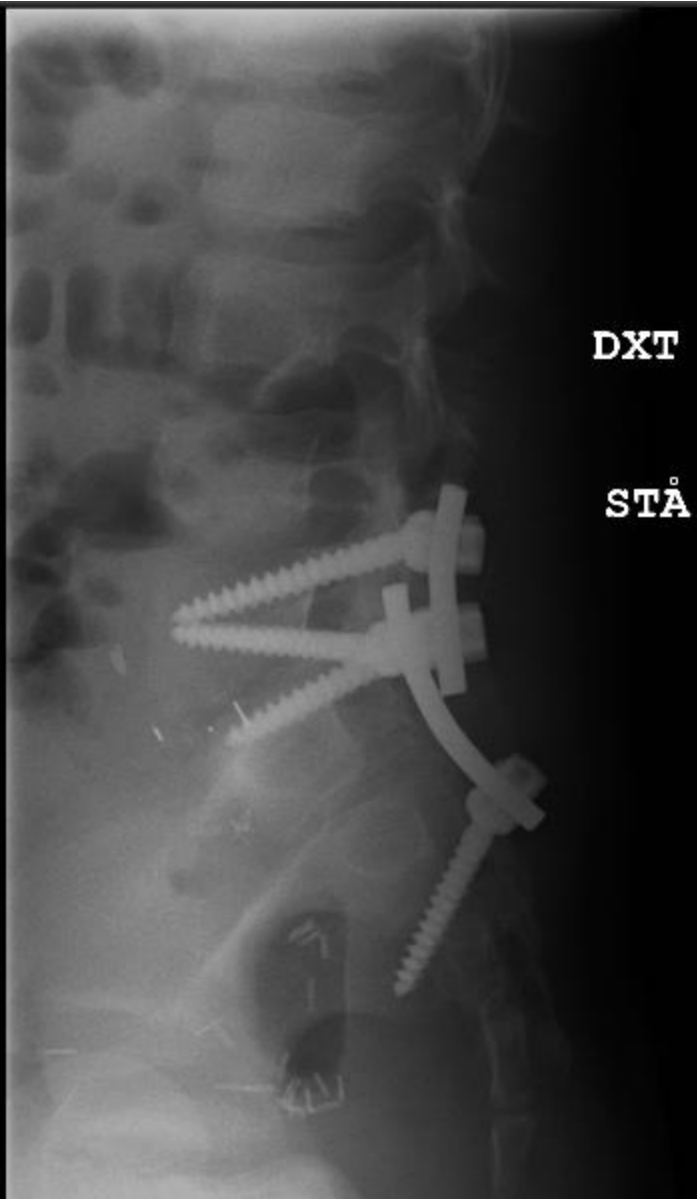


PSR



Ewing's Sarcoma (Emil, 090703-****)

25-05-2010



Local Recurrence

Extralesional èn Bloc Resection versus Intralesional

- Chondrosarcoma 20 % versus 100%
- Chordoma 33 % v 75 -100%
- Ewing 25%
- Osteogenic Sarcoma 20% v 60%
- Giant Cell Tumour 18% v 83%

Primary Extradural Tumours of the Spine

Conclusions

- Rare
- Wrong decision making may have fatal results
- Early referral to Sarcoma Center for diagnosis and treatment:
(oncology/surgery/oncology)



SPINAL METASTASIS

Algoritms of treatment

Cody Bünger, Miao Wong, Kristian Høy, Ebbe Stender Hansen, Yu Wang.
Spine Section, Aarhus, DK

SOA 2011 Abha

Background

Epidemiology of Spinal Metastases*

Spine as most frequent site of bone metastases:

- 10% of all cancer-patients,
- All ages, mainly 40-65 years
- M:F = 3:2.
- 20% = first sign of cancer disease

Localisation:

- 70% thoracic
 - 89% extradural, 75% osseous
- = sign of disseminated tumour disease
- ∅ survival ≈ 10-16,5 months**



*Schaser KD et al. (2007): Surgical management of vertebral column metastatic disease; Unfallchirurg 110(137-162)

**Hirabayashi H et al. (2003) Clinical outcome and survival after palliative surgery for spinal metastases: palliative surgery in spinal metastases. Cancer 97:476-484

Background

Clinical Presentation of Spinal Metastases

≈ 10-20% with spinal metastases

➔ Symptomatic epidural compression*:

90% Pain,

47% Neurological deficits as

Sensitive failures (75%)

Paraparesis/ paraplegia (60%)**

Pathological fractures

B-symptomatic

Hypercalcaemia

➔ Poor quality of life!



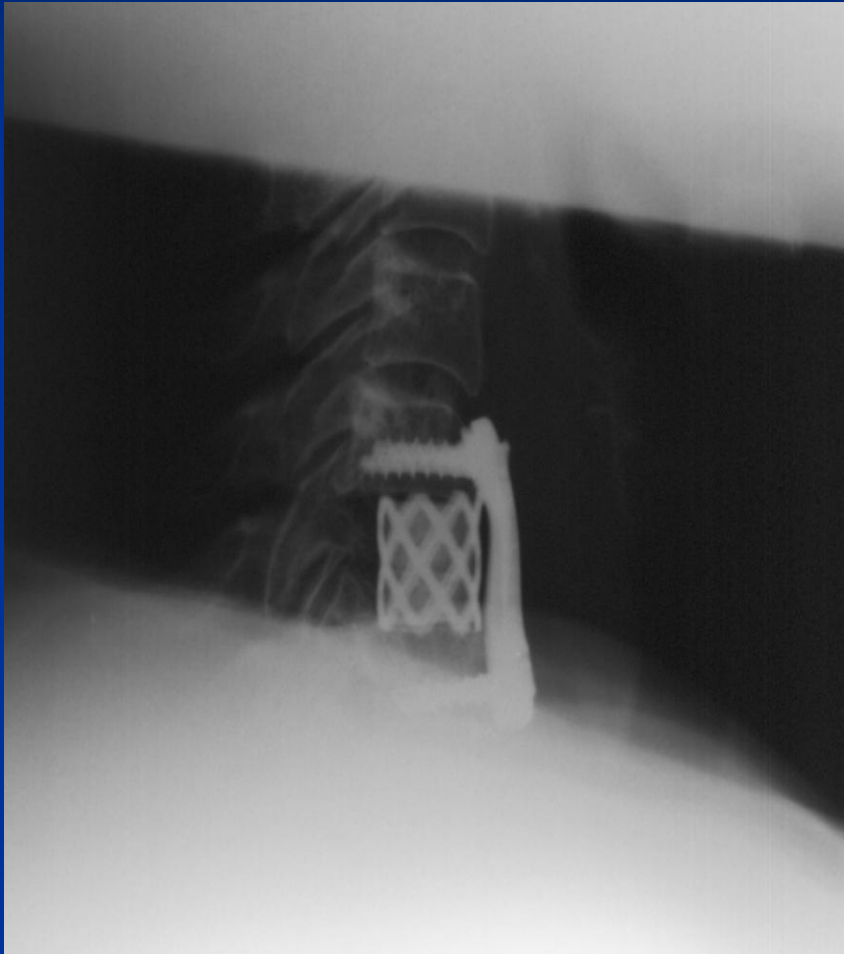
*Klino P (2004) Surgical Management of spinal metastases. The Oncologist 9: 188-196

