Approccio Multidisciplinare
nel Trattamento delle Metastasi Vertebrali

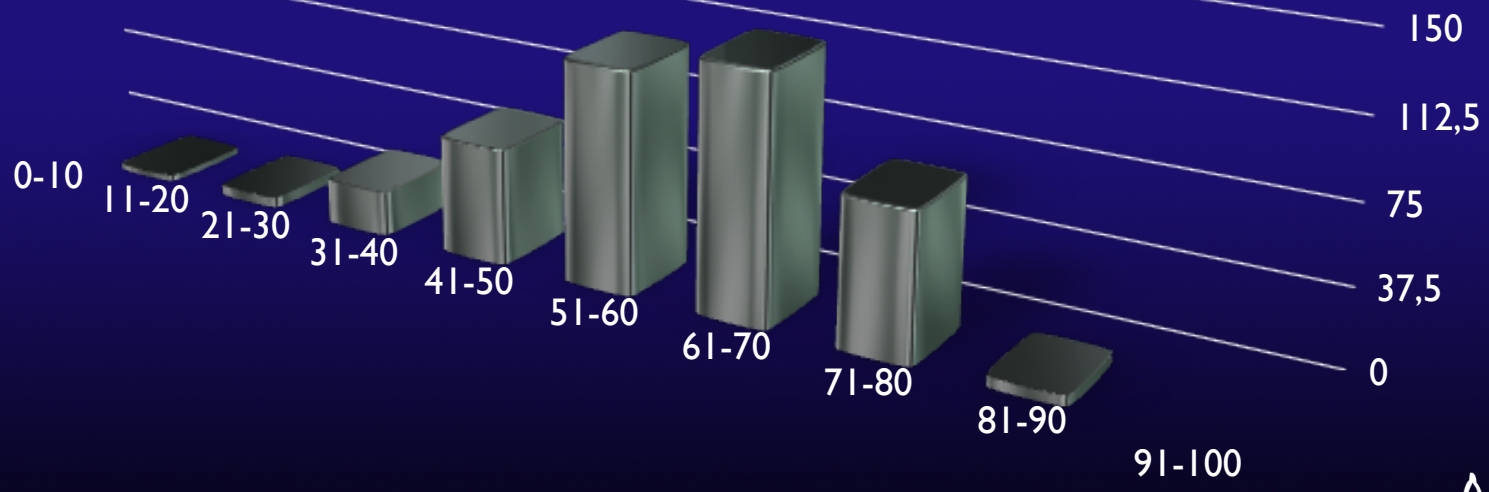
la Chirurgia

Alessandro Gasbarrini

Bone Metastases & Haemopathies of the Spine

390 CASES (1990-2009)

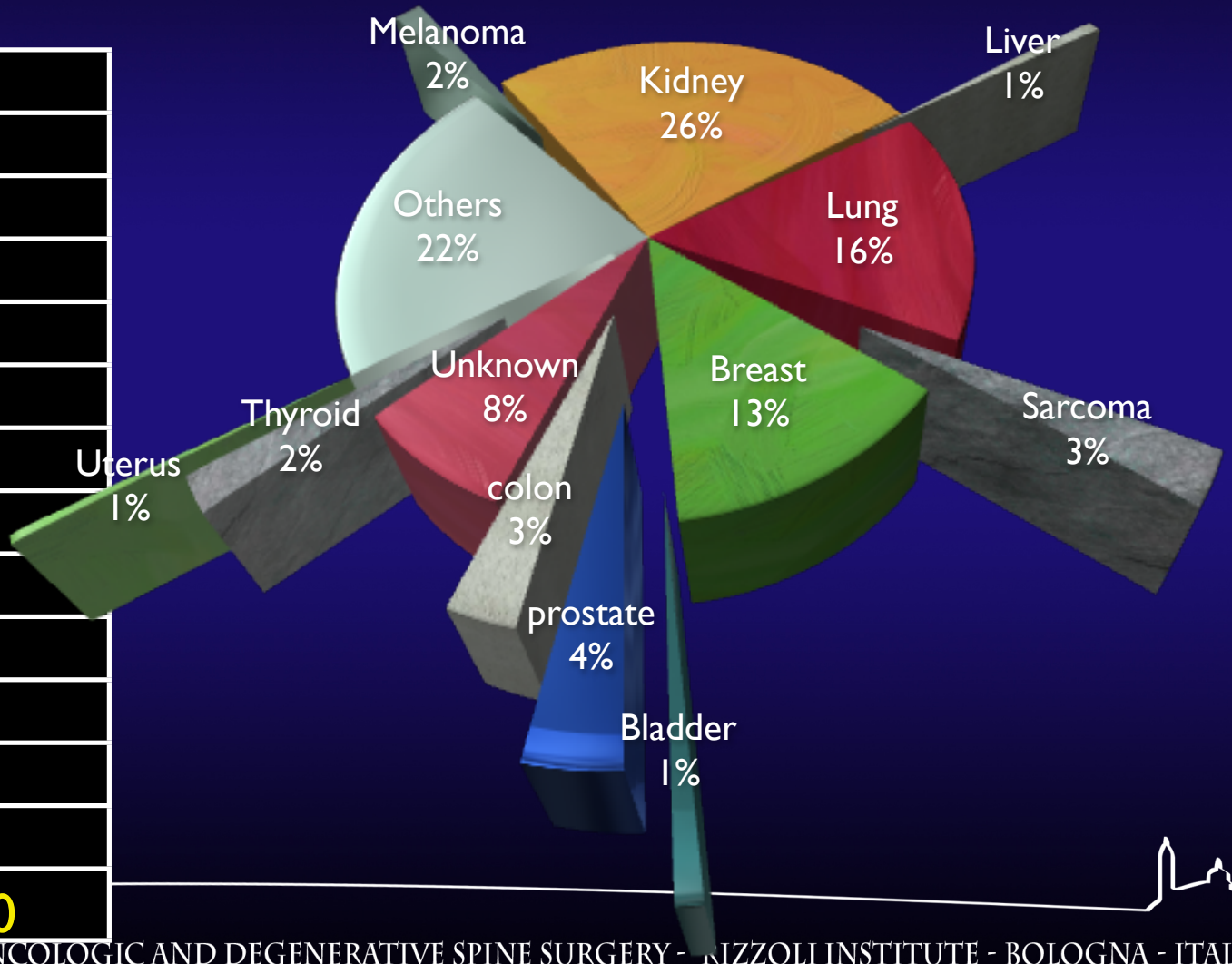
Age: 14 to 86
Av.: 58



Bone Metastases of the Spine

390 CASES (1990-2009)

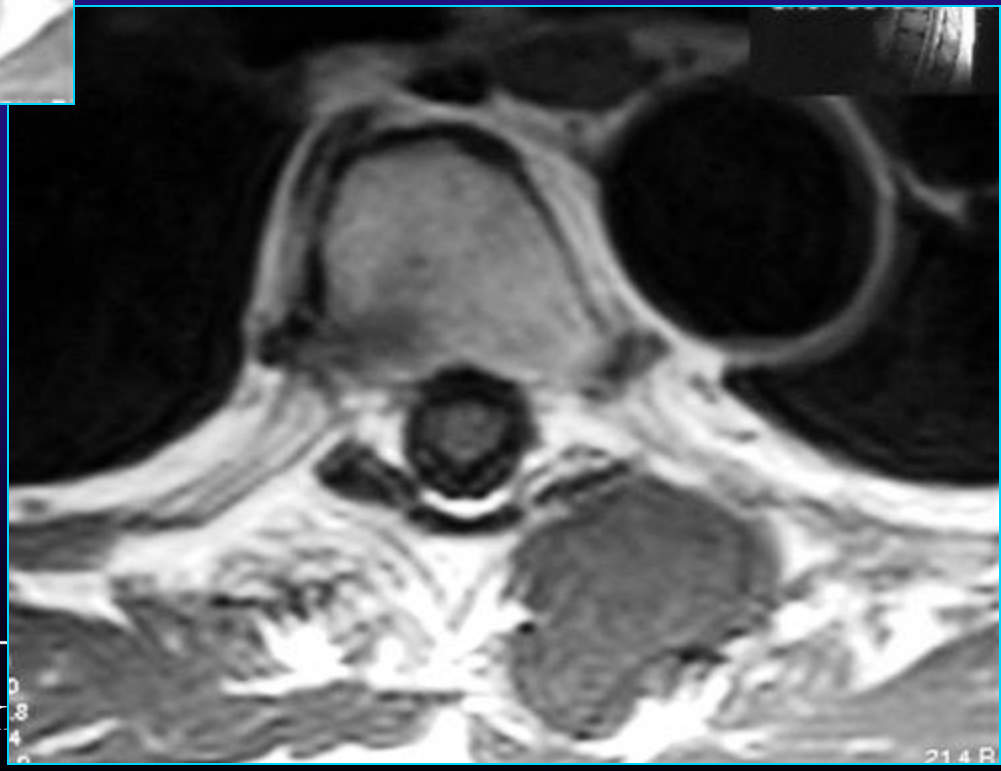
Kidney	99
Lung	60
Breast	50
Bladder	4
Uterus	2
Liver	3
Sarcoma	12
Prostate	15
Colon	12
Thyroid	9
Melanoma	7
Unknown	30
Others	84
Total	390



B.D., 65 yrs., M, T4-T7

- *5 YRS BEFORE, PROSTATECTOMY FOR K.*
- *4 YRS BEFORE, COLONECTOMY FOR K.*

"PRESUMED" DIAGNOSIS OF METASTASIS

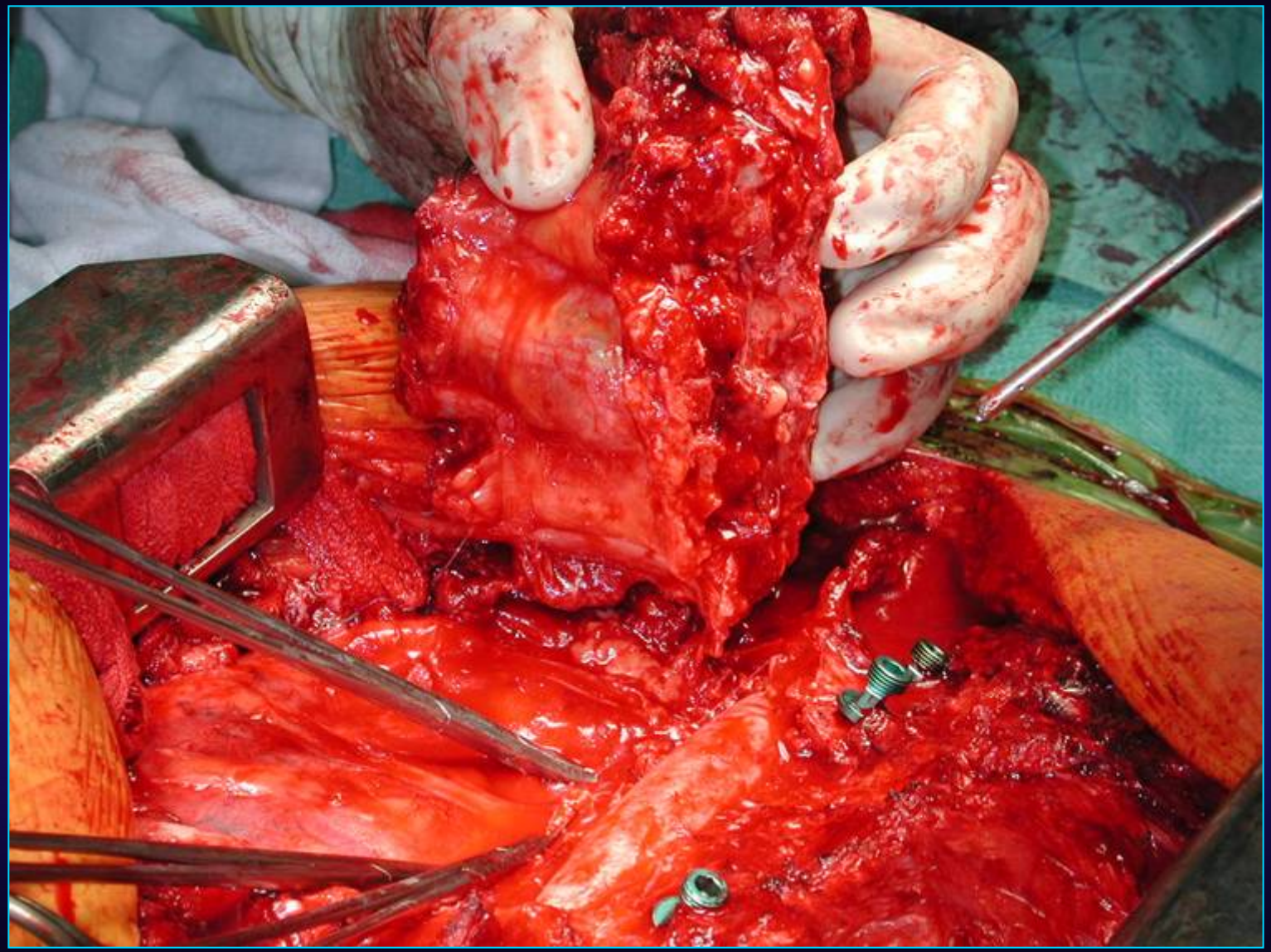


B.D., 65 yrs., M, T4-T7

RTR >INCREASING PARAPARESIS

BIOPSY: CONDROSARCOMA

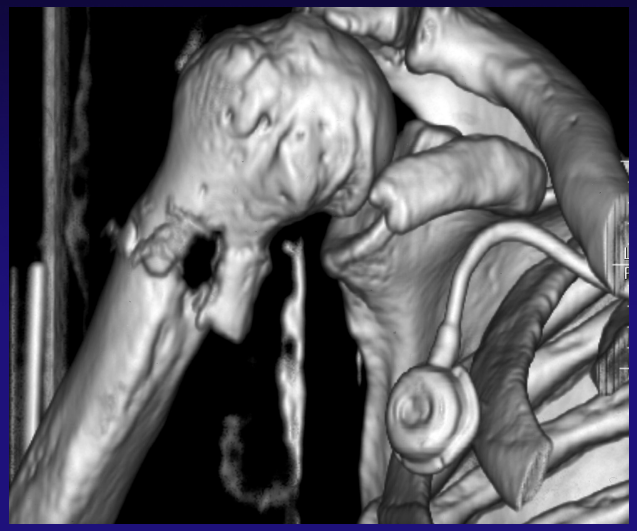
B.D., 65 yrs., M, T4-T7



RESECTION "en bloc"

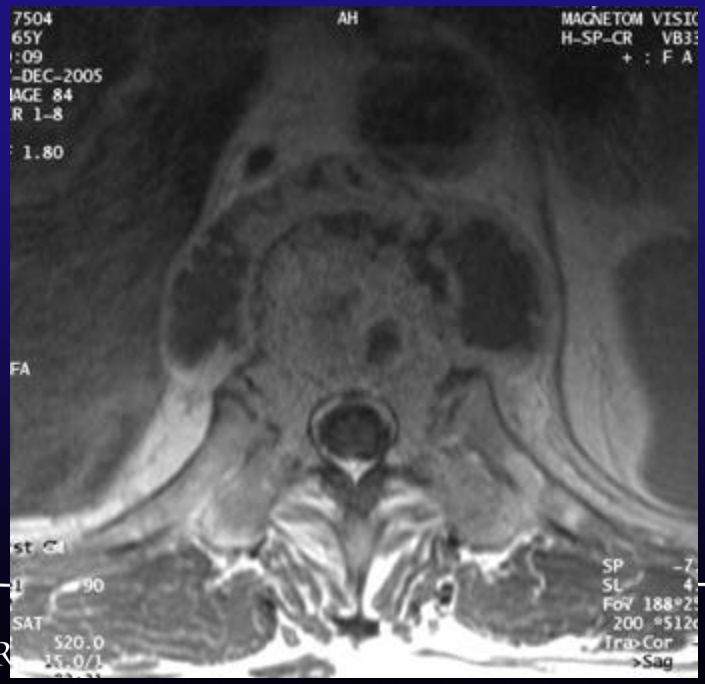
F.G., 63 yrs, multiple mets from Lung Carcinoma

F.G., 63 yrs, multiple mets from Thyroid Carcinoma

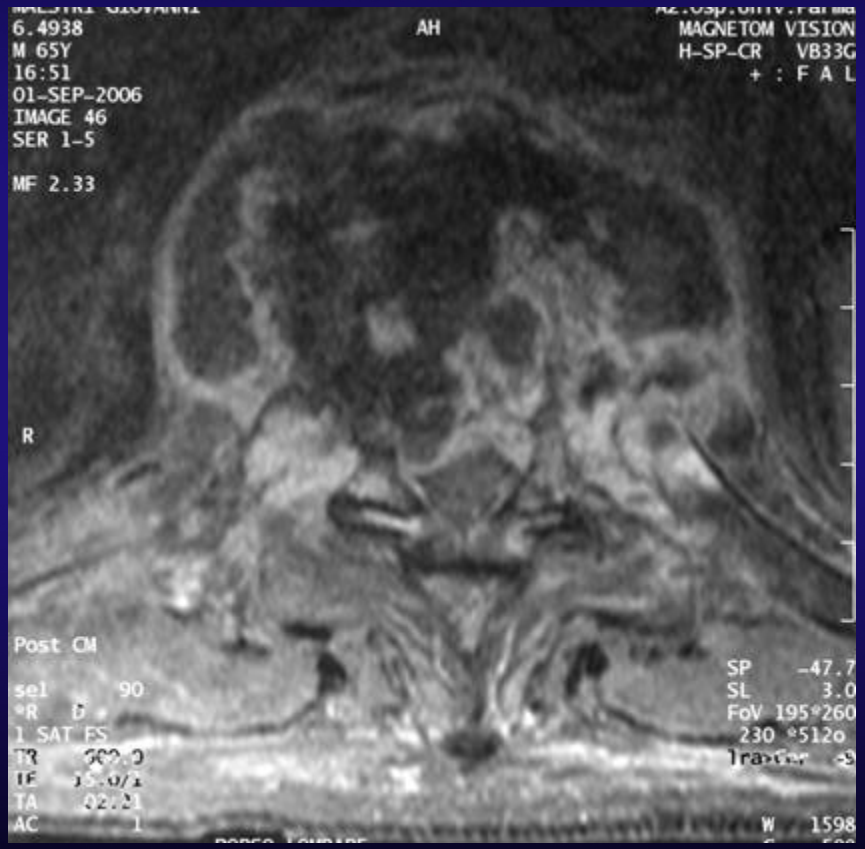


F.G., 64 yrs, 13 months after surgery of humerus

RxT 3600 Gy

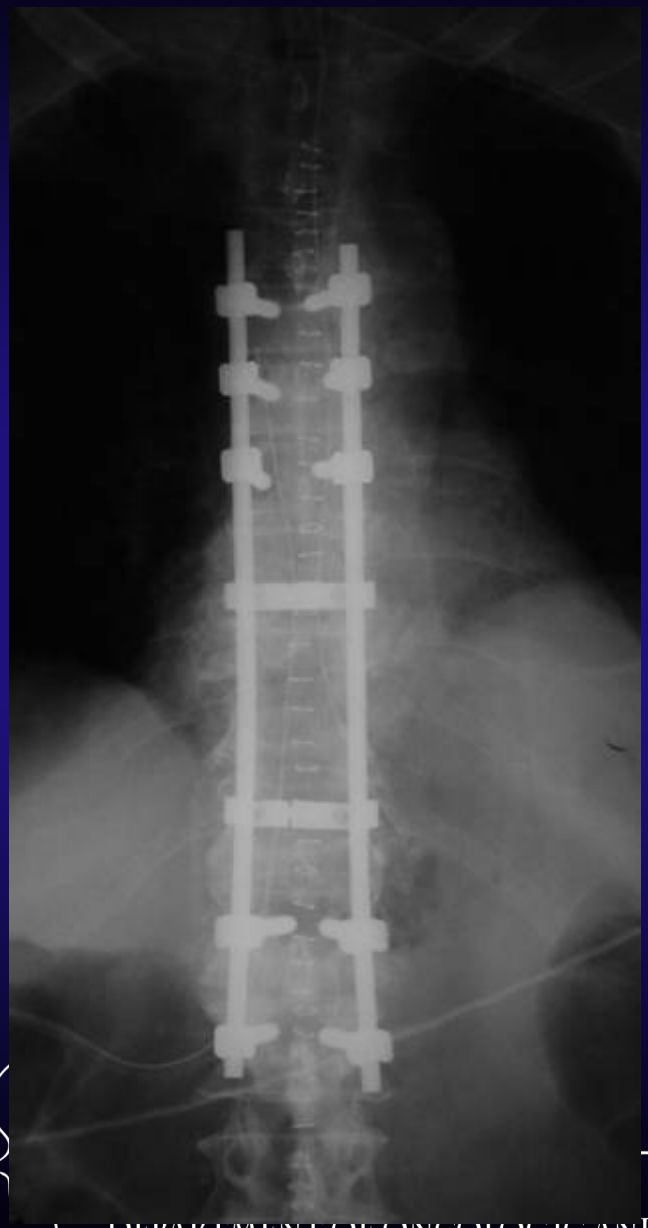


F.G., 64 yrs, 13 months after surgery of humerus



Paraplegia progression

F.G., 64 yrs, 13 months after surgery of humerus



TBC

METASTATIC TUMORS OF THE SPINE

"... selection of the appropriate treatment means avoiding a treatment neither too shy, unable to get a local control, nor too aggressive, exposing the patient to unnecessary morbidity ..."

