DAMAGE CONTROL PROCEDURES

STEP BY STEP

4-Compartment Fasciotomy

4-Compartment Fasciotomy of Lower Leg

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4-Compartment Fasciotomy of Lower Leg
GLOSSARY

Lateral: situated on, directed toward, or coming from the side

Medial: extending toward the middle

Anterior: situated before or toward the front

Posterior: situated behind

Superior: situated above

Inferior: situated below

Proximal: nearest to a point of reference

Distal: farther from any point of reference

Ligate: to apply a ligature

Underrun: to run, pass, or go underneath

Undermine: to weaken by wearing away a base or foundation

Fingerbreadth: the length of breadth of a finger used as a linear measure

Thumbs width: the width of the thumb used as a linear measure

4-Compartment Fasciotomy of Lower Leg
EQUIPMENT

Good:

1. Sterile towels
2. Provo Iodine
3. Sterile gloves
4. Scalpel/ Sterile blade
5. Curved Mayo scissors
6. Large forceps
7. Suture
8. Small forceps
9. Large syringe
10. Potable water
11. Hemostatic gauze/ gauze
12. Constricting wraps
13. Tape/Splinting Material
14. Self-Retaining Retractors or Army/Navy Retractors

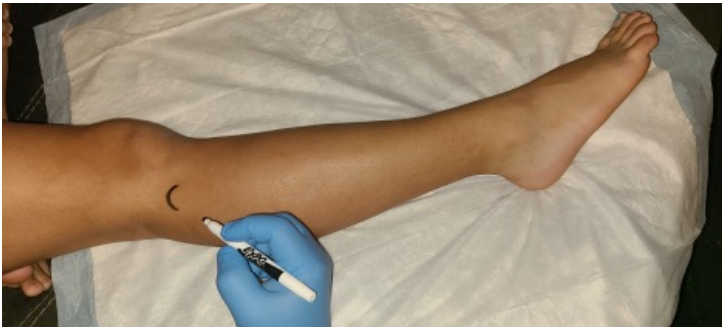
Better:

1. Sterile drapes
2. Chlorhexadine
3. Sterile surgical gloves
4. #10 scalpel
5. Metzenbaum scissors
6. Bovie pen
7. 00 silk suture
8. Tissue forceps
9. 60cc Toomey syringe
10. Sterile water
11. 4X4 sterile gauze
12. (3) 6" constricting wraps
13. 3" tape/Moldable splinting
14. Self-Retaining Retractors or Army/Navy Retractors

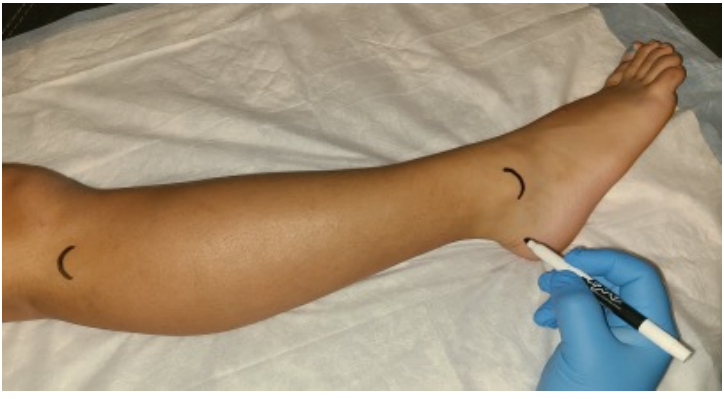
4-Compartment Fasciotomy of Lower Leg
LATERAL MARKING