**Ecker RD et al. (2005) Diagnosis and treatment of vertebral column metastases. Mayo Clin Proc 80:1177-1186

65 y old female with breast cancer and pain in the shoulders



Postop



Århus Metastases Database



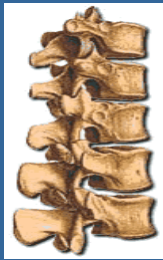
- Denmark with 6000 new cases/ year (Inc.122/100.000)
- Since 1993
- 507 retrospective and prospective patients included
- Conducted study:
 - 474 prospective patients
 - Operated in Aarhus (1997 - 2007)
 - Histologically confirmed diagnosis of spinal metastases



> 80% of the patients = acute patients with neurological impairment!

- ➔ Survival
- ➔ Neurological status (Frankel-Score)





Tokuhashi Score

Prognosis of expected survival time in MSSC.

<u>General condition</u>		<u>Metastases to internal organs:</u>	
Karnofski 10-40 %	0	Non-removable	0
- 50-70 %	1	Removable:	1
- 80-100%	2	None:	2
<u>Extraspinal Bone metastases</u>		<u>Cancer diagnosis</u>	
>3	0	Lung, stomach:	0
1-2	1	Kidney, liver, uterus	
0	2	unknown	1
<u>Spinal Bone metastases</u>		Breast, rectum, thyroid	
>3	0	prostate, myeloma	2
2	1	<u>Spinal cord palsy</u>	
1	2	Complete:	0
		Incomplete:	1
		None	2

Total Tokuhashi score 0-12

Tokuhashi SPINE 1990 15:1110-1113



The Aarhus Surgical Strategy



Life Expectancy /Surgical Treatment Strategy

< 3 months

Tokuhashi 0-4

Laminectomy + Radiation

3-6 months

Tokuhashi 5-8 and Tomita 1-7

Post. decompr.+ post. instru. + Radiation

> 6 months

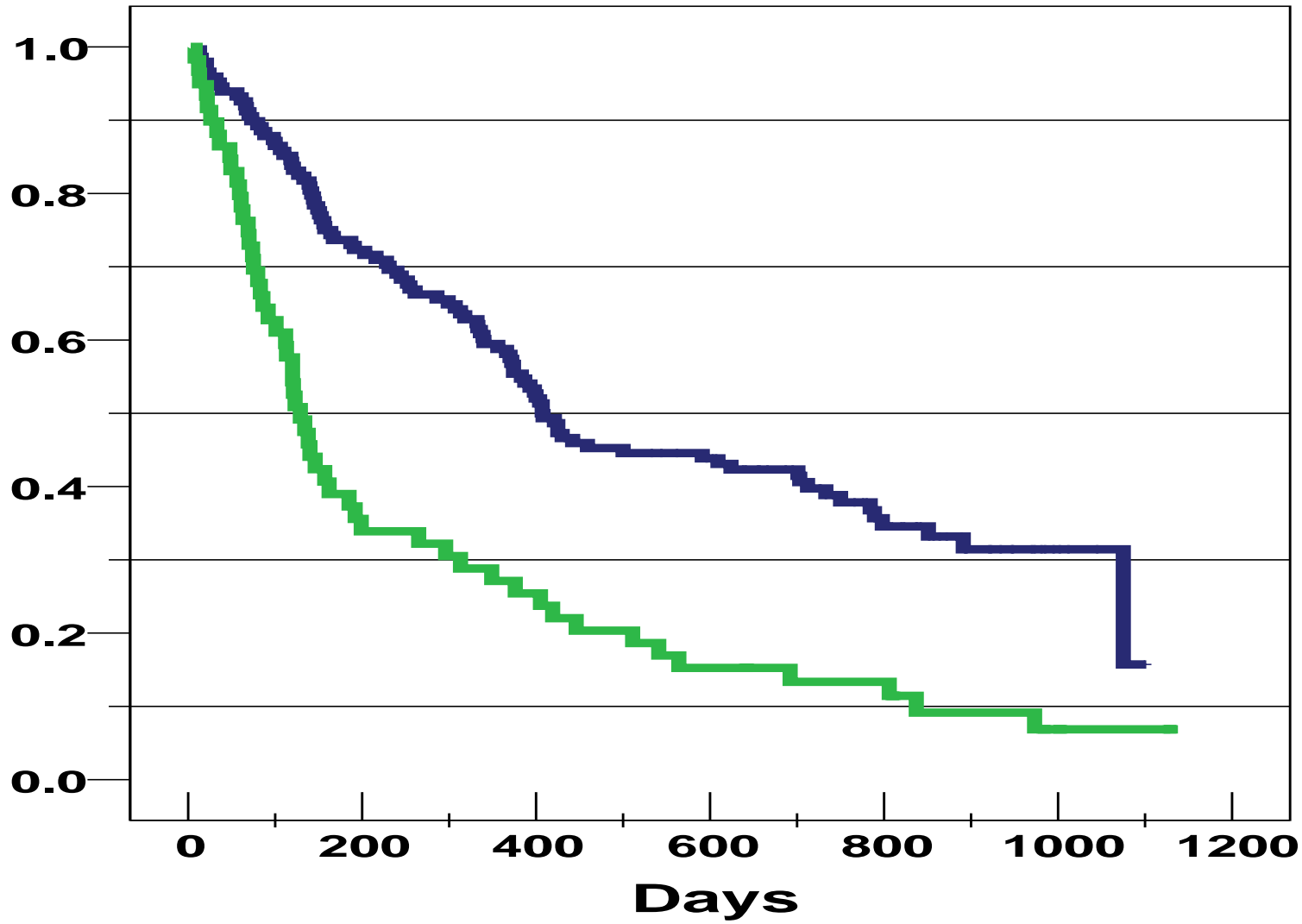
Tohuhashi 9-12

Tomita 1-3: En bloc resection with
vertebrectomy and 360° reconstruction + Rad.

Tomita 4-6: Intralesional Vertebrectomy +
360° reconstruction + Rad.

Tomita 7: Post. decom. + Stab. + Rad.

