COMPARTMENT SYNDROME & ACUTE JOINTS DISLOCATION

Lecture objectives:

CS

1. To explain the pathophysiology of CS
2. To Identify patients at risk of developing CS
3. To be able to diagnose and initially manage patients with CS
4. To be able to describe the possible complications of CS

Acute joint dislocation

5. To describe mechanisms of joint stability
6. To be able diagnose patients with a possible acute joint dislocation
7. To be able to describe general principles of managing a patient with a dislocated joint
8. To describe possible complications of joint dislocations in general and in major joints such as the shoulder, hip and knee.

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References: Dr's slides & 436 team, Toronto Notes'2020'

ACUTE COMPARTMENT SYNDROME متلازمة الحيز

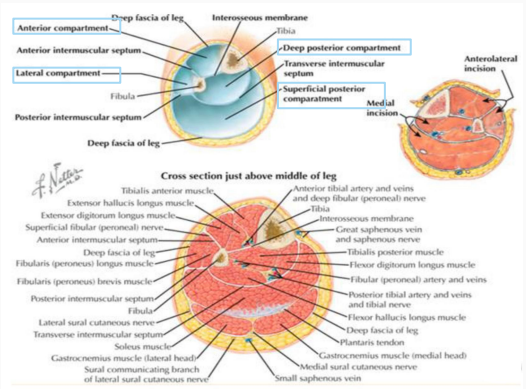
(TORONTO NOTES)

★ **Definition:**

"Is a potentially devastating condition in which the pressure within an osteofascial compartment rises to a level that decreases the perfusion gradient across tissue capillary beds, leading to cellular anoxia, muscle ischemia, and death"

Either: 1- The content of one of the compartments increased. Or 2- The space between them decreased.

- o An orthopedic emergency!
- o Intracompartmental pressure exceeds perfusion pressure.
- o It can develop wherever a compartment is present.



Blue area enclosed by fascia layer contains muscle, nerve & blood supply. Each group is called a compartment

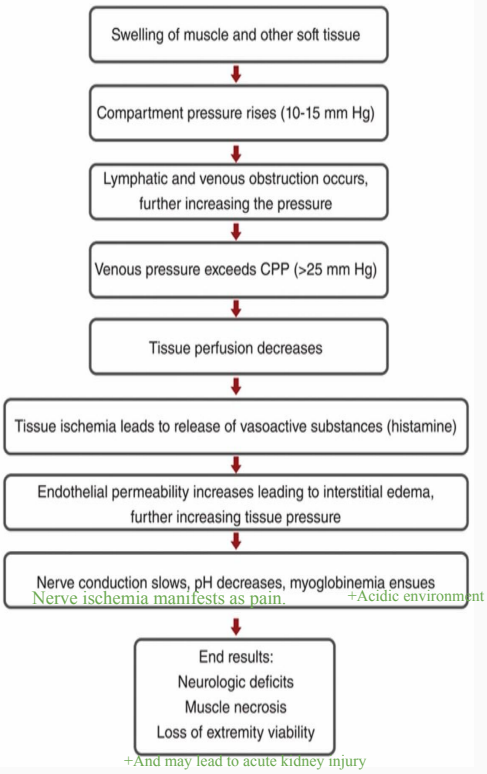
- Occurs when the tissue pressure within a closed muscle compartment (Intracompartmental pressure) exceeds the perfusion pressure results in muscle and nerve ischemia which lead to muscle necrosis.
- It typically occurs following a traumatic event, most commonly a fracture. Also, could happen due to burns or a plaster.
- (Arterial pressure is greater than > arteriole greater than > capillary bed (diffusion/exchange) > venule > vein)

Very unlikely to have an absent artery pulse because it's unlikely for compartment pressure to be > artery pressure. However, when it reaches the level of perfusion pressure the compartment cascade will begin.