IDENTIFY LATERAL LANDMARKS

1. Mark the proximal head of the fibula.

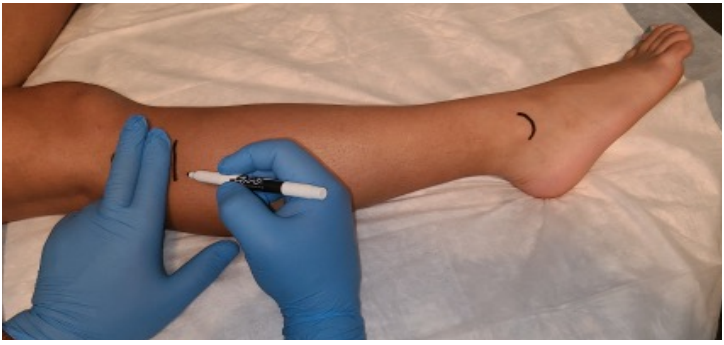


2. Mark the lateral malleolus (metaphyseal flare) at the ankle.

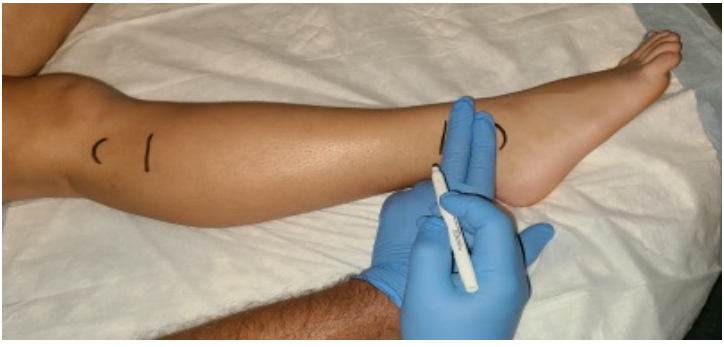


IDENTIFY LATERAL LANDMARKS CONTINUED

3. Mark the proximal incision limit two fingerbreadths (3.0 - 5.0 cm) below (distal to) the head of the fibula.



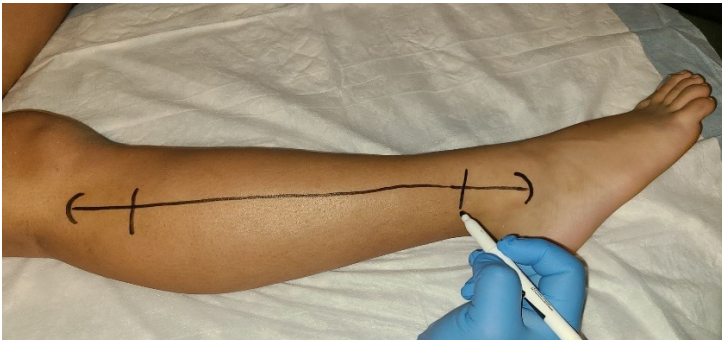
4. Mark the distal incision limit two fingerbreadths (3.0 - 5.0 cm) above the lateral malleolus.



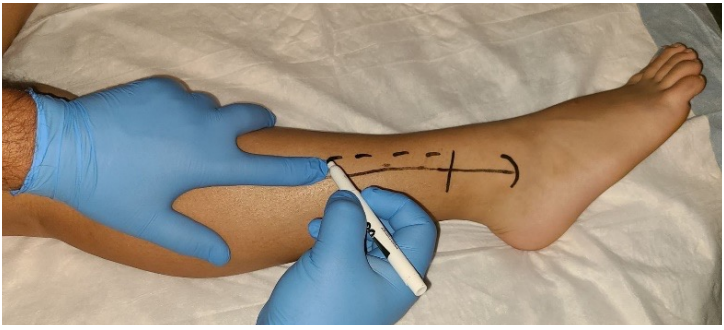
4-Compartment Fasciotomy of Lower Leg
LATERAL MARKING

IDENTIFY LATERAL LANDMARKS CONTINUED

5. Draw a solid line along the course of the fibula connecting the fibular head to the lateral malleolus.



6. Draw a dashed line connecting the proximal and distal incision limits one finger breadth (1.5 - 2.0 cm) in front of (anterior to) the fibula.

