Fasciotomies

Medical Practice Improvement Project

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Disclosures

I have no disclosures

Learning Objectives

- Discuss and understand compartment syndrome
- Understand the symptoms of compartment syndrome
- Upper arm fasciotomies
- Lower extremity fasciotomies
- Gluteal fasciotomies
- Back fasciotomies

Compartment Syndrome

Compartment syndrome is a potentially (Limb Threatening) life-threatening condition that occurs when increased pressure within a confined anatomical space compromises the circulation and function of tissues.

This can lead to muscle and nerve damage, requiring urgent intervention.

Understanding the causes, etiologies, and treatments is essential for effective management.

Compartment Syndrome

- **Causes and Etiologies**
- Compartment syndrome can be classified into two main types: **acute** and **chronic**.

1. **Acute Compartment Syndrome**:
    1. **Trauma**: Fractures, crush injuries, and direct blows can lead to bleeding and swelling in a compartment.
    2. **Vascular Insufficiency**: Conditions like vascular occlusion can increase pressure.
    3. **Reperfusion Injury**: After a period of ischemia, restoring blood flow can lead to edema and increased compartment pressure.
    4. **Burns and Frostbite**: Tissue injury can cause swelling and increased pressure.
    5. **Tight Dressings or Casts**: Improperly applied casts can restrict blood flow and lead to increased pressure.

Compartment Syndrome

Chronic Compartment Syndrome:

1. **Overuse**: Common in athletes, it arises from repetitive activities leading to muscle swelling during exercise.
2. **Anatomical Factors**: Some individuals may have smaller compartments, making them more susceptible to elevated pressures during physical activity.

The 5 P's of compartment syndrome are classic signs and symptoms used to help identify the condition:

Pain: Severe pain that is disproportionate to the injury and does not improve with usual pain relief measures.

Paresthesia: Tingling or a "pins and needles" sensation, indicating nerve involvement.

Pallor: Pale or cool skin, which may suggest compromised blood flow.

Pulselessness: Weak or absent pulses in the affected area, though this may be a late sign.

Paralysis: Weakness or inability to move the affected limb, indicating significant nerve damage.

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Diagnosis of Compartment Syndrome: Pressure Monitoring

- Diagnosing compartment syndrome involves both clinical assessment and objective measurement of intracompartmental pressures. While the classic signs and symptoms (the 5 P's) are essential for initial evaluation, pressure monitoring provides definitive evidence.

Intra compartmental Pressure Measurement

Indications for Monitoring:

- Suspected compartment syndrome based on clinical signs and symptoms.
- Following significant trauma, fractures, or prolonged limb compression.

Measurement Techniques:

- **Invasive Pressure Monitoring**: The most accurate method involves inserting a catheter into the affected compartment.
  - **Catheter Placement**: A thin, flexible catheter (often a 16- or 18-gauge needle) is inserted into the compartment through a small incision.
  - **Pressure Measurement**: Using a pressure monitor, the intracompartmental pressure is measured. Normal pressure is typically between 0-8 mmHg.