★ **Pathophysiology:**

- Threshold pressure:
  - o It's enough to say CS if the Intercompartmental pressure exceeds 30 mm Hg (rigid). Because this pressure is enough to close the capillary bed perfusion pressure. (Absolute measurement).
  - **We use a relative measurement:**
  - o **DBP - Intercompartment = MUST BE <30**
  - o Less than 30 mm Hg difference between compartment pressure and diastolic pressure = it is more relative to perfusion = (clinically relevant) imp to know how to calculate it means that the Intracompartmental pressure is high and almost exceeding the diastolic pressure.

Don't skip. Doctor read this diagram.



Ex1: a patient had a diastolic pressure (DBP) of 60 and a systolic blood pressure of 100 and Intracompartmental pressure (IMP) of 25 is this CS? No, because 60–25= 35 which is not < 30 mm hg "Didn't exceed the perfusion pressure"

Ex2: a patient had a diastolic pressure of 50 and Intracompartmental pressure of 25 is this CS? Yes, because

50-25= 25 which is < 30 mm hg

- o Relative measurement is more important than absolute measurement since a big muscular guy differs from an old thin lady.

★ Etiology:

Increase the Compartment Volume	Reduction in Volume of Tissue Compartments
● Close soft tissue injury/ crush injury. Local hematoma inside ● Close fracture. Medulla which is a big artery is open so there is bleeding inside. ● Open fracture. Common mistake: people think that because of the an open fracture, the pressure will resolve, but in fact the hole is small and isn't enough to release the pressure because soft tissue, muscle, bone are all bleeding and the compartment extends over the whole leg, its one compartment open & 3 still locked and that opening can be occluded by bulging muscle which wouldn't allow sufficient venting causing compartment locked valve mechanism the pressure. ● Hemorrhage. From medulla ● Vascular injury**.** Like laceration ● Coagulopathy (anticoagulation therapy). ● Increased capillary permeability after burns (especially circumferential). ● Infusions or high-pressure injections (eg, regional blocks, paint guns). Radiology intervention/ extravasation ● Reperfusion after prolonged periods of ischemia. The basement membrane it's already damaged, which leads to leakage of fluid leading to interstitial edema leading to increased volume within department. (Cut off is 6 hrs for ischemia Death of artery, vein, and capillary bed, Vascular structures fail and leakage causes compartment Any ischemia → MOST LIKELY GONNA DO FASCIOTOMY)	● Tight circumferential dressings (artificial) (eg, can occur with cotton cast padding alone) ● Cast or splint (artificial) ● Prolonged limb compression it happens more in western countries BC people get drunk and lay down on legs for >24H, not flipping, they come with compression on one side & compartment on the other as in Trendelenburg and lateral decubitus or from alcohol or drug abuse ● Risk factors (general): ○ Head injury. (Late diagnosis) ○ Decreased consciousness (Late diagnosis) ICU pt, Due to prolonged compression and no communication between the doctor and the pt so CS could be missed, not bc it's a direct cause. ○ Hypotension Due to decreased perfusion pressure relative threshold to develop compartment syndrome is lower.

★ Orthopedics conditions:

Underlying Condition	% of Cases
Tibial diaphyseal fracture MOST COMMON!	36
Soft tissue injury	23.2
Distal radius fracture	9.8
Crush syndrome	7.9
Diaphyseal fracture forearm	7.9
Femoral diaphyseal fracture	3.0
Tibial plateau fracture	3.0
Hand fracture(s)	2.5
Tibial pilon fractures	2.5
Foot fracture(s)	1.8

Why tibial shaft fracture is number 1? In a scientific way and what's proven, people reached that by evidence. But logically thinking (not proven), tibia is a big bone in a small tight area

★ **Diagnosis:** it's a clinical diagnosis! No X-ray, US, MRI or CT! Keep a high index of suspicion!

