



TISSUE VITALITY AND EFFECT OF INJURY



“...the bone is a plant, with its roots in the soft tissue, and when its vascular connections are damaged, it often requires, not techniques of a cabinet maker, but the patient care and understanding of a gardener.” Girdlestone



ORIF NOW?



- What do we base our decision on?



ORIF NOW?



- What do we base our decision on?
 - Fracture type?
 - Age?
 - Comorbidity?
 - Smoker?
 - Diabetes?
 - Vascular status?
 - Medication?
 - Trauma mechanism?



LAVPRAKTISK METODE

- Practical approach: Wrinkle test





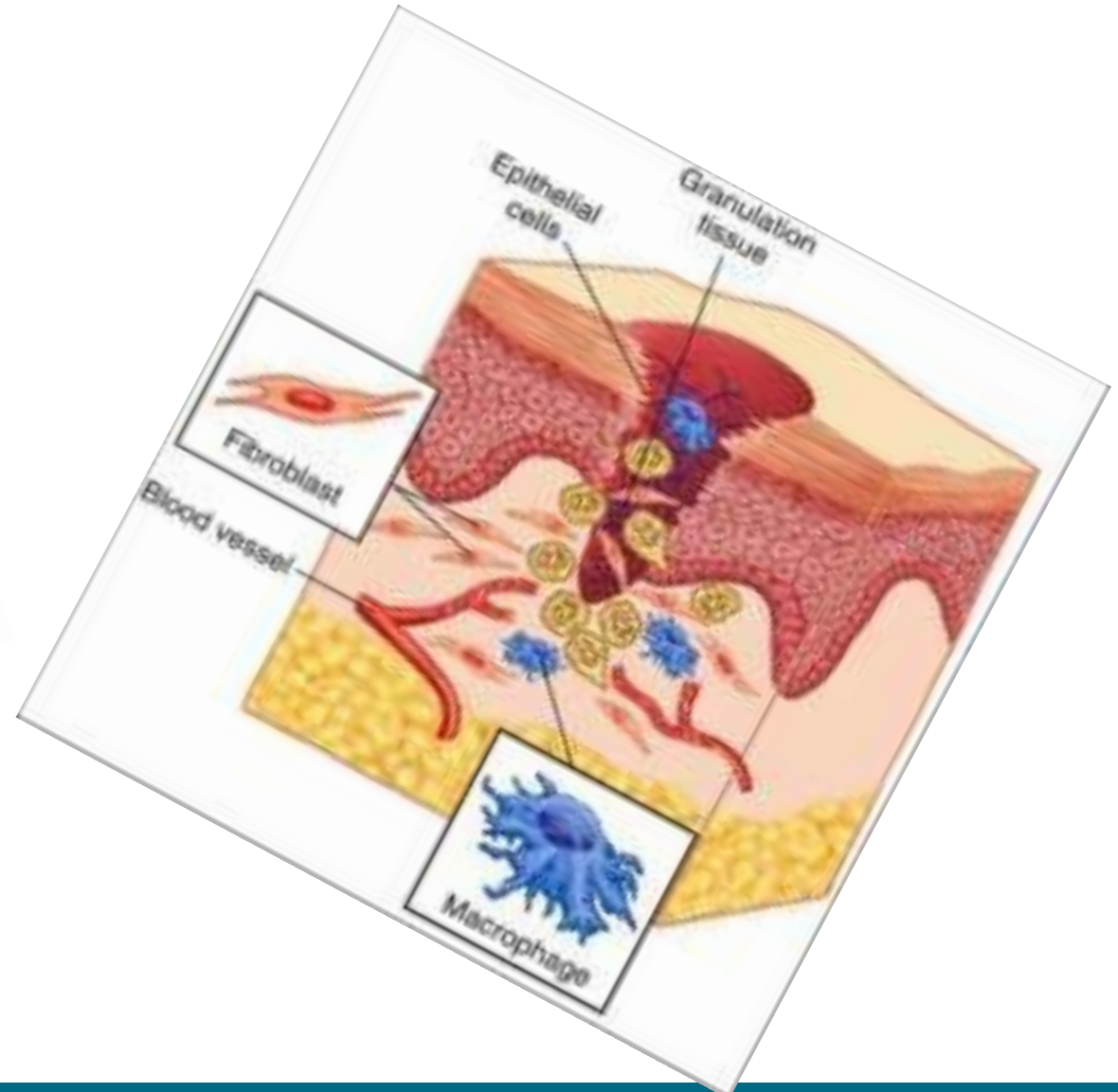
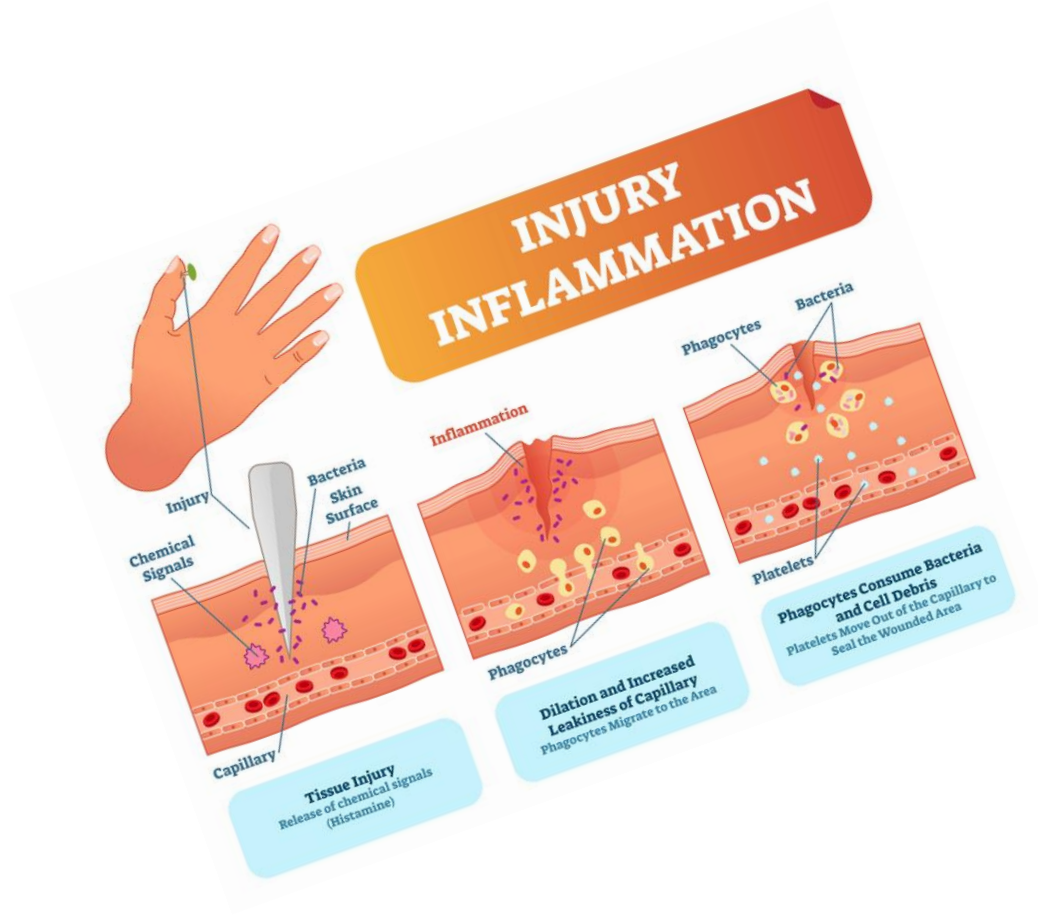
EXTERNAL FACTORS

- Type of insult and area of contact
- Magnitude of force applied
- Direction of force
- Where on the body
- Contamination



