

SURGICAL TREATMENT OF SOFT TISSUE SARCOMAS

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SURGICAL PRINCIPLES

Overview

1. surgical principles
2. margins
3. biological barriers
4. when barriers fail
5. tissue transfer
6. positive margin & local recurrence

SURGICAL PRINCIPLES

Don't touch technique !



- **no contact with the tumor**
- **from the normal periphery towards the tumor**

SURGICAL PRINCIPLES

Preop Planning



translate preop imaging on situs

SURGICAL PRINCIPLES

Dissection of Bx site

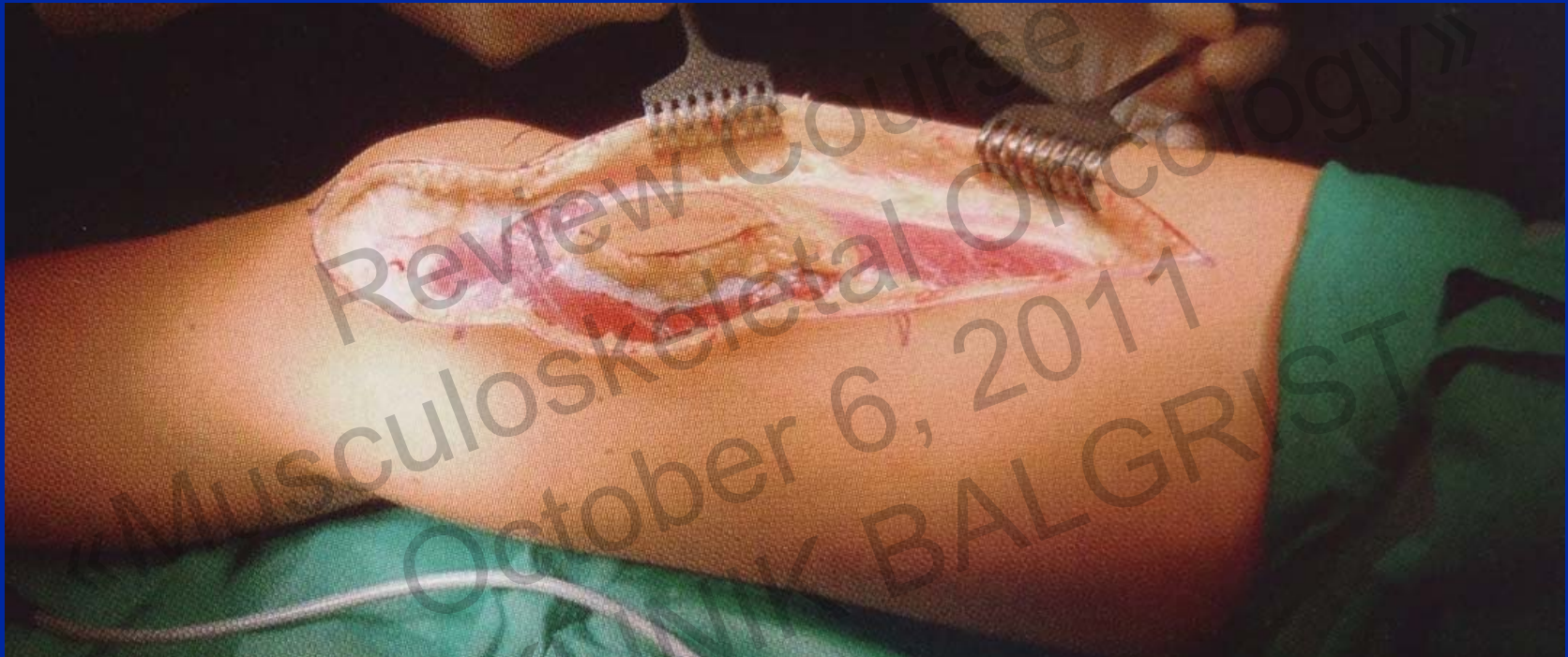


- incorporates the Bx site (1-2cm)
- preparation of subcutis in divergent manner

circular access to fascia w/o violating it

SURGICAL PRINCIPLES

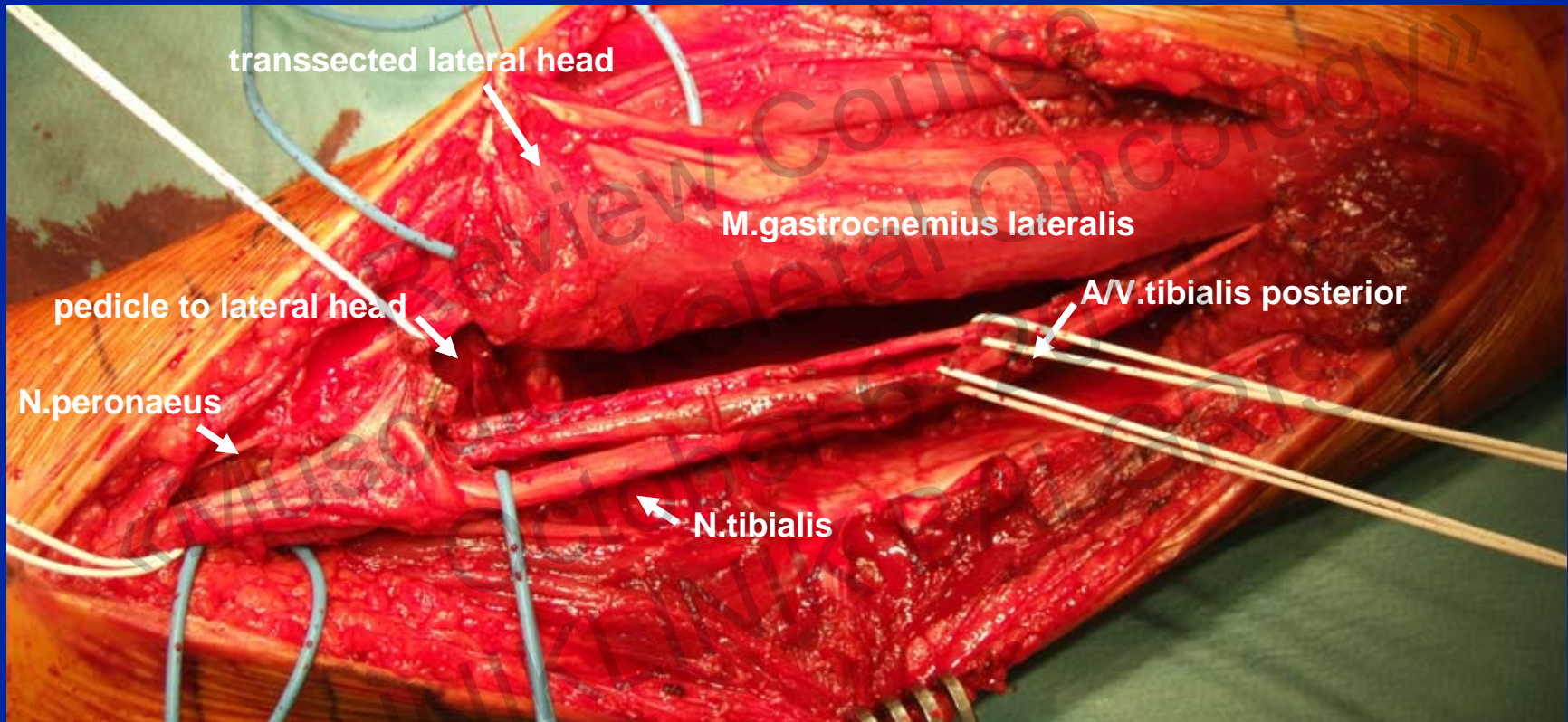
Dissection of Fascia



- fixation of spindle to fascia
- to leave 1-2cm fascia w. Bx site
- no hook into Bx spindle