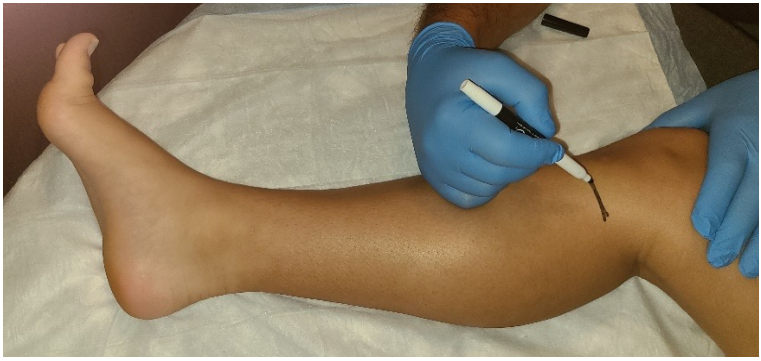


"ONE FINGER IN FRONT OF THE FIBULA"

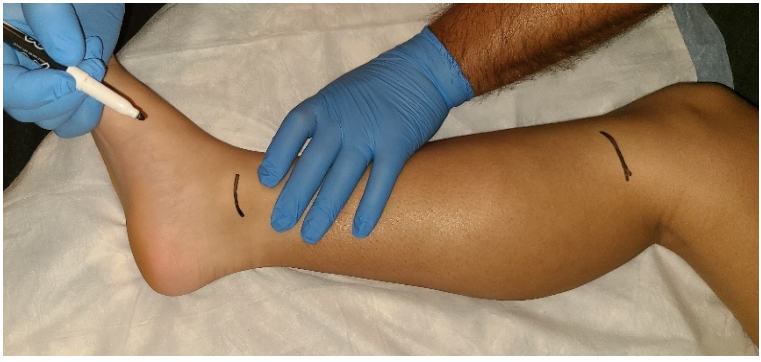
4-Compartment Fasciotomy of Lower Leg
MEDIAL MARKING

