Medscape

Compartment Pressure Measurement Technique

Updated: Mar 26, 2018
Author: Liudvikas Jagminas, MD, FACEP; Chief Editor: Erik D Schraga, MD more...

TECHNIQUE

Measurement of Compartment Pressure

With the patient positioned as previously described, determine needle placement. To avoid introduction of bacteria into deep tissues, avoid placing the needle in areas where the overlying skin may be infected. If an overlying cast is present, it should be bivalved, and if necessary, a window overlying the desired area of needle penetration should be cut from the cast. Prepare the skin at the needle insertion site as for any sterile procedure. Administer local anesthesia.

The lower leg has four compartments, as follows:

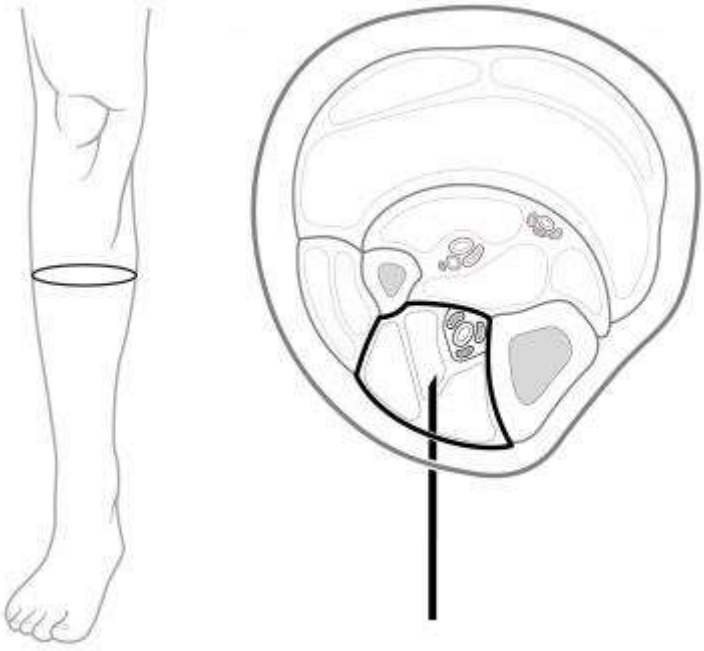
- Anterior
- Lateral
- Deep posterior
- Superficial posterior

The anterior lower leg is especially predisposed to compartment syndrome because of its high vulnerability to injury and its relatively limited compartment compliance. [10]

The easiest cross-sectional level for needle placement for access to all four compartments is approximately 3 cm on either side of a transverse line drawn at the junction of the proximal and middle thirds of the lower leg.

Anterior compartment

With the patient supine, palpate the anterior border of the tibia at the level of the junction of the proximal and middle thirds of the lower leg. Identify the needle entry point 1 cm lateral to the anterior border of the tibia. Orient the needle so that it is perpendicular to the skin, and insert it to a depth of 1-3 cm (see the image below).



Anterior compartment: pressure measurement.

Proper needle placement can be confirmed by measuring the pressure during the following:

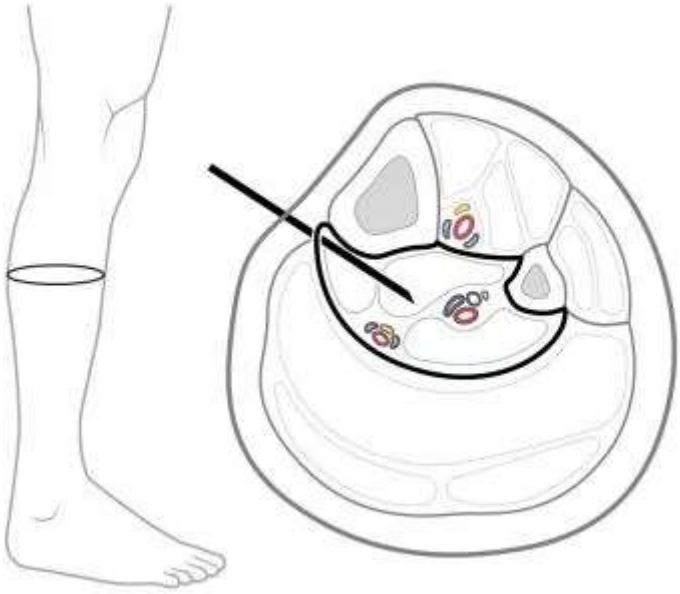
- Digital compression of the anterior compartment just proximal or distal to the needle insertion site
- Plantarflexion of the foot
- Dorsiflexion of the foot

These maneuvers should produce a severalfold rise in pressure on the monitor.

Note that the most common error with both the Stryker monitor set and the arterial line transducer system is depressing the syringe plunger too quickly. This may give a transient falsely elevated reading. Another source of error with either system is obstruction of the needle with a plug of tissue if the syringe plunger is pulled back.