SURGICAL PRINCIPLES

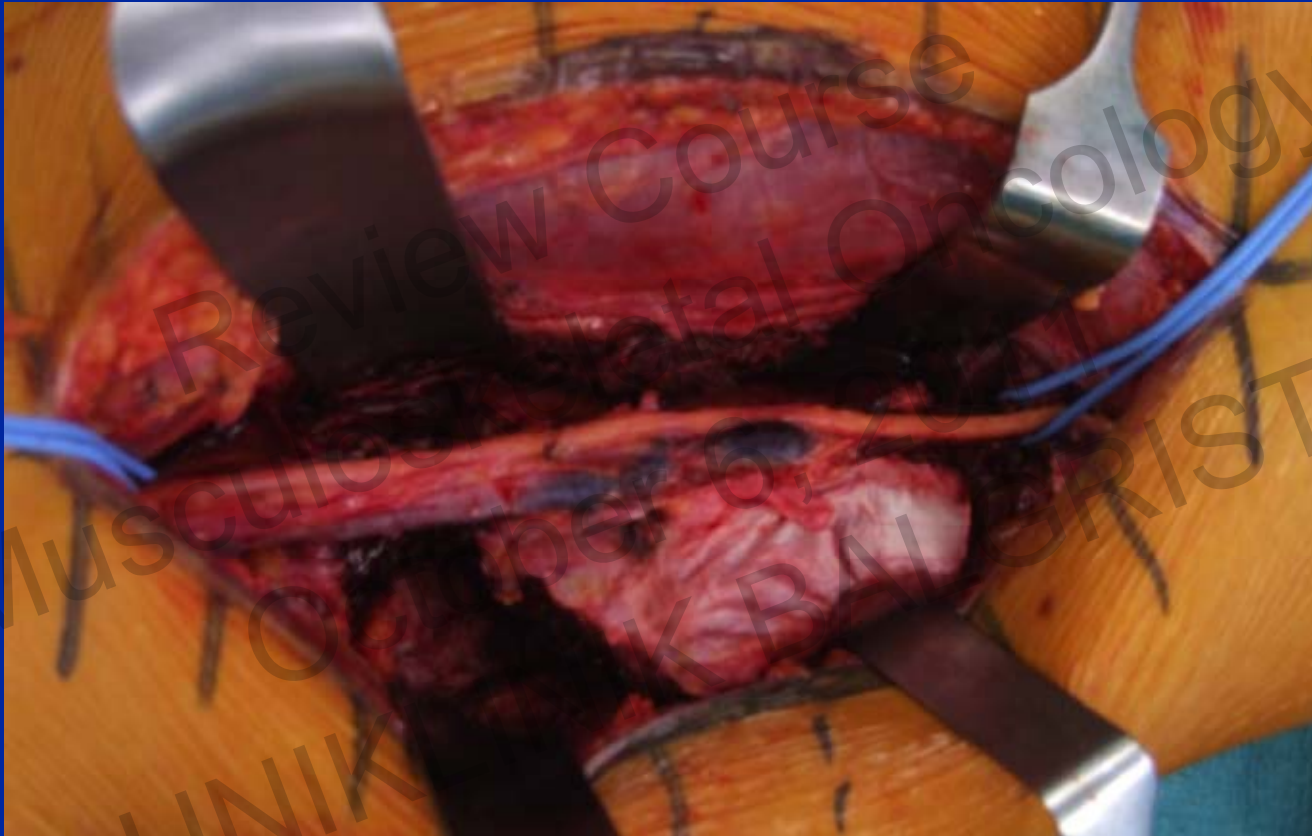
Preparation of Vessels and Nerves !



- first, isolate / tag structures away from the tumor, proximally and distally

SURGICAL PRINCIPLES

Muscle Dissection off Tumor



- when NV structures are „safe“, muscles are dissected (5cm longitudinal; 1cm, radial)

SURGICAL PRINCIPLES

NV Dissection off Tumor



- when tumor is free, either remove vessels / nerves or dissect them off the tumor

SURGICAL PRINCIPLES

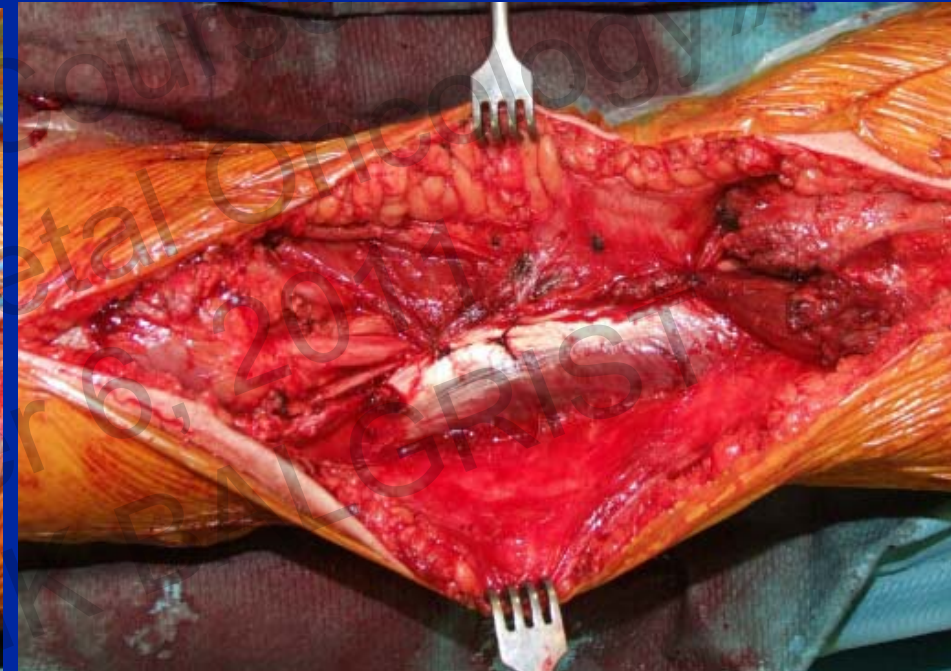
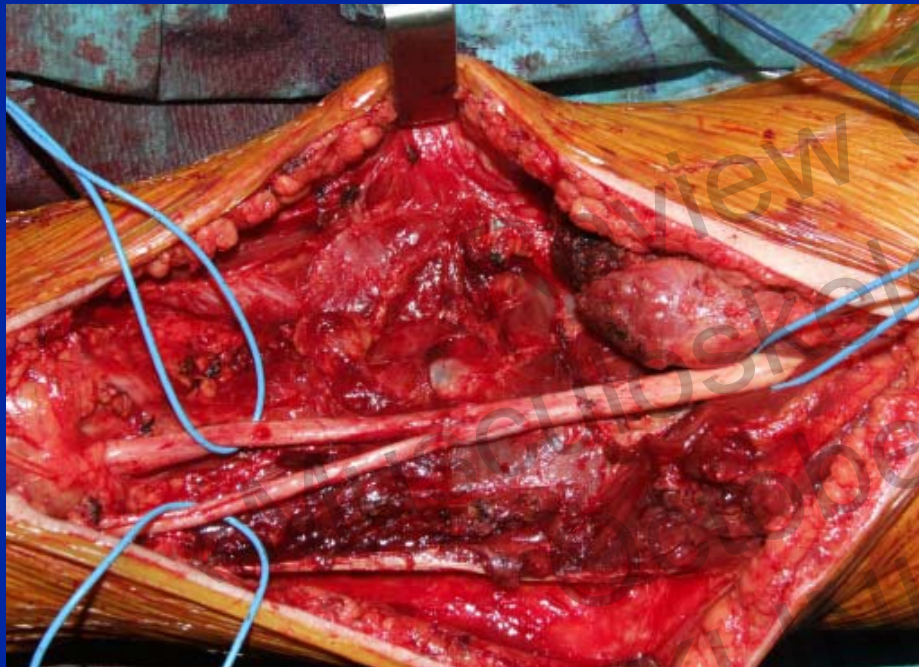
Specimen