Signs and symptoms

The earliest:

★ Very severe pain!!!! out of proportion to the injury
Patient is crying from pain and no medication works (increase need of analgesics). This is the most sensitive symptom and sign and after it we look for the presence of risks (the list above) and with a high index suspicion. (opioid does not relieve pain)

Scenario: A 22 Y/O male patient C/O pain. The nurse called you and told you that this patient had surgery to fix his tibia this early morning and she is suspecting CS, you rushed to the patient and found him chatting on whatsapp, is this CS? NOO :\

- Pain with passive stretching of the muscles in the compartment dorsiflexion to check the:
  posterior compartment of the leg and
  plantarflexion for the anterior compartment
- Pain May be worse with elevation.
- Patient will not initiate motion on their own.
- Presence of risk factor.
- Tense swelling
- High index of suspicion to save the limps.

The late sign:

- 4Ps: **P**aralysis, **P**aresthesia, **P**allor and **P**ulselessness.
  Pulselessness is RARE (Doctor mentioned that he never saw a case with pulselessness.), and only severely high compartment pressure causes it because the pressure gets very high to the point where it starts to compress the arteries, So it's a late sign and you shouldn't mention it.
- Tight (Woody compartment) most reliable sign to diagnose clinically.

Calf muscle would be hard and woody which is normally soft

- Tender compartment. Movement of anterior or posterior muscles of leg elicits severe pain

In Pediatrics:

3 As: (Increasing Analgesic requirement, Anxiety, Agitation)

Intramuscular Pressure (IMP) Measurement:

Objective method

A pressure measurement device, needle inserted inside the compartment, inject fluid, device collects and measures.

Problems:

- Not reliable, if you insert it into a muscle it will give you a very high reading.
- High false positive rate, so you might commit to unnecessary procedure.

Rarely necessary.

Must be done at area of highest expected pressure.

May give false low result.

The only relative indication for using it is: if the patient is in ICU and unconscious with precaution. Since he can't complain of pain.
BUT, if you see a patient with a risk factor and felt the compartment to be tight,
there is no reason to waste your time and measure, just take the patient
and do surgery to him!!! If you involved yourself with taking measurements,
you will put yourself in a medicolegal corner and people can sue you! :/

★ **Management:** Reverse the etiology, decrease content of compartment and increase space.

First is Prevention

Initial (undeveloped CS): SAQ

o Maintain normal blood pressure.
o Remove any constricting bandage.
o Keep limb elevated. (but not too much)
o Regular close monitoring (15-30 minute intervals).
o Avoid nerve blocks, sedation and strong analgesia to obtain patients feedback. Anything that can block pain response.

Fully Developed CS

- Remove any constricting bandage (the first and immediate thing)
- Maintain normal blood pressure.
- Keep limb at heart level.
- Diuresis to avoid kidney tubular injury if late. (Diuresis is not used for compartment, may be used to protect the kidneys from Myoglobinuria)
- Urgent surgical decompression (Fasciotomy). ASAP!! To prevent permanent muscle & nerve injury. If late the muscle will be dead.
  1. Split the cast and dressing down to the skin.
  2. Elevate the leg.
  3. Ice.
  4. Feel the compartments, if not tight you observe the patient every 2 H.
  5. If compartments are tight, take patient to OR for emergency Fasciotomy.

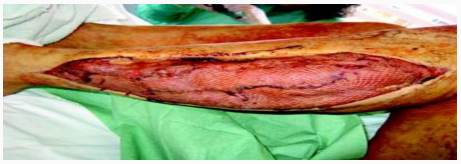
★ **Fasciotomy:** it's a surgical decompression ★ **MCQ:** If I had to choose fasciotomy or needle, always fasciotomy

Indications

● Within 6 hours of total ischemia time (ex: arterial embolism), should not be done if there is no expected viable tissue, otherwise infection. The problem with the 6 H is that it only applies for those with acute vascular ischemia who comes early, not chronic. Any patient with >24 hours compartment syndrome, we don't do anything, we let them suffer with the complications.. Unless patient has AKI because of myoglobinuria.
● Significant tissue injury. ● Worsening initial clinical picture.
● Delayed presentation with a picture of developed compartment syndrome.
● Absolute Compartment pressure >30 mmHg or <30 mm Hg difference from diastolic pressure.