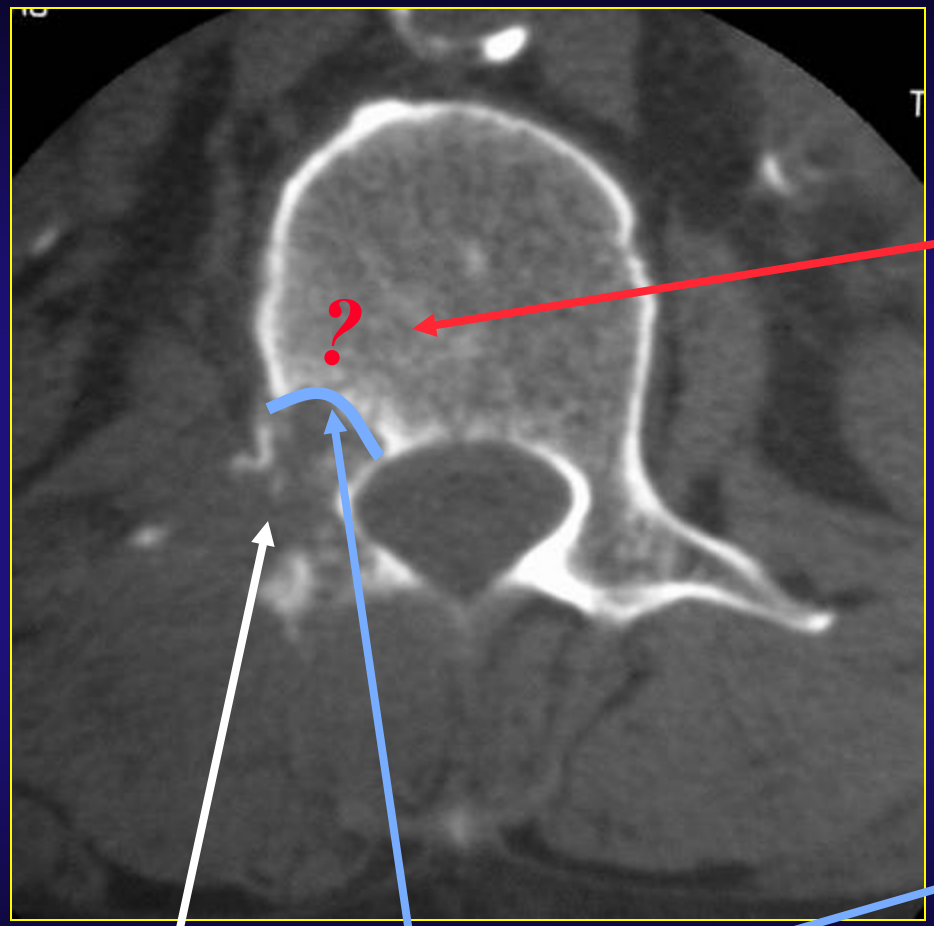
Mario Campanacci 1932-1999

METASTATIC BONE TUMORS OF THE SPINE SYSTEMIC DISEASE

Oncologic Target:
Local control of the disease

Clinical Target:
Quality of Life

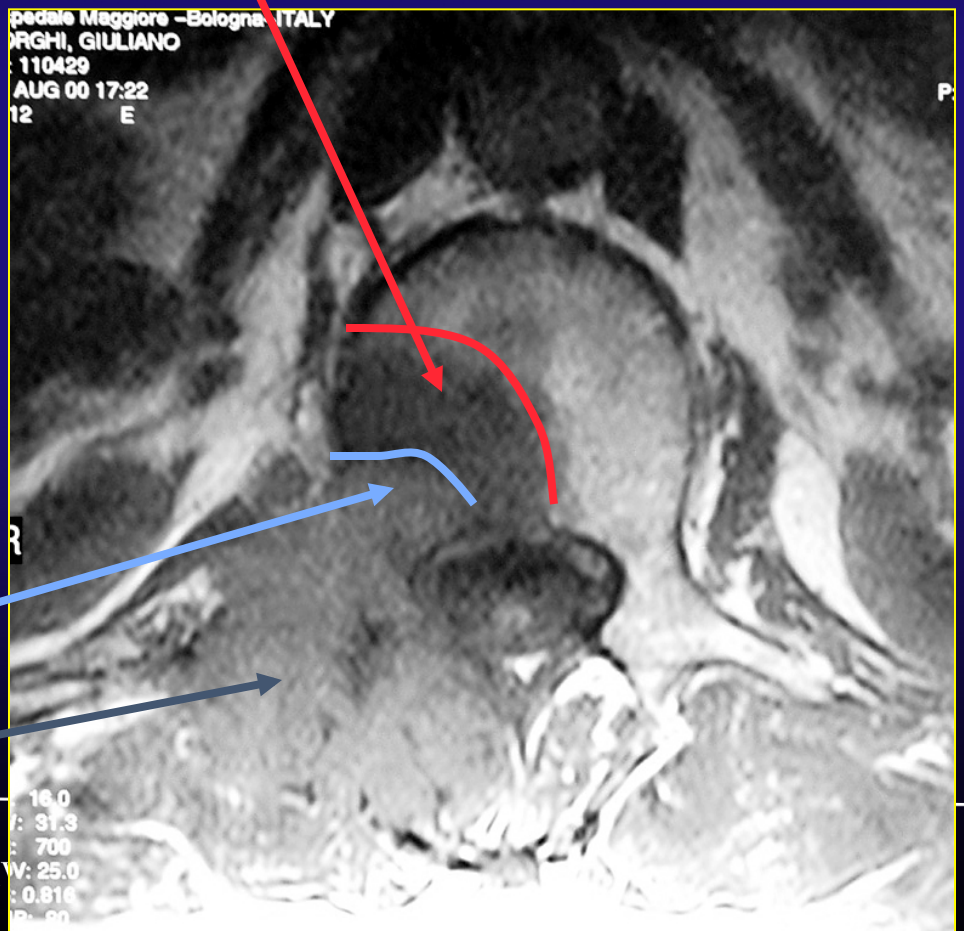
Definitions of tumoral and peritumoral areas



PSEUDOCAPSULE

CAPSULE

TUMOR

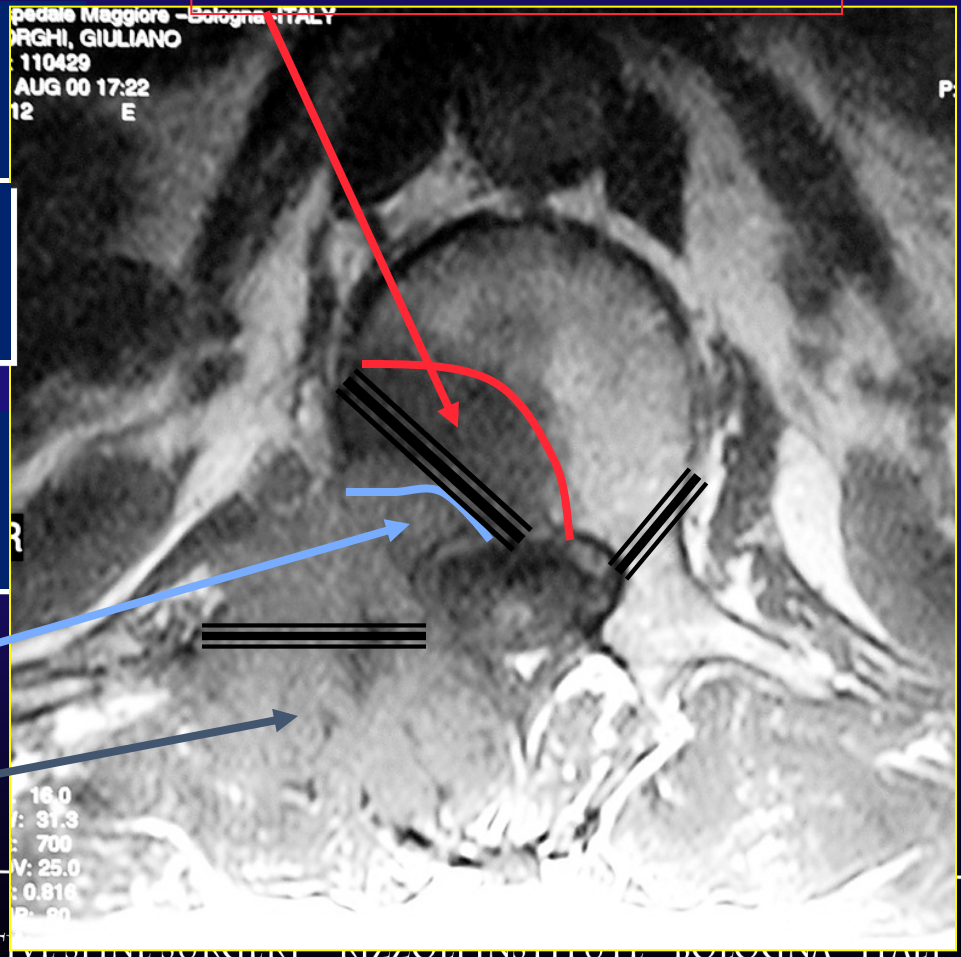


Definitions of Margins

WIDE
En-bloc excision
outside the pseudocapsule

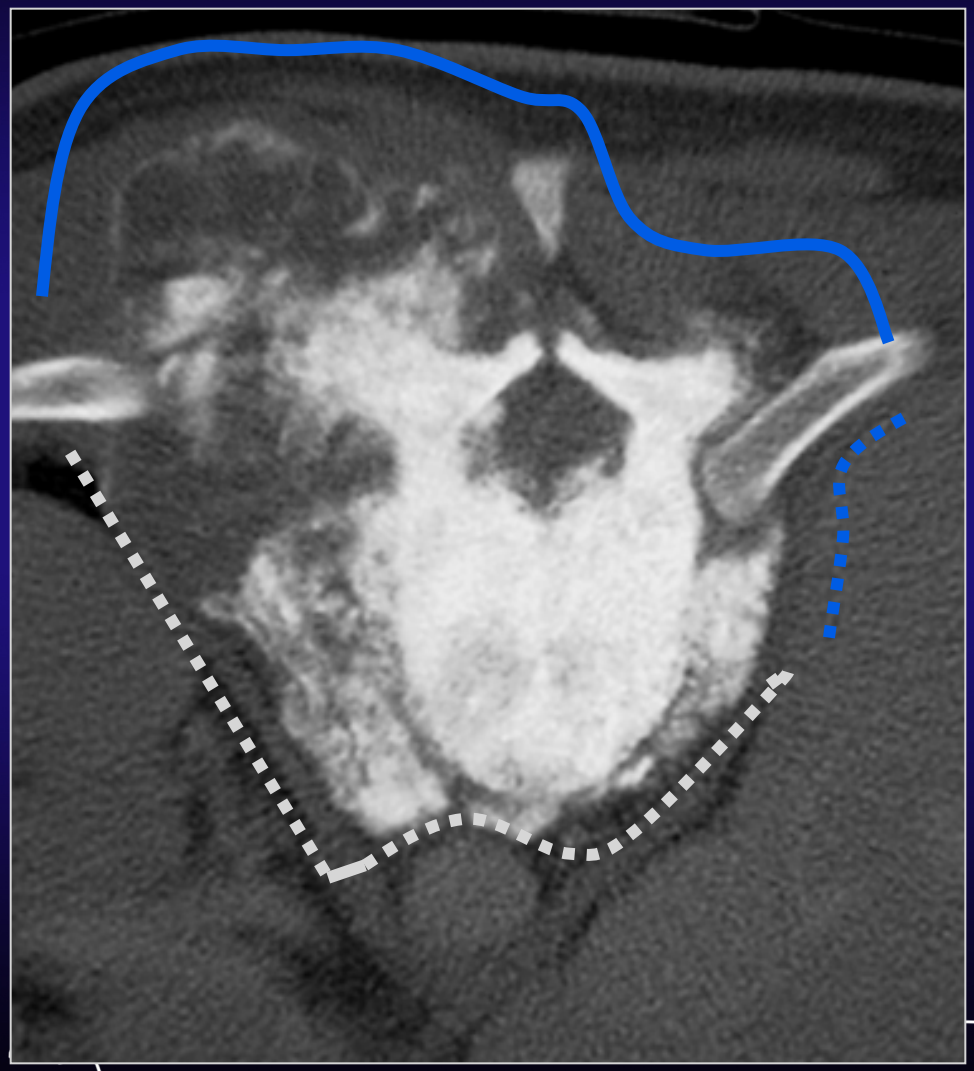
MARGINAL
En-bloc excision
along the pseudocapsule

INTRALESIONAL
En-bloc excision
within the tumor



C.C, f, 17 yrs. T11 Osteosarcoma

treated with Wide margin surgery



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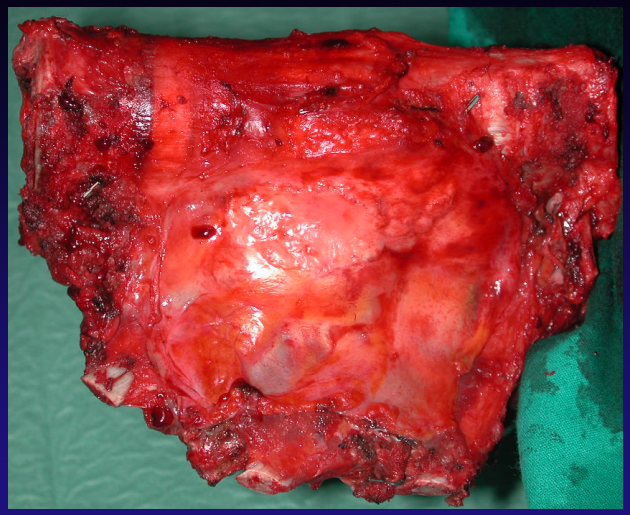
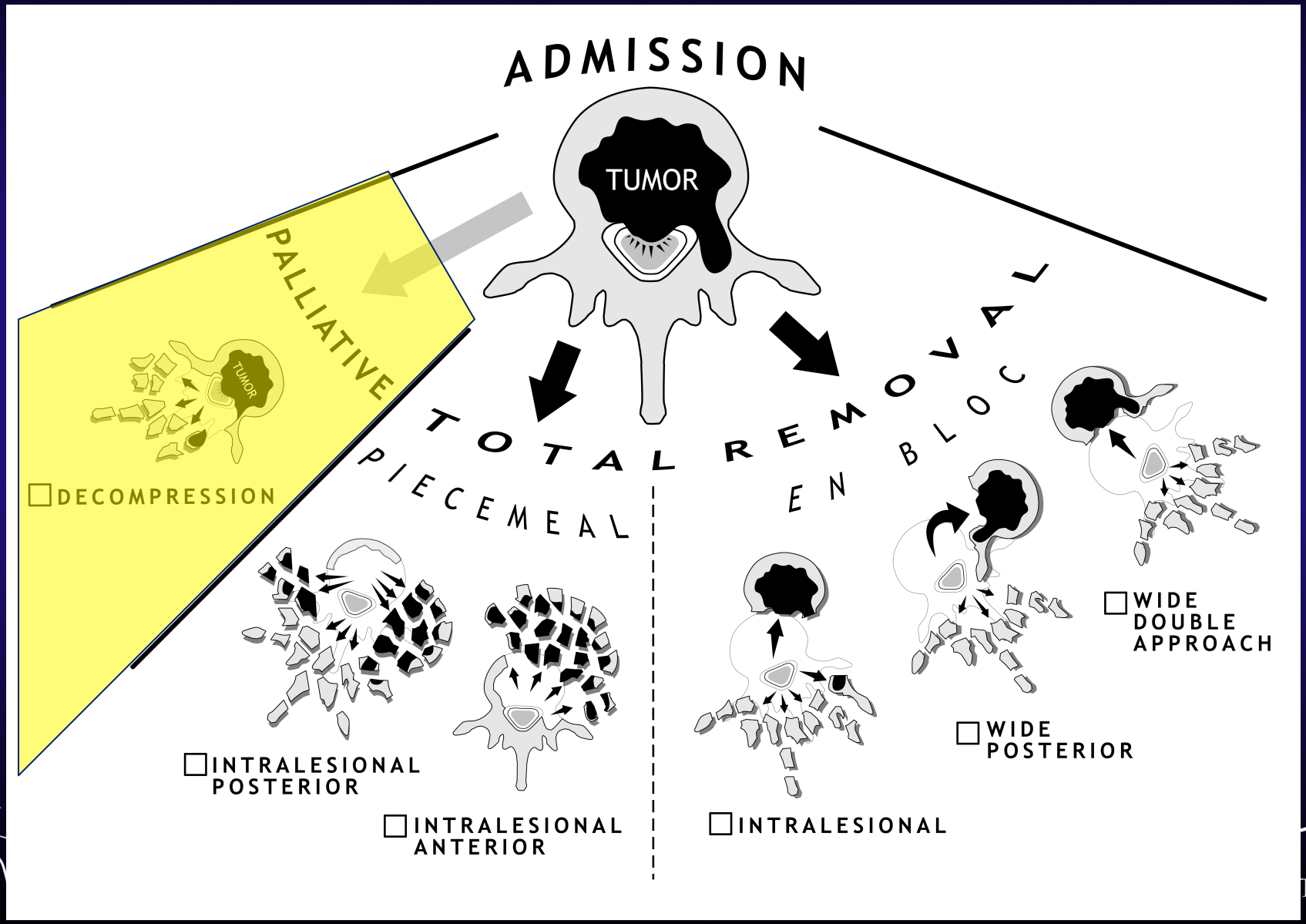
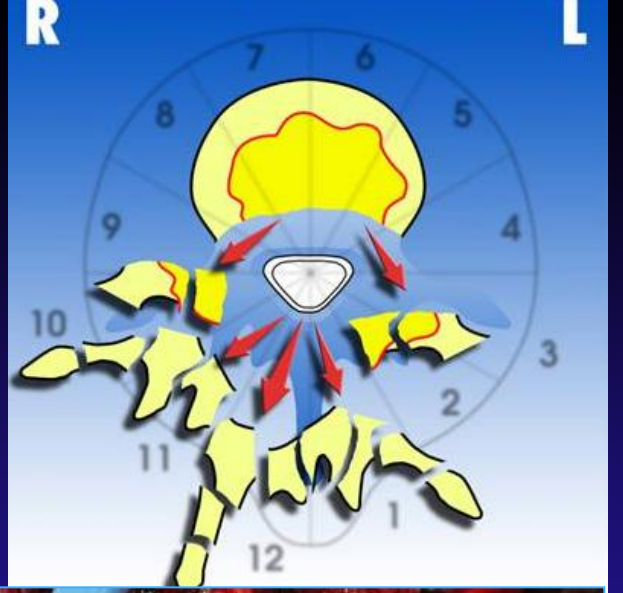