- mark the specimen to orient it for pathologist
- Eg. long suture: proximal margin; short suture: anterior margin

SURGICAL PRINCIPLES

Resection Bed



- avoid any dead space

SURGICAL PRINCIPLES

Drainage

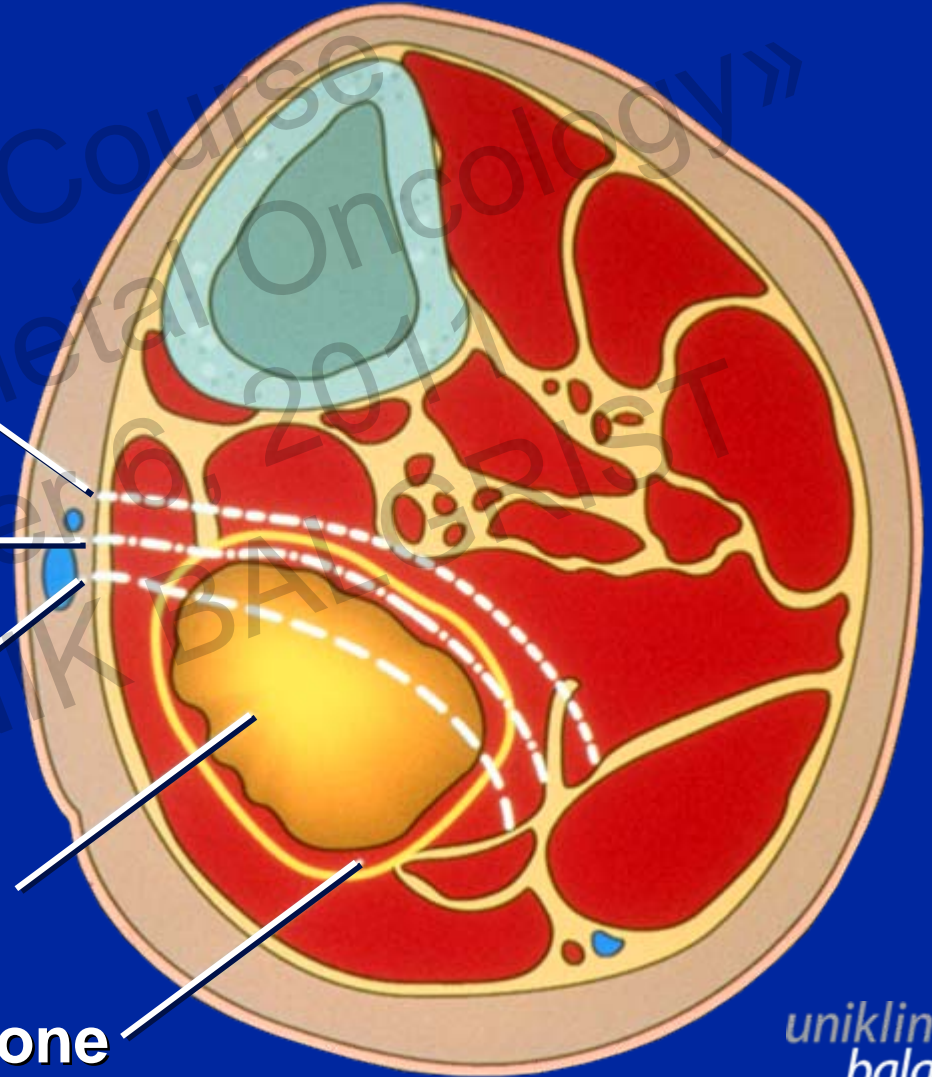


- in line of the incision
- at the end of the incision

MARGINS



- wide margin
(cuff of normal tissue)
- marginal margin
(through reactive zone)
- intralesional margin
(through tumor)
- Tumor mass
- reactive Zone



MARGINS

The „R-Classification“

- **R0:** surgical margins are macro-/microscopically negative
- **R1:** surgical margin microscopically contaminated with tumor cells or the tumor was marginally resected along pseudocapsule
- **R2:** an intralesional tumor resection was performed

MARGINS

Goal of Surgical Treatment

- → R0 resection with a good functional outcome !
 - compartmental resection:
Removal of muscle from origin to its insertion
 - *functional* compartmental resection:
preservation of muscle stumps
- Question is not what is wide, but what is safe!!!

MARGINS

The absolute metric width of surgical margin is not as important as oncological safety !



It's about the biology/anatomy, not about metrics !

MARGINS

Biological Barriers

= any resistance against tumor invasion

-thick barrier:

iliotibial band, presacral fascia, joint capsule, periosteum of child

-thin barrier:

muscle fascia, periosteum of adult, vessel sheath, epineurium, growth plate

when planning on STS resection, always evaluate the biological barriers on preop. imaging !

MARGINS

Biological Barriers

if barrier is NOT infiltrated:

- tumor is removed with the barrier

if tumor is infiltrating the barrier:

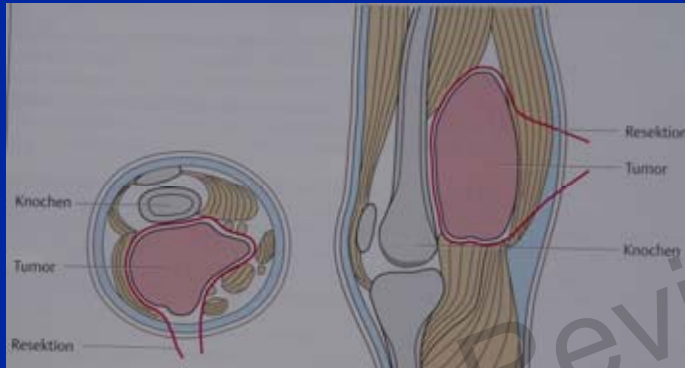
- en bloc removal with tumor

if there is no barrier:

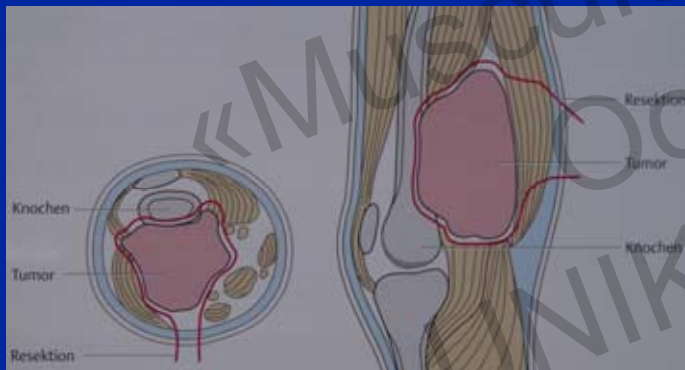
- as much margin as possible
(longitudinally 5cm, radially 1cm)

