**Fasciotomy**

**Compartment syndrome:** pressure within a confined tissue space (extremity or abdomen) has the potential to cause irreversible damage to its contents.

**Clinical signs:** a tense, swollen compartment, unrelenting pain, pain on passive stretch, sensory deficit, and muscle weakness (a late sign).

**Tissue pressure measurements** are made with simple needle manometer technique or the STIC (Stryker) catheter hand-held system. Use of a 16-gauge needle generally produces measurements that are within 4-5mmHg of STIC catheter thresholds are pressures > 35mHg, a more reliable indicator is a compartment perfusion pressure CPP < 30mHg ($\Delta p$= diastolic -compartment pressure). Clinical concern should be the overriding indicator, and should prompt fasciotomy even in the face of normal pressure measurements.

**Fasciotomy Techniques:**

**Upper Extremity:** Forearm compartment syndrome may be associated with crush injury, fracture, burns, or vascular injury.

**Lower Extremity**

The lower leg is the most common site for compartment syndrome requiring fasciotomy. Four compartments are invested by muscle fascia and can be released via a two-incision fasciotomy.

**PRINCIPLES:**

- **Anterolateral Incision:** (Two Incision Technique)
  - anterior & lateral compartments are approached thru single longitudinal incision placed halfway down leg 2 cm anterior to fibular shaft, or alternatively placed halfway between the tibial crest and the fibula;
  - incision is therefore placed over anterior intermuscular septum separating anterior & lateral compartments & allowing access to each;
  - in an elective chronic syndrome, a small 4-5 cm incision can be used;
  - in the acute traumatic syndrome, a 15 cm incision is used;
- transverse incision is made over fascia of anterior & lateral compartments, which allows clear view of the intermuscular septum;
  - attempt to identify the superficial peroneal nerve near the septum;
  - tension is maintained on the fascia w/ a Kocher clamp;
  - blunt tipped scissors are used to spread above and below the fascia on both sides of the intermuscular septum, both proximally and distally;
  - **anterior compartment**:
    - after identifying septum, small nick is made in fascia of anterior intermuscular septum midway between the septum & tibial crest;
    - tension is maintained on the fascia w/ a Kocher clamp;
    - blunt tipped scissors are used to spread above and below the fascia both proximally and distally;
    - fascia is opened proximally & distally w/ long, blunt-pointed scissors;
    - proximally aim for the patella and distally to the center of the ankle inorder to ensure that the fasciotomy stays in anterior compartment;
    - distally, avoid straying too medially so as too avoid injury to the dorsalis pedis;
  - **lateral compartment fasciotomy**:
    - made in line w/ fibular shaft;
    - distally direct scissors toward lateral malleolus inorder to keep instrument posterior to superficial peroneal nerve;
    - superficial peroneal nerve exits from lateral compartment about 10 cm above lateral malleolus and courses into anterior compartment;
    - if tip of scissors has strayed from fascia, instrument is left in place and two centimeter incision is made over its tip & fasciotomy is completed;
    - once the fascia has been partially transected, tension on the fascia will be lost, which means that the scissors cannot re-engage the edge of the fascia in a blind fashion;
  - **Postero medial Incision: (Two Incision Technique)**
    - deep and superficial posterior compartments are approached thru a single 15 cm longitudinal incision in distal part of leg 2 cm posterior to posterior medial palpable edge of the tibia;
    - once down to fascia undermine anteriorly to posterior tibial margin, which will avoid saphenous vein and nerve;
    - the saphenous vein should be retracted anteriorly;
    - **superficial compartment**:
      - retract saphenous vein & nerve & release fascia over superficial posterior compartment;
      - tension is maintained on the fascia w/ a Kocher clamp;
      - blunt tipped scissors are used to spread above and below the fascia both proximally and distally;
    - **deep posterior compartment**:
      - the soleus takes origin from the proximal 1/3 of the tibia and fibula and covers the proximal portion of the deep posterior compartment;
      - detach soleal bridge and retract it to expose fascia covering FDL & tibialis posterior;
      - note that the FDL lies just posterior to the tibia, and this fascia needs to be released to decompress the compartment;
      - the neurovascular bundle is protected, lying between the tibialis posterior and the soleus;
      - in the distal half of the tibia the deep posterior compartment lies just below the subcutaneous tissue;
      - again, releasing the fascia over the FDL is required to decompress the deep posterior compartment;
      - fascia is opened distally and proximally under the belly of soleus;
      - wounds are left open if swelling is too much to allow for primary skin closure;
      - skin grafting is rarely needed if full week is allowed for dissipation of edema;

**References:**
1: Marx: Rosen's Emergency Medicine, 7th ed. Copyright © Mosby 2009
5: American College of Surgeons; Anatomically Based Trauma Course 2011

http://www.wheelessonline.com/ortho/fasciotomy_of_the_leg