IDENTIFY MEDIAL LANDMARKS

1. Mark the medial tibial plateau.

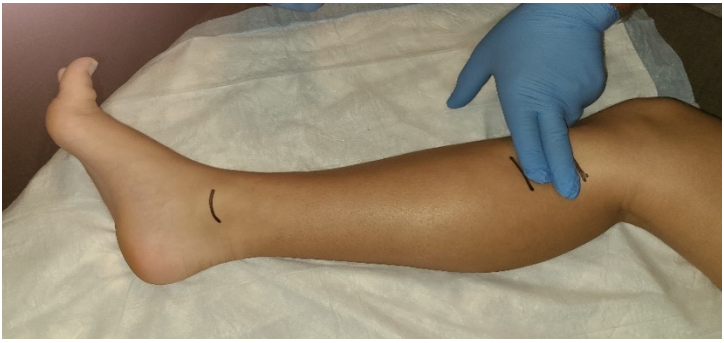


2. Mark the medial malleolus (metaphyseal flare).

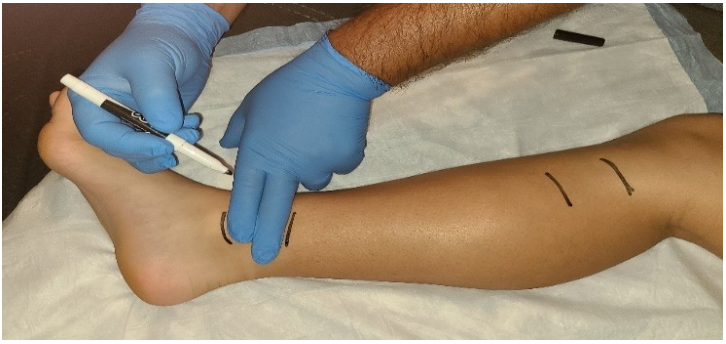


IDENTIFY MEDIAL LANDMARKS CONTINUED

3. Mark the upper end of the incision two fingerbreadths (3.0 -5.0 cm) below the medial tibial plateau.



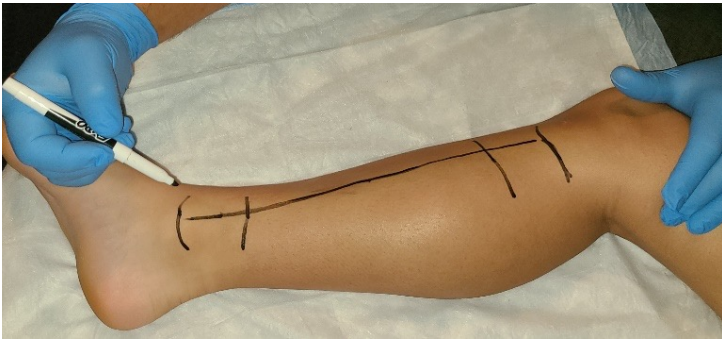
4. Mark the lower end of the incision point two fingerbreadths (3.0 - 5.0 cm) above the medial malleolus.



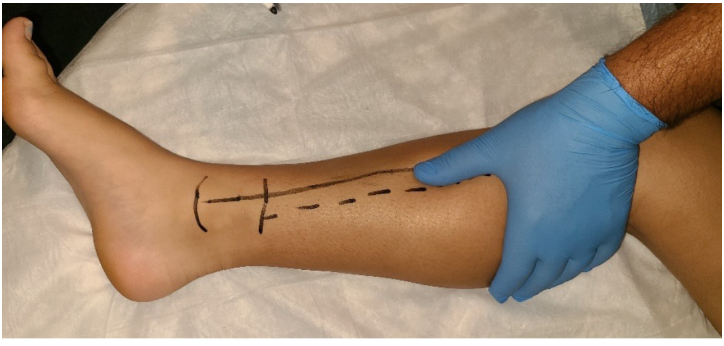
4-Compartment Fasciotomy of Lower Leg
MEDIAL MARKING

IDENTIFY MEDIAL LANDMARKS CONTINUED

5. Mark the entire posterior medial edge of tibia.



6. Draw a dashed line connecting the two incision limits one thumbs width (2.5 - 3.0 cm) posterior to the medial edge of the tibia as previously marked in step #5.

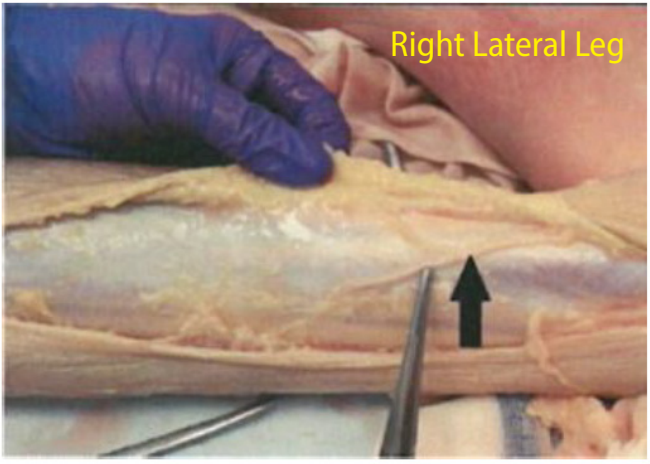


"ONE THUMB BEHIND THE TIBIA"

4-Compartment Fasciotomy of Lower Leg
LATERAL INCISION

MAKE THE INCISION

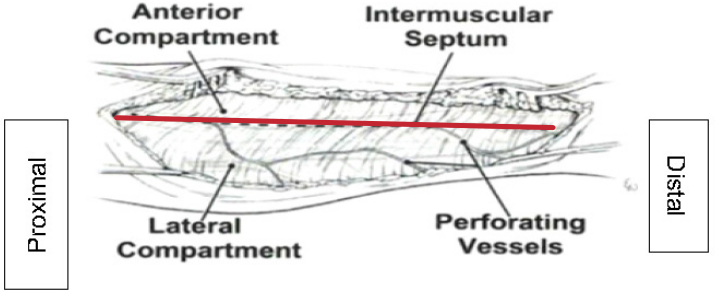
1. Perform an incision through the skin, utilizing a #10 blade scalpel, ensuring to follow along the lateral dashed line approximately one finger breadth (1.5 - 2.0 cm) anterior to (in front of) the fibula.
2. Incise completely through the skin and adipose tissue, in order to expose the fascia. Try to avoid incising the fascia with this initial exposure
3. Be sure to identify, avoid, and protect the superficial peroneal nerve (indicated by black arrow below).