METASTATIC BONE TUMORS OF THE SPINE



Decompression and Stabilization

B.A., 59 yrs., T10-T12, breast mets



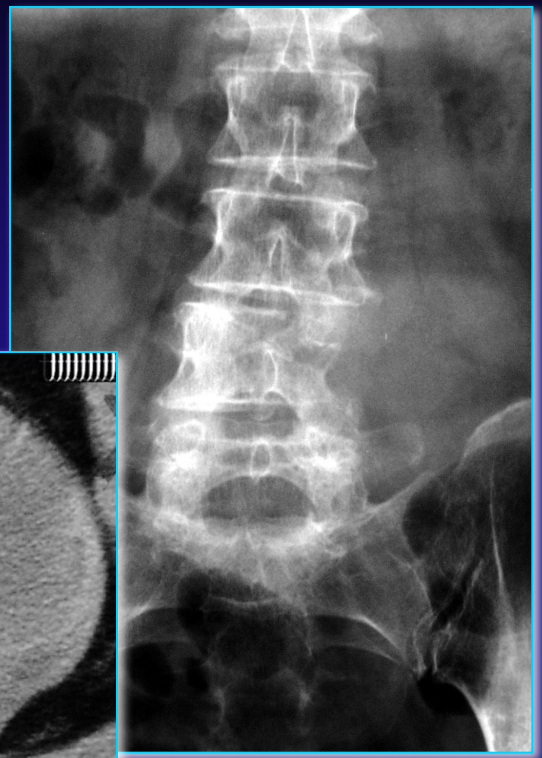
… w.out reconstruction of anterior column

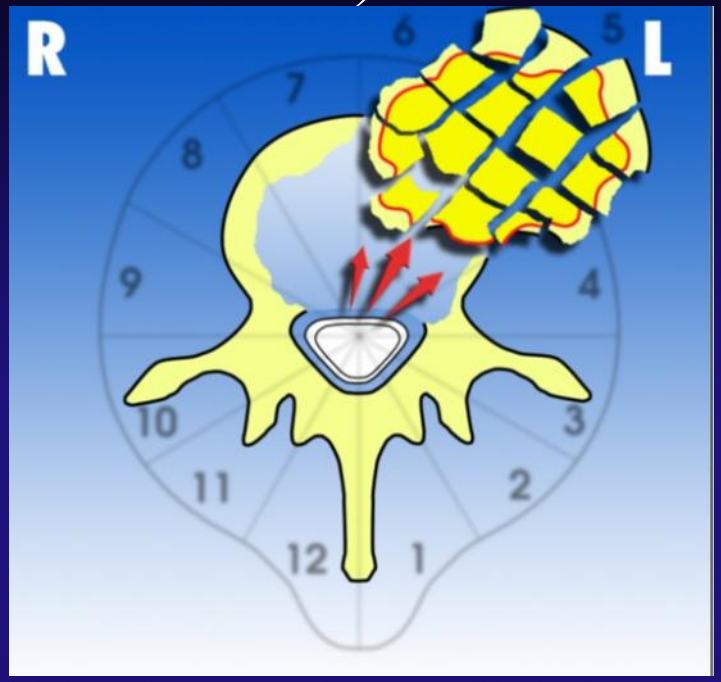
Decompression and Stabilization

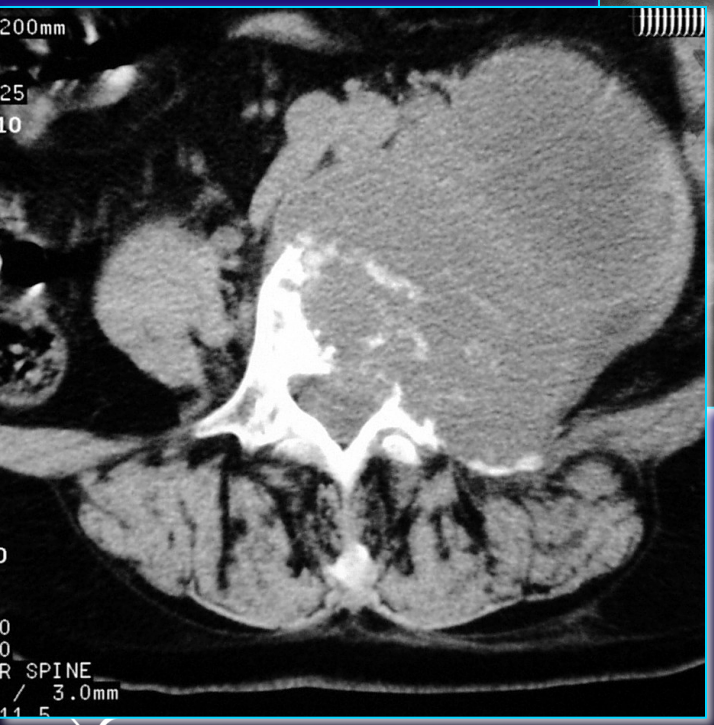
B.A., 59 yrs., T10-T12, breast mets
Complete neurological recovery and reconstructon of anterior column

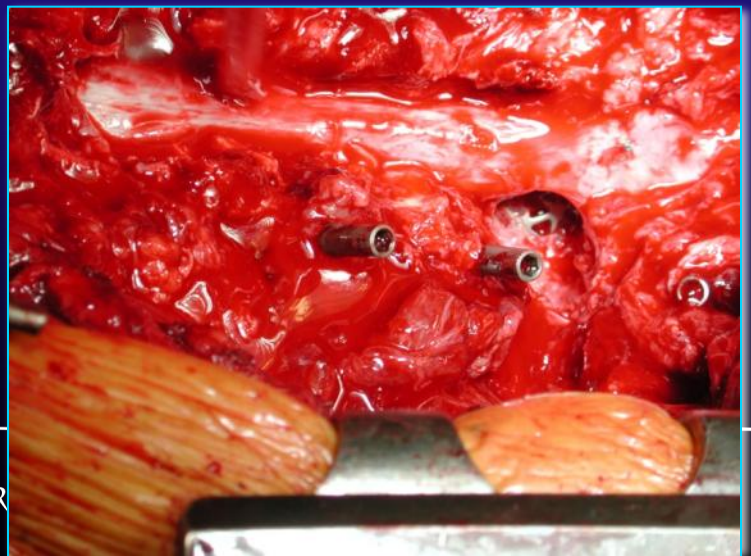
6 mths after RTR, CHT and diphosphonate

Debulking
(intralesional "extracapsular" excision)





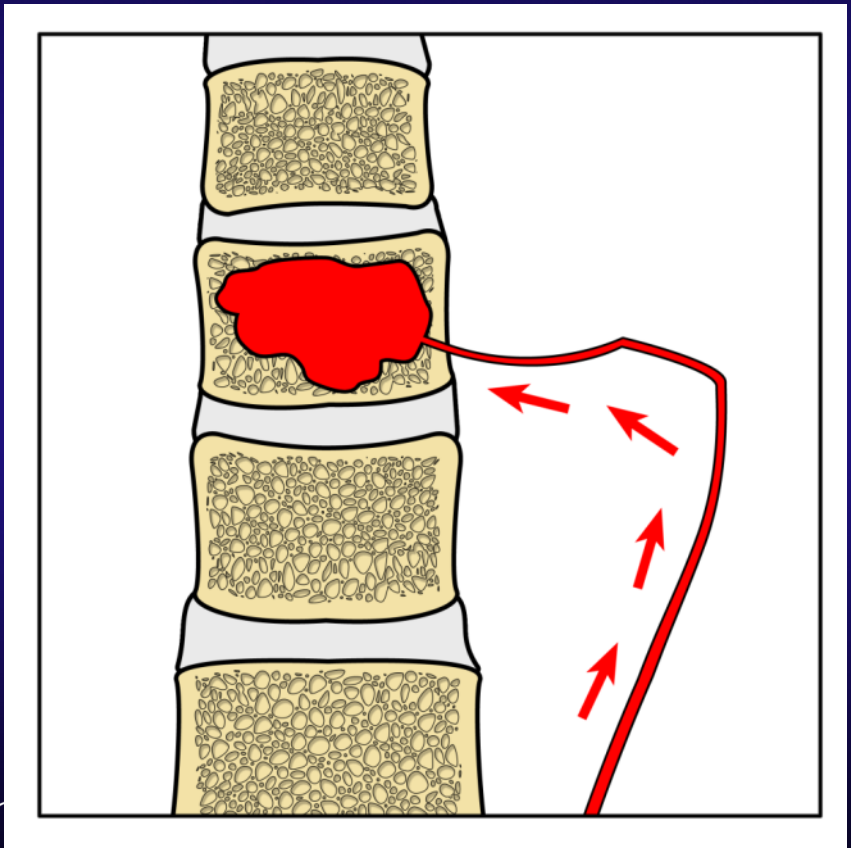


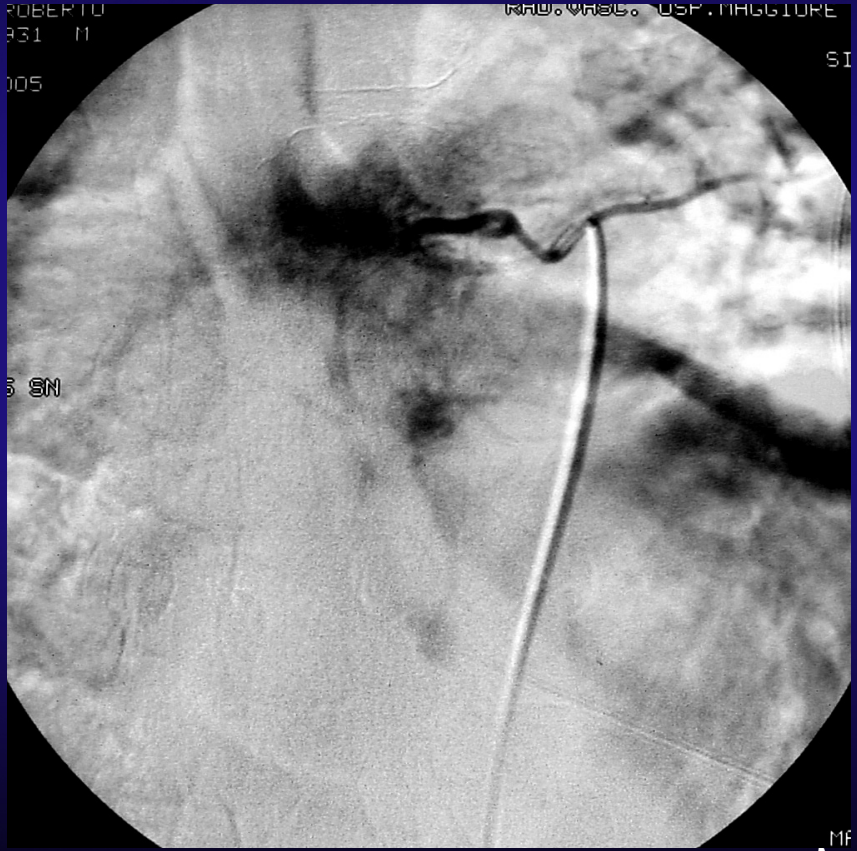


M.M., f, 65 yrs., L4, uterus met

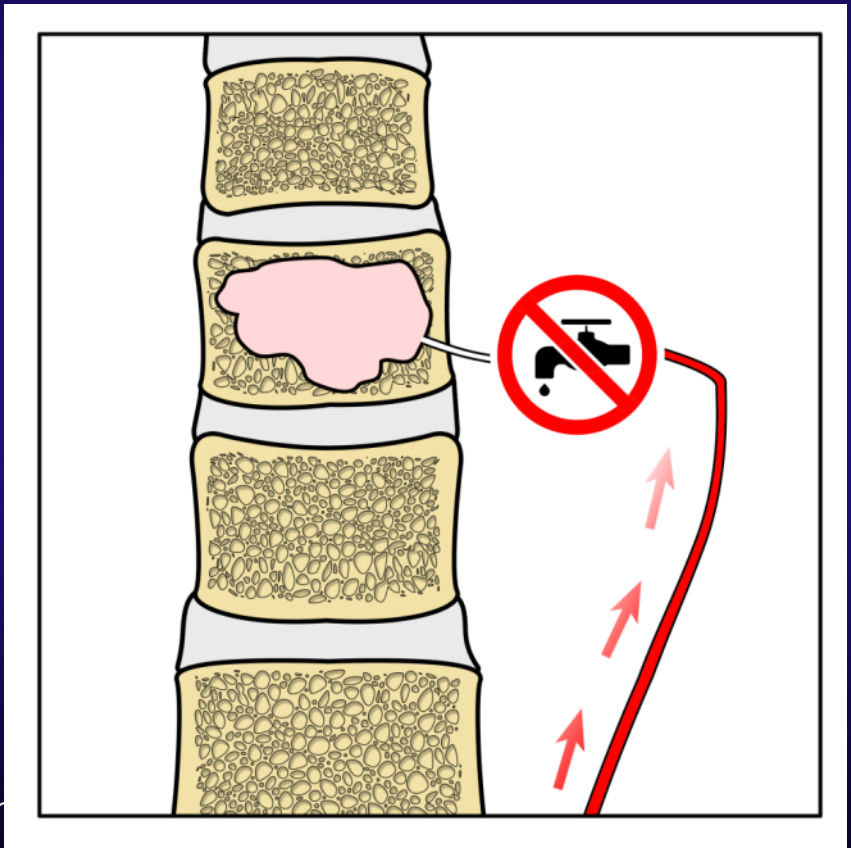
GENERATIVE SPINE SUR

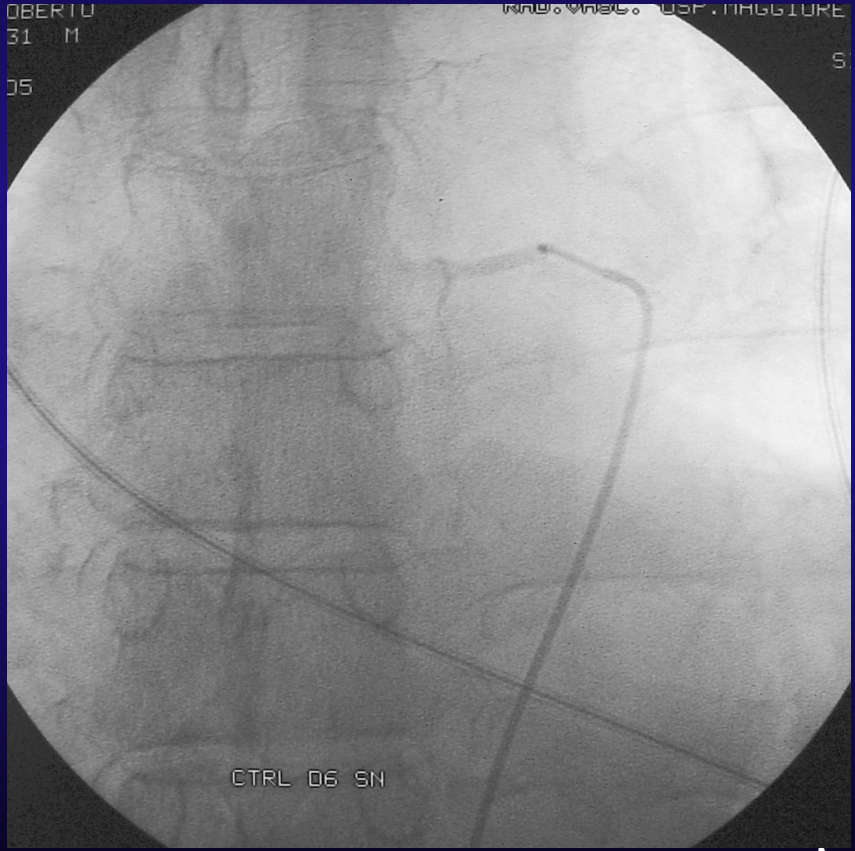
Selective Arterial Embolization



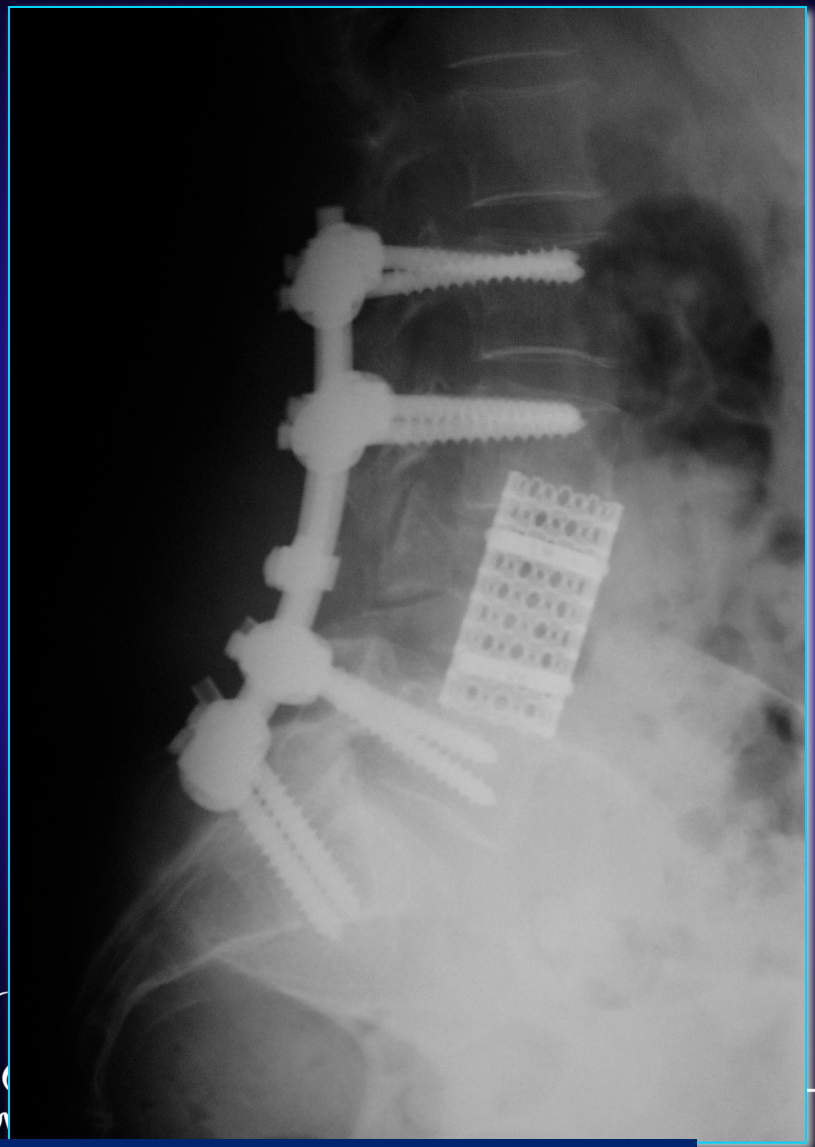


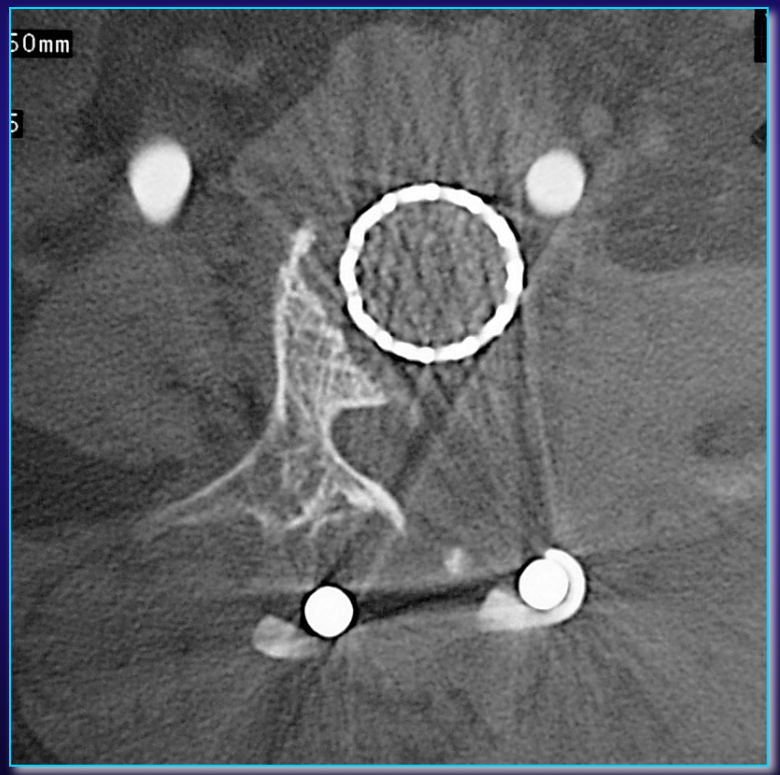
Selective Arterial Embolization





Debulking
(intralesional "extracapsular" excision)