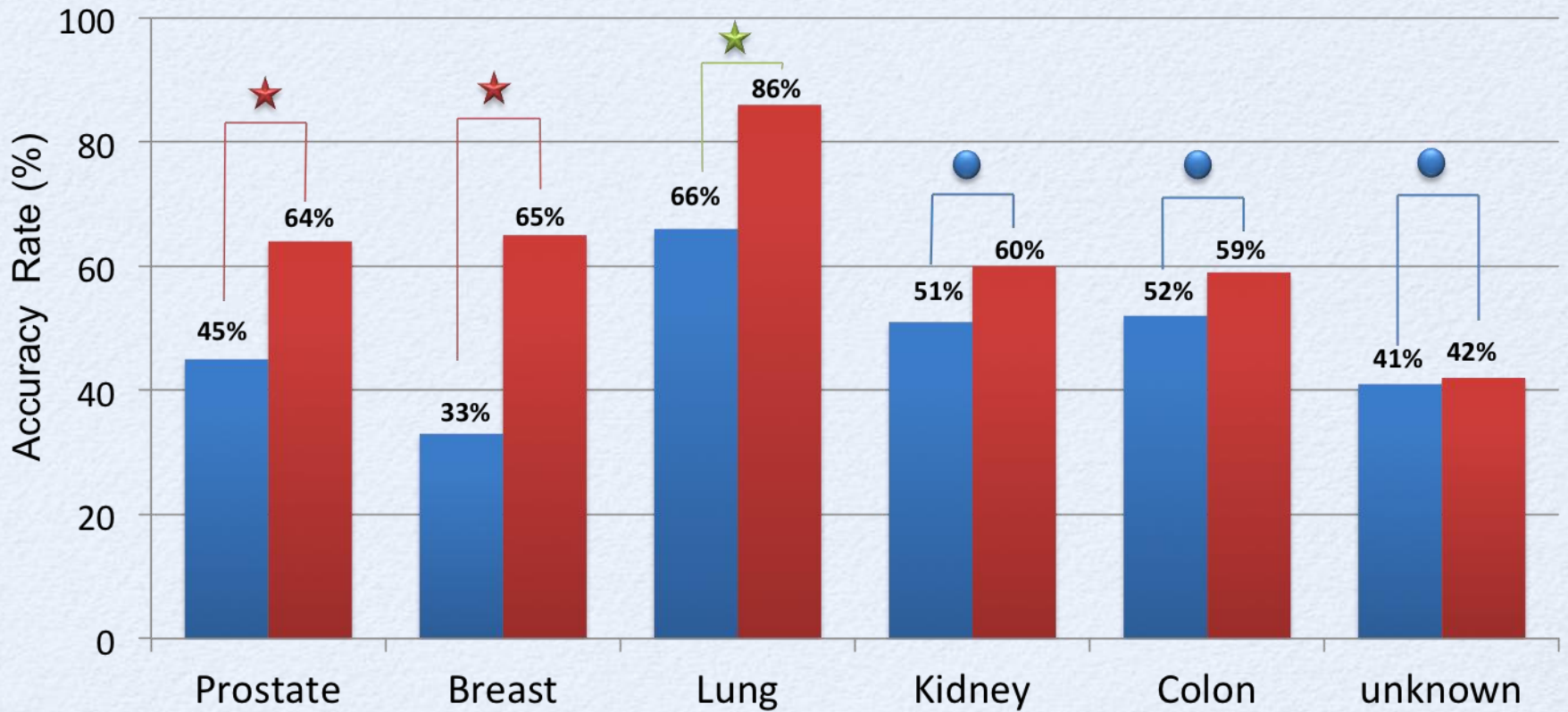
Survival difference in between patients admitted mobile and immobile.



Results:

Comparison of Accuracy Rate

■ Tok 12 ■ Tok 15



★ $p < 0.01$; ★ $p < 0.05$; ● $p > 0.05$

*Roy A Patchell, Phillip A Tibbs, William F Regine
Richard Payne, Stephen Saris Richard J
Krysscio, Mohammed Mohiuddin, Byron Young*

*Direct decompressive surgical resection in the
treatment of spinal cord Compression caused by
metastatic cancer a randomized trail.*

Lancet 2005; 366:643-48

**Direct decompressive surgical resection in the treatment of
spinal cord compression caused by metastatic cancer:
a randomised trial**



Roy A Patchell, Phillip A Tibbs, William F Regine, Richard Payne, Stephen Saris, Richard J Krysscio, Mohammed Mohiuddin, Byron Young

Summary

Background The standard treatment for spinal cord compression caused by metastatic cancer is corticosteroids and radiotherapy. The role of surgery has not been established. We assessed the efficacy of direct decompressive surgery.

Lancet 2005; 366: 643-48
Published online July 21, 2005
DOI:10.1016/S0140-6736(05)

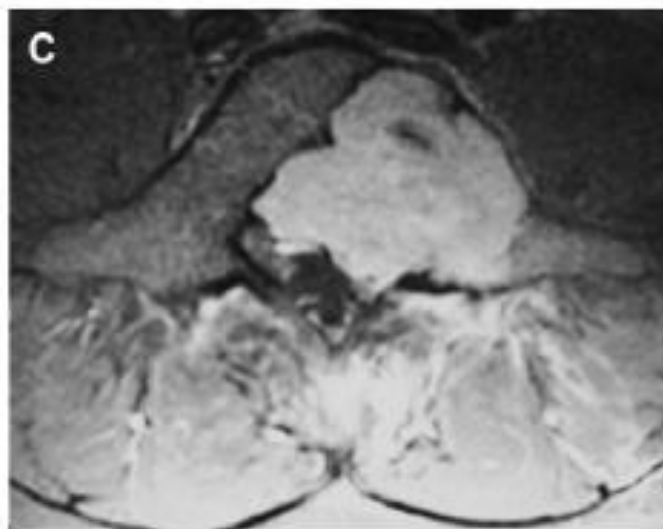
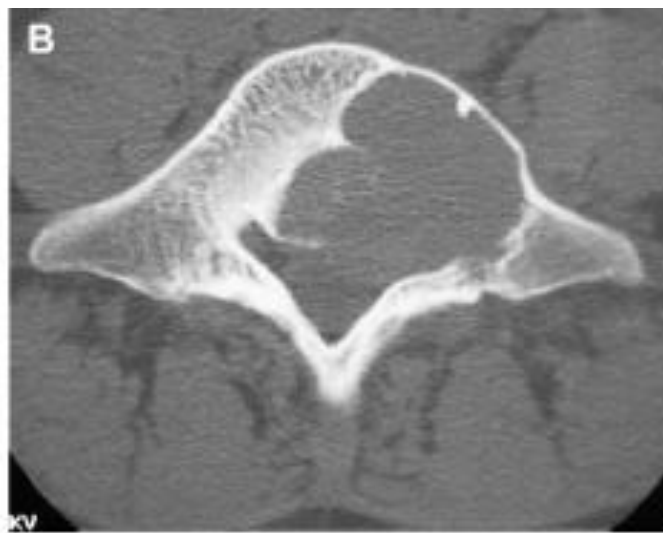
SPINAL TUMORER