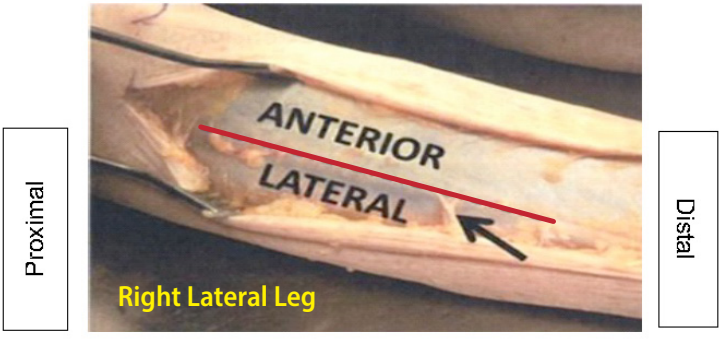


4-Compartment Fasciotomy of Lower Leg
LATERAL INCISION

KEY LATERAL ANATOMY

1. Identify intermuscular septum.
   - Follow the perforating vessels (black arrow) as they enter the fascia to help identify the intermuscular septum (dashed line). This landmark determines the location of the first incision between the perforating vessels and across the septum.



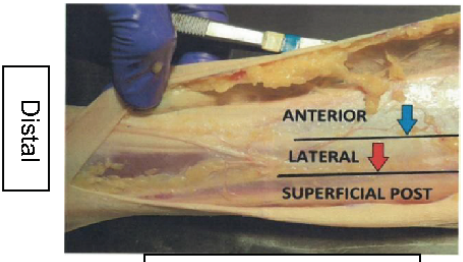


CRITICAL ERRORS – LATERAL INCISION

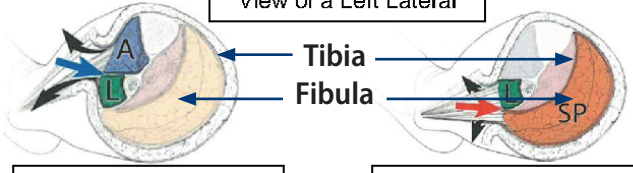
1. **Do not misidentify the intermuscular septum**

   - **The intermuscular septum (red arrow) between the lateral and superficial posterior (post) compartments can be mistaken for the septum between the anterior and lateral compartments (blue arrow) if the incision is made to far posterior to the fibula.**

   - **Palpate the anterior border of the Tibia. The Anterior compartment sits lateral and posterior to the tibia.**