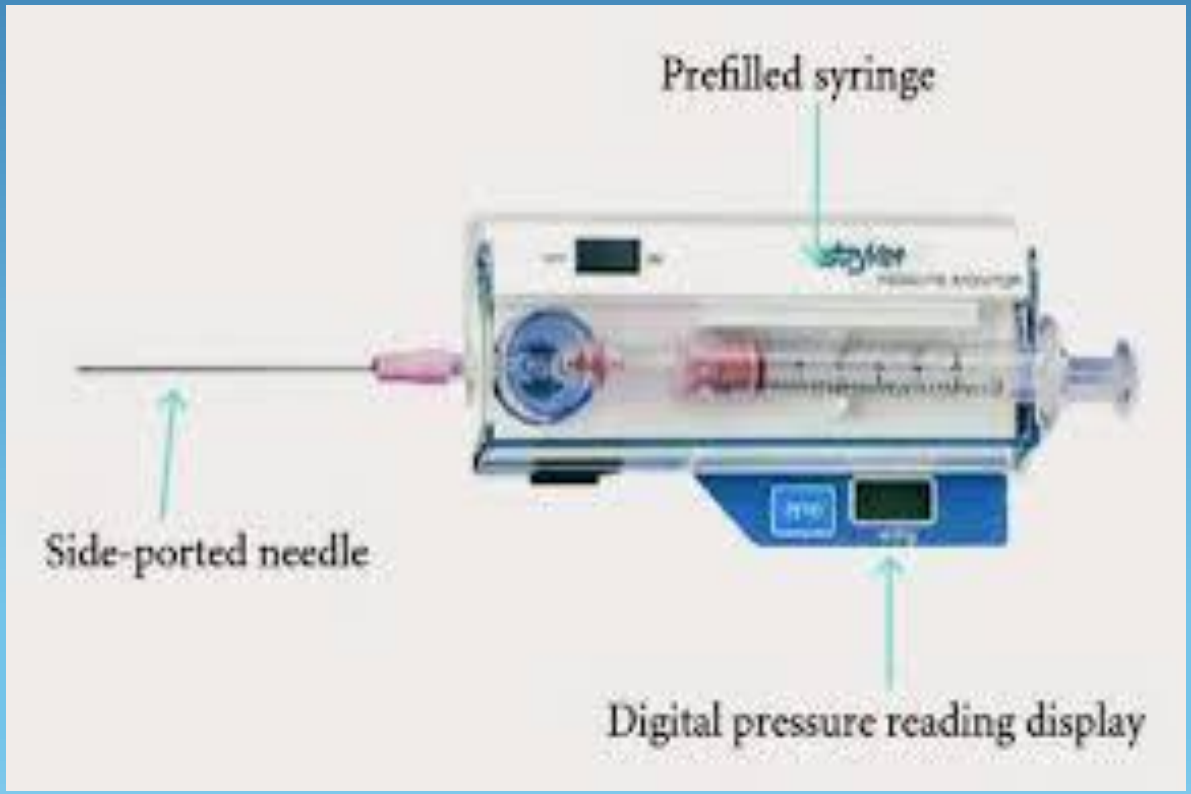
Diagnostic Criteria:

Elevated Pressure: A pressure reading above 30 mmHg is often considered indicative of compartment syndrome. However, some sources suggest that a pressure greater than 20 mmHg may warrant concern, especially if combined with clinical symptoms.

Delta Pressure: This is the difference between the diastolic blood pressure and the intra-compartmental pressure.

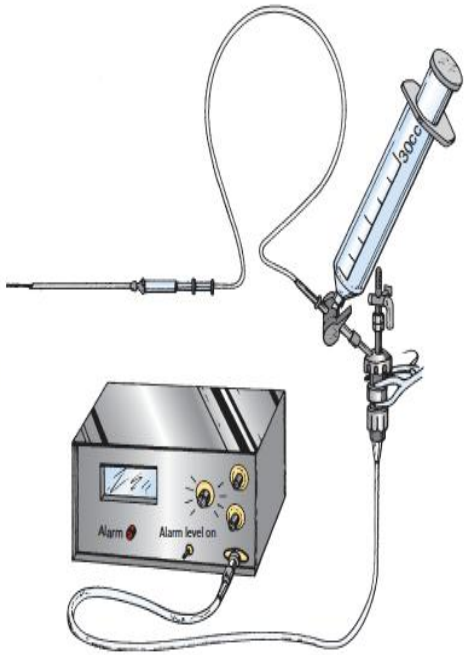
A delta pressure of less than 20-30 mmHg is often used as a criterion for diagnosis.