Technique of Fasciotomy بَضعُ اللفافة أو بضع غشاء التجويف البطني (WATCH)

● It is a prophylactic procedure, doesn't reverse injury to permanently damaged tissue, So better to have lower threshold.
● Releasing the compartment fascia which allows swollen muscles to expand in volume which results in decreased compartment pressure with avoid further damage and doesn't reverse already occurred damage; ideally should be done as soon as diagnosis is made and should be done as long as there is still viable tissue. Shouldn't be done if there is no expected viable tissue, otherwise infection is likely.
● Debridement of all necrotic tissue is necessary.
● Second and third look surgeries are often required.
● Closure of skin is usually achieved after swelling has subsided.
● Skin grafting is often required.



You cut the skin→deep fascia→ muscles burst out like if it's breathing→ keep it open and cover with sterile dressing → reevaluate after 48 H (second look) →after 48 H or (Third look) → close the wound with in 3-5 days → if not possible do skin grafting. (you should close within 7 days) we usually close one side of the wound and close the other side with skin graft.

★ **Complications of ACS: SAQ**

1. Ischemic myonecrosis Muscle death: > Myoglobinuria > kidney tubular damage > acute renal failure 1st thing. Creatine kinase (CK). = Rhabdomyolysis.

2. Loss of function of the involved compartment secondary to muscle contracture:

o Flexion contracture

o Paralysis

o Loss of sensation

o chronic pain

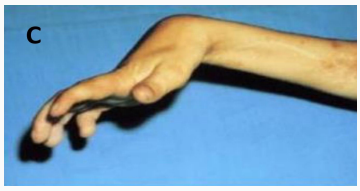
3. Leg:

o Anterior compartment: Drop foot تدلي القدم it's miserable (Pic A).

o Deep posterior compartment: Claw toesأصبع القدم المخلبية (Pic B) + Loss of sensation in the sole.

4. Forearm:

○ Deep Volar compartment: Volkmann's contracture تقفع فولكمان. is a permanent shortening (contracture) of forearm muscles, usually resulting from injury, that gives rise to a claw like deformity of the hand, fingers, and wrist. It is more common in children. Muscles are dead and start to be contracted -> fibrosed -> holds in a position -> not allowed to move.



Delay in Diagnosis/ Treatment is the cause of a poor outcome

5. Loss of limb:

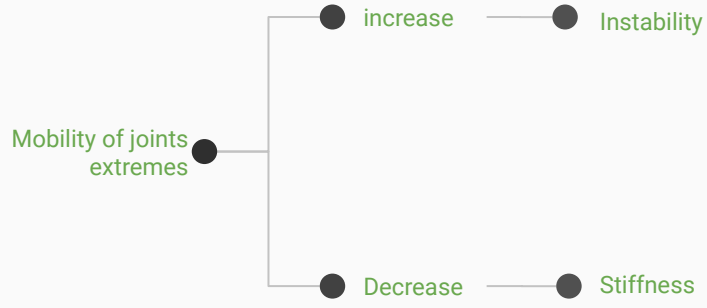
ACUTE JOINT DISLOCATION خلع المفصل الحاد

Definitions: ·

1. **Dislocation** is a total loss of contact between the articular surfaces of the joint. (complete separation)
2. **Subluxation** is a partial loss of contact between the articular surfaces of the joint.
3. **A joint dislocation** is described by stating the location of the distal segment;
   - o **Anterior shoulder dislocation:** anterior displacement of the humeral head relative to the glenoid.
   - o **Posterior hip dislocation:** posterior displacement of the femoral head relative to the acetabulum.

Anterior knee dislocation.