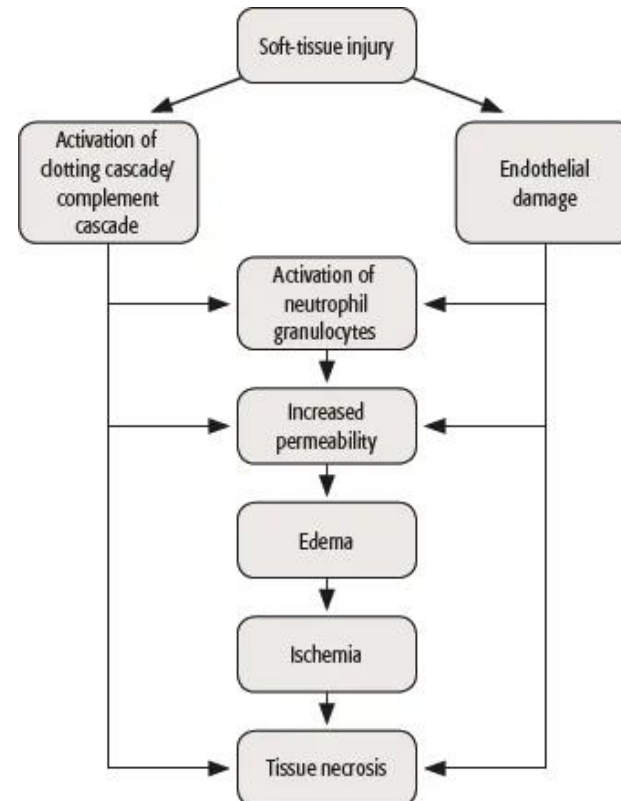


BUT WHAT IS THE BASIS OF OUR ASSESSMENT



MEN HVAD KAN VI GØRE NOGET VED?

- Sekundær skade





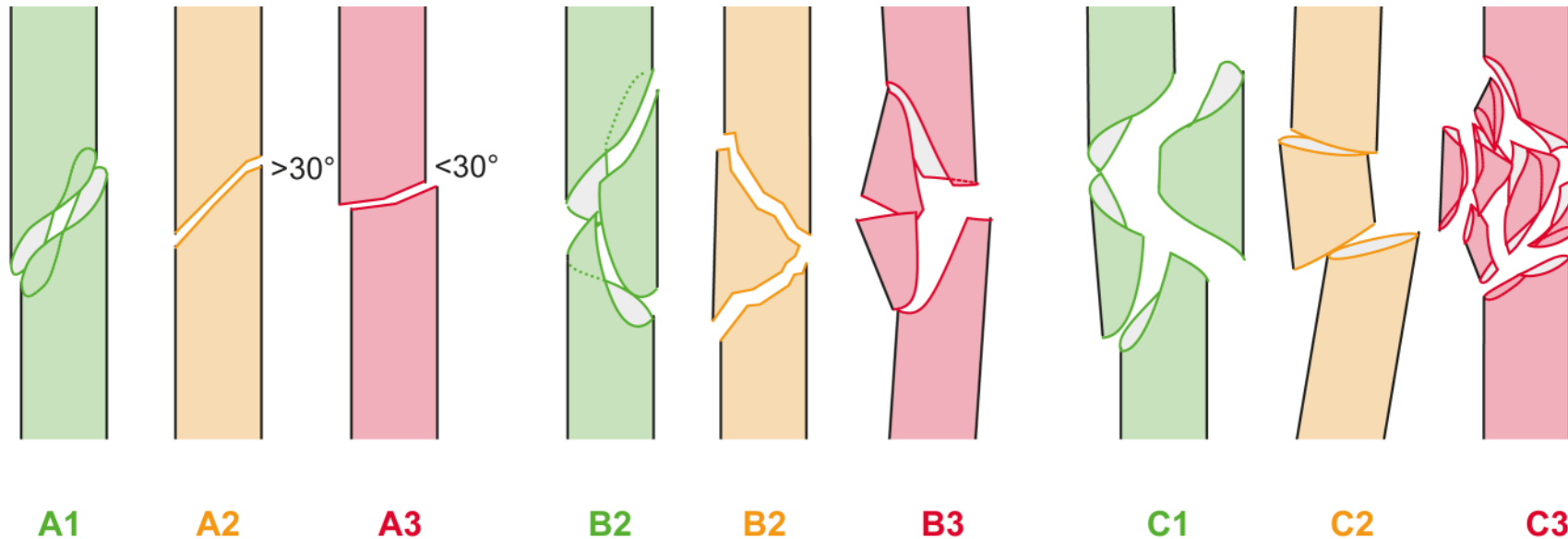
HVAD VISER PATIENTEN OS?