MARGINS

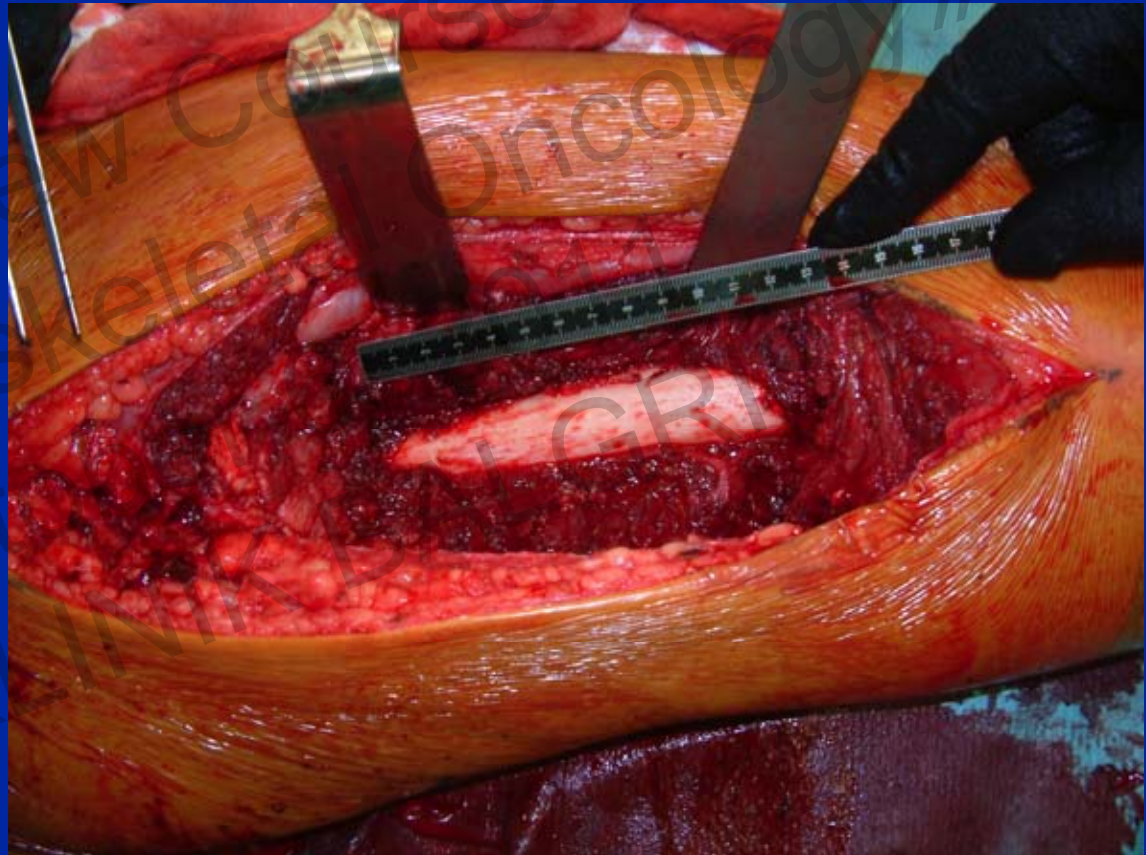
Biological Barriers: periosteum



If there is muscle layer between tumor and periosteum, then keep it

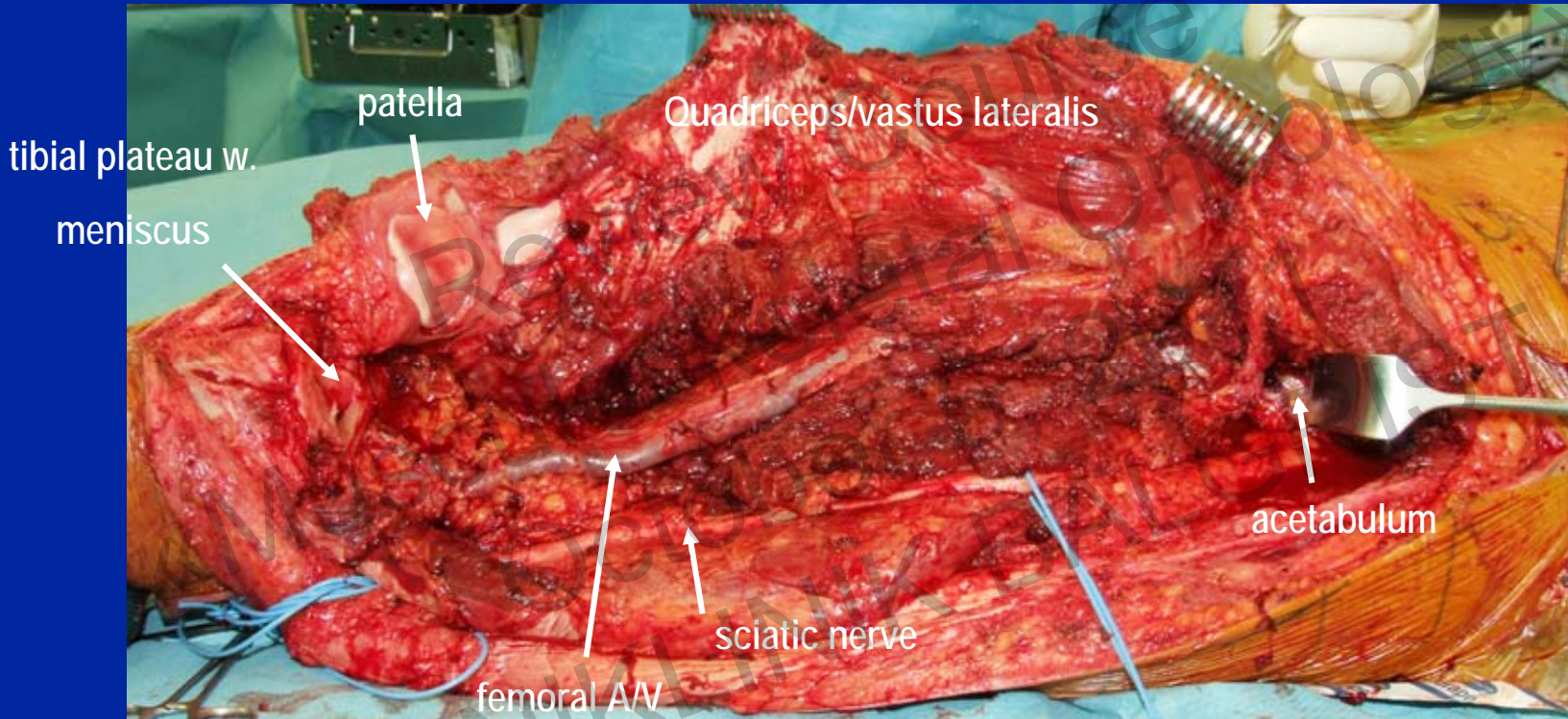


If STS is attached to periosteum, but does not infiltrate, then remove it



MARGINS

Biological Barriers: Adventitia