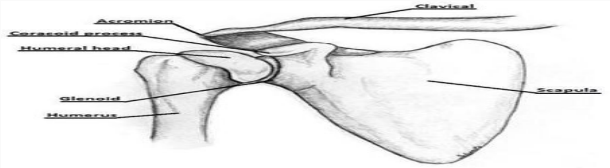
Anterior subluxation

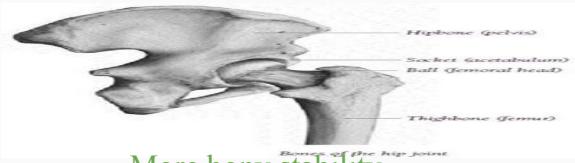


Joint stability:factors causing stability of joints

Bony stability [6]

Shape of the joint =configuration e.g: (ball and socket(Hip) vs round on flat (shoulder)). The more movement needed by joint the less bony stability and the more dependence on soft tissue, and the more bone configuration is leading to stability the less Mobile of joint. Hip joint more stability than shoulder





More bony stability.

Soft Tissue more important

- Dynamic stabilizer: Tendons/Muscles.= when the body move the joint by contracting muscles and these muscle cause compressive force to hold the joint in place.
- Static stabilizer: Ligaments ± Meniscus/labrum = One which is holding the joint in the place regardless of the movement status of joint = these mainly are ligaments or Meniscus/labrum, e.g. acute knee dislocation happens b/c there is injury in the ligament of knee that stabilize the knee joint, shoulder dislocation rely mainly on soft tissue called labrum which is kind of cartilage surrounding periphery of glenoid, if torn the join is no further stable"). يعني الركبة ما يصير لها ديسلوكيشن إلا لو انقطعت كل اللقمتس الي حولها بعكس الكتف
- Complex synergy leading to a FUNCTIONAL and STABLE joint.

Pathophysiology:

- It takes **higher energy** to dislocate a joint with bony stability than a joint with mainly soft tissue stability like weak ligaments;, we see recurrent joint dislocation with no history of trauma, only because their ligaments are weak.
- Connective tissue disorders may lead to increased joint instability due to abnormal soft tissue stabilizers. Ehlers-Danlos Syndrome has high tendency to have dislocation at lower threshhold of energy
- Dislocation of a major joint should lead to considering other joints. لأن الميجر جوينتس ما تتأثر الا لو فيه إنجري أثرت عليها كفاية إنها تأثر على الي حولها If an energy is sufficient to dislocate a joint you should suspect other injuries including muscle/ neurovascular.
- When a joint is subjected to **sufficient force in certain directions** it might sustain a fracture (in stable joint usually like hip joint), a dislocation (with torn ligament) or a fracture dislocation.
- Different joints have different force victors that may lead to a dislocation depends on position of arm and direction of force commonly in one direction, It depends on the direction of the force and the position of the limb at the time of dislocation. Ex: you're driving a car and had a dashboard injury, it will push your flexed knee backward.
- A joint might dislocate in different directions; in acute dislocation mainly is in one direction.

Risk groups:

1. Major trauma victims especially unconscious patient.
2. Athletes and sport enthusiasts.
3. Connective tissue disorder patient; due to increased joint instability in result of abnormal soft tissue stabilizers.

[6] Hip joint depends more on the bony stability (deep socket). The joint is shoulder joint (very shallow joint not deep), depends mainly on ligaments

Diagnosis:

- History of a traumatic event (Major trauma or any trauma with the limb in high risk position)
- Very severe Pain and inability to use the limb.
- Deformity. Like squaring of shoulder in shoulder dislocation (pic1).
  - May have Axillary nerve injury deltoid atrophy + loss of sensation.
  - Shortening. رجل اقصر من رجل posterior hip dislocation (pic 2)
  - Malalignment.
  - Malrotation.
- Should check for other injuries (distracting injury).
- Should always check the distal neurovascular status.
- Should check for compartment syndrome.
- X- ray: If you're sure that the joint is dislocated, you reduce it first, but if you're not, you do an X-ray first.
- Should be done urgently without delay if dislocation is suspected.
- Two perpendicular views of the involved joint. It's a 2D image, one view can mislead you.
- Occasionally, special views are required such as the **axillary** view for **shoulder** dislocation.
- X-rays to the joint above and below.

