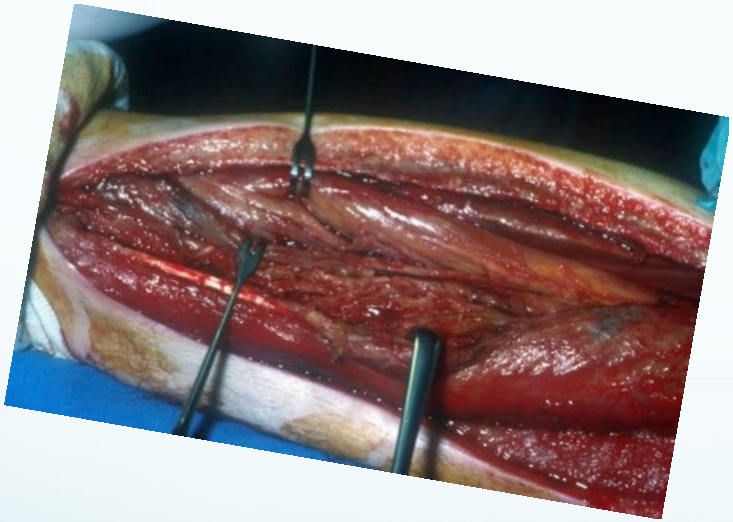
جـامعـة المعـرفـة
ALMAAREFA UNIVERSITY

Compartment Syndrome



Prof. Mamoun Kremli

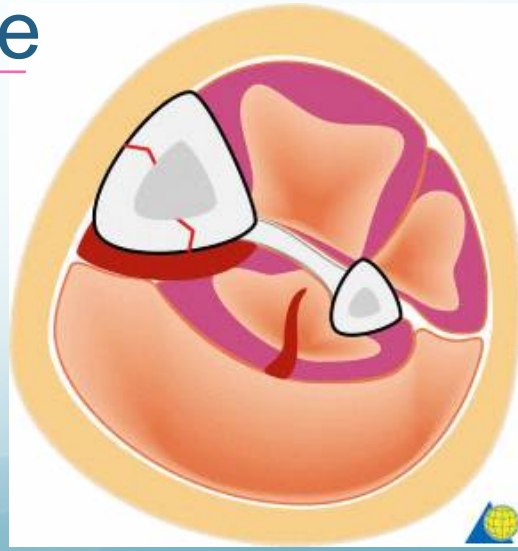
Lina Serhan 🫶

Objectives

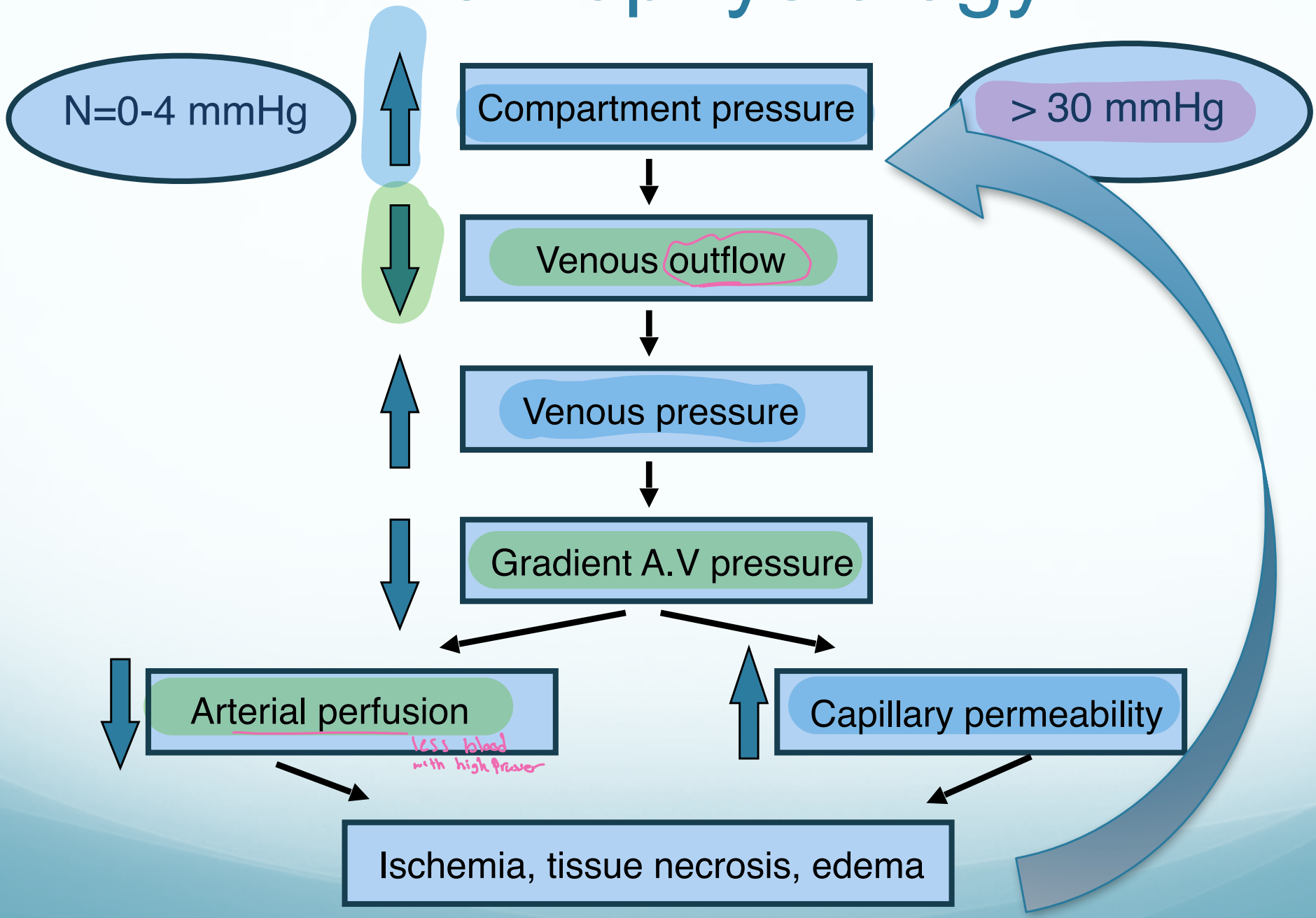
- Pathophysiology and causes
- Clinical Picture
- Identification
- Treatment

Pathophysiology

- Increasing volume in a closed compartment
- Pressure increased in compartment
- Decreasing arteriovenous difference
- Hypoxia
- irreversible muscle and nerve damage



Pathophysiology



Causes

- Hematoma
  - Fracture hematoma
  - Soft tissue trauma
  - Arterial injury
  - Bleeding disorders hemophelia
- Surgery
  - Post osteotomy (Tibia / Forearm)
  - Circumferential tight dressings/ casting
- Extravasation of IV infusion
  the fluid go to the soft tissue
- Burns
- Post-ischemic swelling (reperfusion)

www.pediatricsconsultant360.com

www.jointreplacementclinic.com

Clinical Picture – 5Ps

- Pain out of proportion & expectation/ burst sensation (most important)
- passive motion / stretch → Pain (is increase)
- Palpable tense swelling (like you hold a rock)
- Paresthesia

(to confirm it)