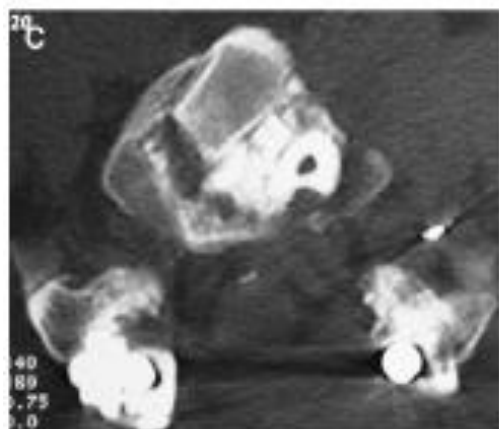
Giant Cell Tumour in a Child



Giant Cell Tumour







Chordoma

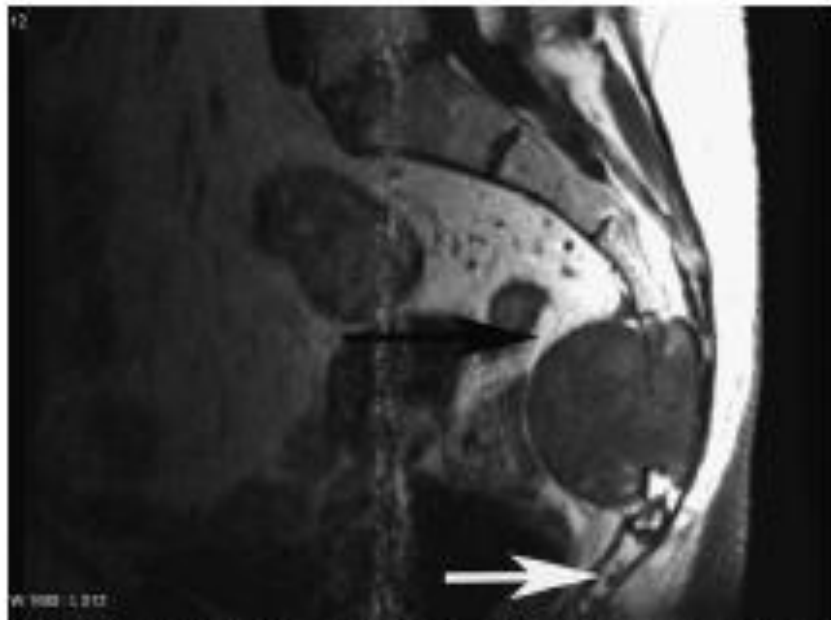


FIGURE 1. T1-weighted MR image showing a well-delineated tumor mass with low signal intensity in front of the sacrum and within the spinal canal (black arrow). Also seen are 2 intraosseous coccygeal lesions with irregular nodule contours and similar signal intensities (white arrow).

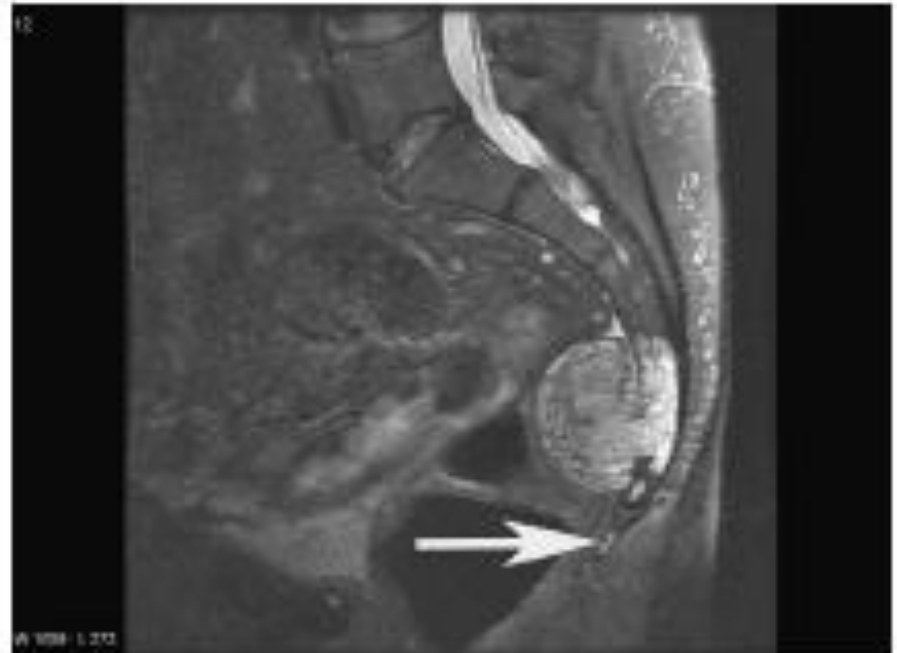
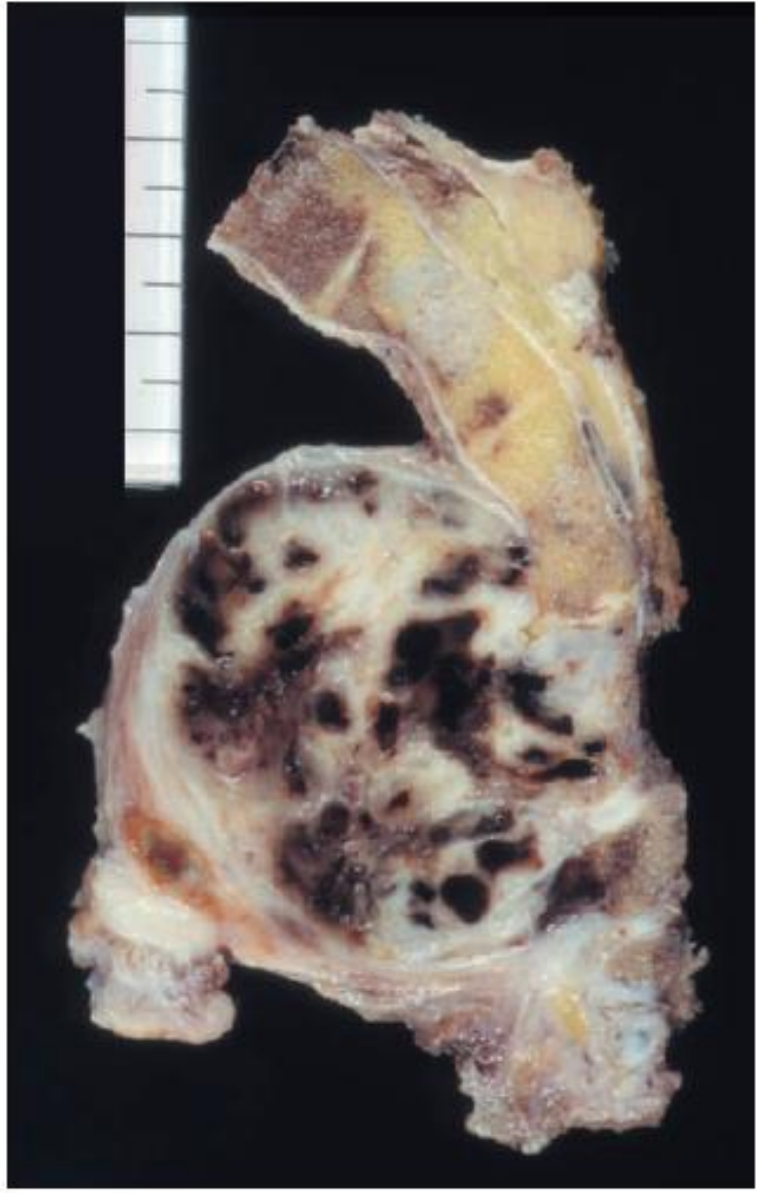