Squaring of shoulders (shoulder dislocation)

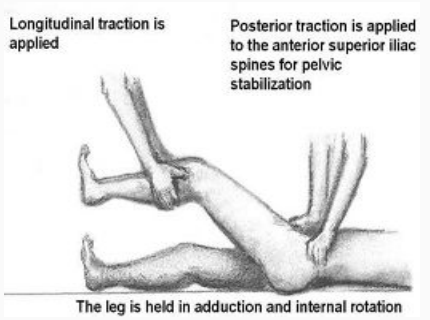
Internal rotation, shortening of the leg & posterior hip dislocation.

Management principles: **Scenario** Patient with multiple trauma, presented to ER with acute hip dislocation. What will you do?	
1	Must rule out other injuries.
2	Consent for reduction/conscious sedation (almost asleep but still breathing) pain relief.
3	Urgent reduction. After reduction you move the limb in all directions till you feel that at a certain level, he might dislocate his joint again. Then after that you tell him not to move his limb above this level.
4	Check stability and safety zone.
5	Check neurovascular status **after reduction** and before.

6	X-rays after reduction to confirm.
	• Shall we do xRay before or not?
	  ○ If the patient is in hospital setting already then it's better to do xRay for documentation if immediately available.
	  ○ Meanwhile, if patient is in the scene of injury then came to hospital then it's better to reduce right away because the muscle are softer at that time and it's easier to reduce.

7	Protect the joint by Immobilization, stabilizing. for 2 to 3 weeks to heal and after that send them to physical therapy department.
8	Rehabilitation.
9	Follow for late complication.

Reduction Technique: Reduction SAQ Best treatment of pain is reduction of joint not medications.



1. Monitor vitals.
2. IV analgesia (opioid).
3. IV sedation (to relax the muscles).
4. Gradual traction to distract the joint.
5. Realignment and rotation to reduce the joint based on direction of dislocation.
6. A palpable clunk well be felt.
7. Check ROM range of motion and stability of the joint.
8. Once joint is felt to be reduced, check distal NV neurovascular status:
   - If it was intact before but not after, farther urgent management is needed.
   - If it was not present before but intact after, check again later to confirm.

o Observe patients' vitals until medications wear out.

o Stabilize joint and get X-rays.

o **If irreducible or partial reduction only:** Urgent closed reduction under general anesthesia and possible open reduction (you open the joint and see what inside) if closed reduction fails, **Usually due to** 1- insufficient muscle relaxation or 2- Entrapment of soft tissue.

Posterior hip dislocation technique:
Stabilize, 1.Traction of leg 2.Hip flexion , till the joint is reduced 3. Countertraction of pelvis 4. Wait for a طقة 'Clunk'.
Then examine, if stable immobilize then rehabilitation. If unstable do surgery.

Shoulder dislocation technique:
has many technique one of them is dislodging by using body weight of patient and pull the arm then use a folded sheet by helper to pull shoulder to the direction

Scenario: did reduction in emergency department and it's not reduced, you have to fo urgent closed reduction & general anesthesia (because you can give muscle relaxant and you have all control.) Not possible? Do open reduction by cutting skin, dissection to joint capsule and see joint by your eyes.
*Using K wires is closed reduction.

SPECIAL CONSIDERATION:

o A fracture dislocation is usually reduced in an open fashion in the operating room.

o Must confirm concentric reduction on the x-rays, otherwise an open reduction should be performed. pic shows: fracture and dislocation, you must rush the patient to the OR.

- Make sure that the neurovascular status is documented before & after.