- Pallor
- Paralysis
- Pulselessness

TREAT

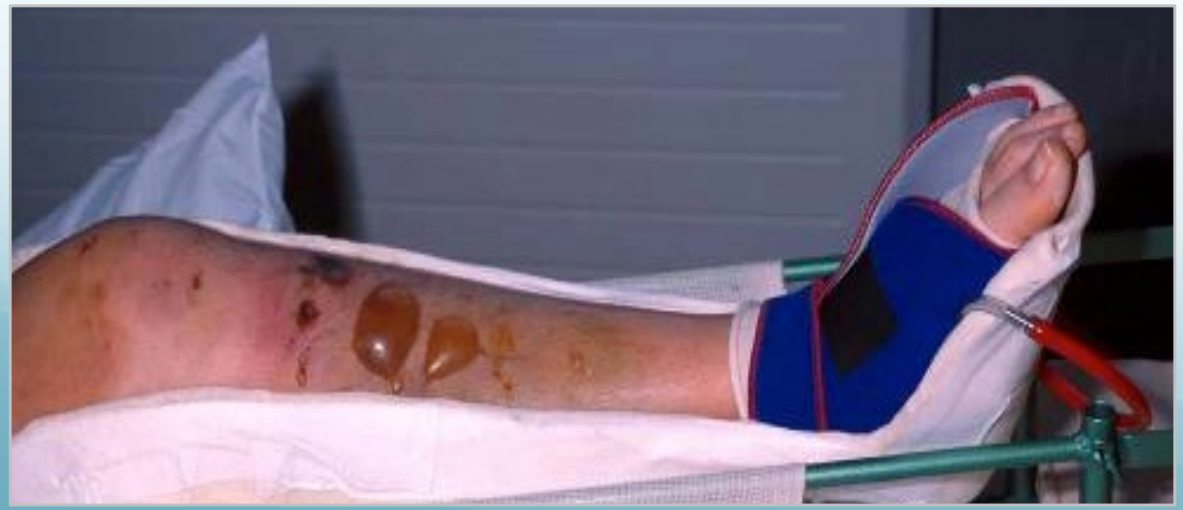
→ too late, >8h

Pain

- Absent in (high-risk patients):
  - Altered consciousness because of pain, ICU
  - Children (unable to verbalize) follow the response of analgesia
  - Concomitant nerve damage
  - Clinical picture equivocal
  - Polytrauma (Multiple injuries) patient
  - Sedated patient or Epidural anesthesia

Clinical Picture - Look

- Shiny Swelling of compartment
- Pallor / or Dusky skin
- Blisters
  - Clear fluid
  - serosanguinous: severe
  - Bloody: worst



Clinical Picture - Feel

- Tense
- Tender
- Paresthesia
- Weak Pulse ?
  - Too late

Clinical Picture - Move

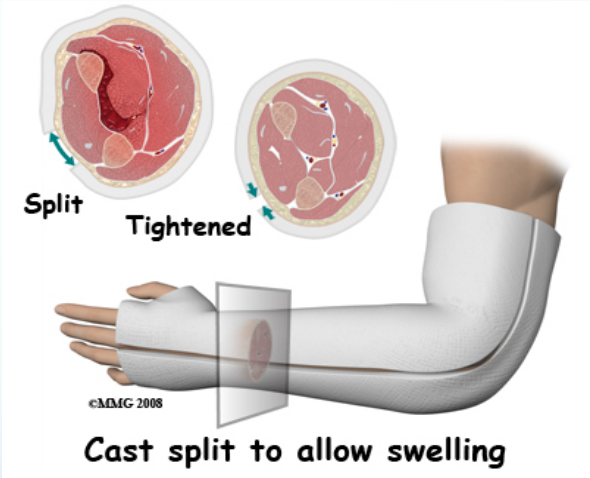
- Pain on passive stretch
  - Passive dorsiflexion of ankle (leg)
  - Passive dorsiflexion of wrist (forearm)

Diagnosis

- Open fractures DO NOT decompress an elevated compartment pressure = could be open fracture but the opening not enough so pt have compartment.
- High index of suspicion
- Diagnosis is clinical:
  - Unrelenting bursting pain
  - Not relieved by analgesia
  - Swollen compartment
  - Pain on passive stretching
  - Sensory deficit?
  - Pulses always palpable