Measuring Devices

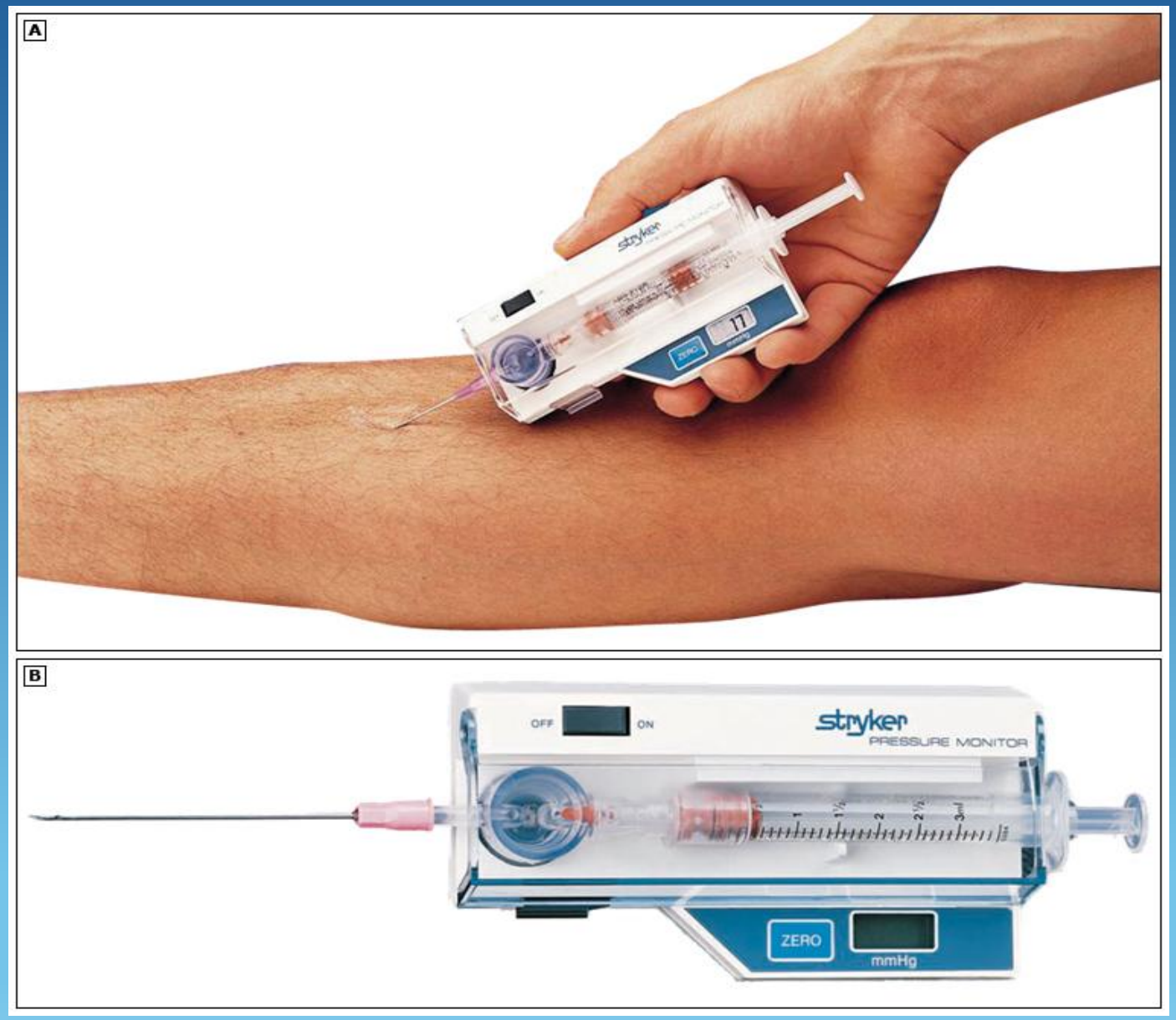


Equipment

- One 18-gauge simple or spinal needle
- High-pressure tubing
- Pressure transducer with cable
- Pressure monitor
- Sterile saline
- Transducer stand that allows variable adjustments in height
- Two three-way stopcocks
- One 20-mL syringe



Pressure Monitoring



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Timing of Measurement:

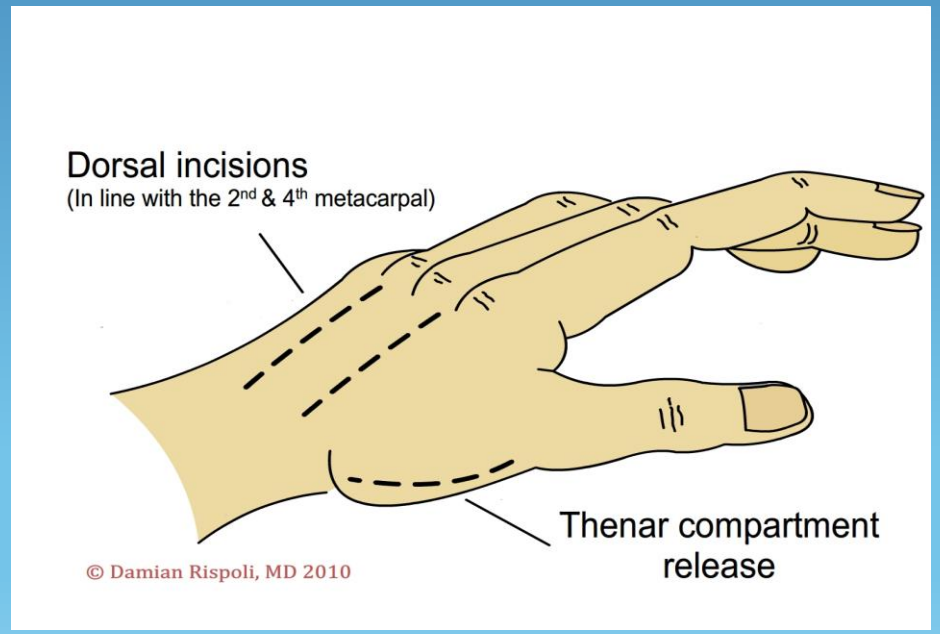
- Pressure monitoring should be performed as soon as compartment syndrome is suspected, ideally before irreversible muscle and nerve damage occurs.
- **Limitations**:
- False positives may occur due to local edema or other conditions.
- Pressure readings should be interpreted in conjunction with clinical findings.

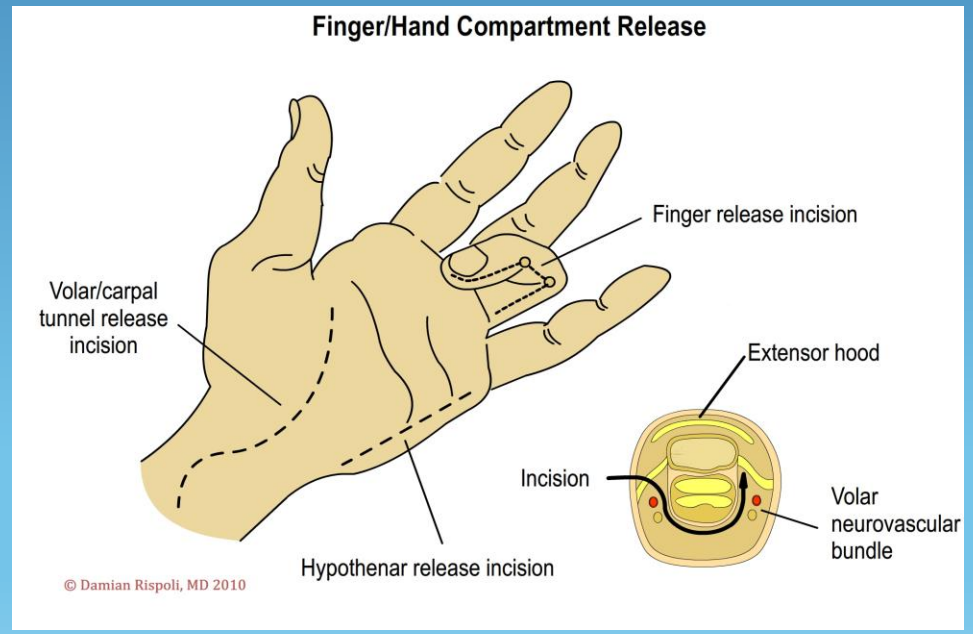
Types of Fasciotomy

- Fasciotomy is performed based on the location of the compartment syndrome.