Complications:

Early	Late
Heterotopic ossification تعظم غير متجانس. (bone formation at an abnormal anatomical site).تسوي رستركشن اوف موفمنت احيانا Neurological injury (reversible or irreversible). Vascular injury (more commonly with neurological injuries). Compartment syndrome. Osteochondral fracture/injury.= Cartilage of one side of joint with a piece of bone on it is damage= a piece of Cartilage that peels off & can prevent reduction cause mechanical block & cause OA in the future	Stiffness. -Soft tissue damage leading to fibrosis. -Improper rehabilitation program. Heterotopic ossification. Calcification within soft tissue of muscle or tendon not supposed to be = there Calcification within wrong position. Not known why. Chronic instability more common in shoulder joint. Recurrent dislocation Avascular necrosis التنخر اللاوعائي it may appear after 4 to 6 month and more common in the head of femur. It's a local bone ischemia due to destruction of blood supply Osteoarthritis. Damage to cartilage.

EXAMPLES OF JOINT DISLOCATION:

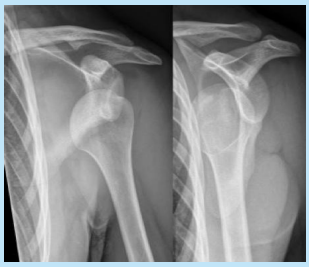
Hip joint Dislocation:

- **Posterior** dislocation is commonest.
- Major trauma with hip flexed (dashboard injury in RTAs).
- Sciatic nerve injury is common; check extension and flexion of the big toe.
- loss of foot dorsiflexion
- High incidence of late avascular necrosis 10%

An orthopedic emergency!

Shoulder dislocation

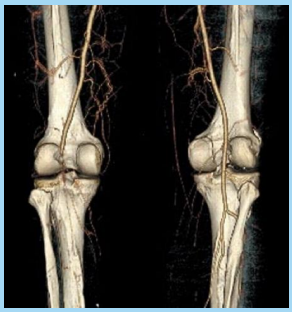
Humerus out anteriorly.



- Common.
- **Anterior** dislocation is more common. Patients presents with pain and limited range of motion after shoulder injury.
- Patients with seizures prone to posterior dislocation. (Because they can't protect themselves when they fall while having a seizure)
- May cause chronic instability.
- Can result in **axillary** nerve injury and wasting in deltoid muscle (deltoid atrophy) and numbness over its area.

Young patient with dislocation = Higher rate of recurrence

Anterior **Knee** dislocation



- Very serious emergency. Very BAD!
- Usually with **severe (high energy) trauma.**
- It is could be anterior dislocation or posterior dislocation.
- Three or more ligaments are teared = have medial and lateral collateral ligament and, anterior and posterior cruciate ligaments these main ligaments hold the knee plus meniscus.
- **May be associated with popliteal artery injury (50%) (**Limb threatening) **or peroneal nerve injury.**
- Needs accurate **vascular** assessment.
- May be associated with fracture/ compartment syndrome.
- **Most require surgery either early or late or both.**

- Prognosis is not great.

TAKE HOME MESSAGES

- High index of suspension is needed to make diagnosis of compartment syndrome
- Pain is the most sensitive symptom / sign for compartment syndrome
- Early intervention can save limb suffered from compartment syndrome
- Joint dislocation is an emergency
- Prompt reduction should be performed
- Check neurovascular status pre and post reduction

TORONTO NOTES

Compartment Syndrome SLIDE2

- increased interstitial pressure in an anatomical compartment (forearm, calf) where muscle and tissue are bounded by fascia and bone (fibro-osseous compartment), with little room for expansion
- interstitial pressure exceeds capillary perfusion pressure, leading to muscle necrosis (in 4-6 h) and eventually nerve necrosis

Etiology

- intracompartmental
  - fracture (particularly tibial shaft or paediatric supracondylar and forearm fractures)
  - reperfusion injury, crush injury, or ischemia
- extracompartmental: constrictive dressing (circumferential cast), poor position during surgery, circumferential burn