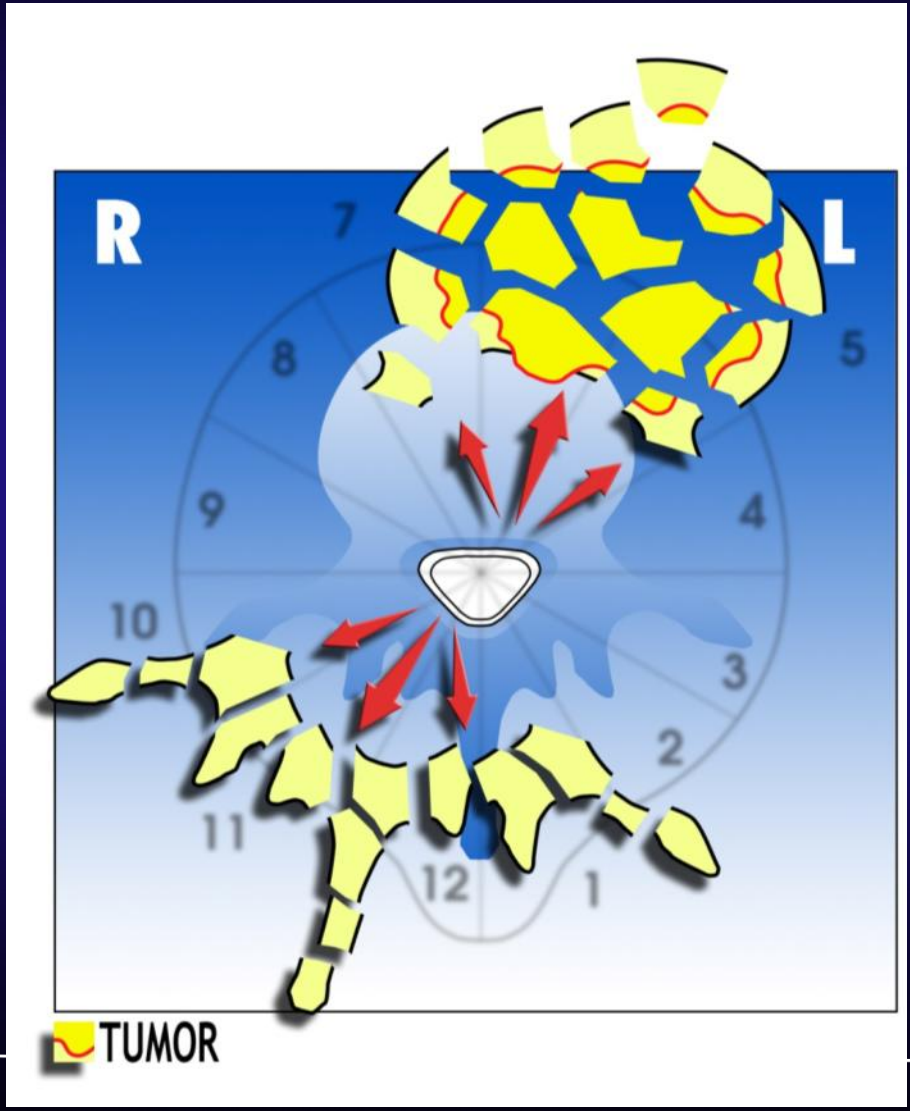


M.M., f, 65 yrs., L4, uterus met

Vertebrectomy

- Surgical removal of all the anatomical elements of a vertebra

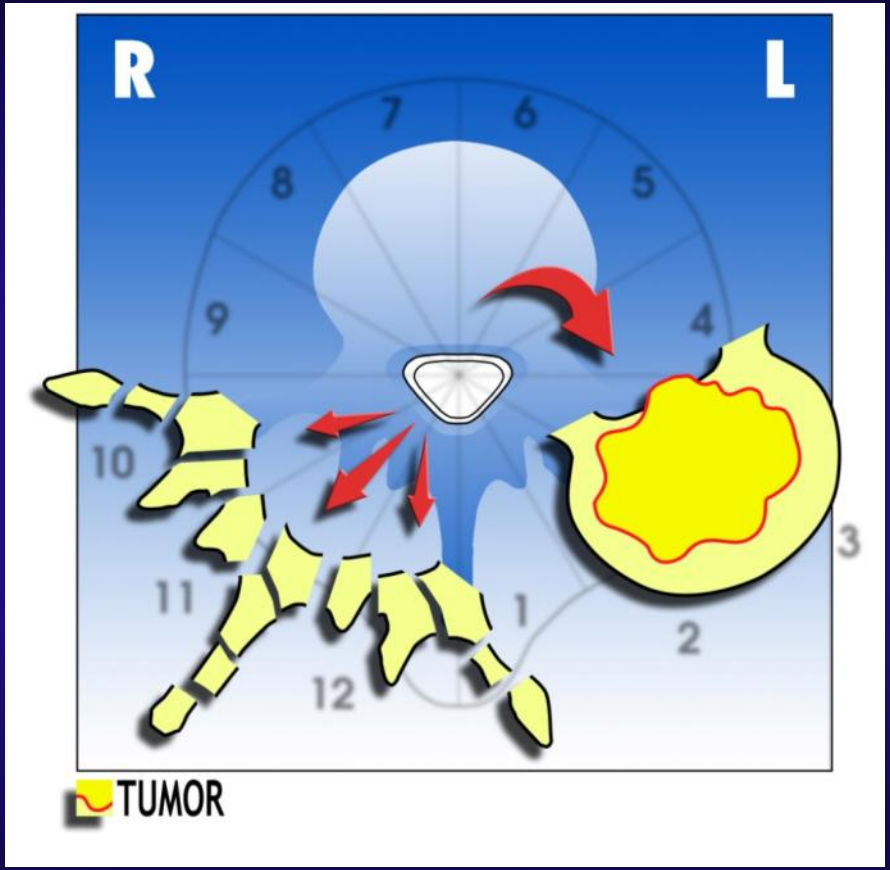
Intralesional (piecemeal, curettage) ("debulking" if subtotal)



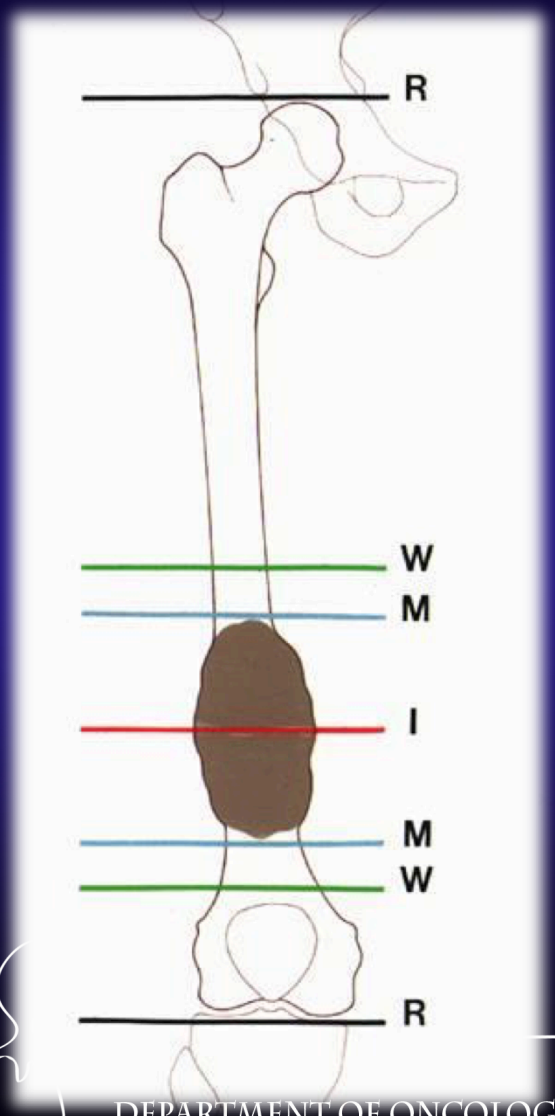
Vertebrectomy

- Surgical removal of all the anatomical elements of a vertebra

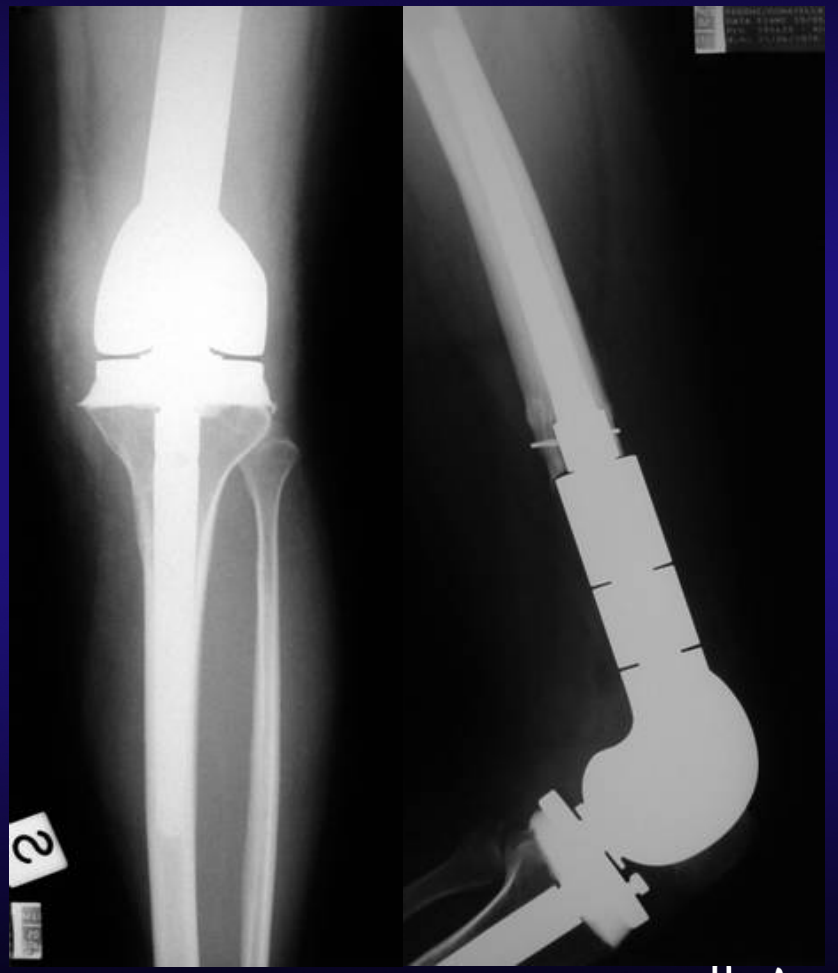
En bloc
(vertebral body enbloc resection)



“En Bloc” Resection in the Limbs

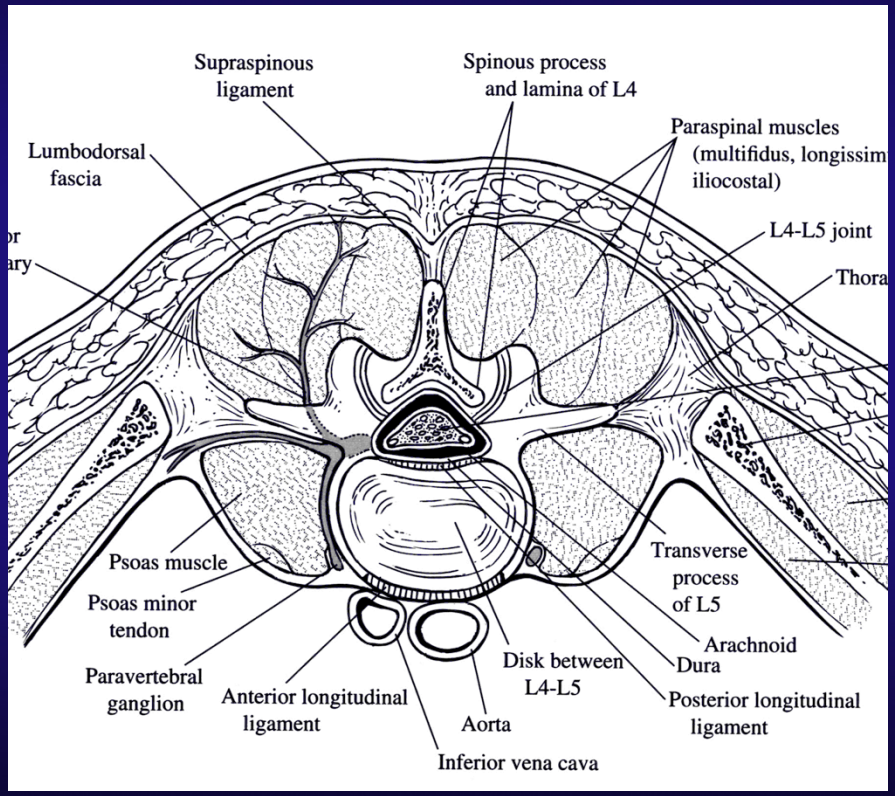


“En Bloc” Resection in the Limbs



“En Bloc” Resection in the Spine

- *Unresectable structures*
- *Severe functional loss*
- *High I-O morbidity*
- *Technically demanding procedures*



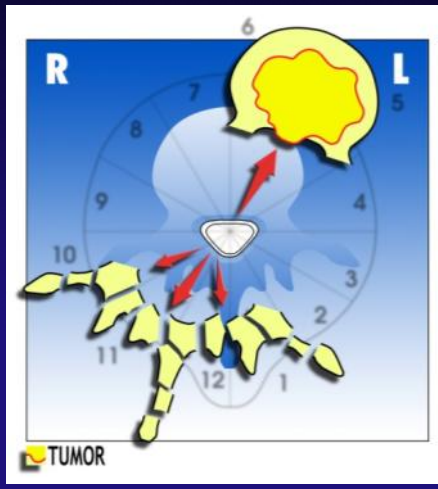
EN BLOC RESECTION IN METASTASES OUT OF 141 *VERTEBRECTOMY*

PSEUDOTUMORS	2
BENIGN	23
PRIMITIVE MALIGNANT	74
METASTASES	42 (29%)

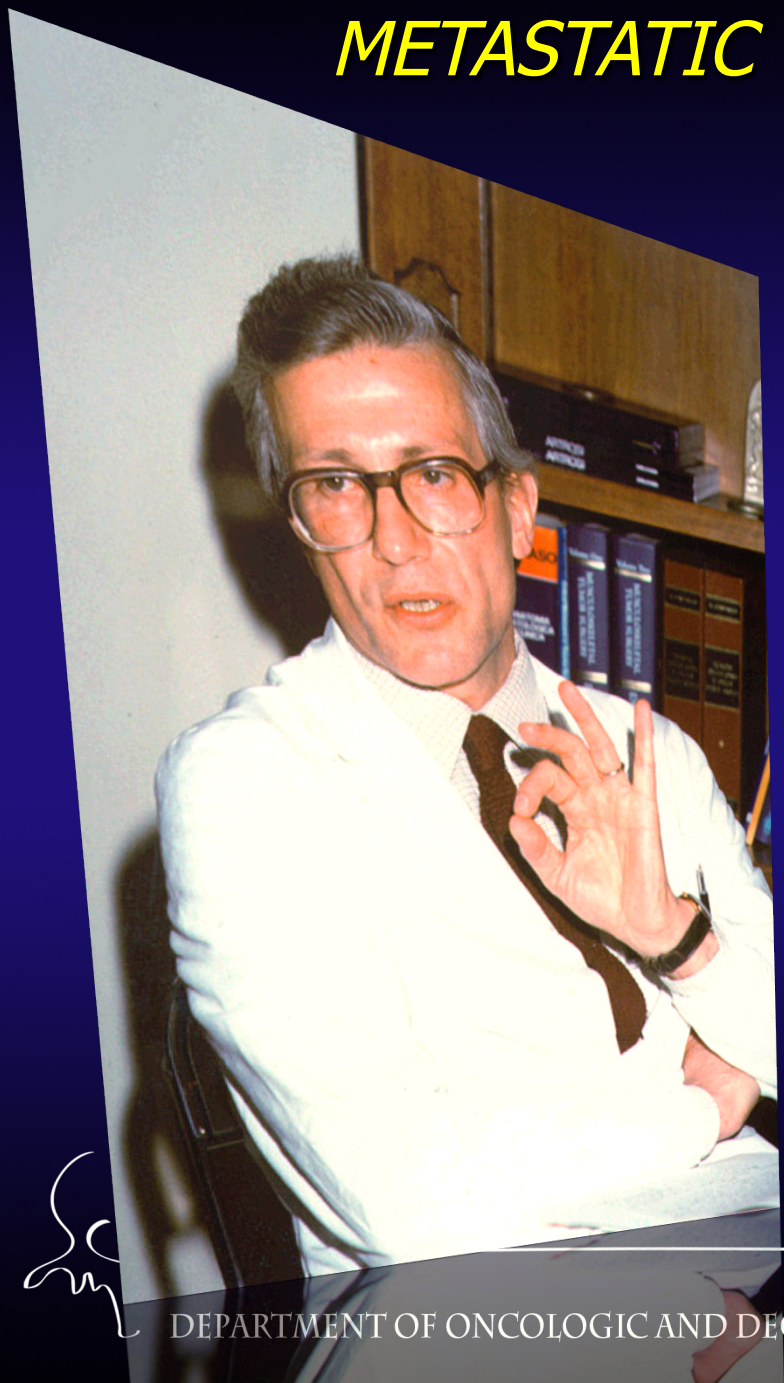
EN BLOC VERTEBRECTOMY IN METASTATIC BONE TUMORS OF THE SPINE

12% of cases

42/350



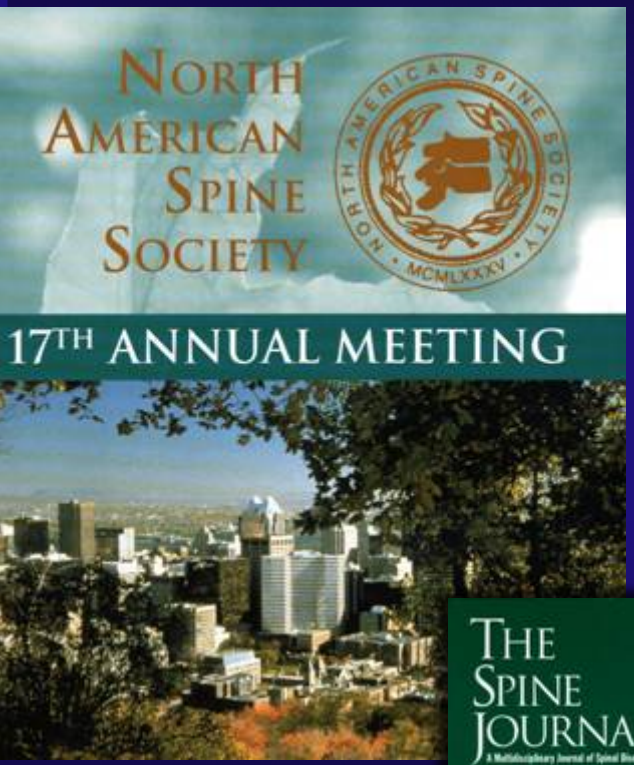
METASTATIC TUMORS OF THE SPINE



- *Patient-Centered Medicine*
- *Meritocracy*
- *International Relationships*
- *Multi-Disciplinar Approach*

Mario Campanacci 5 luglio 1996

Tokuhashi Scoring System

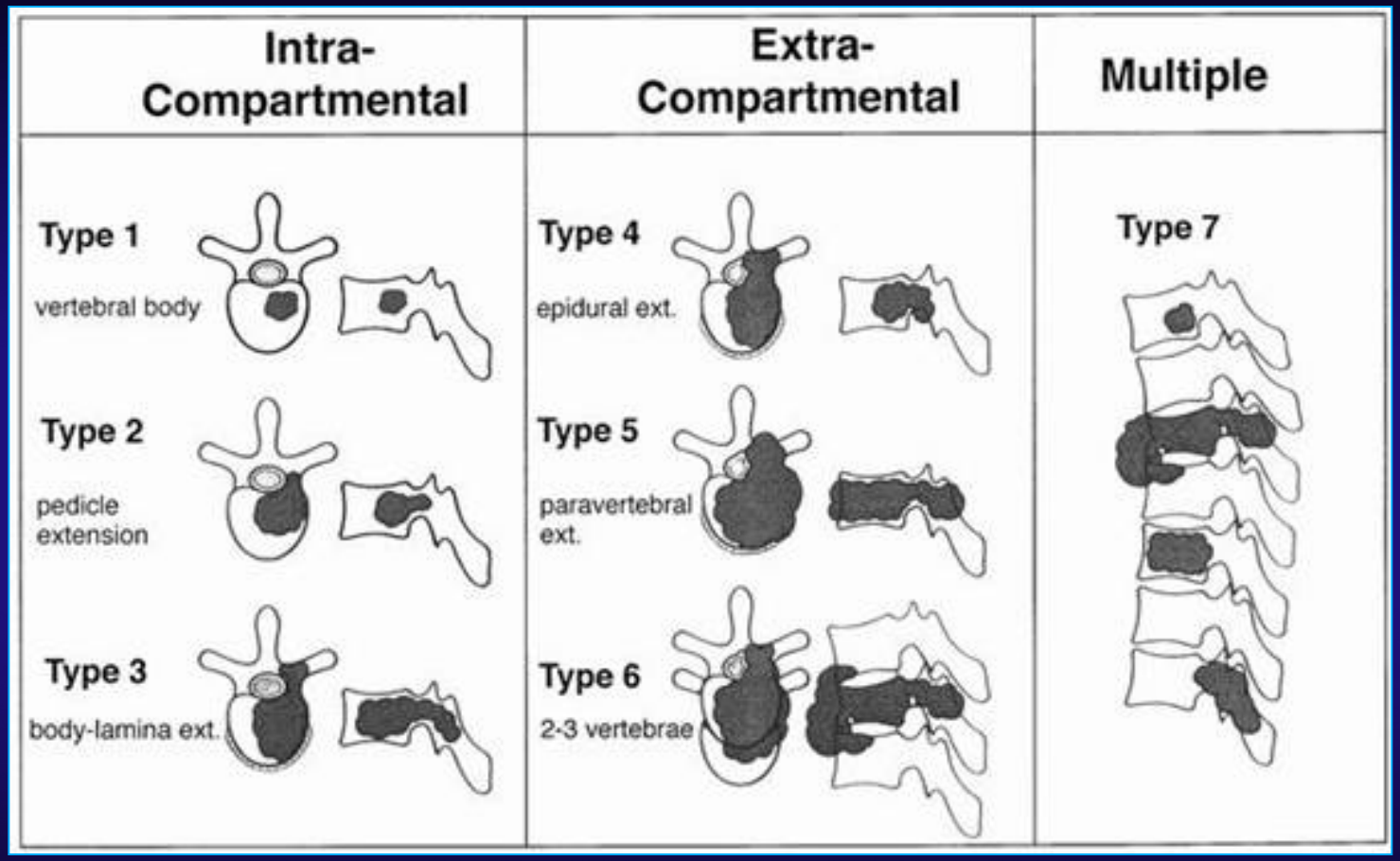


Scoring System for the Preoperative Evaluation of Metastatic Spine Tumor Prognosis

YASUAKI TOKUHASHI, MD, HIROMI MATSUZAKI, MD, SADAYOSHI TORIYAMA, MD, HISASHI KAWANO, MD, and SHUNZO OHSAKA, MD

A revised scoring system for preoperative evaluation of metastatic spine tumor prognosis. Y. Tokuhashi et al., 2002.