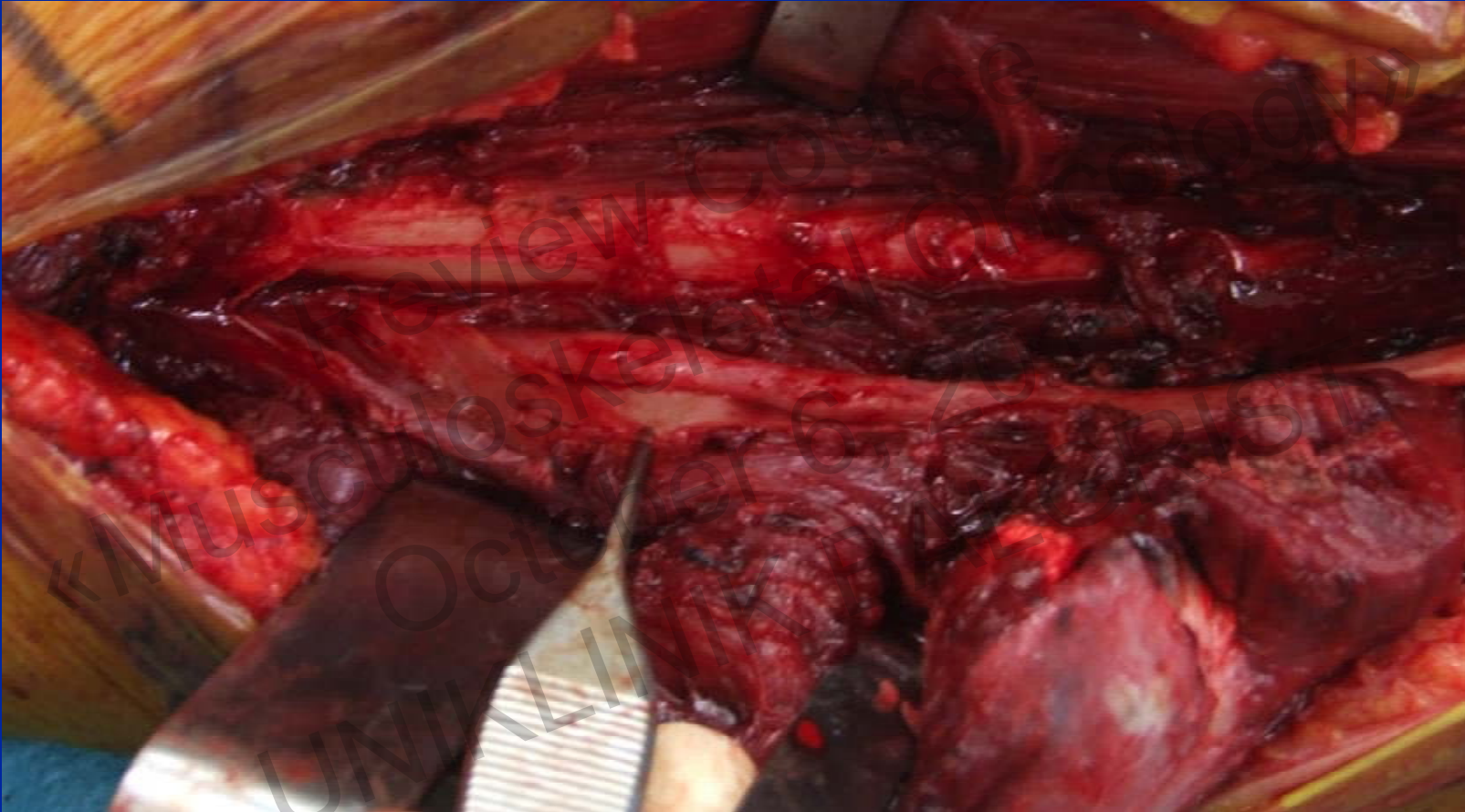


adventitia is left with tumor to provide safe margin!

(often in combination w. preop. RT)

MARGINS

Biological Barriers: Epineurium



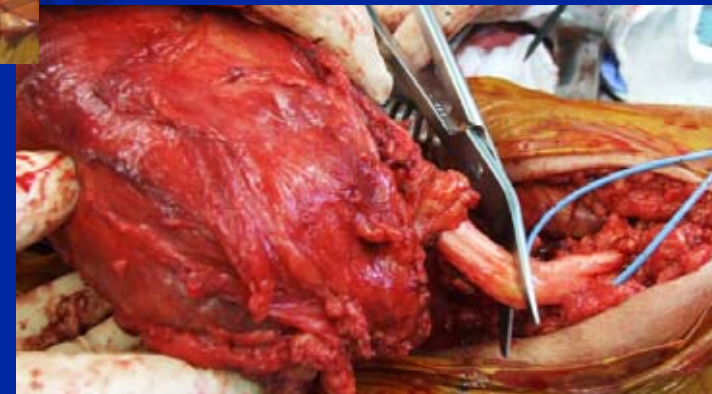
epineurium is left with tumor to provide safe margin!

(often in combination w. preop. RT)