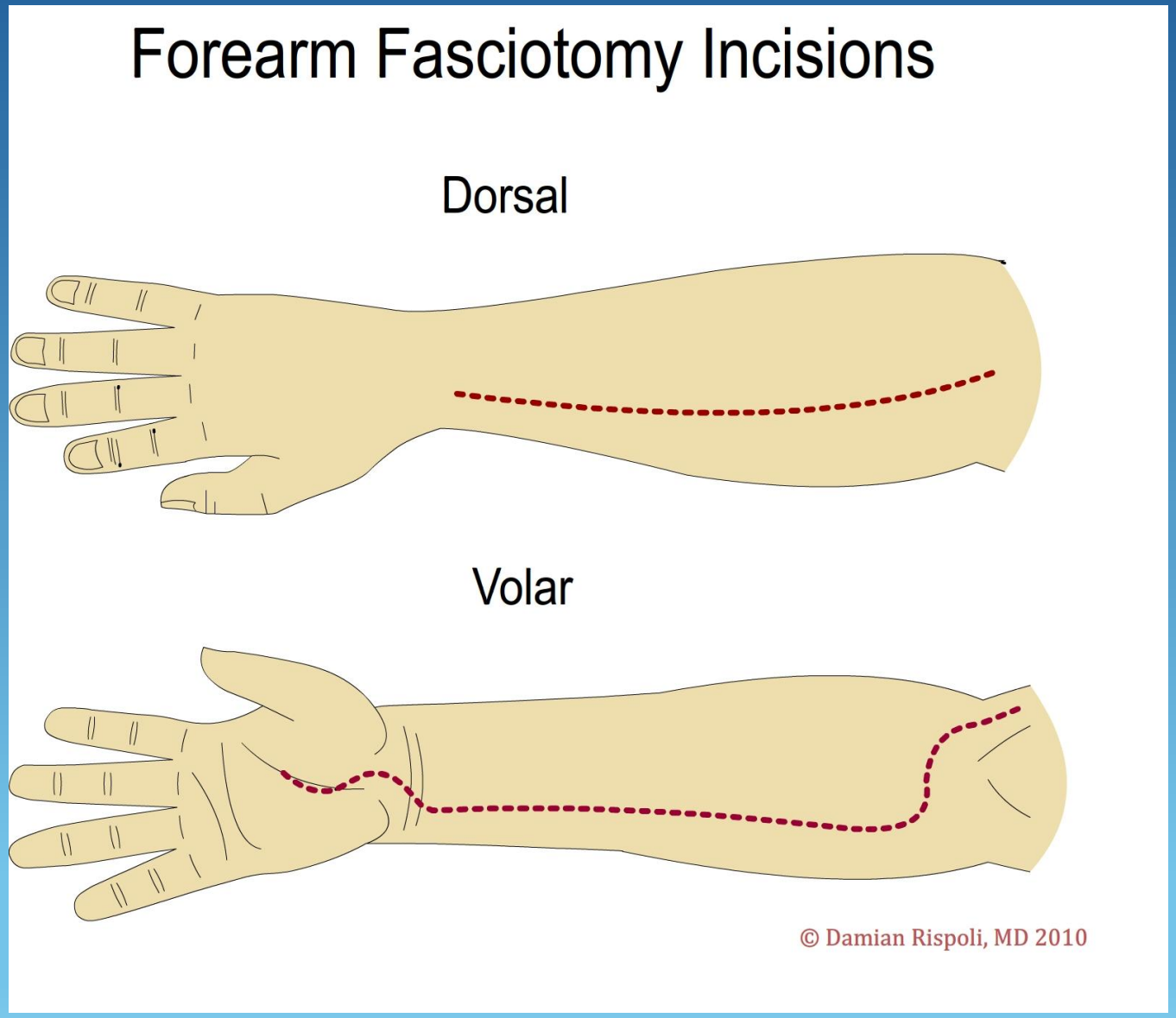
Upper Extremity Fasciotomy:

Indicated for acute compartment syndrome in the forearm. An incision is made along the anterior aspect, often extending to the wrist, to relieve pressure in the flexor and extensor compartments.