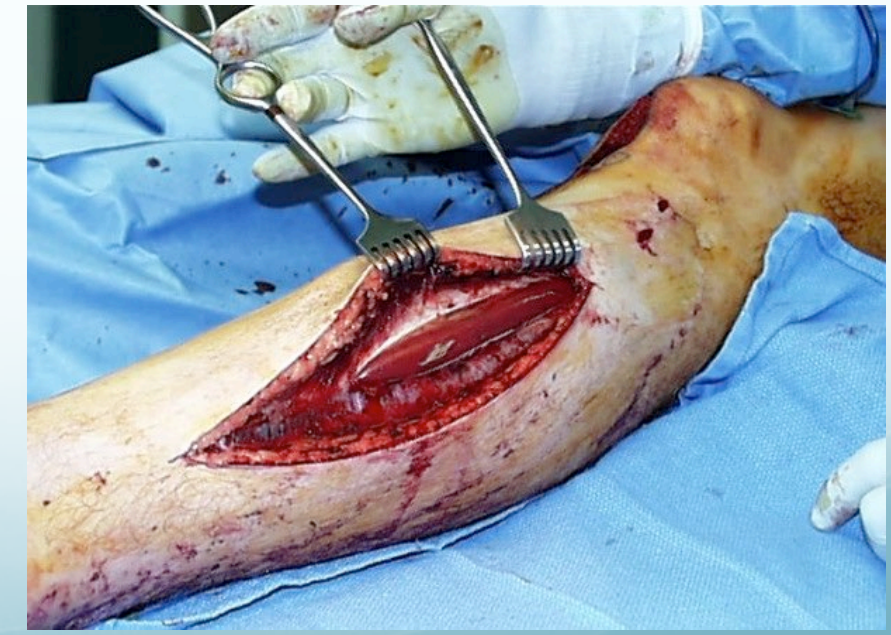
Management

- ABC's.
- Correct hypotension
- Supplemental oxygen administration
- If in cast:
  - Bivalve down to skin or remove
- Remove circumferential bandages
- Raise limb at level of the heart
  - Higher elevation reduces the arterial inflow



Surgical Management

- Urgent. Should not be delayed
  - No response to medical management within one hour
- Fasciotomy
  - Skin and All compartments



Fasciotomy Indications

- High risk patients
- Prophylactic with major corrective osteotomy of the leg & forearm
- S&S not resolved within 30-60 min. of appropriate precautions
- Significant tissue injury
- Suspicion: Equivocal clinical findings
- Based on measurements:
  - Delta pressure (DBP - compartment P.) ≤ 25 mm Hg.
  - Compartment pressure > 30mm Hg.

Fasciotomy Principles

- Long skin incisions
- Release all compartments
- Debride necrotic muscles (4C's):
  - color, consistency, contraction, circulation
- Preserve neurovascular structures
- Never close fascia, Keep wound open
- Repeated looks x48h as needed
- Coverage (within 3-5 days)

Fasciotomy Principles

Treatment - early

- Color red
- Consistency normal
- Capable of bleeding
- Contracts when pinched

Treatment – late

- Color dark
- Consistency abnormal
- Not bleeding
- No contractions when pinched

Fasciotomy Principles

- No skin wound closure
  - Bulky dressing with a splint
  - V.A.C" dressing (Vacuum Assisted Closure)
  - ? "Boot lace" vessel loop closure (gradual)

to make the closure of wound easy

sponge with suction

http://www.sjtrem.com/

Fasciotomy Principles

- Later skin graft / flap:
  - Usually skin graft
  - Flap coverage needed if nerves, vessels, or bone exposed

mgur.com

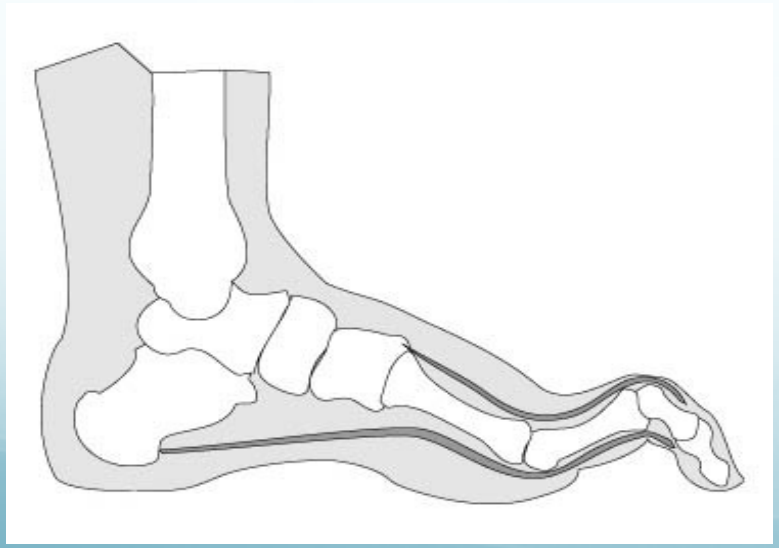
https://www.sciencedirect.com/science/article/pii/S187713271630152X

Fasciotomy Contraindication

- Confirmed acute compartment syndrome diagnosis for > 48 hours
  - Damage cannot be reversed, and
  - High infection rate when dead tissues are exposed
- Already dead muscles, as in crush injuries

Complications of untreated C.S.

- Volkmann's contracture :
  - Muscle weakness
  - Sensory loss
  - Chronic pain



Summary

- Compartment syndrome is a clinical diagnosis
- Should not be missed - Disaster
- Requires urgent management
  - If in doubt perform fasciotomy
- “Time” is the important factor to avoid irreversible complications
- Do NOT apply circumferential dressings