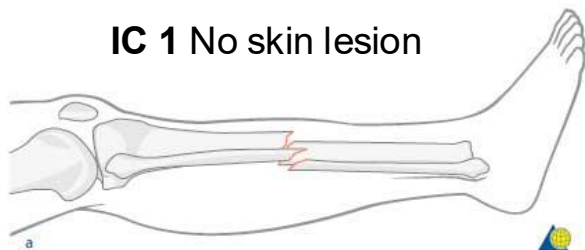
FRACTURE PATTERN (AO CLASSIFICATION)

- Torsion (skiing)
- Bending (indirect)
- Compression (fall from height)
- Contusion (direct, e.g. bumper injury)
- Combinations

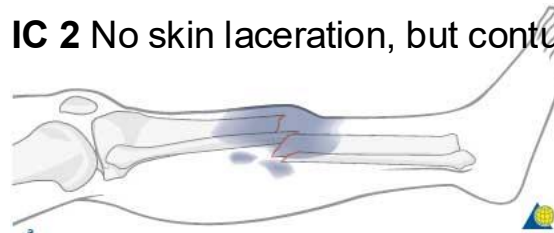


AO soft-tissue classification: closed skin lesions

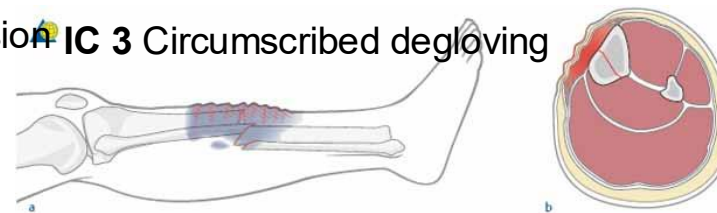
IC 1 No skin lesion



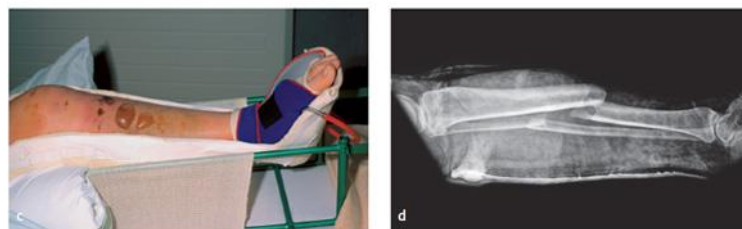
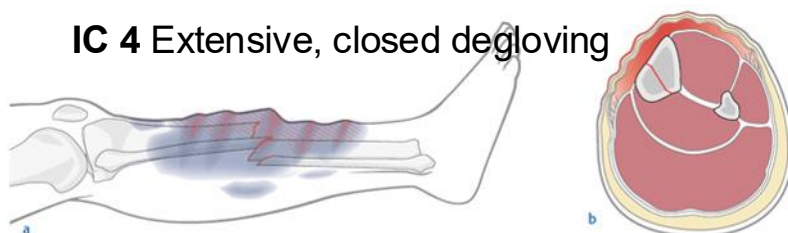
IC 2 No skin laceration, but contusion