Classification according to Tomita score



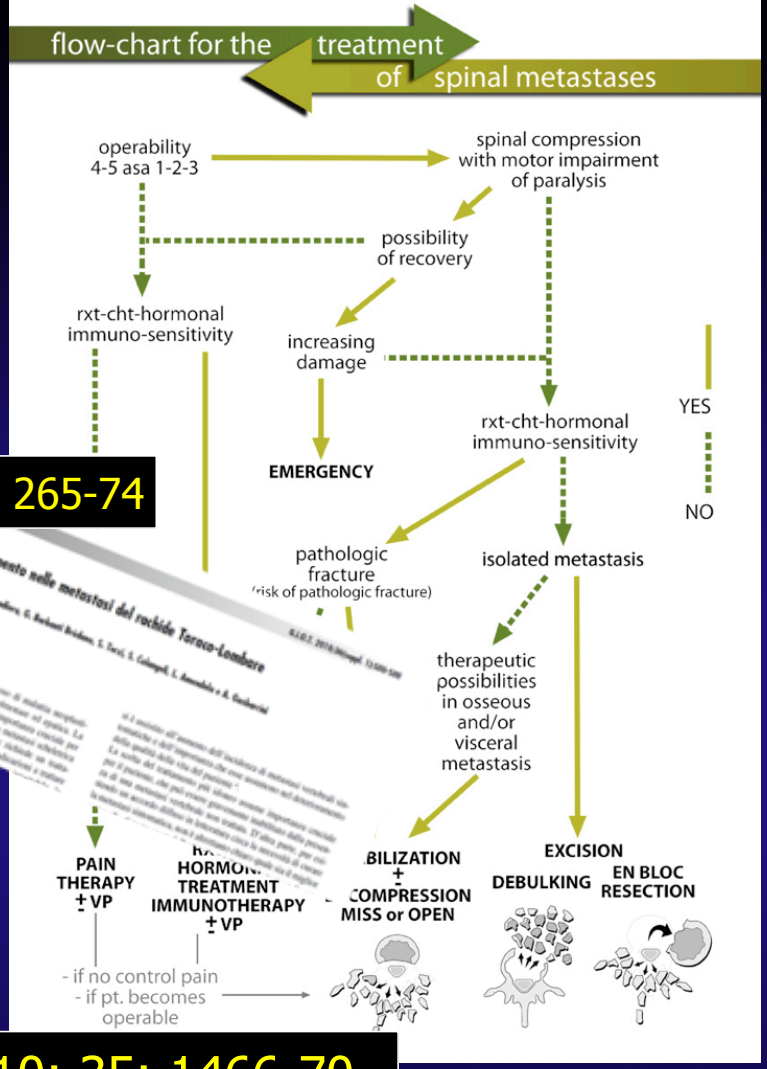
K. Tomita, N. Kawahara, T. Kobayashi, A. Yoshida, H. Murakami, and T. Akamaru. Surgical strategy for spinal metastases. Spine 26 (3):298-306, 2001.

Scoring Systems

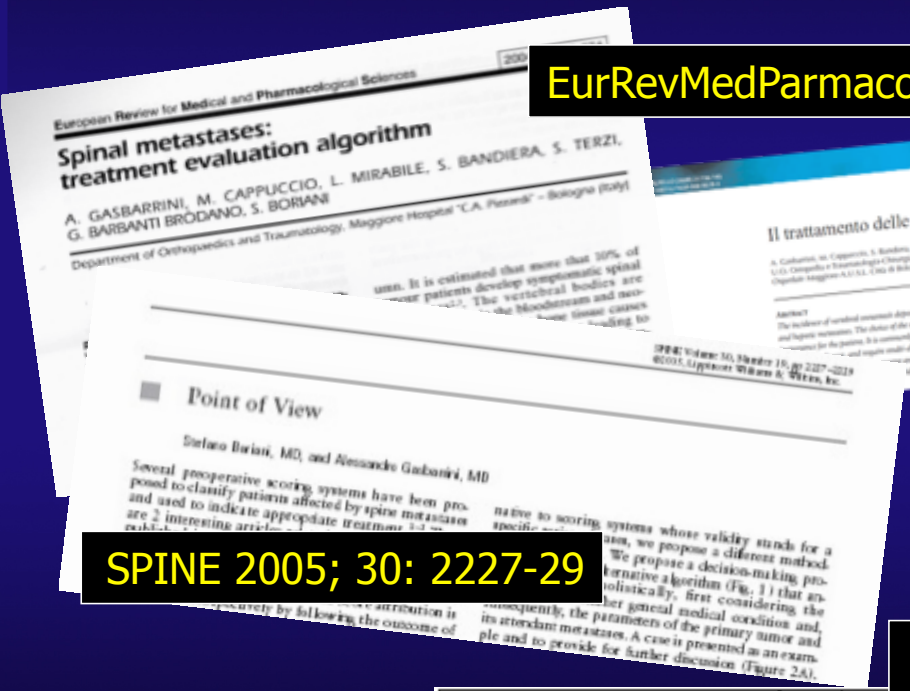
- A point system for different disease parameters
- Indication for treatment based on cumulative points

- Does NOT account for the patient's overall status
- Relevance of parameters can vary from patient to patient

SPINAL METASTASES TREATMENT FLOW-CHART



EurRevMedParmacolSci 2004; 8: 265-74


European Review for Medical and Pharmacological Sciences

Spinal metastases: treatment evaluation algorithm

A. GASBARRINI, M. CAPPUCCIO, L. MIRABILE, S. BANDIERA, S. TERZI, G. BARBANTI BRODANO, S. BORIANI

Department of Orthopaedics and Traumatology, Maggiore Hospital "C.A. Pizzardi" – Bologna (Italy)

SPINE 2005; 30: 2227-29

Point of View

Stefano Boriani, MD, and Alessandro Gasbarrini, MD

SPINE 2010; 35: 1466-70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Efficacy Evaluation of a New Treatment Algorithm for Spinal Metastases

Alessandro Gasbarrini, MD,* Haomiao Li, MD,† Michele Cappuccio, MD,‡ Loris Mirabile, MD,‡ Stefania Paderni, MD,‡ Silvia Terzi, MD,‡ and Stefano Boriani, MD*

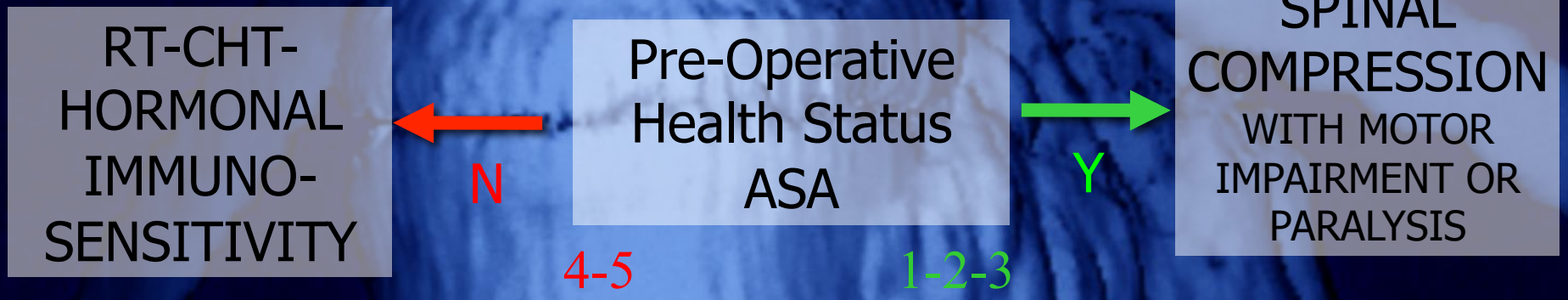
Components of the Algorithm

Decision points:

- *Suitability for surgery*
- *Neurological status*
- *Sensitivity to non-surgical therapies*
- *Pathologic Fracture*
- *Involvement of other organs and systems*

Clinical and radiographic parameters evaluated in an individualized manner

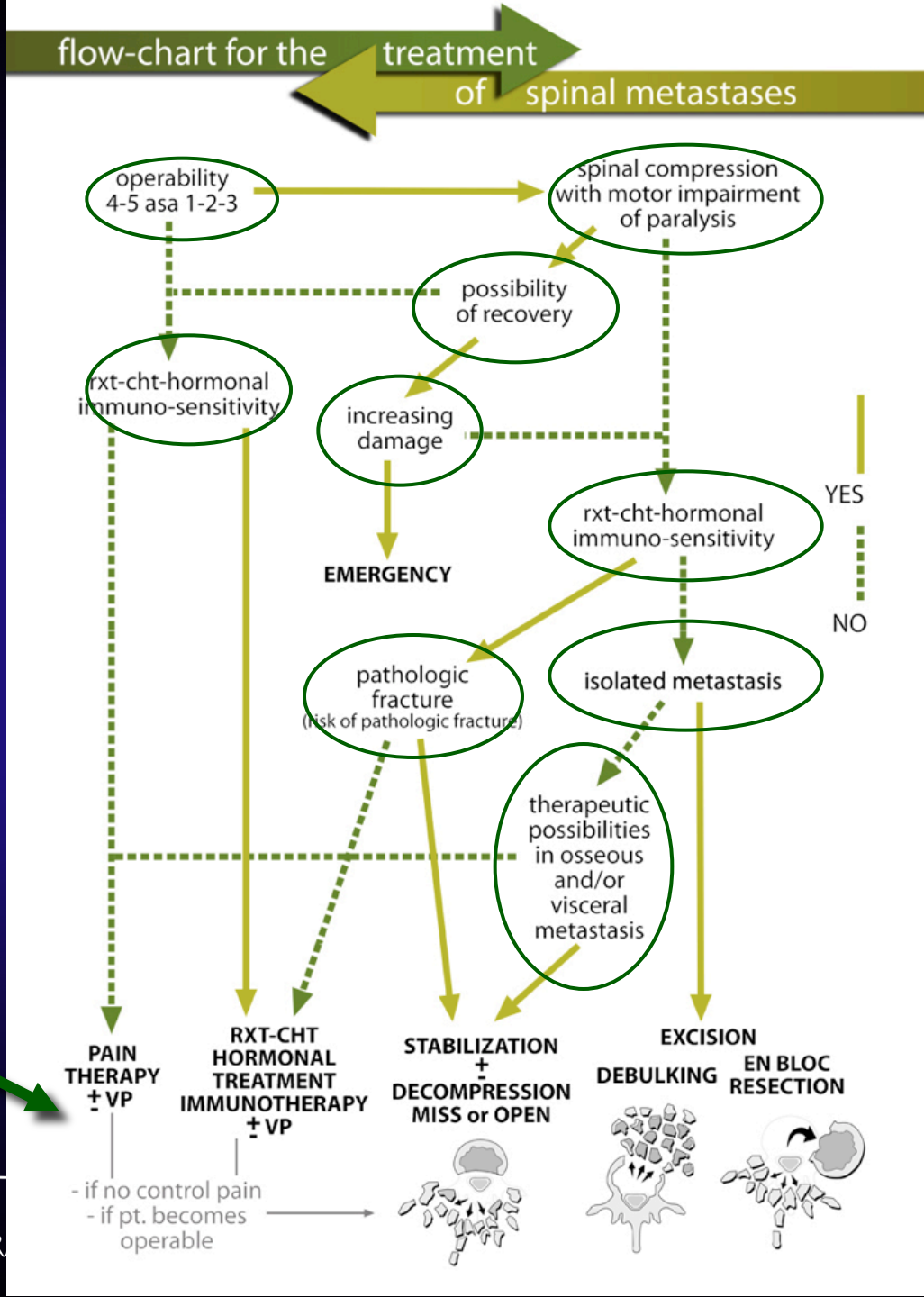
SPINAL METASTASES TREATMENT FLOW-CHART



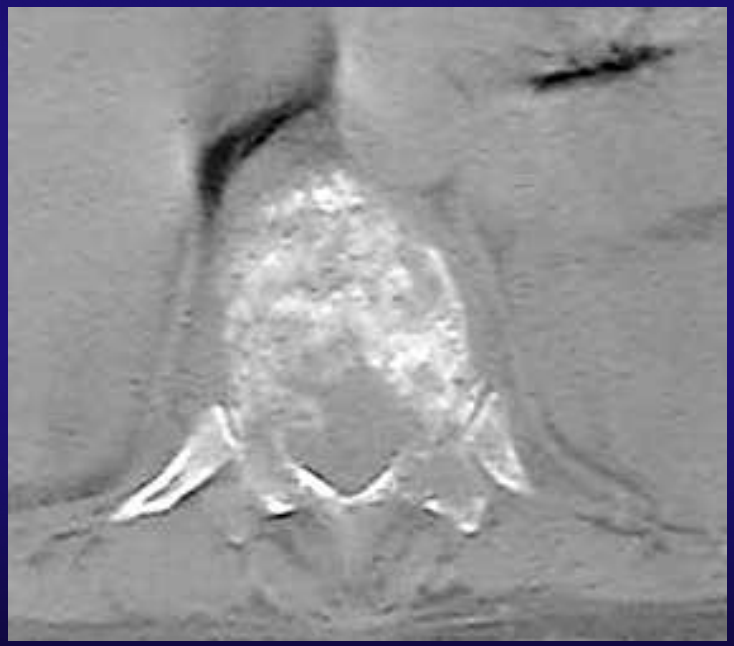
SPINAL METASTASES TREATMENT FLOW-CHART

Decision Points

Treatment options



C.T., 43 yrs., ASA score: 3
T12 isolated Met from Breast Carcinoma
Karnofsky score: 90%
Frankel score: E
No pathologic fracture
Δt: 3 years



Excisional surgery

Tokuhashi score		SCORE
1. General function status-Karnofsky score (Ks)		
Bad	(Ks 10-40%)	0
Medium	(Ks 50-70%)	1
Good	(Ks 80-100%)	2
2. N° of extraspinal bone metastasis foci (Tc^{99}MDP Scan)		
> o = 3		0
1-2		1
0		2
3. N° of spinal metastasis foci (MRI)		
> o = 3		0
2		1
1		2
4. Metastases at internal organs (CT chest, US abdomen)		
No surgical treatment option		0
Surgical treatment option		1
No metastases		2
5. Primary cancer diagnosis		
Lung, stomach		0
Kidney, liver, uterus, unknown		1
Thyroidea, prostate, breast, rectum		2
6. Spinal cord injury (Frankel score)		
Complete	(Frankel A or B)	0
Incomplete	(Frankel C or D)	1
None	(Frankel E)	2
	Total	12

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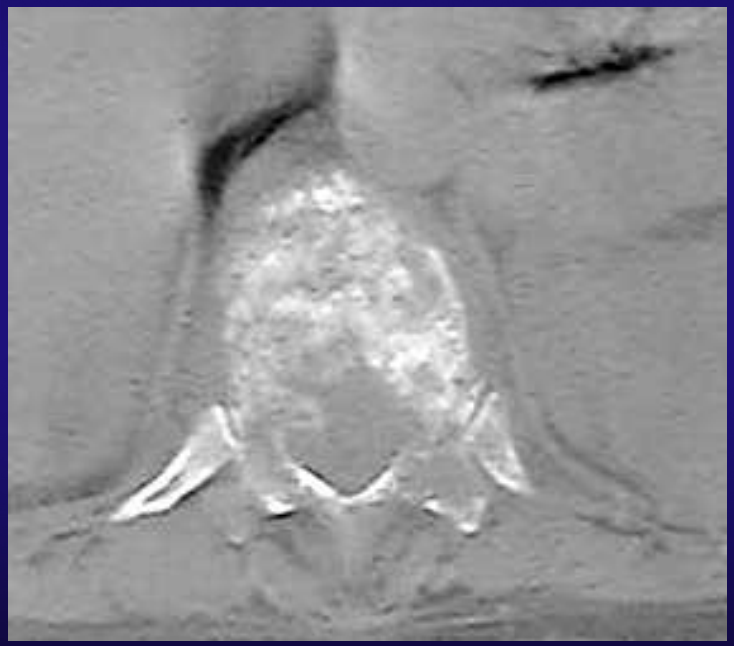

Tomita score	score
Grade of malignancy	
- Slow growth	1
- Moderate growth	2
- Rapid growth	4
Visceral metastases	
- No metastasis	0
- Treatable	2
- Untreatable	4
Bone metastases	
- Solitary/isolated	1
- Multiple	2
total	3

Excisional surgery
(wide or marginal)