View of a Left Lateral

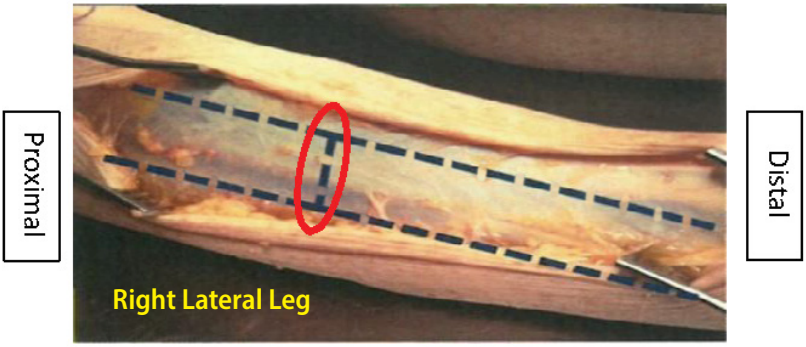


Proper view of septum between Anterior and Lateral compartments

Misidentified septum between Lateral and Superficial Posterior

4-Compartment Fasciotomy of Lower Leg
LATERAL INCISION

2. Make an anterior to posterior incision using a #10 scalpel across the septum as shown by the blue line.



3. Undermine the fascia with closed scissors along the legs of the "H".

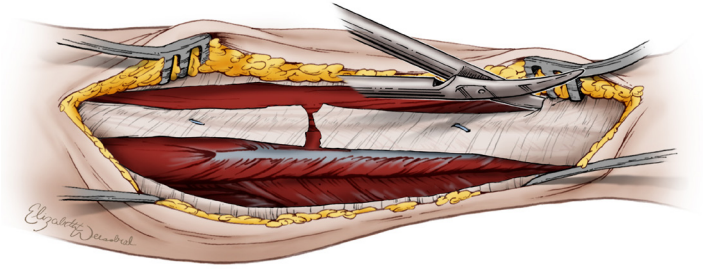
4. Open the fascia in the lateral compartment by running the incision completely along the length of the inferior legs of the "H" in a pushing fashion with partially closed scissor tips similar to cutting wrapping paper. Scissors are not used to snip the fascia.

Point the scissor tips away from the septum to avoid injury to underlying structures. The incisions in the fascia should be at least 1 cm from the septum.

5. Open the fascia over the anterior compartment by running the incision completely along the length of the superior legs of the "H".

6. Palpate the tibia under skin to confirm location of anterior compartment.

7. Ensure that all compartments are opened beyond the length of the skin incision.

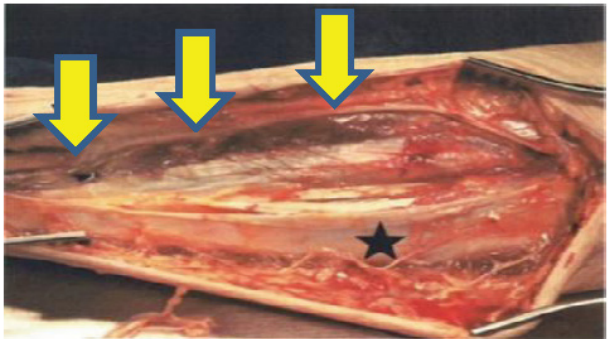


4-Compartment Fasciotomy of Lower Leg
MEDIAL INCISION

MAKE THE INCISION

1. Begin your incision utilizing a #10 blade scalpel one thumbs width (2.5 - 3.0 cm) posterior to the medial edge of the tibia (previously marked) following the dashed line. Incisions should be generous, as the skin can act as a constricting element.
2. Identify/protect the saphenous vein (yellow arrows). Ligate or cauterize saphenous vein tributaries to control bleeding.
3. Underrun the fascia of the superficial compartment with closed forceps or Curved Kelly tips prior to cutting.
4. Open fascia with partially closed scissor tips to minimize damage to underlying structures.
5. Blunt dissect the soleus bridge from the tibia to expose the deep posterior compartment.

Distal



Proximal

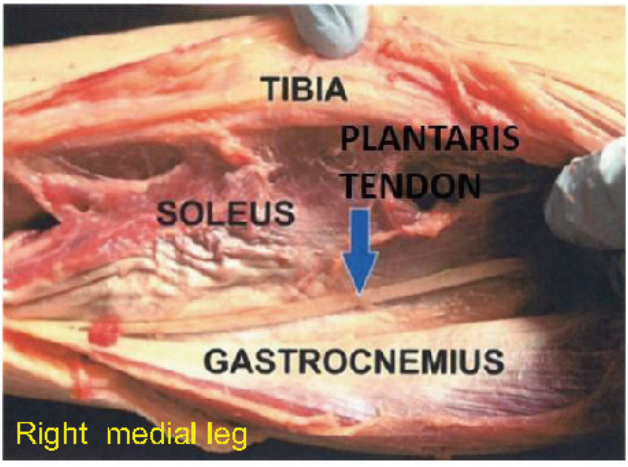
★ = fascia of superficial post compartment overlying the gastrocnemius muscle

4-Compartment Fasciotomy of Lower Leg
RIGHT MEDIAL INCISION

CRITICAL ERRORS – MEDIAL INCISION

1. Mistaking the plane between the soleus and gastrocnemius for deep posterior compartment.
2. The soleus fibers MUST be pulled away from the underside of the tibia to gain access to the deep posterior compartment.
3. Do not mistake plantaris tendon (blue arrow) for posterior neurovascular bundle.

