

Nerve block of lateral femoral cutaneous nerve of the thigh.

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1. INTRODUCTION

The lateral femoral cutaneous nerve of the thigh (LFCN) is the single human nerve most subject to anatomic variations. Figure #1 shows the dermatome of LFCN. The nerve is small and mostly invisible under ultrasound scanning. For nerve block success, drug must be injected into four fascial compartments, each of which a variant nerve type may pass through in different individuals.

2. ANATOMY

The lateral femoral cutaneous nerve is a sensory nerve supplying the skin on the lateral aspect of the thigh. That sensory area *nearly* reaches the thigh posterior midline and the thigh anterior midline. Its superior limit passes over the greater trochanter and its inferior limit nearly reaches the height of the patella.

The typical LCNT, in 60% of patients, is a branch of the lumbar plexus deriving from the dorsal divisions of nerve roots L2 and L3. The LFCN forms within the psoas muscle, and exits the pelvis medial to the anterior superior iliac spine (ASIS) and under the inguinal ligament. It then passes over the sartorius muscle, under fascia lata, before branching into its final divisions. In forty percent of patients the LFCN has completely different anatomy, but fortunately the nerve always passes in proximity to the proximal sartorius muscle. That is the optimal part of sartorius muscle to target during LCNT nerve blocks.

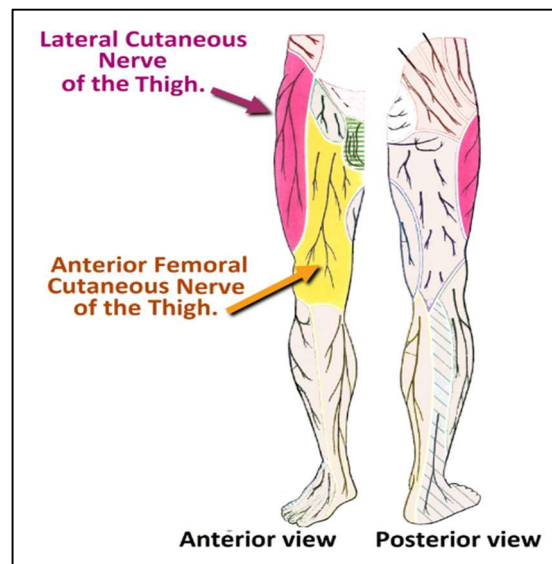


Figure 1. Classic dermatomal distribution of the lateral femoral cutaneous nerve (LFCN), derived from Sobotta.

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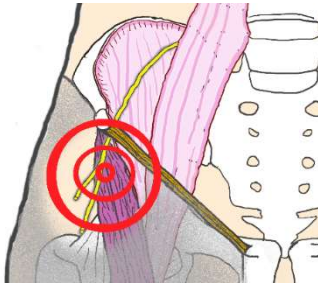


Figure #2. Target area for blocking the LFCN.

That *optimal* part of the sartorius muscle lies 2.5 centimeters caudad to the palpable Anterior Superior Iliac Spine (ASIS). See figures #2 and #3.

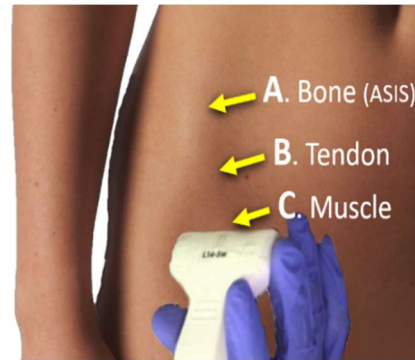
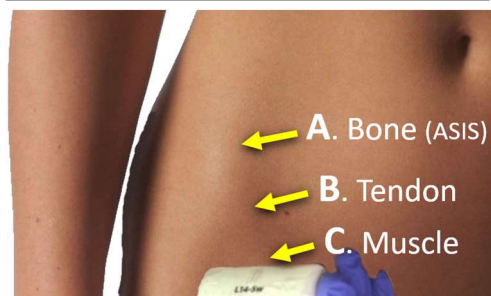
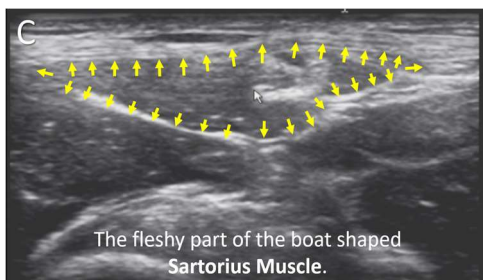
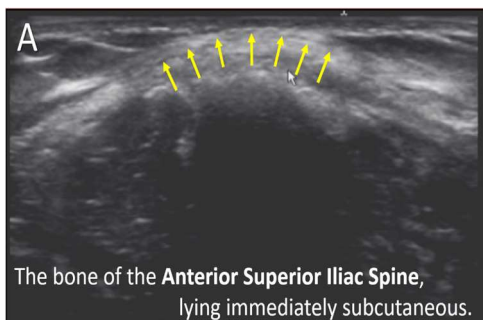