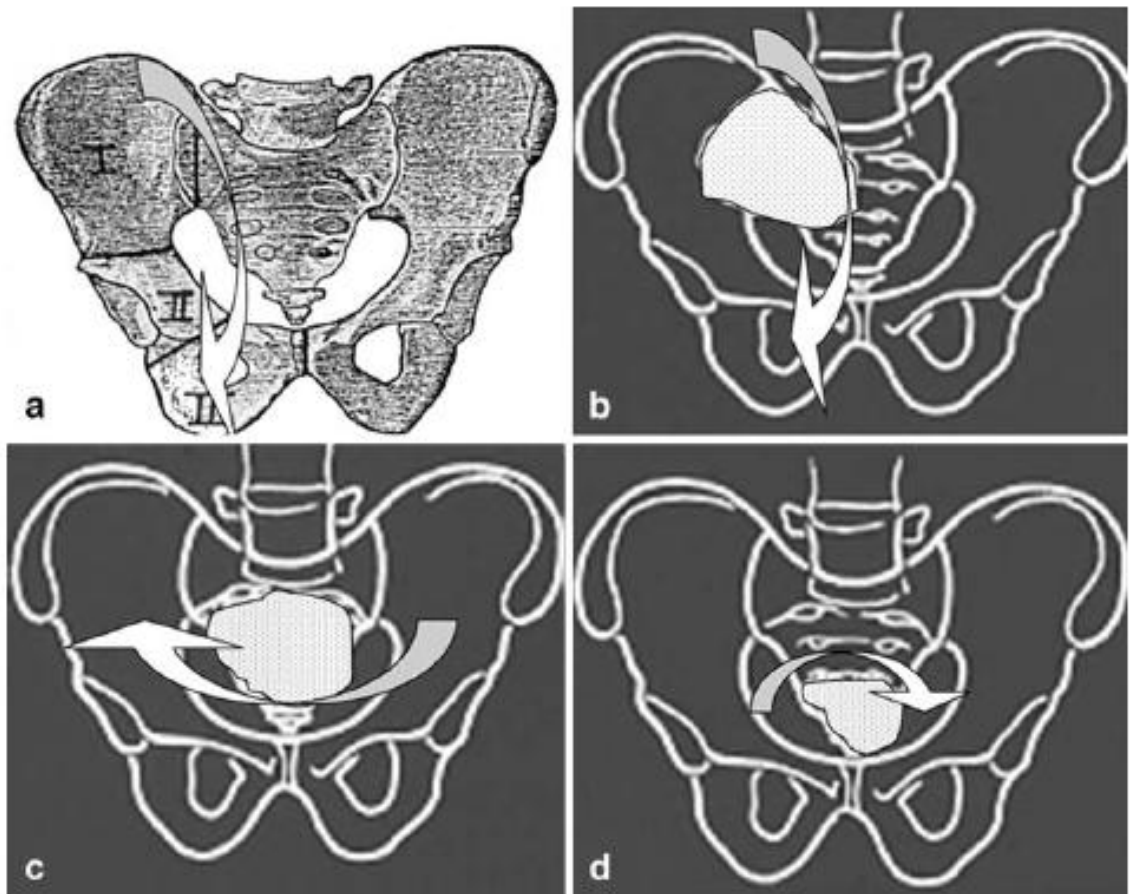
FIGURE 2. T2-weighted MR image demonstrating a high intensity for all lesions, including the coccygeal BNCT (white arrow).