Distal



Proximal

4-Compartment Fasciotomy of Lower Leg
RIGHT MEDIAL INCISION

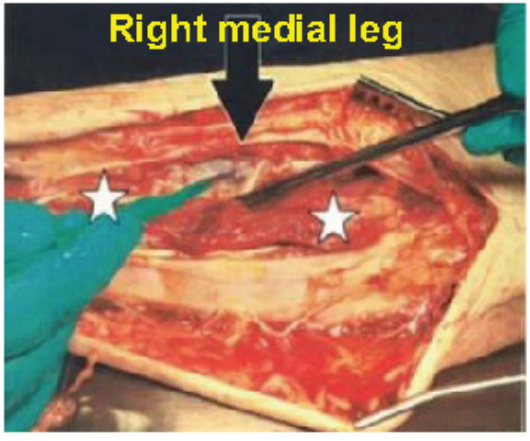
KEY MEDIAL ANATOMY

Cutting the saphenous vein can cause significant bleeding and may result in venous insufficiency if the deep venous system has been injured.

1. **Bluntly and completely take down the fibers of the soleus muscle (stars in image) off the edge of the tibia (arrows in image) to gain entry into the deep posterior compartment. Release muscle from posterior tibia through full length of compartment.**

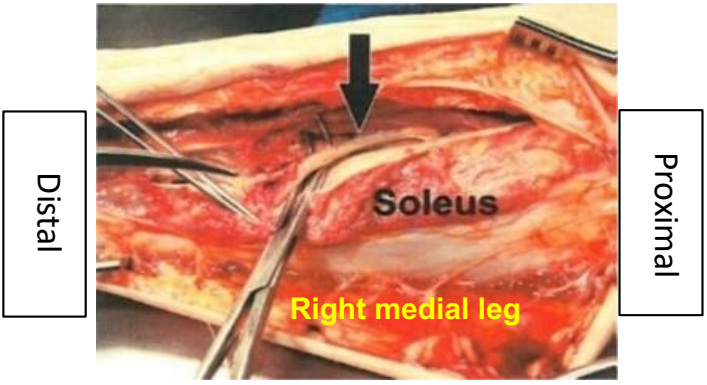
2. **Identify and protect posterior tibial neurovascular structures (arrow). This landmark is used to confirm entry into the deep posterior compartment.**

Distal



Proximal

3. Identify and protect posterior tibial neurovascular structures (arrow). This landmark is used to confirm entry into the deep posterior compartment.



4-Compartment Fasciotomy of Lower Leg
POST PROCEDURE

WOUND CARE

OBTAIN HEMOSTASIS

1. Use cautery, vessel clips, forceps, or tie off large bleeders using 00 silk.
2. Gently pack the wound with 4X4 gauze or sterile "S" rolled gauze.
3. Use Hemostatic gauze if necessary.

DEBRIDE NECROTIC TISSUE

1. Flush the four compartments with copious body temperature normal saline, sterile water, or potable tap water.
2. Identify and remove gross contamination and clearly nonviable tissue.
3. Grasp and lift necrotic muscle with tissue forceps
4. Work from edge of the wound inward towards the base removing any avascular tissue or tissue with low probability of recovery.

DRESS AND SPLINT WOUND

1. Check for posterior tibialis and dorsalis pedis pulses prior to dressing and splinting the fasciotomy.
2. Apply moist gauze, Telfa or non-adherent dressing to the wound bed.
3. Loosely wrap the lower extremity with cotton padding or 6" compression bandage.
4. Splint the leg with an L-shaped posterior splint extending above the knee.
5. Secure the splint with Kerlex or Ace wrap. Caution: do not recompress the leg when applying the splint.
6. Check for posterior tibialis and dorsalis pedis pulses prior after splinting.

DAMAGE CONTROL PROCEDURES

STEP BY STEP

4-Compartment Fasciotomy