Figure #3.

Figure #4. Sonograms of ASIS, the sartorius tendon, and sartorius muscle.



The only special technical requirement is that local anesthetic drug be injected in four different fascial bounded compartments around sartorius, each of which will contain the LFCN in a different individual.

Place the ultrasound transducer in the target area and first identify ASIS. See figure 4A. Glide the transducer towards half or one centimeter towards caudad, and slightly towards medial. See the sartorius tendon. See figure 4B. Glide another half or one centimeter discover the most proximal part of the muscle belly. See figure 4C.

The prime nerve block region is this most proximal part of the fully formed muscle belly of sartorius muscle caudad to ASIS. Next, insert a 90 mm nerve block needle with an in-plane approach. The best needle is 90 mm Quincke-point spinal needle. That is one with a sharp point.

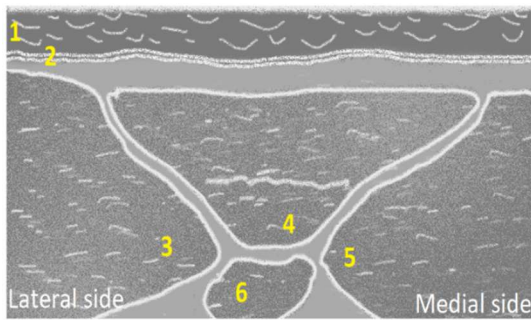


Figure #5. Relational anatomy of the proximal sartorius muscle.

1. Subcutaneous fat.
2. Fascial iliaca
3. Tensor fascia lata muscle on the lateral side.
4. Sartorius muscle.
5. Ilio-psoas muscle on the medial side.
6. The tendon of biceps femoris muscle.

The other anatomical structures relative to the most proximal sartorius muscle are; (i) the tensor fascia lata muscle which lies towards lateral, (ii) the ilio-psoas muscle which lies towards medial, and (iii) the biceps femoris tendon lying deep to sartorius. Biceps femoris muscle, part of quadriceps muscle, takes its origin at that point from the Anterior Inferior Iliac spine (AIIS) which lies close and caudad to ASIS.

Inject local anesthetic drug as follows;

1. Insert the needle tip just deep to the center part of sartorius muscle. Inject 2 ml of drug.
2. Redirect the needle into the center of sartorius muscle. Inject 2 ml of drug.
3. Redirect the needle tip to lie just above and close to sartorius muscle, and inject 9 ml of drug. This is the main dose that will spread far under fascia lata to block most of patients' LFCNs.
4. Finally redirect the needle just under the dermis, and above fascia lata. Inject 2 ml of drug subcutaneous. subcutaneous and close to the iliac bone. Infiltrate a 5 cm tract using 2.5 ml of drug.