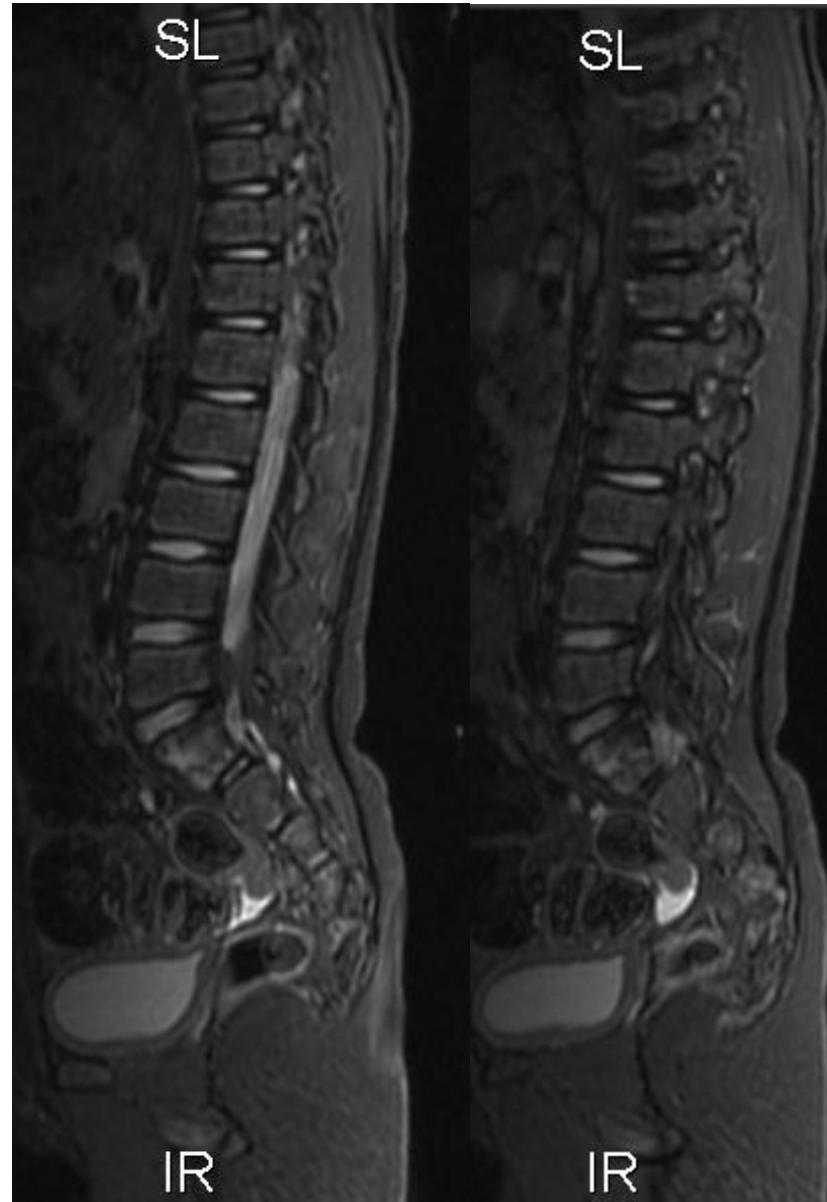
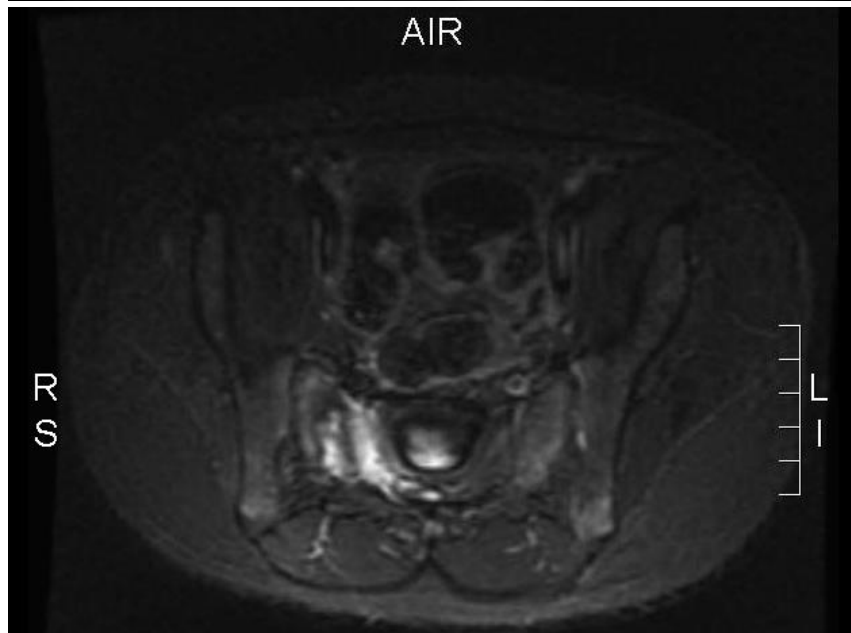
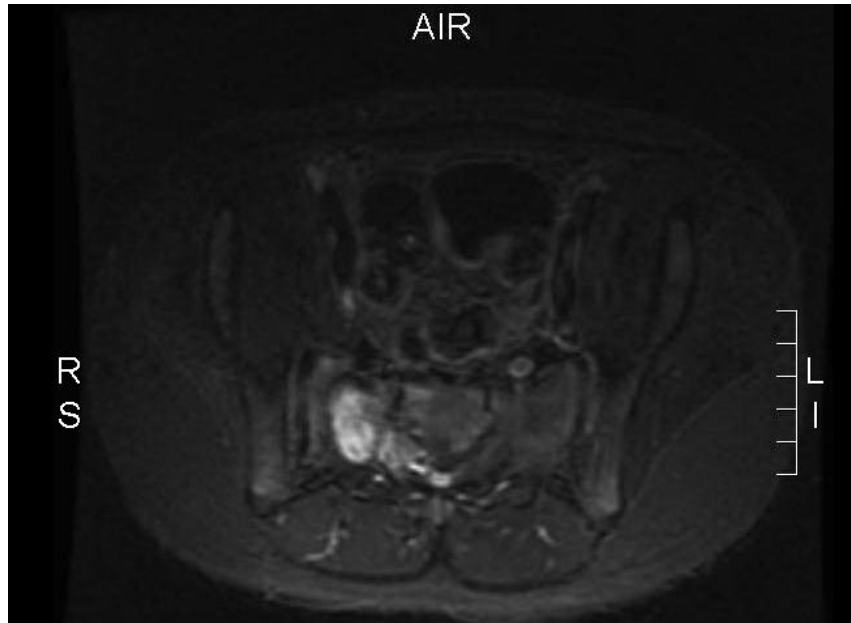