Deep posterior compartment

With the patient supine, elevate the leg slightly, if possible. Palpate the medial border of the tibia at the level of the junction of the proximal and middle thirds of the lower leg. Identify the entry point just posterior to the medial border of the tibia (see the image below). Palpate the posterior border of the fibula on the lateral aspect of the leg at the same level. Orient the needle so that it is perpendicular to the skin, and advance it toward the posterior fibular border to a depth of 2-4 cm, depending on the amount of subcutaneous fat.



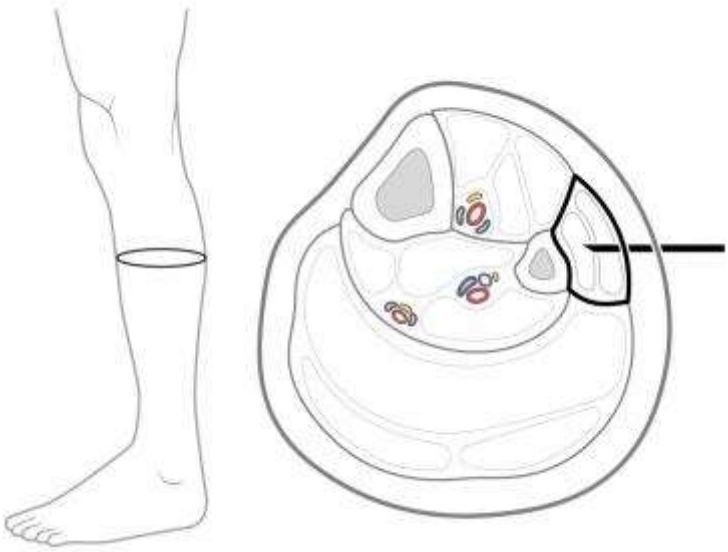
Deep posterior compartment: pressure measurement.

Proper needle placement can be confirmed by seeing a rise in pressure during the following:

- Toe extension
- Ankle eversion

Lateral compartment

With the patient supine, elevate the leg slightly, if possible. Palpate the posterior border of the fibula at the level of the junction of the proximal and middle thirds of the lower leg. Identify the needle entry point just anterior to the posterior border of the fibula. Orient the needle so that it is perpendicular to the skin, and advance it toward the fibula to a depth of 1-1.5 cm (see the image below). If the needle contacts bone, retract it 0.5 cm.



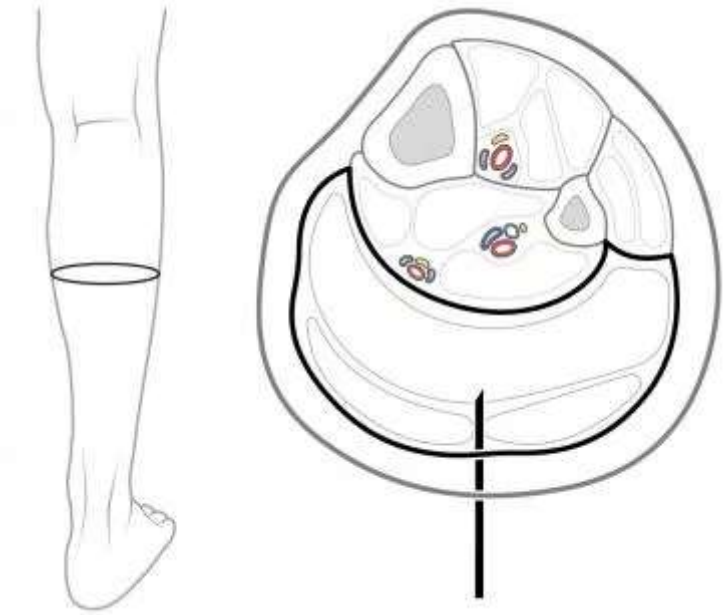
Lateral compartment: pressure measurement.

Proper needle placement can be confirmed by seeing a rise in pressure during the following:

- Digital compression of the lateral compartment just inferior or superior to the needle entrance site
- Inversion of the foot and ankle

Superficial posterior compartment

With the patient prone and the leg at the level of the heart, identify a transverse line at the level of the junction of the proximal and middle thirds of the lower leg. Identify the needle entry point at this level and 3-5 cm on either side of a vertical line drawn down the middle of the calf. Orient the needle so that it is perpendicular to the skin, and advance it toward the center of the lower leg to a depth of 2-4 cm (see the image below).



Superficial posterior compartment: pressure measurement.

Proper needle placement can be confirmed by seeing a rise in pressure during the following:

- Digital compression of the superficial posterior compartment just inferior or superior to the needle entrance site
- Dorsiflexion of the foot