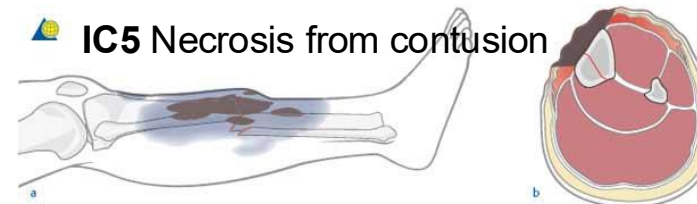
IC 3 Circumscribed degloving



IC 4 Extensive, closed degloving

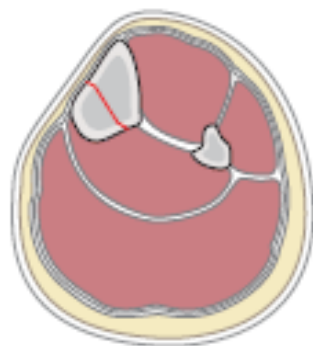


IC5 Necrosis from contusion



AO MUSCLE INJURY CLASSIFICATION: MT = MUSCLE AND TENDON

MT 1



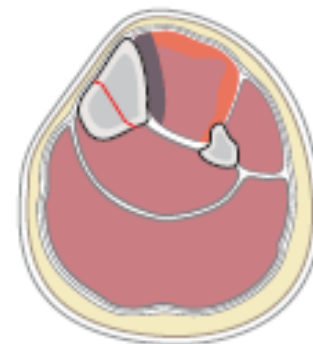
No muscle injury

MT 4



Muscle defect,
tendon laceration,
extensive muscle
contusion

MT 2



Circumscribed
muscle injury, one
compartment only

MT 5



Compartment
syndrome/crush
syndrome with wide
injury zone

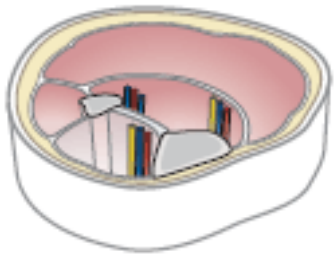
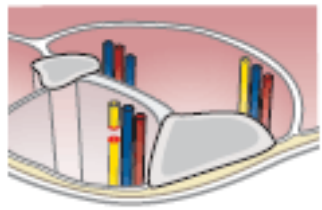
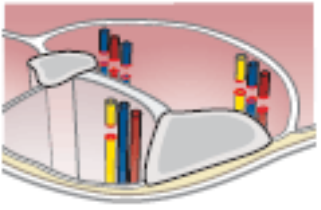
MT 3



Considerable muscle
injury,
two compartments



AO NEUROVASCULAR INJURY CLASSIFICATION: NV = NERVE & VESSEL

NV 1	 No neurovascular injury	NV 4  Extensive segmental vascular injury
NV 2	 Isolated nerve injury	NV 5  Combined neurovascular injury, including subtotal or even total amputation
NV 3	 Localized vascular injury	



42-A2/IC4-MT5-NV1

Mid-shaft tibial fracture - simple oblique

Massive soft tissue injury:

- Blister and suspected extensive degloving
- Suspected extensive muscle contusion and compartment syndrome.
- No NV-injury



WHEN SHOULD WE PERFORM SURGERY

Type of injury	Details of injury	Time of primary surgery	Procedure of primary surgery	Time of early reconstruction surgery	Definitive reconstruction surgery
Polytrauma	Hemodynamically unstable	Immediate	Damage-control surgery External fixator	5–10 days “window of opportunity”	After 3 weeks
	Hemodynamically stable	Immediate	Early appropriate care	–	–
Open fracture	Type I–IIIA	< 12–24 hours	Debridement and definitive fracture fixation	24–72 hours Redebridement and soft-tissue coverage	After 6–20 weeks Bone graft and soft-tissue management
	Type IIIB and IIIC	< 6 hours	Debridement, definitive fracture fixation or local damage control	24–72 hours Redebridement and soft-tissue cover by 5 days and definitive fracture fixation when clean	–
Closed fracture	Good soft tissues	1–3 days	Definitive fracture fixation	–	–
	Poor soft tissues	< 24 hours	Local damage control, spanning external fixator	–	After 10–18 days when wrinkle sign presents Definitive fracture fixation
Unstable fracture dislocation	Good soft tissues	< 12 hours	Definitive fracture fixation	–	–
	Poor soft tissues	Immediate	Local damage control, spanning external fixator	–	After 10–18 days when wrinkle sign presents Definitive fracture fixation



CONCLUSION

- Evaluate both the soft tissue and the fracture
- Be patient