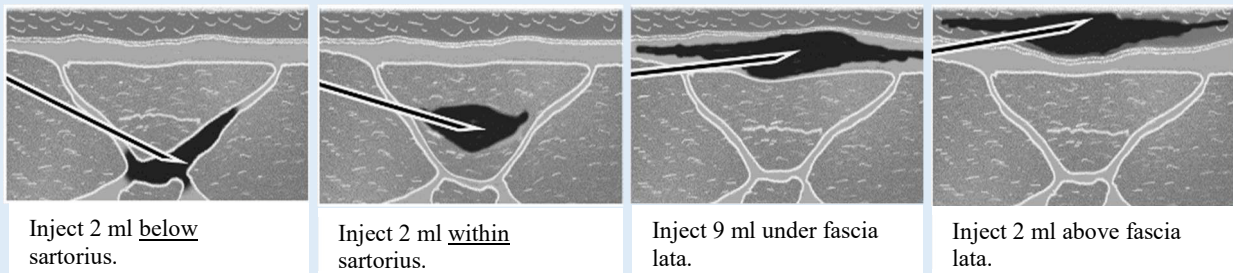


Figure #6. The four fascial planes about sartorius muscle that must be filled with local anesthetic drug injected for a successful LFCN block in subjects with all known anatomic nerve variations.

4. CHOICE OF LOCAL ANESTHETIC

Any nerve block local anesthetic drug can be used. The choice will be based upon whether the block is to be diagnostic, therapeutic or analgesic. Also, one must consider the total of drug to be used combined with other simultaneous nerve blocks being performed. Bupivacaine 0.5% is best if total drug volumes, combined with other nerve blocks is low. Otherwise, ropivacaine 0.75% works best with a faster block onset but a shorter duration of block, than that with bupivacaine 0.5%.



5. GENERAL INDICATIONS FOR L.C.N.T. NERVE BLOCK.

1. Split skin graft harvest on the outer thigh.
2. Quadriceps muscle biopsies from vastus lateralis. The LFCN block will provide anesthesia to the overlying skin, but not the muscle.
3. Anesthetize the skin for the incision for total hip arthroplasty. Considering all the other nerves that need to be blocked for hip surgery a psoas compartment block is best done, to block the LFCN, as well as all other nerves needing to be blocked. Block the parasacral sciatic nerve as well.
4. Provide comfort for thigh tourniquet usage during awake distal femur, knee or lower leg awake surgery being done under peripheral nerve blocks alone.

CASE example. 85 year old lady with recent heart failure, severe ischemic heart disease, peripheral vascular disease, low molecular weight heparin therapy for recently placed coronary arterial stents, needed an urgent above knee amputation for gangrene of the lower leg. It was desirable to avoid general anesthesia, and critical to avoid neuraxial anesthesia. The amputation was done with a transgluteal parasacral sciatic nerve block, femoral nerve block, obturator block and LCNT block with as little as 35 ml of drug. Minimum sedation was used.

5. For treatment of meralgia paresthetica.

6. COMPLICATIONS and SIDE-EFFECTS of the Lateral Femoral Cutaneous Nerve block.

In general the LFCN block is a very safe block. LFCN potential problems are;

1. **Failure.** This is between 30 and 60% when using the older described blind fan-injection techniques. It is zero using a correctly performed ultrasound guided sartorius muscle targeted technique.
2. **Unwanted femoral nerve block.** Using blind widely injected local anesthetic, this has occurred in 5 to 30% of patients in some worker's hands. With this recommend ultrasound guided technique the incidence is zero. With this article's landmark based and tactile technique the incidence should be low, and will be related to operator skill and experience.
3. **Other;** (1) Discomfort during awake nerve block injection. (2) Local anesthetic toxicity can occur if the total amount of drug used combined with the other nerve blocks is excessive. (3) Injection site infection can theoretically occur. Nerve injury from nerve block is not yet described.

7. CONCLUSION;

This author has successfully used the LFCN block, combined with other nerve blocks in awake surgeries like below-knee amputations and above-knee amputations in severely ill aged patients. The other additional nerves blocked, to make awake surgery feasible, were the femoral, sciatic, and obturator nerves.

If the LFCN block is needed together with a femoral and or obturator nerve block (e.g. for hip joint surgery) and a primary anesthetic is going to be general anesthesia, then the LFCN would be best blocked as part of a psoas compartment block at lumbar plexus root level. The psoas compartment also has the advantage of being easily catheterized to facilitate maintaining the analgesia from multiple nerve blocks, for a few days after surgery.