Femoral Nerve Decompression To Restore Quadriceps Function

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Introduction

The femoral nerve can become entrapped as it travels from its origin at the L2-L4 nerve roots beneath the iliac fascia to emerge in the anterior thigh under the inguinal ligament (Figure 1).

While femoral nerve entrapment remains a rare condition, it can result in significant:
- weakness in hip flexion and knee extension
- gait disturbance
- dysesthesias
- pain in the antero-medial thigh and medial leg

The benefits of surgical decompression of the femoral nerve for management of femoral nerve entrapment are under-recognized.

Here we present a series of 3 patients with femoral nerve entrapment who underwent decompression with immediate improvement in motor strength.

Methods

Surgical Technique

The patient is positioned supine on the operating table with the hip in partial external rotation. An 8 cm longitudinal incision is marked just below the inguinal crease and lateral to the palpable femoral artery (Figure 2). This corresponds to a point about two-thirds of the distance from the pubic tubercle to the anterior superior iliac spine (ASIS).

Decompression of the femoral nerve requires release of three layers of investing fascia:
1. the superficial fascia
2. the fascia of the sartorius muscle (Figure 3A)
3. the femoral sheath (Figure 3N)

After incising through the superficial fascia within the subcutaneous fat, dissection continues to the muscular fascia of the sartorius muscle, which is incised over the medial border (Figure 3A). The sartorius muscle is then retracted laterally and its motor nerves can be seen entering the muscle on the deep surface of its medial border. These nerve branches are superficial relative to the quadriceps nerve branches.

The femoral sheath is then incised overlaying the femoral neurovascular bundle, distal to the inguinal ligament and lateral to the palpable vessels (Figure 3B). The sartorius branches are traced proximally to the femoral nerve trunk.

Exposure and dissection of the femoral vessels should be avoided as this may disrupt lymphatic drainage.

Once the femoral nerve trunk is identified, the fascia overlying the nerve branches is released proximally and distally along the nerve, freeing it from any scar tissue.

The inguinal ligament is identified and retracted. Complete decompression is achieved when it is possible to guide a finger over the femoral nerve into the retroperitoneal space. Release of the inguinal ligament is not required for a complete decompression.

The femoral nerve branches are then neurolysed distally to their insertions. They are individually stimulated with a hand-held nerve stimulator (Checkpoint Surgical, Inc. Cleveland, OH) to confirm presence of function.

Post-operatively, weight bearing is allowed as tolerated.

Methods (cont’d)

Case 1

A 16-year old male with femoral nerve palsy following acute flaccid myelitis underwent femoral nerve decompression and end-to-side sartorius to femoral nerve transfers 8 months after injury, and had immediate improvement (POD#1) in quadriceps function from MRC 1/5 to 4/5.

Case 2

A 26yo M with femoral nerve palsy following a gunshot injury underwent femoral nerve decompression and end-to-side sartorius to femoral nerve transfers 15 months after injury, and had immediate improvement (POD#1) in quadriceps function from MRC 3/5 to 4/5.

Case 3

A 34yo F with femoral nerve palsy following hip arthroplasty underwent femoral nerve decompression and end-to-side sartorius to femoral nerve transfers 6.5 months after injury, and had immediate improvement (POD#1) in quadriceps function from MRC 2/5 to 4/5.

Conclusion

Femoral nerve decompression can restore quadriceps function in patients with femoral nerve entrapment neuropathy. The immediate improvement of motor function days after surgery suggests a role for decompression in ischemic conduction block.

Early referral to a nerve surgeon for nerve palsies is warranted.