MARGINS

when biological barriers do not work

Involvement of major nerves

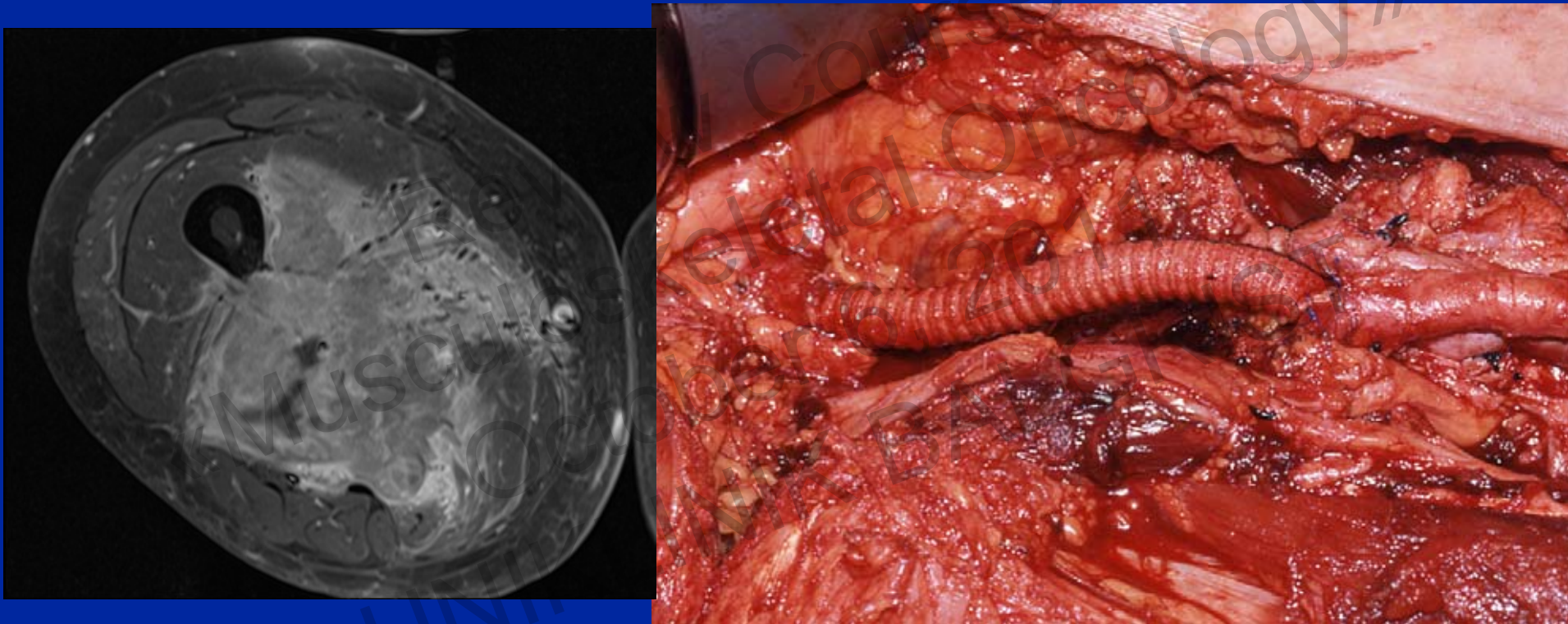


→ no compromise on margins

RECONSTRUCTION

when biological barriers fail

Involvement of vessels



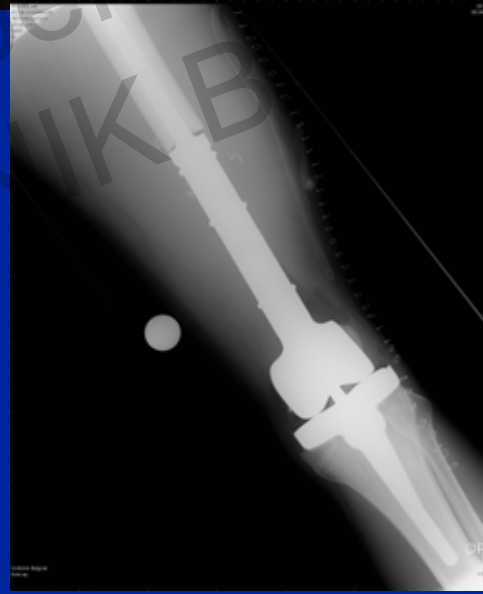
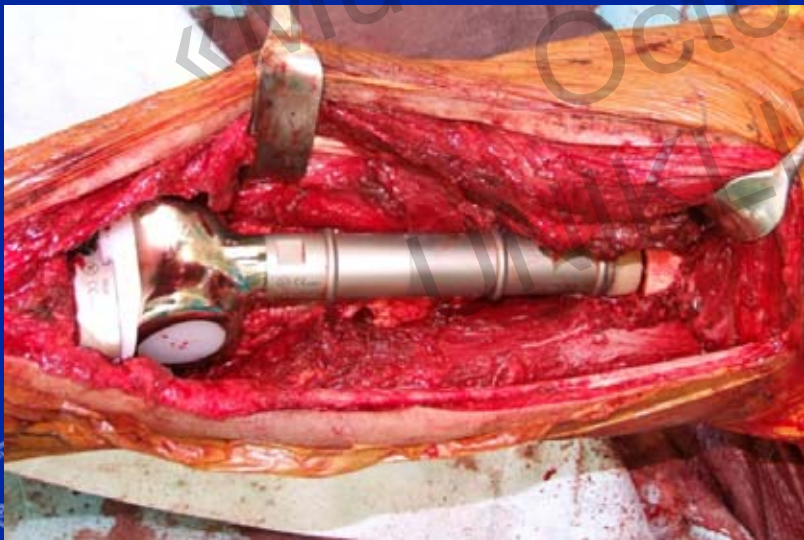
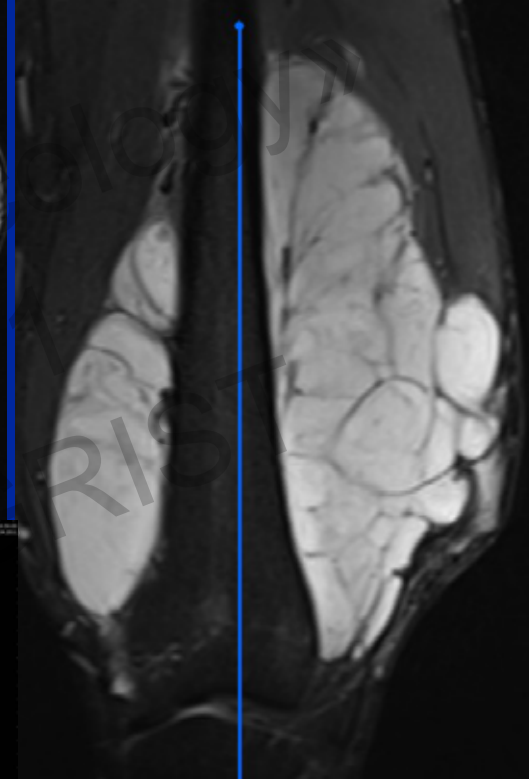
→ reconstruction using artificial vessels
(and/or autologous veins)

RECONSTRUCTION

when biological barriers fail



If STS is attached to periosteum, but does not infiltrate, then remove it



RECONSTRUCTION

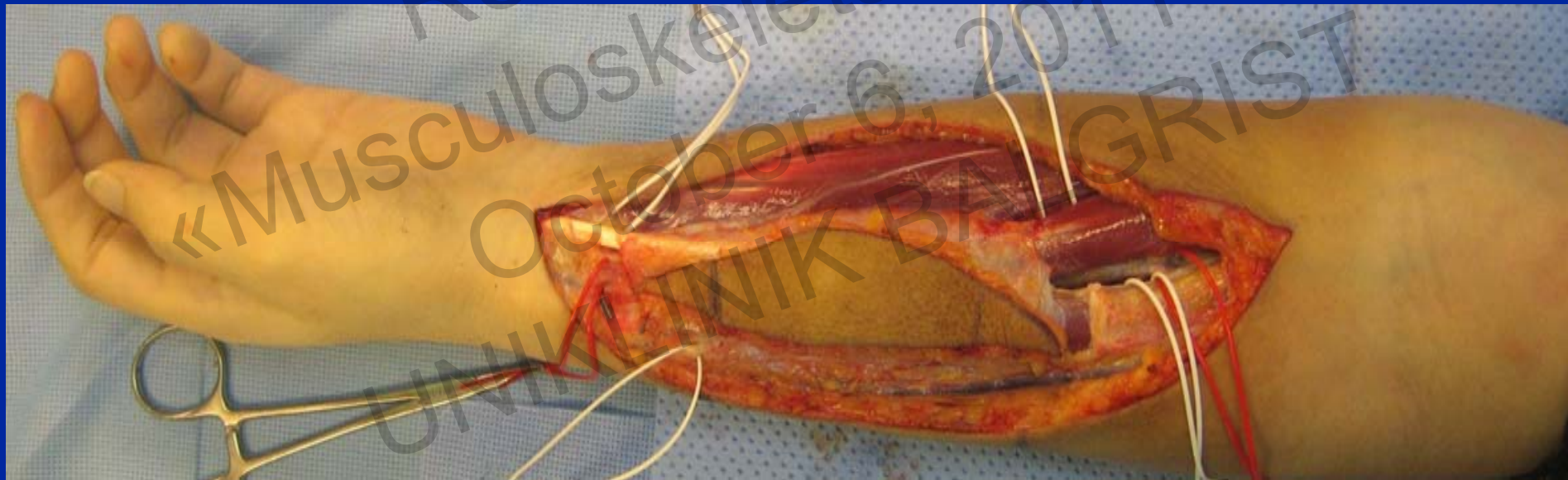
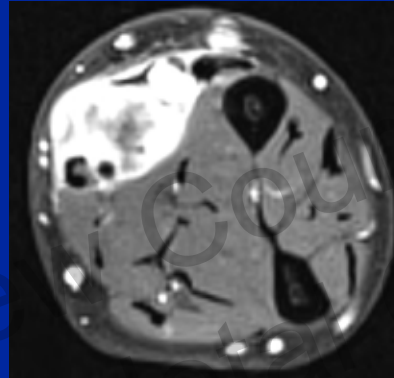
Tendons