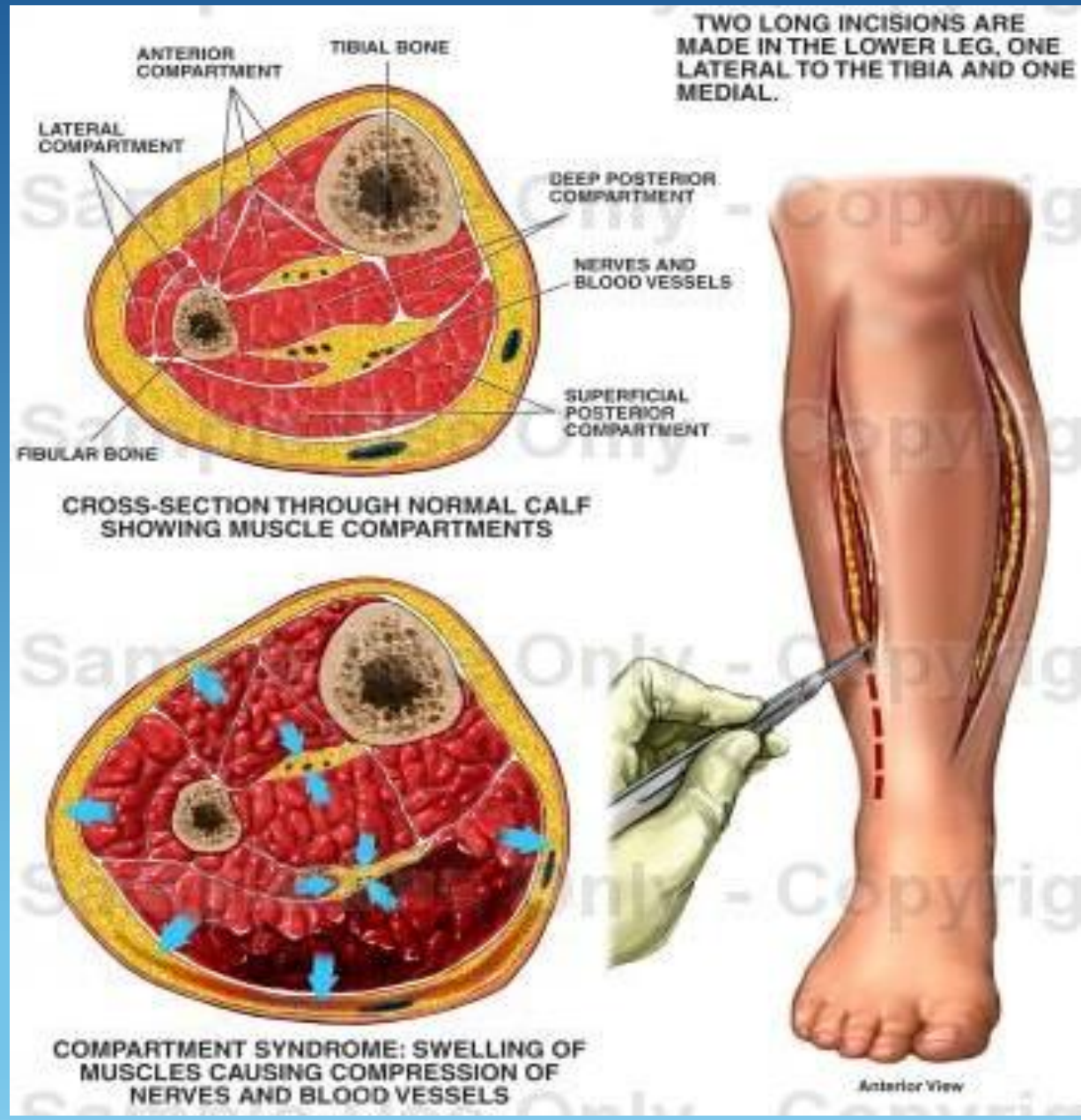
Upper Extremity Continued



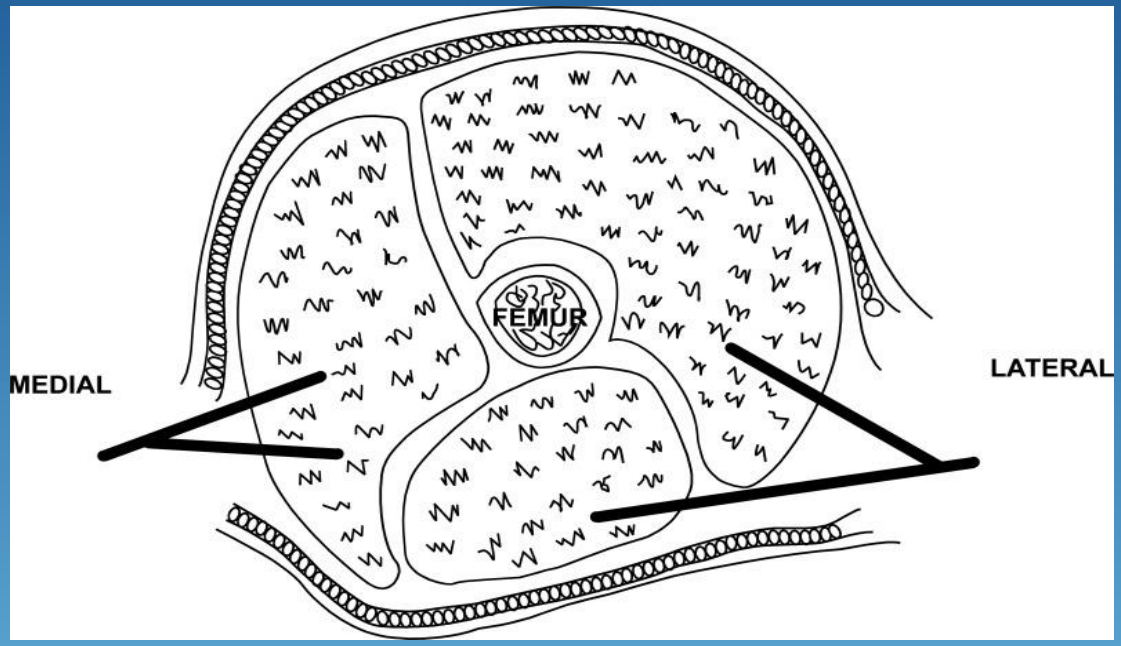
Types of Fasciotomy

Lower Leg 4-Compartment Fasciotomy:

Commonly performed for acute compartment syndrome in the lower leg. The four compartments (anterior, lateral, deep posterior, and superficial posterior) are accessed through incisions made on the medial and lateral aspects of the leg.

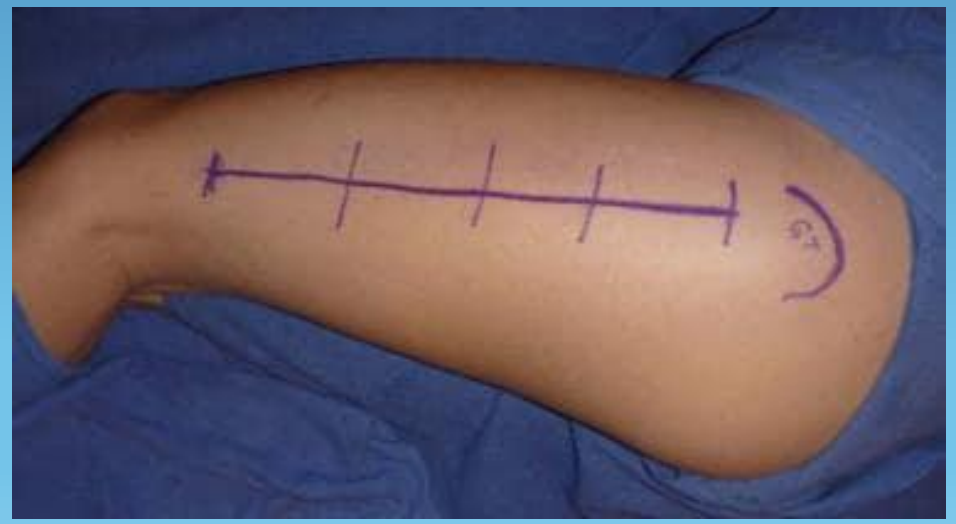


Types of Fasciotomy



Quadriceps Fasciotomy:

Indicated for compartment syndrome in the thigh. A longitudinal incision is made over the quadriceps muscle to relieve pressure, commonly seen in cases of trauma or intense exercise.



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Types of Fasciotomy

Gluteal Fasciotomy:

Performed for compartment syndrome in the gluteal region. An incision is made over the gluteus maximus to relieve pressure, often in cases of trauma or prolonged positioning

Types of Fasciotomy

Quadratus Lumborum Fasciotomy:

Less common, indicated for severe pain and pressure in the lumbar region. An incision is made to access and relieve pressure on the quadratus lumborum muscle, often in cases of post-operative complications.

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