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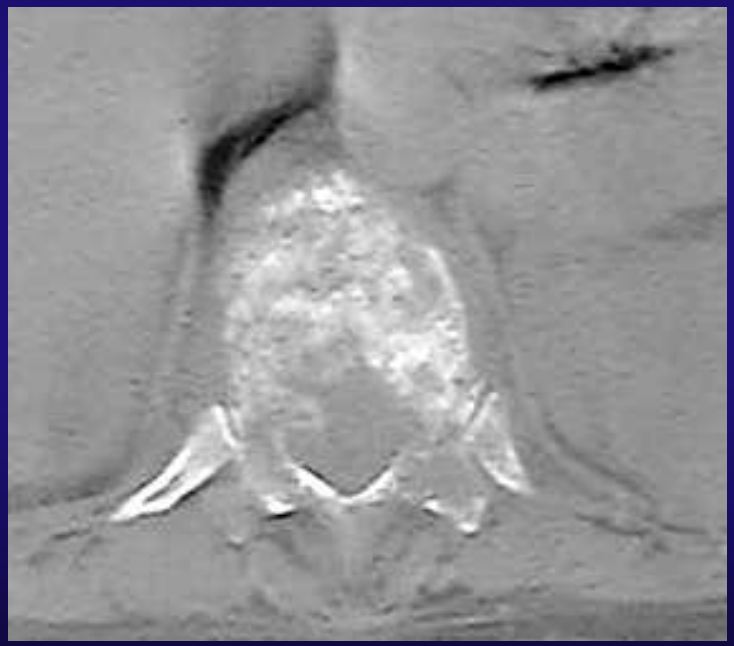
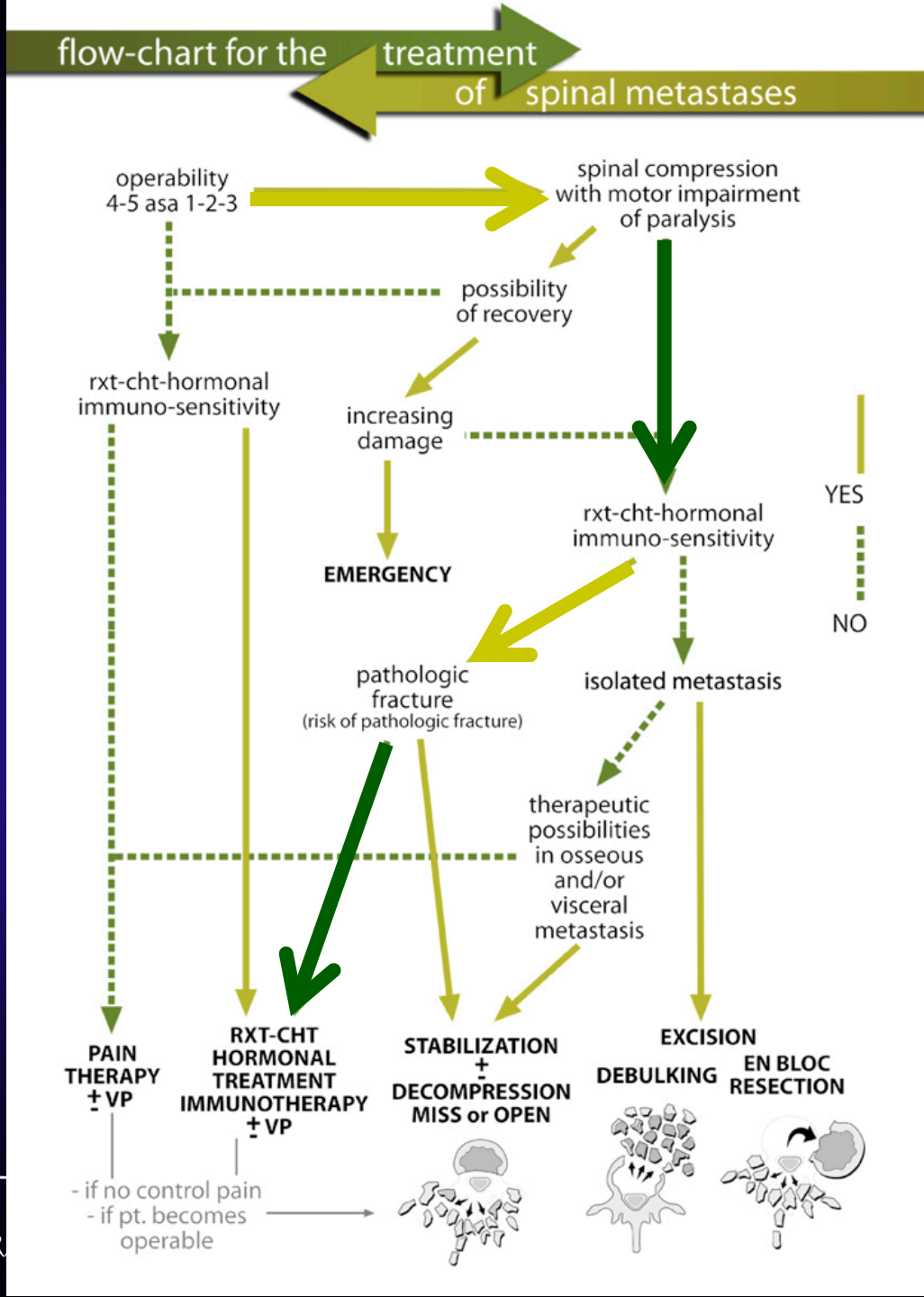
Δt: 3 years



Hormonal and RTR



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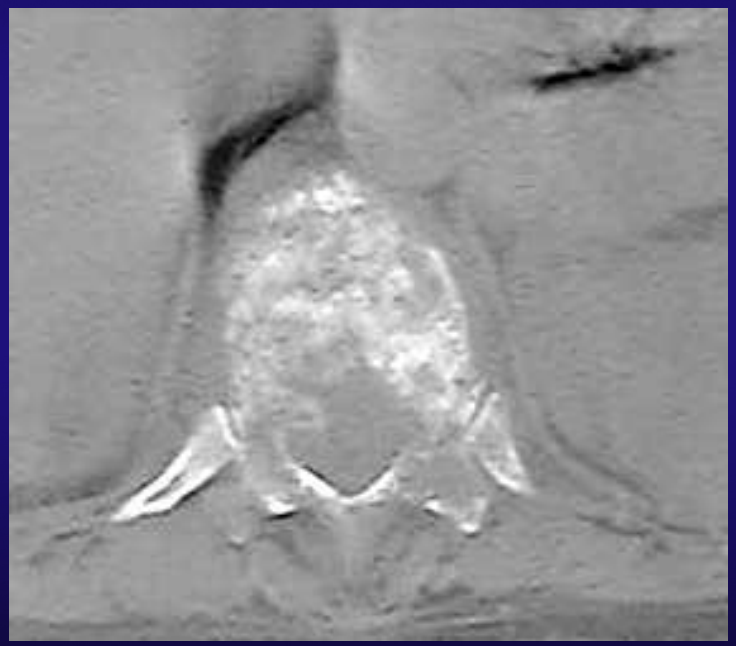
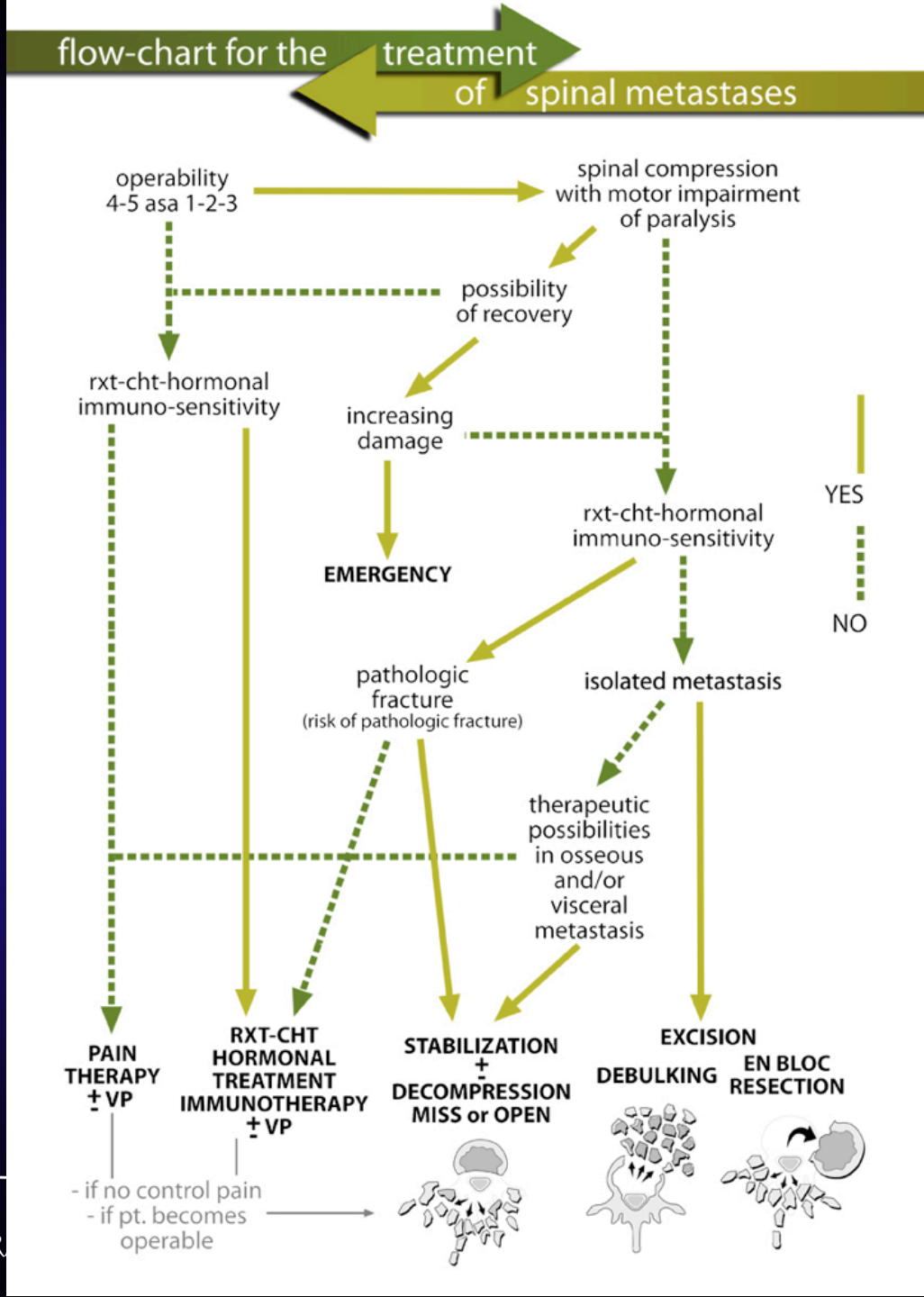
SPINAL METASTASES TREATMENT FLOW-CHART



9 months after Radio and Hormonal tx

SPINAL METASTASES TREATMENT FLOW-CHART

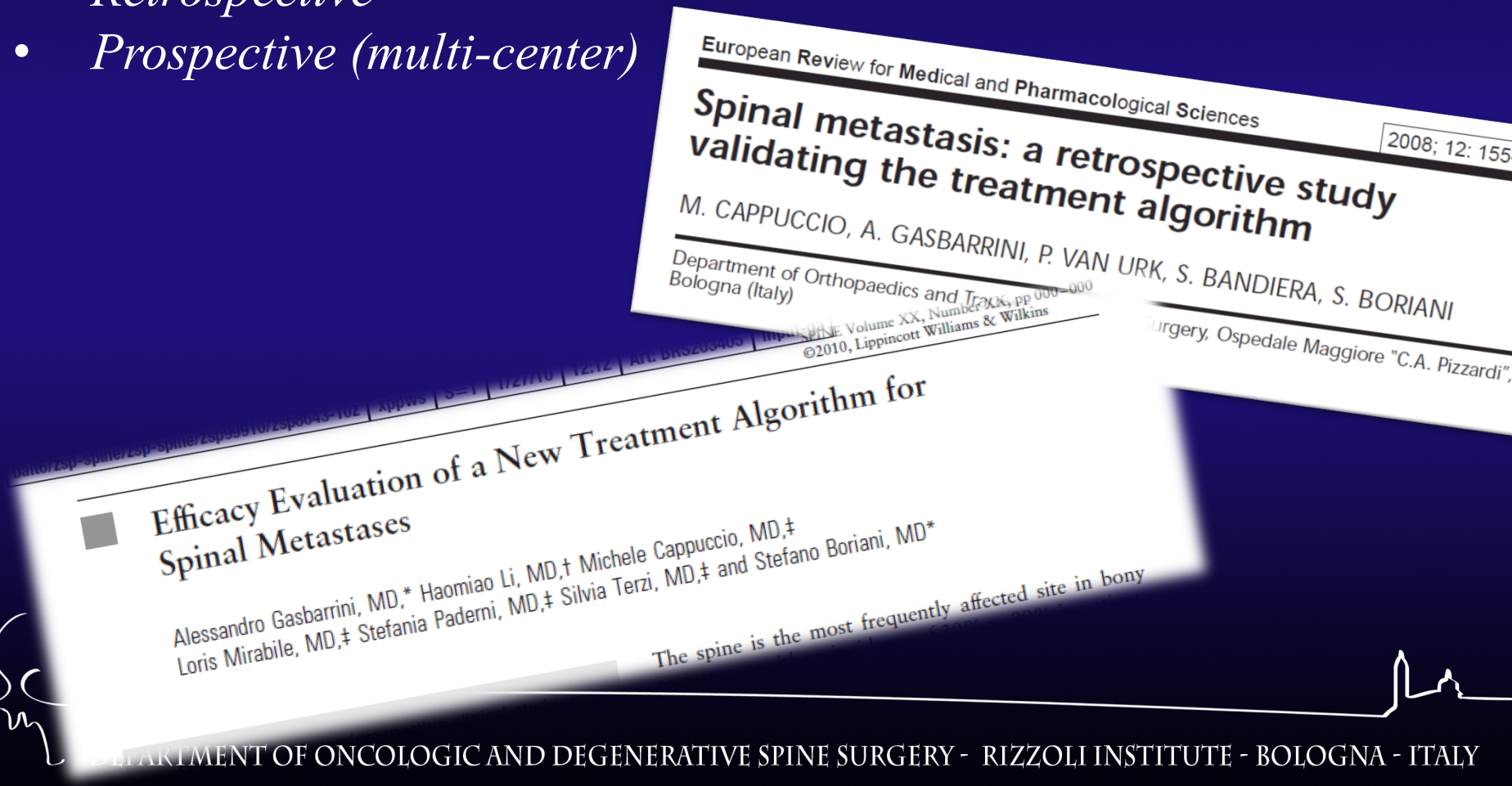
- *Logical sequences*
- *Patient-centered*
- *Multidisciplinary approach*



SPINAL METASTASES TREATMENT FLOW-CHART

Validation/Reliability Studies

- *Retrospective*
- *Prospective (multi-center)*



European Review for Medical and Pharmacological Sciences

2008; 12: 155

Spinal metastasis: a retrospective study validating the treatment algorithm

M. CAPPUCCIO, A. GASBARRINI, P. VAN URK, S. BANDIERA, S. BORIANI

Department of Orthopaedics and Trauma, pp 000-000
Bologna (Italy)

urgery, Ospedale Maggiore "C.A. Pizzardi",

SPINE Volume XX, Number XX, pp 000–000
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Efficacy Evaluation of a New Treatment Algorithm for Spinal Metastases

Alessandro Gasbarrini, MD,* Haomiao Li, MD,† Michele Cappuccio, MD,‡
Loris Mirabile, MD,‡ Stefania Paderni, MD,‡ Silvia Terzi, MD,‡ and Stefano Boriani, MD*

The spine is the most frequently affected site in bony

SPINAL METASTASES TREATMENT FLOW-CHART

Validation/Reliability Studies

- *Retrospective*
- *Prospective (multi-center)*

Method

- "target achievement"
  - Survival in the statistical range
  - Local control (tumor growth and pain)
  - Frankel score mantained or improved

SPINAL METASTASES TREATMENT FLOW-CHART

Validation/Reliability Studies

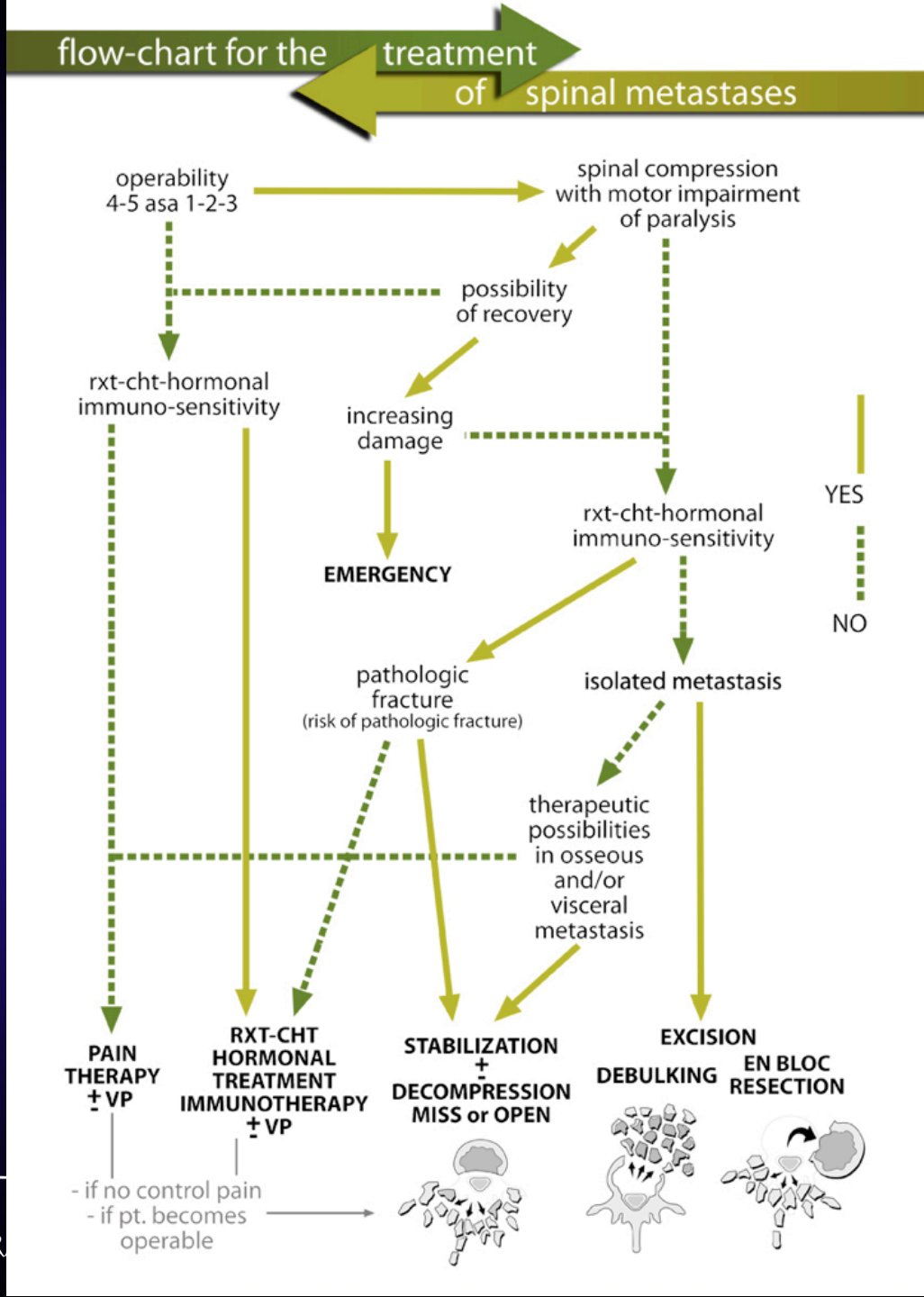
- *Retrospective*
- *Prospective (multi-center)*