→ no compromise on margins

RECONSTRUCTION

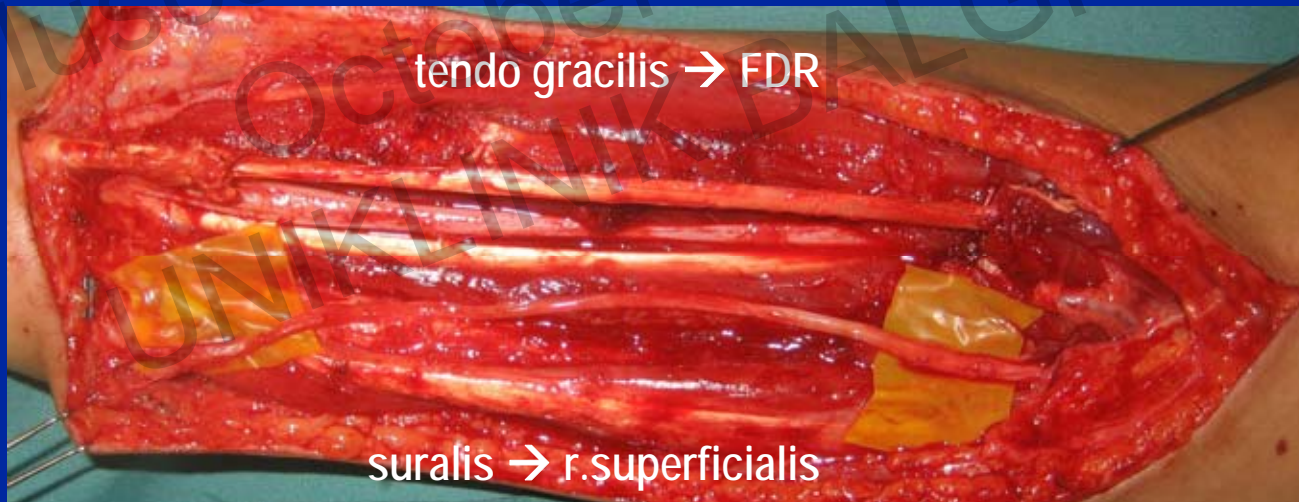
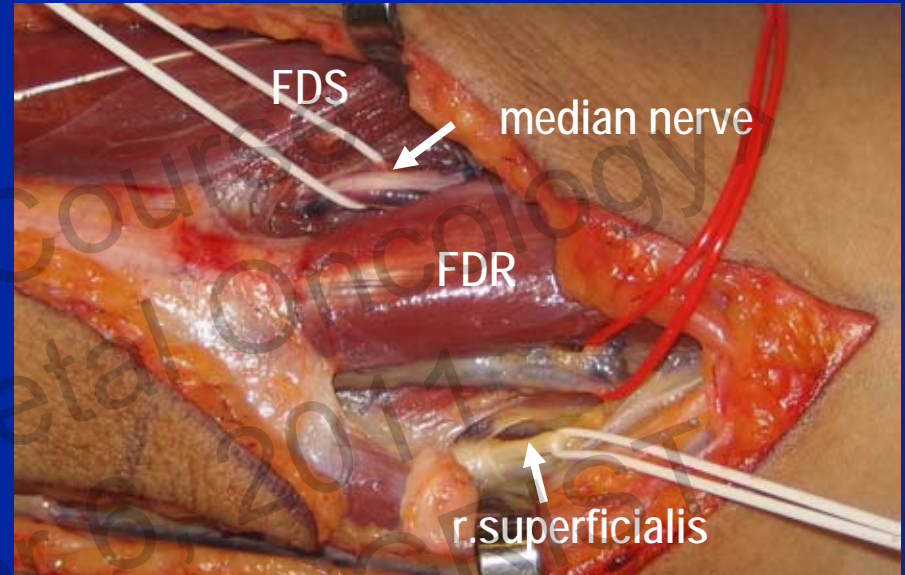
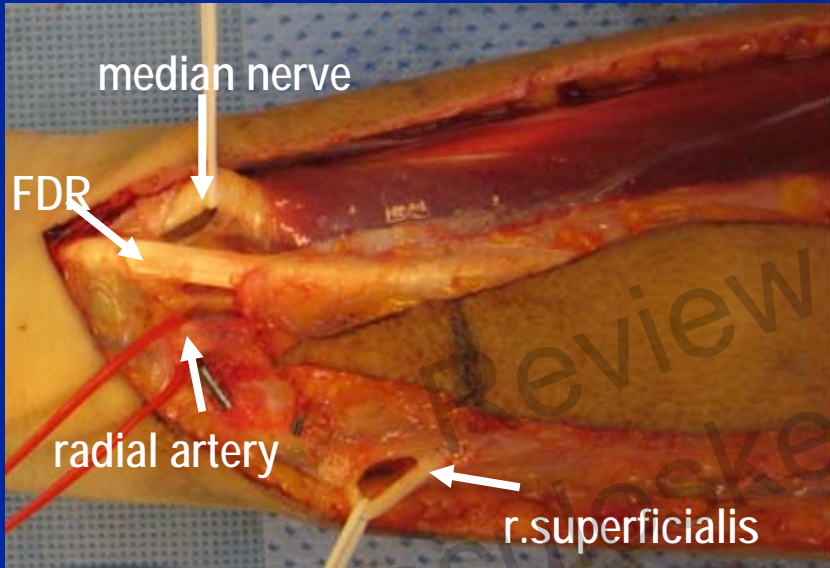
Nerves



→ sural nerve often used

RECONSTRUCTION

Nerves



→ sural nerve often used

RECONSTRUCTION

Tissue Transfers



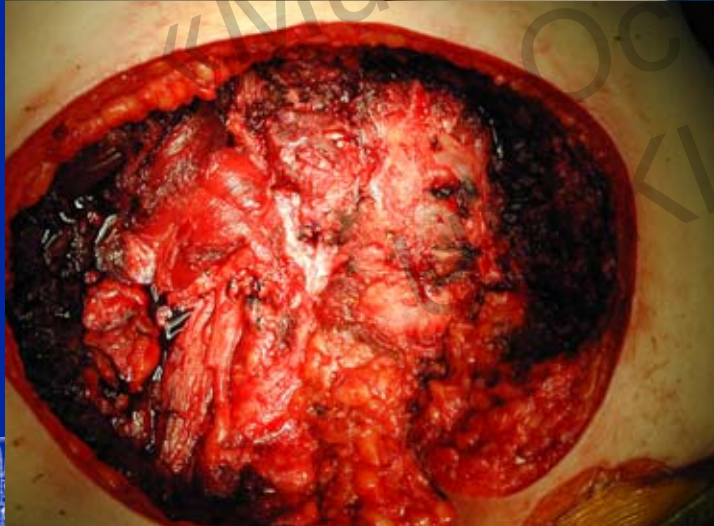
pedicled or free !

→ allow larger resections, bring new vascularized tissue w. independent blood supply, reducing wound complications

RECONSTRUCTION

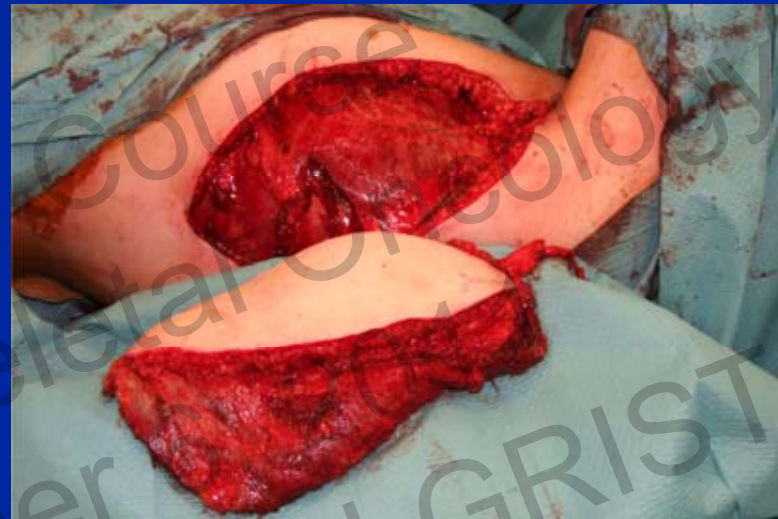
Tissue Transfers

V / Y advancement



RECONSTRUCTION

Tissue Transfer: latissimus dorsi



RECONSTRUCTION

Tissue Transfer: rectus abdominis



RECONSTRUCTION

Tissue Transfer: rectus abdominis



anterior rectus mobilization



hand in sciatic notch



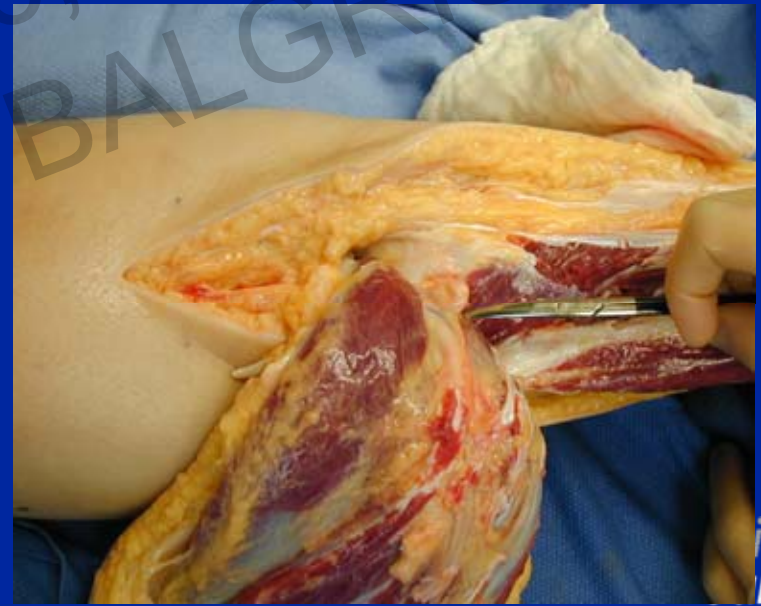
RECONSTRUCTION

Tissue Transfer: gastrocnemius

pedicled (most often)