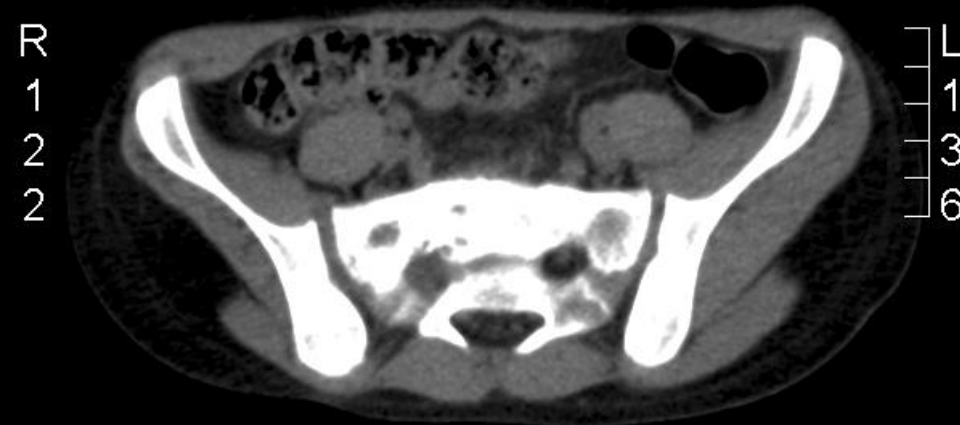
Imaging of sacral tumours

S. Gerber · L. Ollivier · J. Leclère · D. Vanel ·
G. Missenard · H. Brisse · G. de Pinieux ·
S. Neunen-schwander

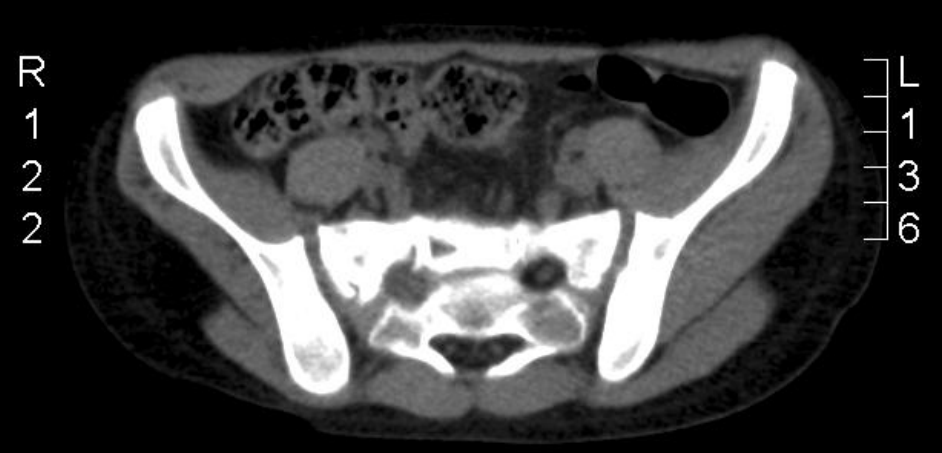
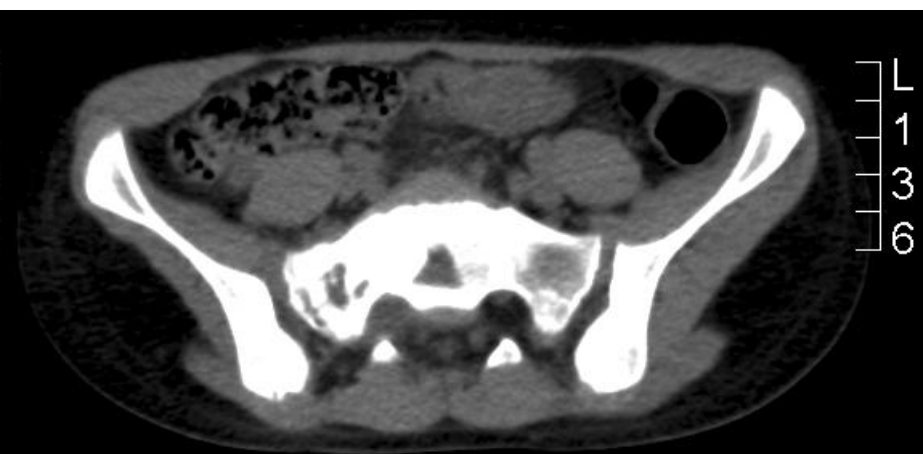
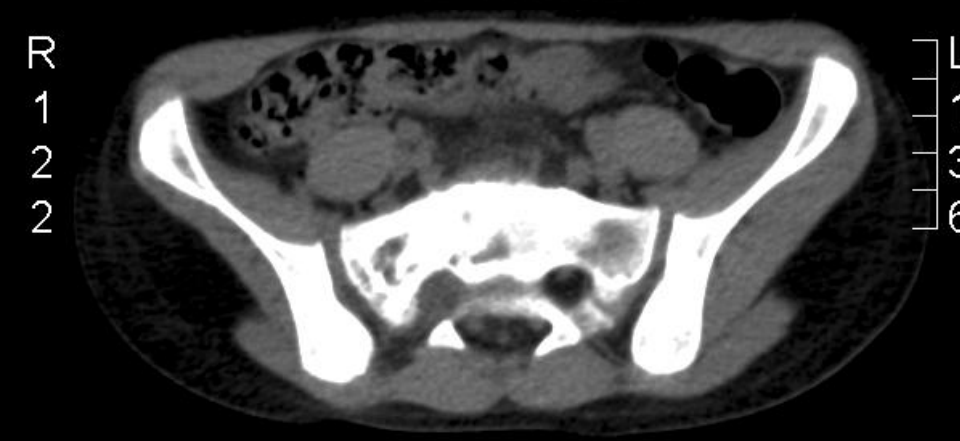
- Giant cell tumor
- Ewing sarcoma
- Chordoma
- Metastasis



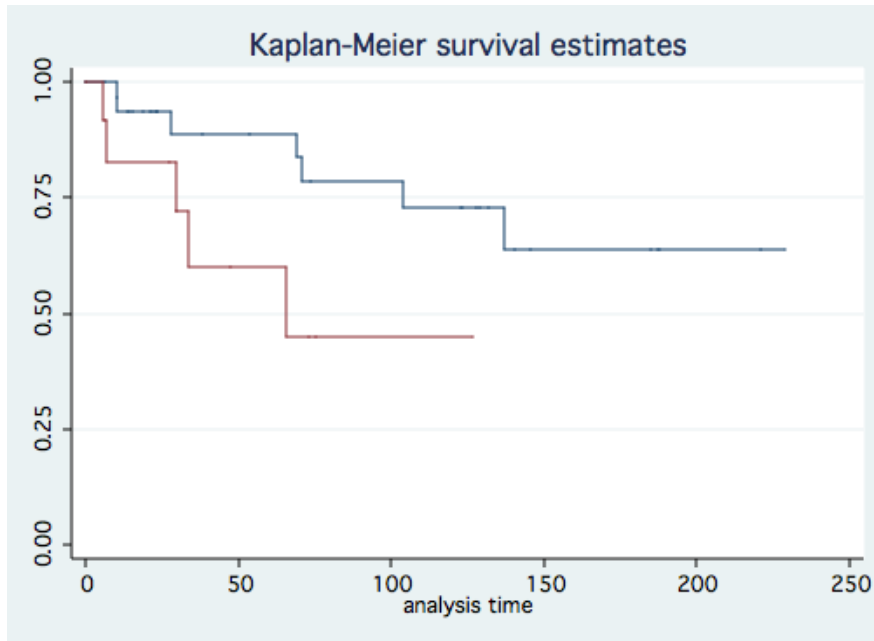




Ewing's Sarcoma (Emil, 090703-*****)
04-05-2010



Survival analysis



44 patients (M:F= 20: 24)
Since March 12, 1992 to June 25, 2009

Blue: Extralesional group 32 patients
Red: Intralesional group 12 patients

$p=0.0495$ Log-rank test

Commonest tumor types:

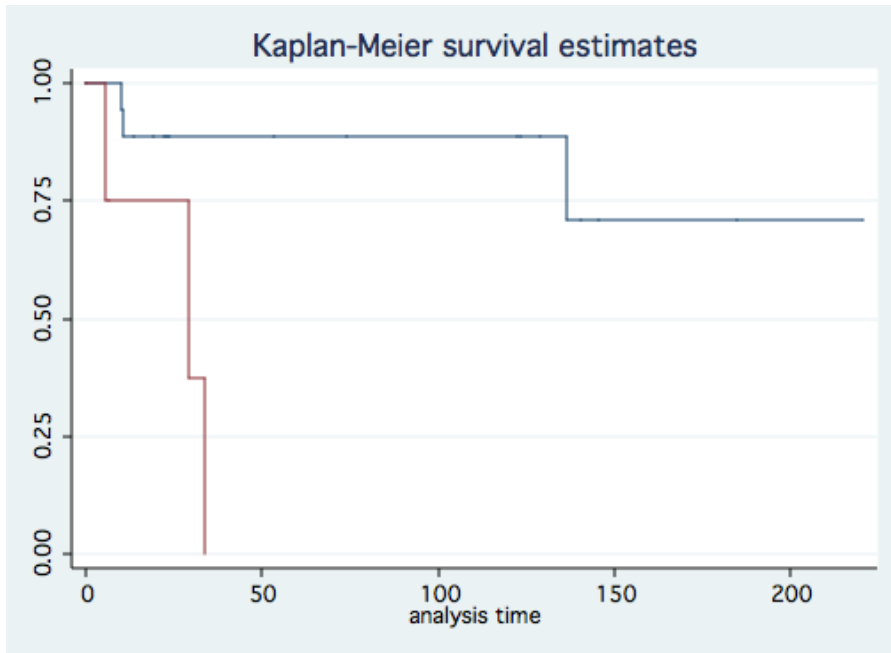
Chondrosarcoma (10), Osteoblastoma (5), Osteoid osteoma (5),
Ewing's sarcoma (4), Chordoma (3), Osteosarcoma (3), giant cell tumor (3)

Local Recurrence

Intralesional versus en Bloc Resection

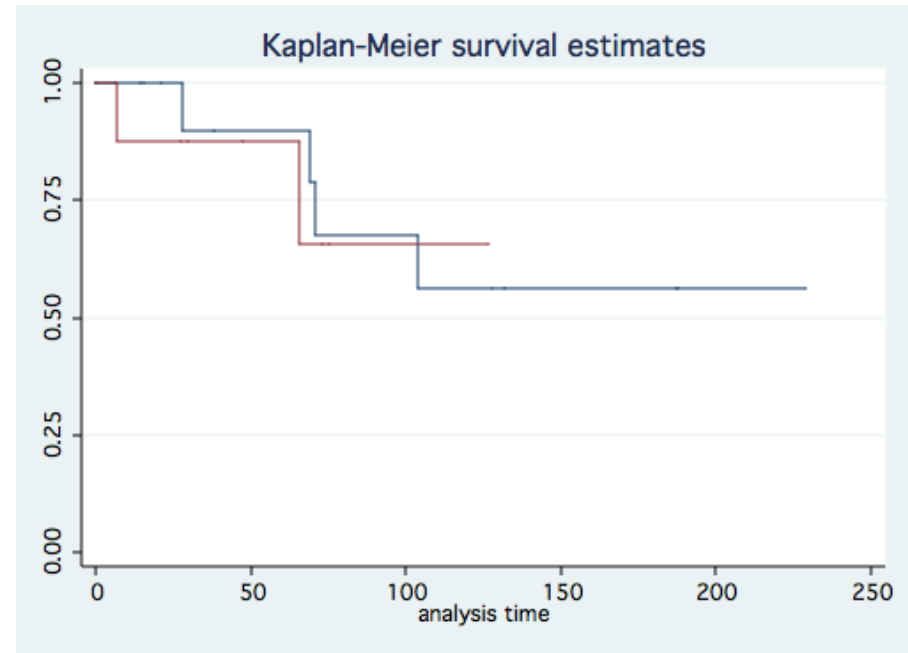
- Chondrosarcoma 20 % versus 100%
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- Ewing 25%
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- Giant Cell Tumour 18% v 83%

Survival analysis



patients ≤ 30 years, n=22

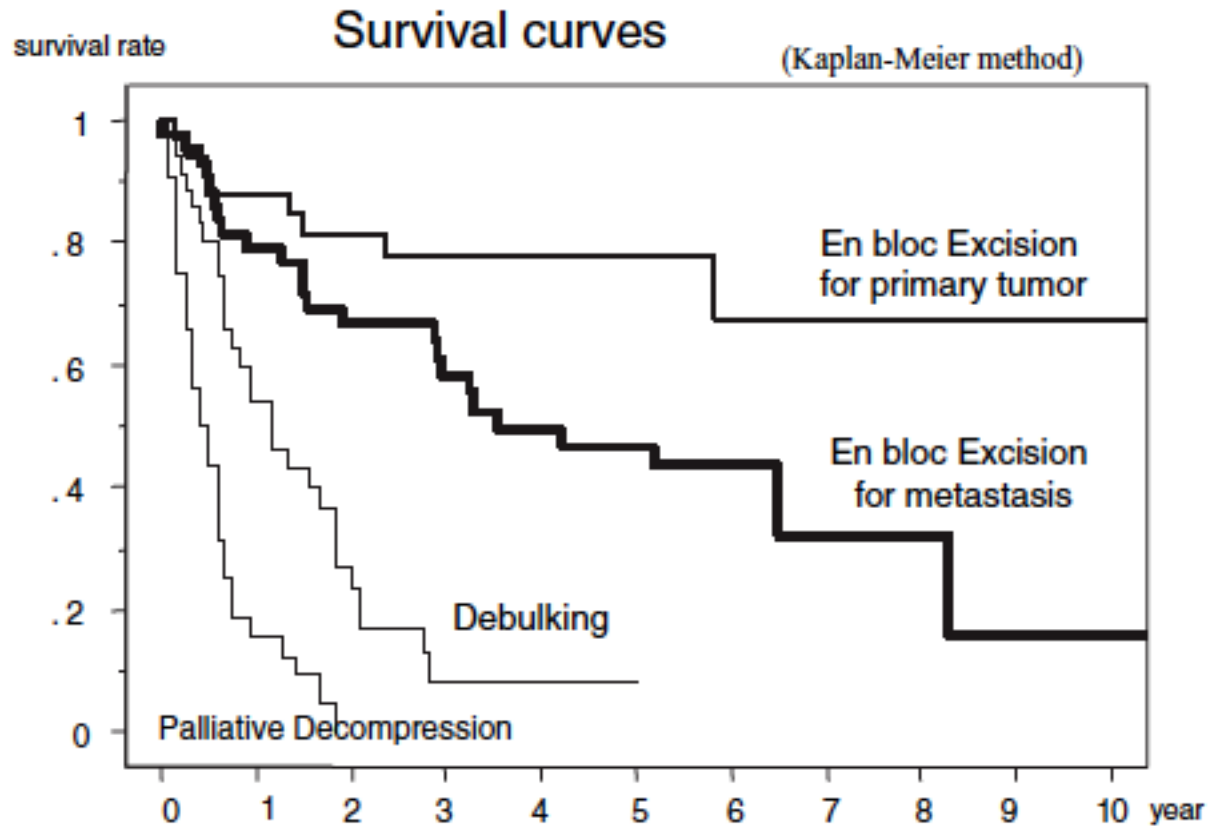
$p = 0.0016$ Log-rank test



Patients > 30 years, n=22

$p = 0.8600$ Log-rank-test

Survival analysis



Tomita K et al 2009