Results

Flow Chart	% target achievemet
Followed	85%
Overtreatment	35%
Undertreatment	66%

SPINAL METASTASES TREATMENT FLOW-CHART

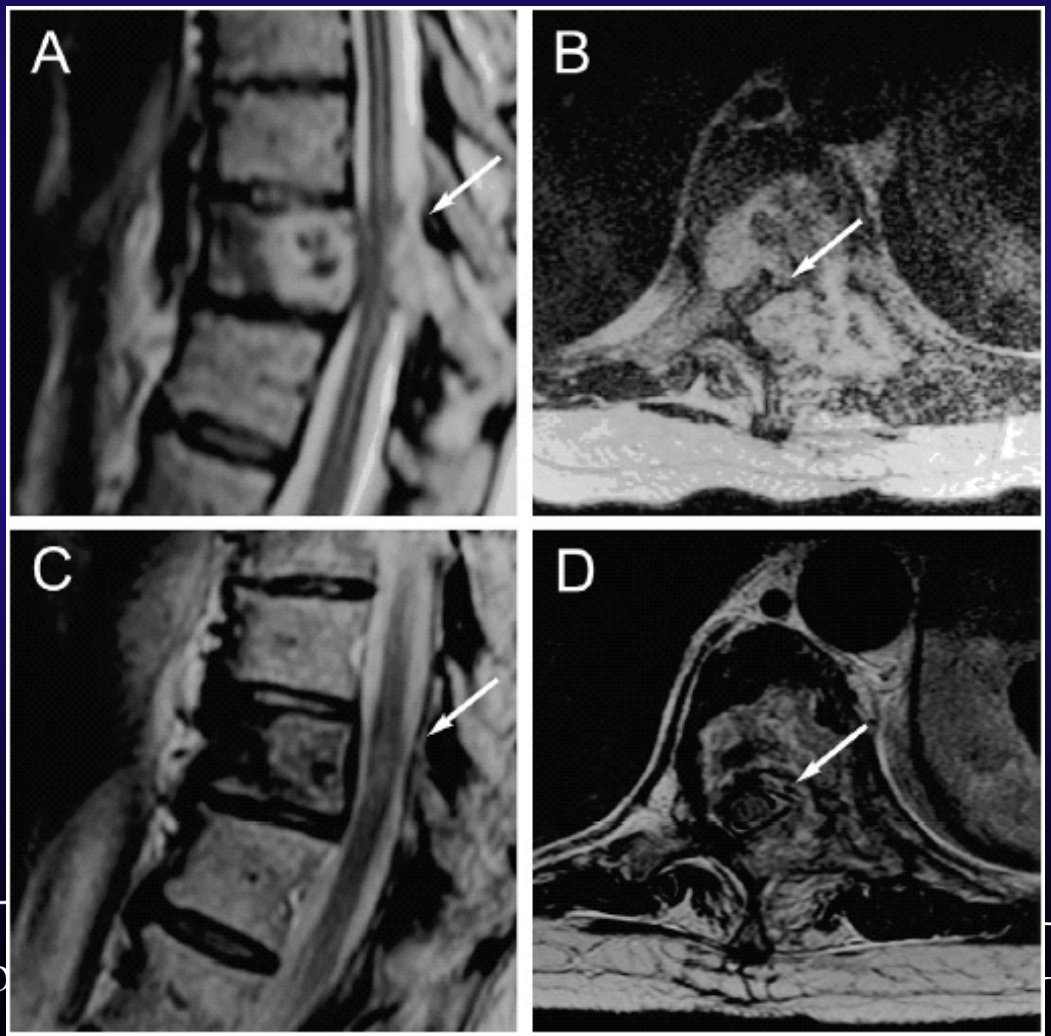
- *Logical sequences*
- *Patient-centered*
- *Multidisciplinary approach*
- *Reiliable and Reproducibile*
- *Everlasting*



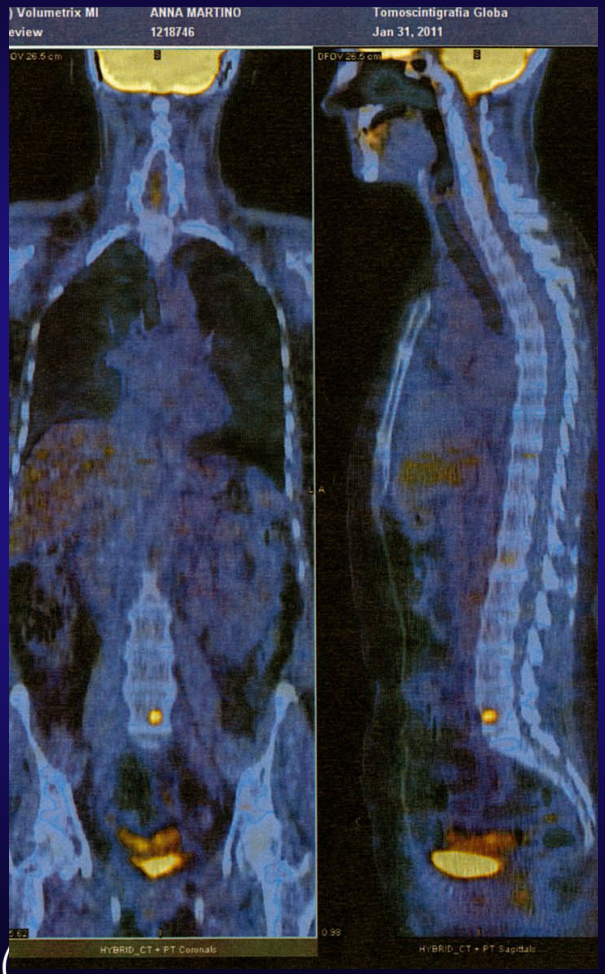
Case Study of the Month

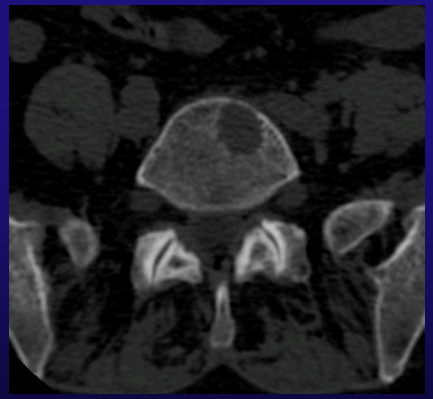
Sunitinib Relieves Renal Cell Carcinoma Spinal Cord Compression

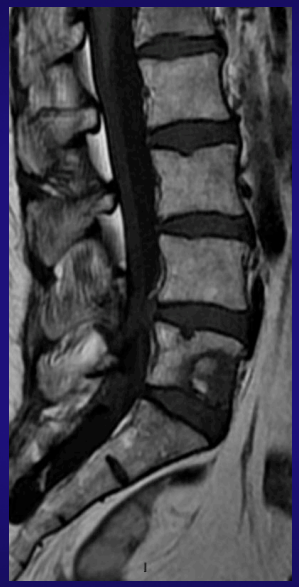
Quoc-Dien Trinh [a], Étienne Cardinal [b], Andrea Gallina [a], Paul Perrotte [a], Fred Saad [a], Pierre I. Karakiewicz [a,*]

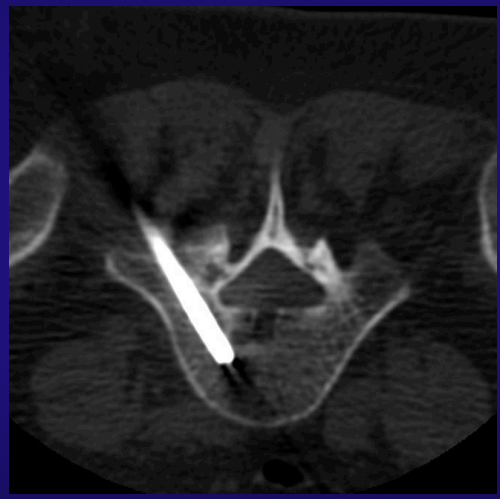


M.A., 61 yrs., L5 Melanoma Metastasis









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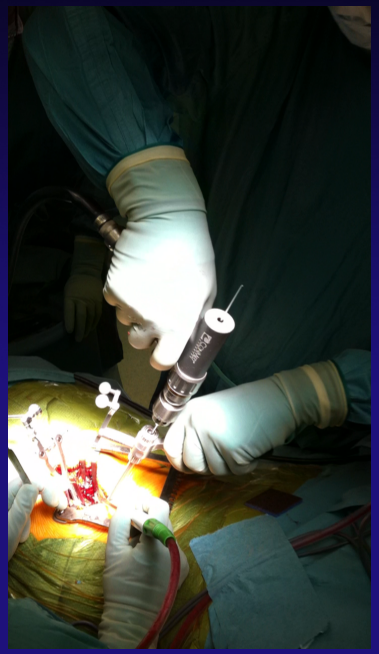
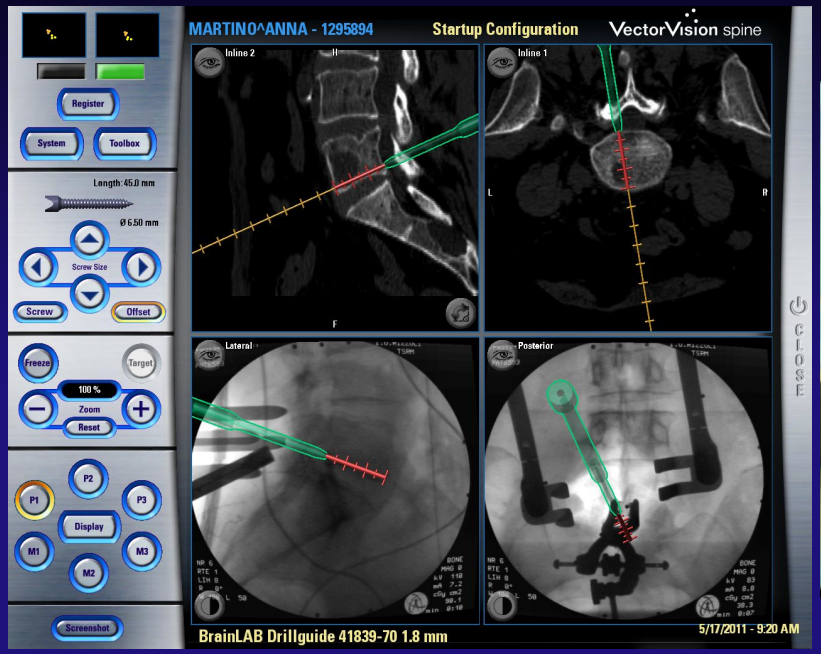
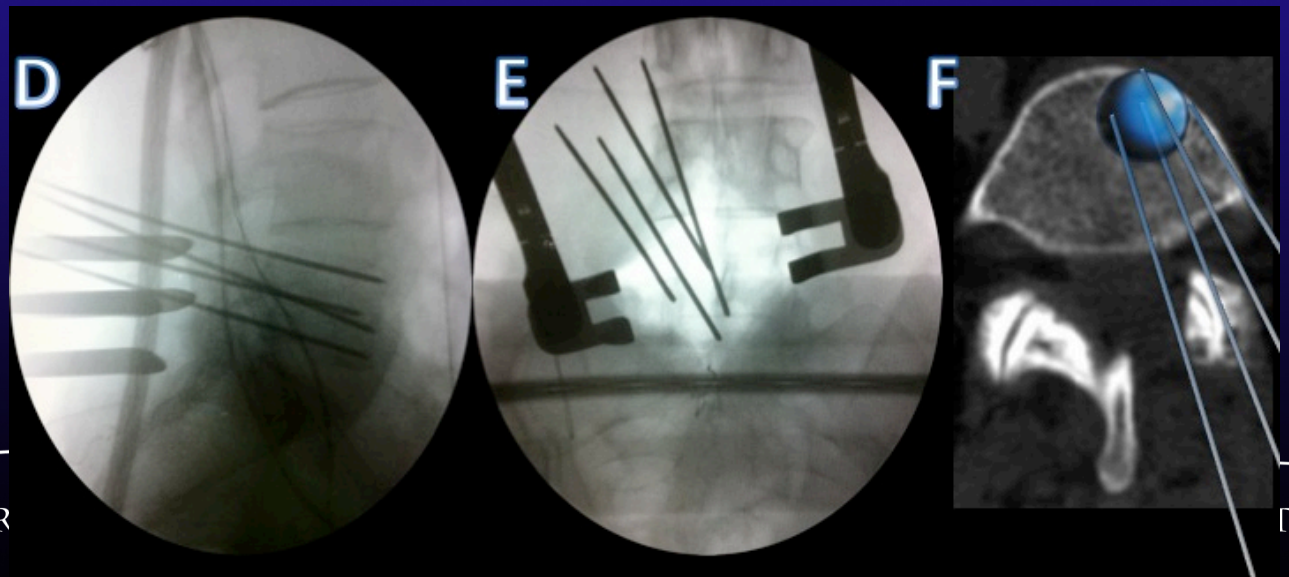
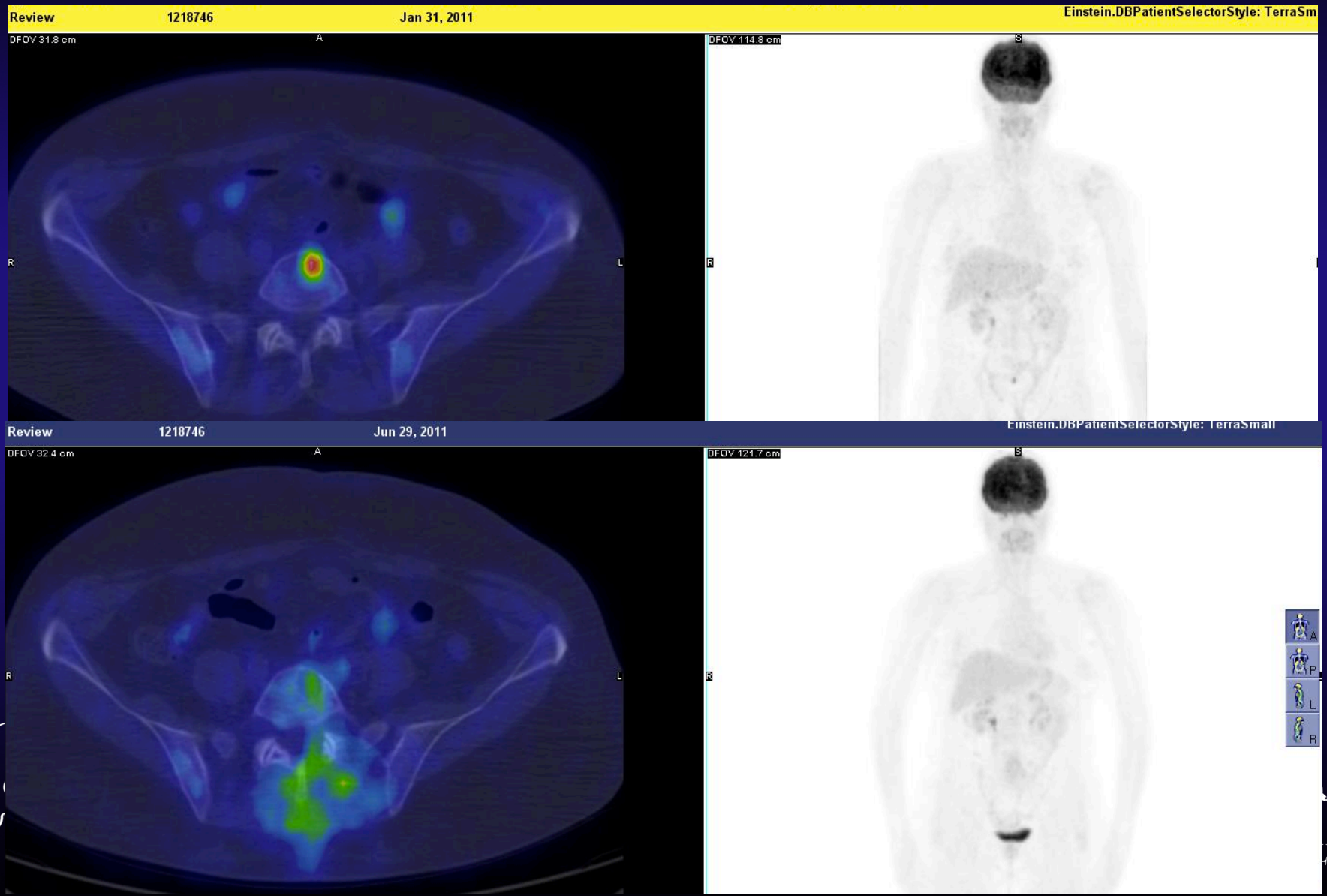






M.A., 61 yrs., L5 Melanoma Metastasis



RT+Surgery vs. Surgery+RT

Bone Tumors of the Spine
Incidence of Post-Op. Complications

63 on 774 cases

- Oncologic
- Septic
- Tissue damage
- Hardware

Bone Tumors of the Spine

Incidence of Post-Op. Complications

- 27 on 109 surgeries on previously irradiated

  24,7%

- 36 on 665 surgeries on non-irradiated

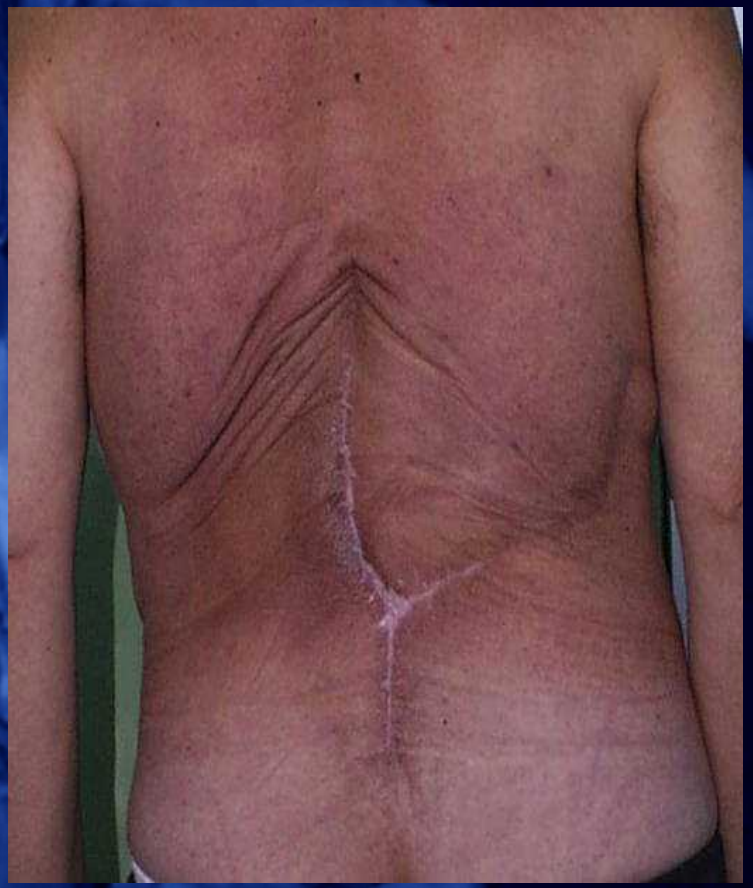
  5,4%

Eur Spine J (2010) 19:231–241
DOI 10.1007/s00586-009-1137-z

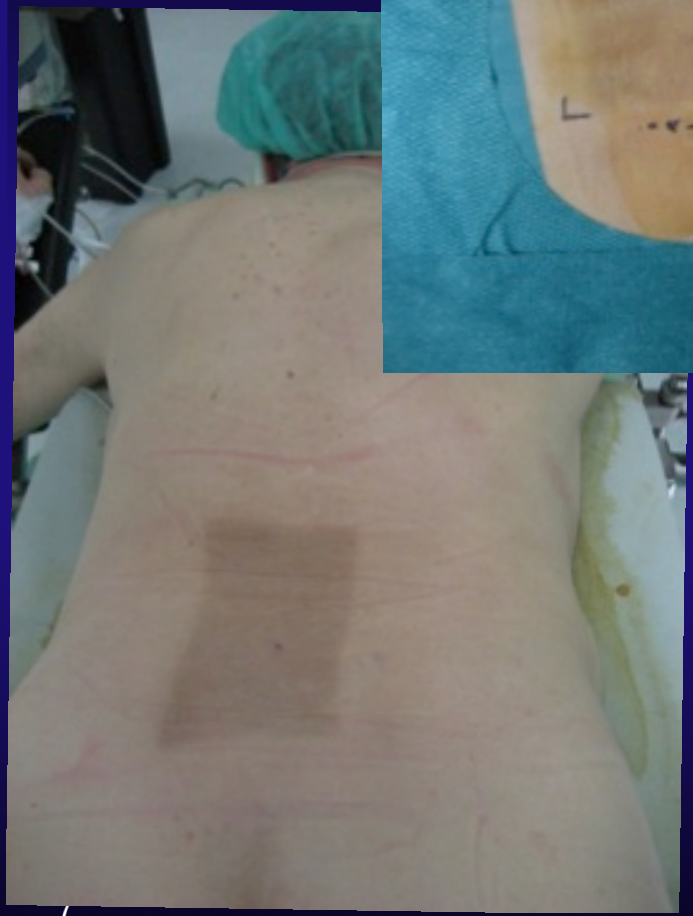
ORIGINAL ARTICLE

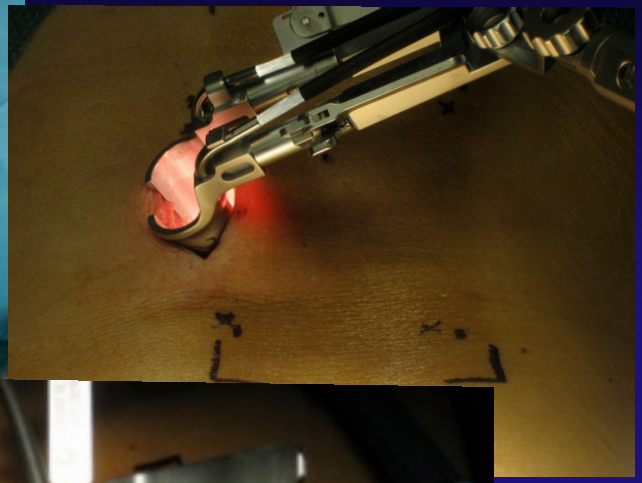
Morbidity of en bloc resections in the spine