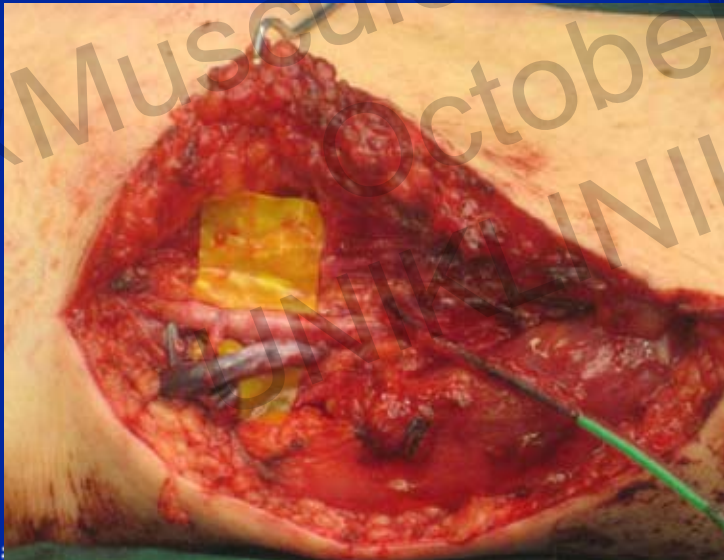
or

free fillet flap



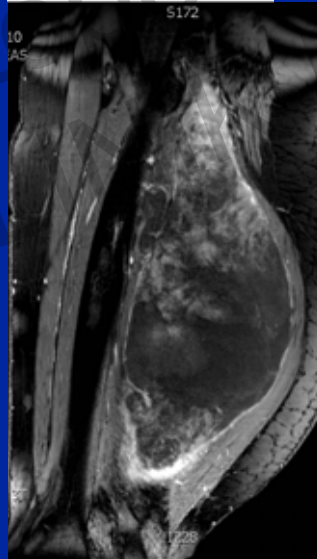
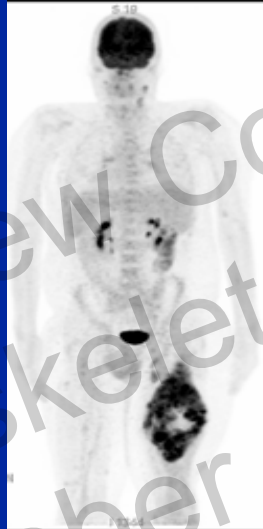
RECONSTRUCTION

Tissue Transfer: serratus



IF ADEQUATE MARGIN IS IMPOSSIBLE

Amputation



POSITIVE MICROSCOPIC MARGIN

what does it mean ?

- strongest predictor of local failure
- 1/3 of it will eventually recur, 2/3 not !
 - importance of molecular background!
Eg: MPNST / myxofibrosarcomas worst
Liposarcoma / Synovialsarcoma „best“
- Histological grade versus local recurrence ↑
- no proven influence on distant spread !
- no causative relationship w. longterm survival

LOCAL RECURRENCE

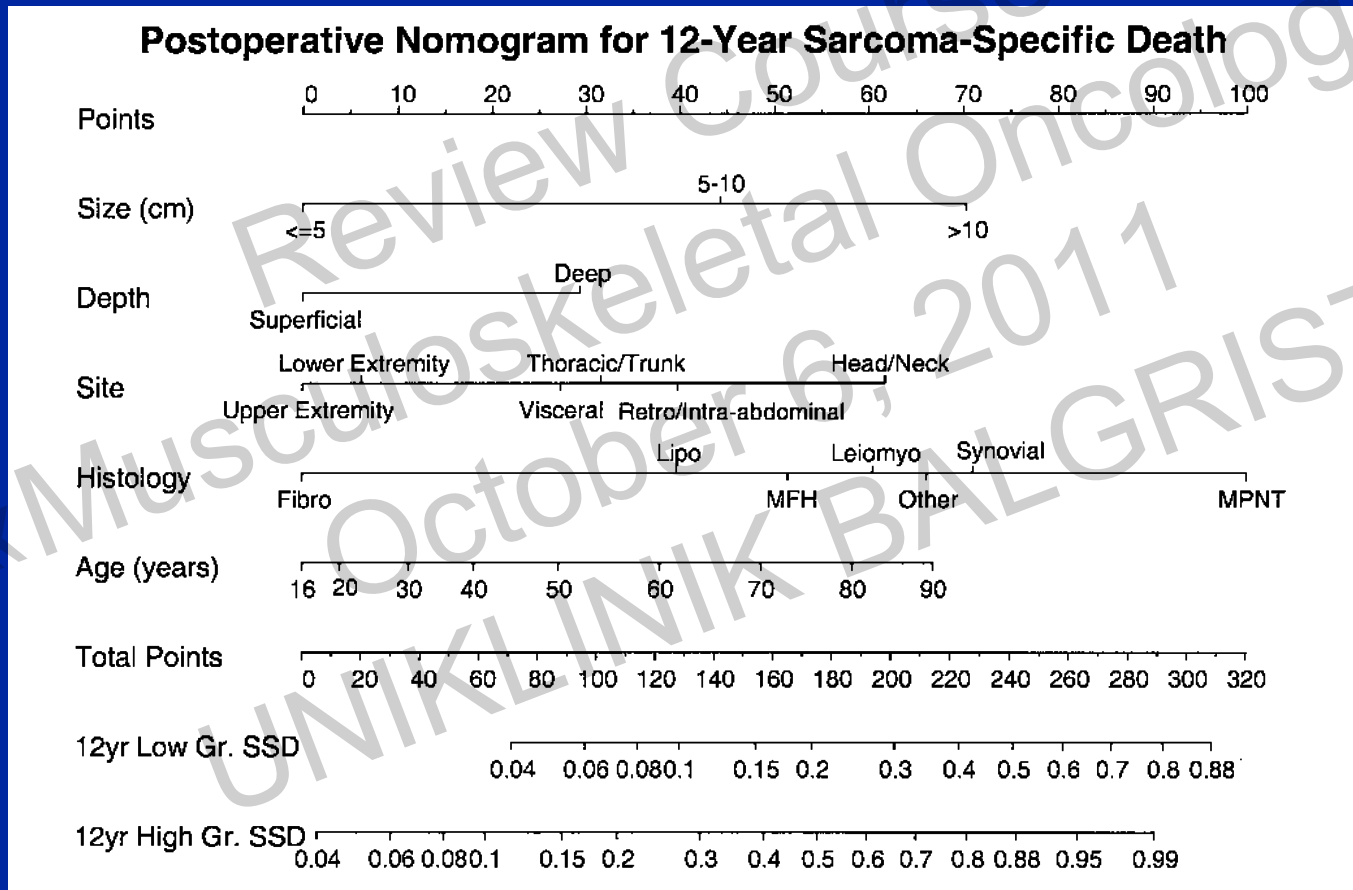
what does it mean ?

- LR alone does not define long-term outcome
- marker of tumor aggressiveness and less the cause of metastatic spread
- adequately performed surgery is less likely to result in LR
- LR despite adequate surgery is caused by biological aggressiveness, which will also cause metastatic spread.
- → LR has to be avoided, nature of LR is crucial and does not in itself cause poor outcome!

PROGNOSTIC FACTORS

in case of optimal surgery

postoperative nomogram of STS



THANK YOU !