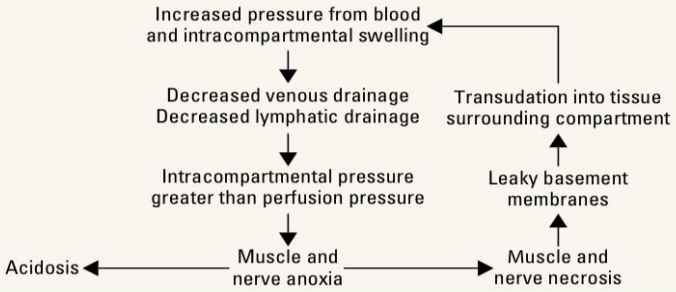


Figure 8. Pathogenesis of compartment syndrome

Clinical Features

- pain out of proportion to injury (typically first symptom and the most significant finding)
- pain with active contraction of compartment
- pain with passive stretch (most sensitive)
- swollen, tense compartment
- suspicious history

- **5 Ps:** late sign – do not wait for these to develop to make the diagnosis!

Most important sign is increased pain with passive stretch. Most important symptom is pain out of proportion to injury

5 Ps of Compartment Syndrome
Pain: out of proportion for injury and not relieved by analgesics
- Increased pain with passive stretch of compartment muscles

Pallor: late finding
Paresthesia
Paralysis: late finding
Pulselessness: late finding

Investigations

- usually not necessary, as compartment syndrome is a clinical diagnosis
- in children or unconscious patients where clinical exam is unreliable, compartment pressure monitoring with catheter (normal = 0 mmHg; elevated ≥30 mmHg or [measured pressure – dBP] ≤30 mmHg)

Treatment

- non-operative
  - remove constrictive dressings (casts, splints), elevate limb at the level of the heart
- operative
  - urgent fasciotomy
  - 48-72 h post-operative: necrotic tissue debridement + wound closure
  - may require delayed closure and/or skin grafting

Complications

- Volkmann's ischemic contracture: ischemic necrosis of muscle; followed by secondary fibrosis; and finally calcification - especially following supracondylar fracture of humerus
- rhabdomyolysis, renal failure secondary to myoglobinuria

QUESTIONS

1) Which of the following is most likely to be found in compartment syndrome?

A. IMP 29 DBP 70
B. IMP 29 DBP 50
C. IMP 29 DBP 50
D. IMP 30 DBP 75

2) 16 year old male Post-operative patient following debridement presented with pain. Which of the following is a suggestive sign for compartment syndrome?

A. Pain is worsening
B. Pain is intermittent
C. Pulselessness
D. loss of sensation

3) a young male presented to the ER after falling on his outstretched hand. What is the most likely diagnosis?

A) Shoulder dislocation
B) Clavicle fracture
C) Glenoid fracture
D) Sternoclavicular joint dislocation

4) A 17 years old football player had an injury to the shoulder. X-ray shows dislocation of the humerus. What concomitant sign can you clinically see?

A) Deltoid atrophy
B) Wrist drop
C) Winged scapula
D) Deltoid hypertrophy

5) 20 - year - old man is post - surgical fixation of Rt tibia fracture earlier today . He has below knee back slab . He has increasing leg pain that cannot be controlled with pain meds .

A) What's your initial management in the floor ?

Maintain normal blood pressure. Remove any constricting bandage. Keep limb elevated.Regular close monitoring (15-30 minute intervals).Avoid nerve blocks, sedation and strong analgesia to obtain patients feedback.

B) Mention 3 possible complications if left untreated ?

- Ischemic myonecrosis
- Loss of function
- Leg: Anterior compartment: Drop foot, Deep posterior compartment: Claw toes

6) A 22 - year - old man sustained posterior hip dislocation .

A) Please describe reduction technique in Emergency department.

SLIDE9

ANSWERS: 1- B 2- A 3-A 4-A