Stefano Boriani · Stefano Bandiera · Rakesh Donthineni · Luca Amendola · Michele Cappuccio · Federico De Iure · Alessandro Gasbarrini



F. 68 yrs L4 thyroid carcinoma metastases





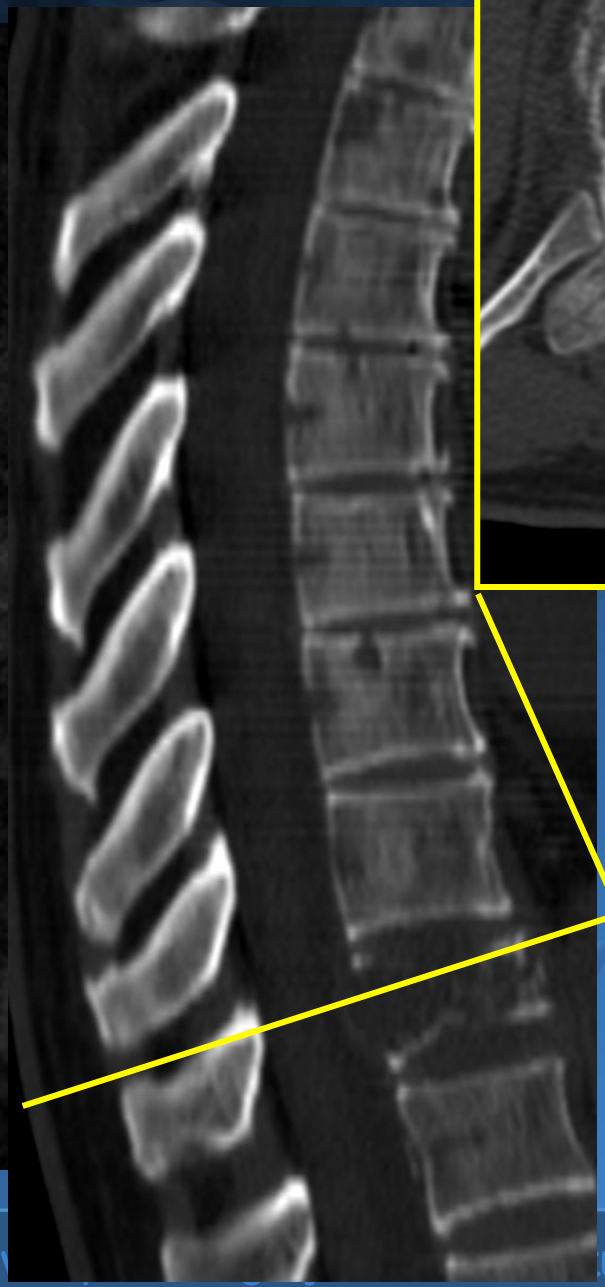
To take home…

- Less tissue damage
- Less morbidity

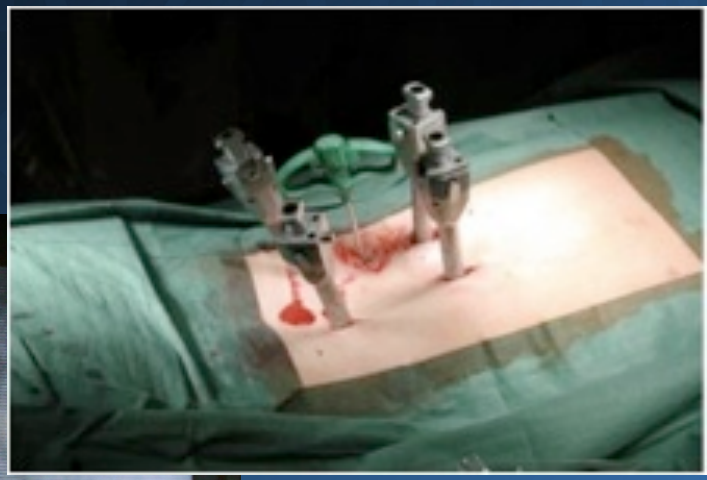
Faster recovery

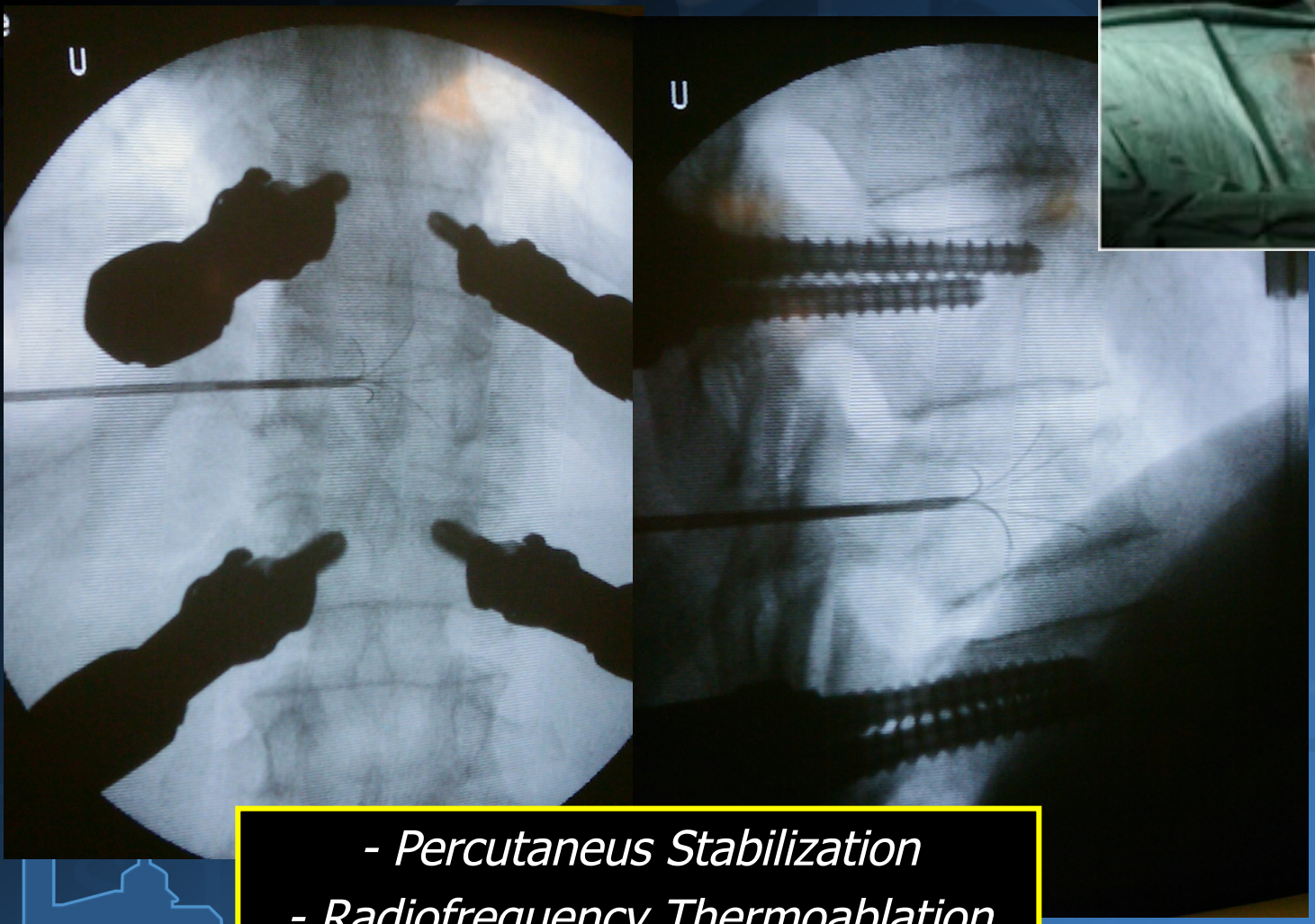
ADJUVANT THERAPY (QT and RT) can be started EARLIER

R.M., 68 yrs., T11 HCC Meta after liver Transplant



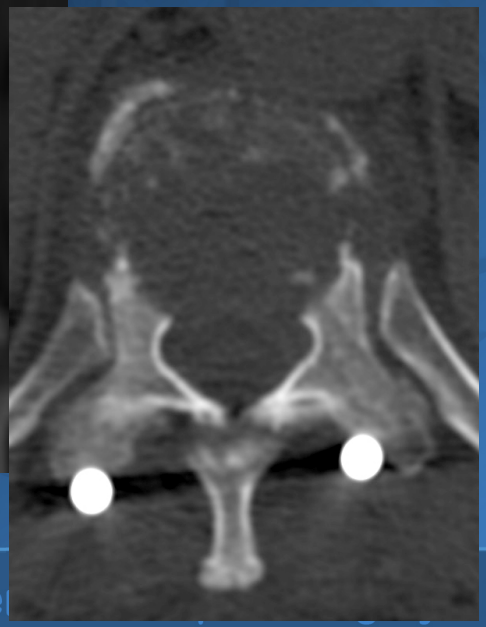
R.M., 68 yrs., T11 HCC Meta after liver Transplant



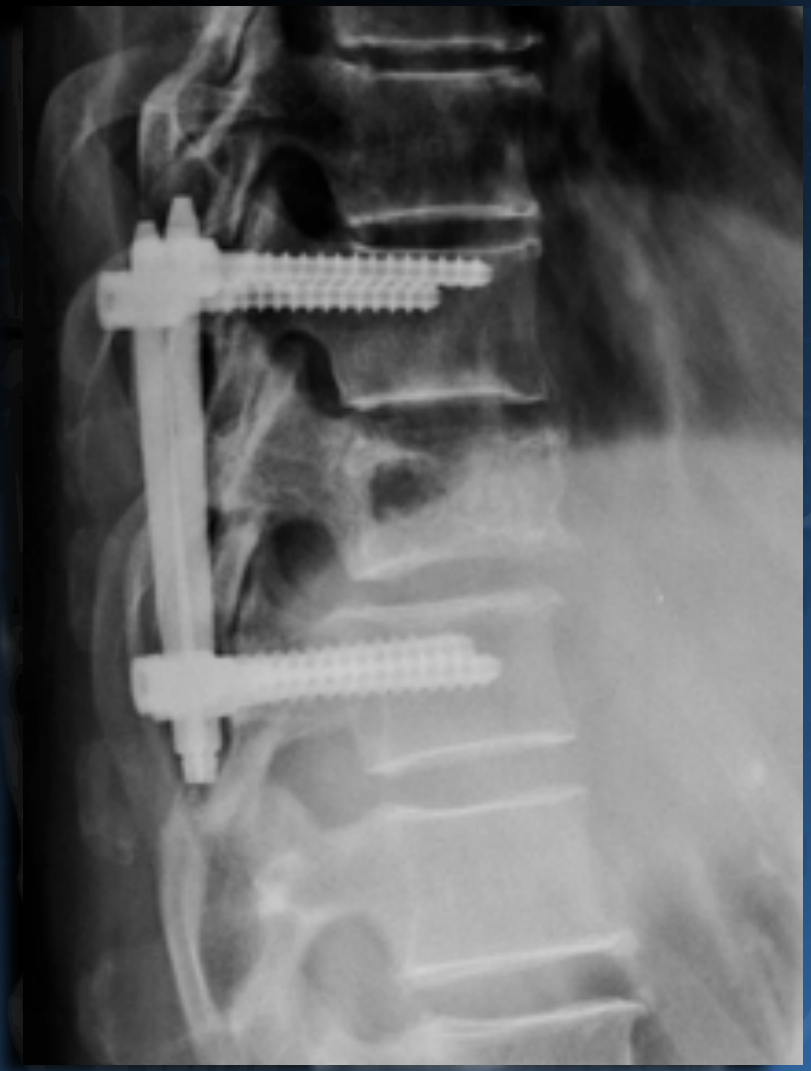


- *Percutaneus Stabilization*
- *Radiofrequency Thermoablation*

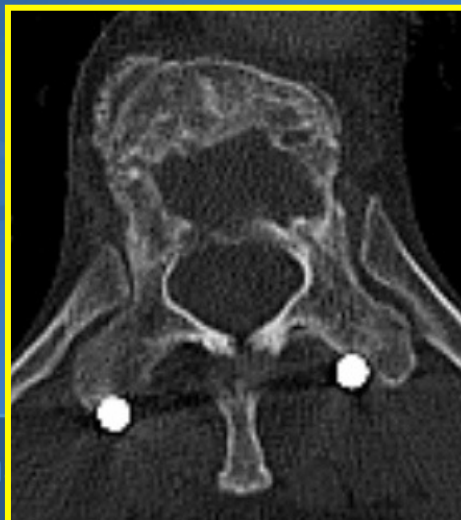
R.M., 68 yrs., T11 HCC Meta after liver Transplant



R.M., 68 yrs., T11 HCC Meta after liver Transplant



2yrs later NED: excellent Q.of L.



Endoscopy
in the Treatment of Bone Tumors of the Spine

To take home…

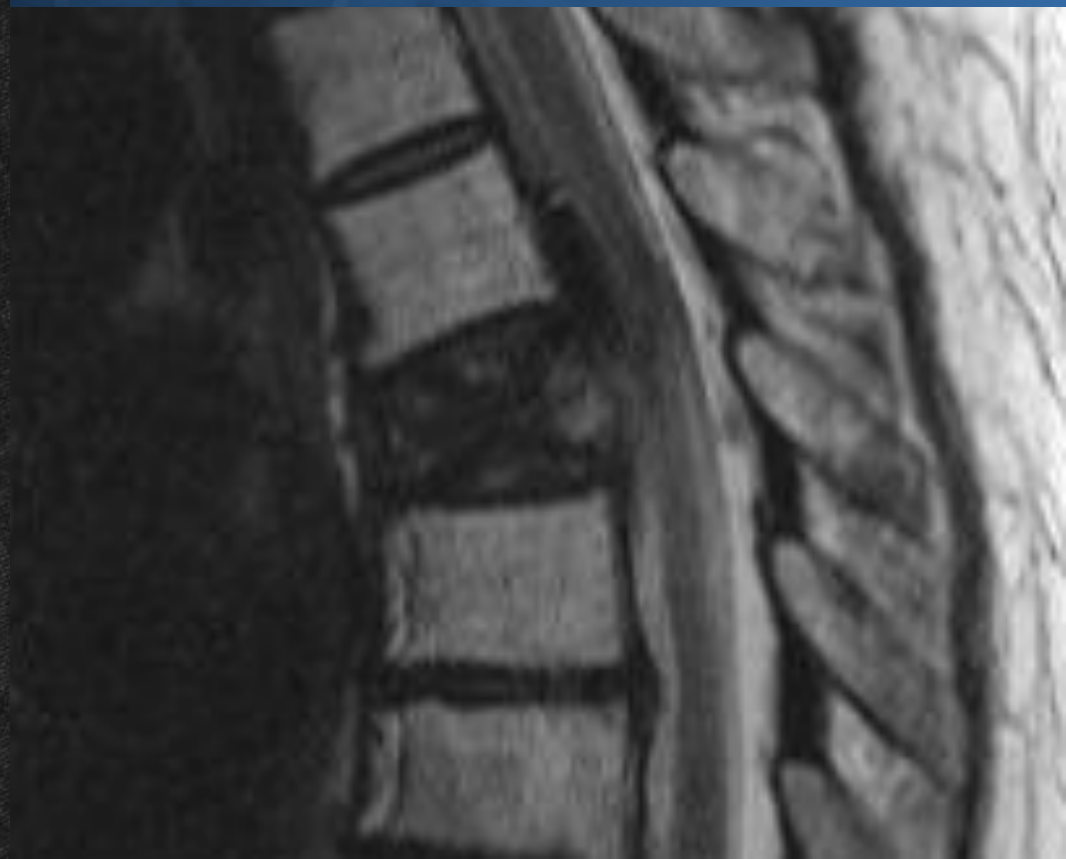
Minimal or Reduced Invasive Surgery must be planned according to:

- Diagnosis
- Oncological Staging

R.B., f, 40 y/o.
“Solitary“ breast met T5 DT 2 yrs

R.B., f, 40 y/o.
“Solitary“ breast met T5 DT 2 yrs

Vertebroplasty in March 2008
(German University Hospital)

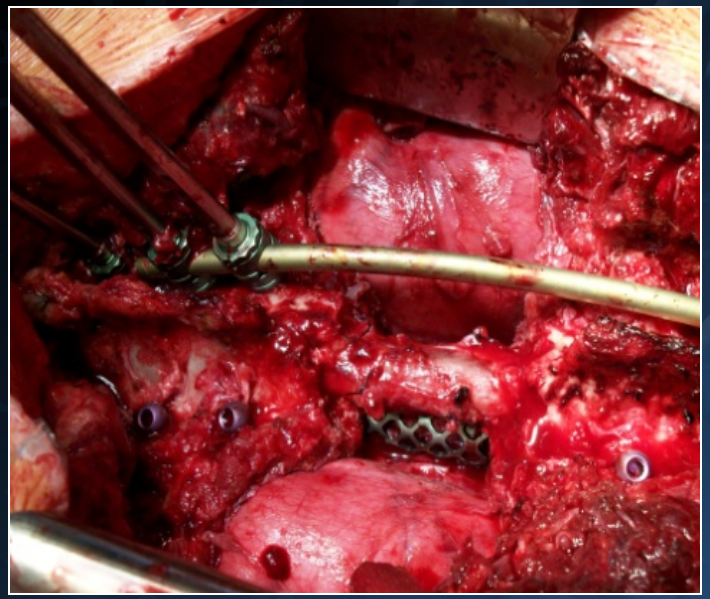


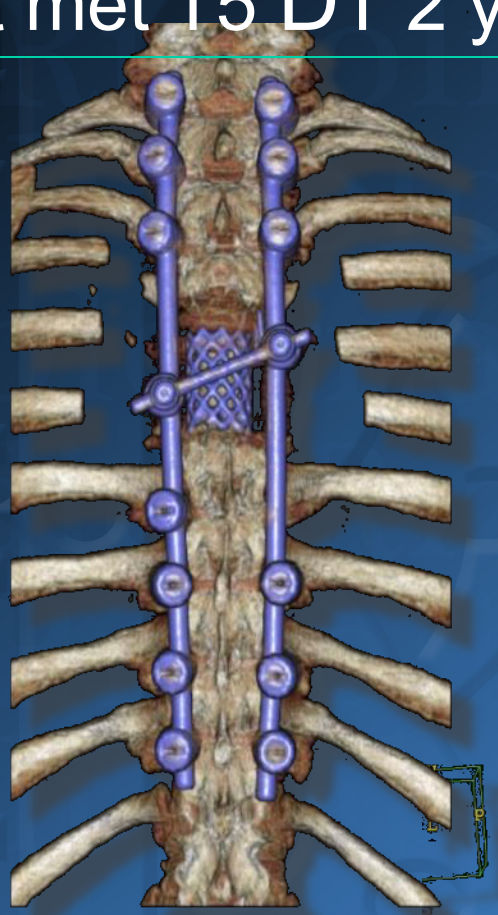
R.B., f, 40 y/o.
“Solitary“ breast met T5 DT 2 yrs

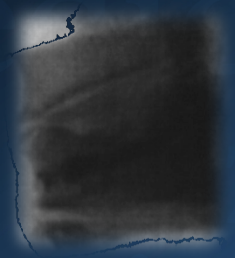
- Vertebroplasty March 08
- No neurol. deficit
- Postop. Radiation after vertebroplasty
- Sept. 08 increasing back pain and kyphosis

Sept. 08
(Bone scan, PET-C):Single Metastasis T 5

R.B., f, 40 y/o.
“Solitary“ breast met T5 DT 2 yrs







En bloc –Resection T 5 via bilateral posterolateral approach.
Resection of adjacent parts of T 4 and T6
Spinalcanalclearance (Vertebroplasty cement)

To take home…

CONCLUSIONS

- THE GOAL OF SURGICAL TREATMENT IN VERTEBRAL METASTASES IS IMPROVING QUALITY OF LIFE

- THE AIM OF SURGERY MUST BE LOCAL CONTROL OF THE LESION

- A MULTIDISCIPLINARY APPROACH IS BEST

APP - iSMT
Spinal Metastases Treatment