

# Retrospective Analysis of Complications After Peripheral Nerve Block in Foot and Ankle Surgery

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## Purpose & Literature Review

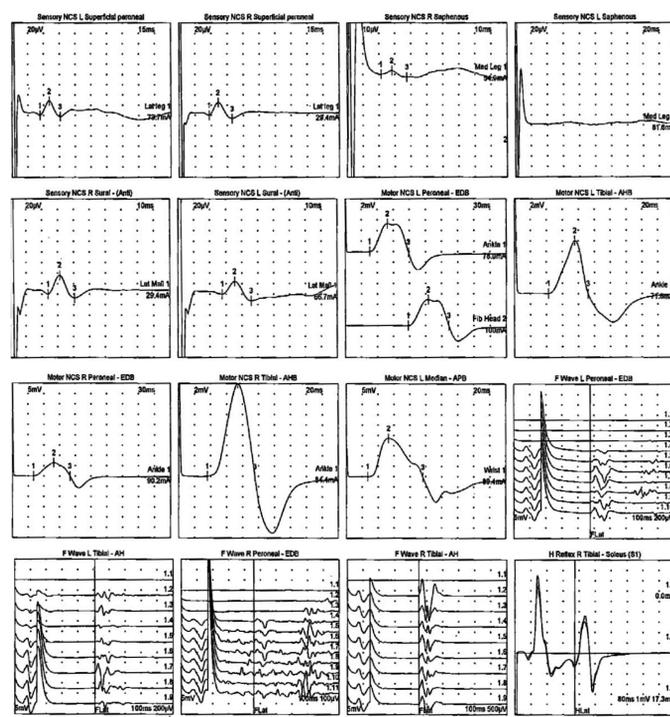
By preventing the inflammatory cascade, popliteal nerve blocks are hypothesized to reduce postoperative pain levels as well as decrease the anesthetic requirement intraoperatively<sup>1</sup>. Transient weakness and an insensate lower extremity are expected following a proximal peripheral nerve block, and may lead to an increased risk of accidental injury in the early postoperative period<sup>2</sup>. Hunt et al, demonstrated that compared with a single infusion, the use of a popliteal block with a continuous infusion pump catheter leads to earlier hospital discharge. However, a continuous infusion catheter can disrupt early rehabilitation, impairing range of motion; compared to ankle block, it presents a high cost and greater procedural complexity<sup>3</sup>. In the literature, PNBs have demonstrated low complication rates with regional anesthesia<sup>4,5,6</sup>. The purpose of this study is to assess the rate of neurological complication resulting from ankle blocks versus popliteal nerve blocks in the setting of foot and ankle surgery.

## Level of Evidence – III, Therapeutic

## Case Study

A 17-year-old female underwent foot and ankle surgery under general anesthesia. Preoperatively, a left single-shot saphenous and popliteal block were performed under ultrasound guidance using 0.5% ropivacaine. During subsequent postoperative visits, the patient continuously relayed numbness and burning to the medial aspect of her left lower extremity, proximal to the location of surgical repair. An EMG/NVC was conducted and found an absence of the saphenous sensory potential while all other nerves demonstrated normal potential and latency, indicating saphenous nerve injury.

## Imaging – EMG Study



### Sensory NCS

Nerve / Sites	Rec. Site	Lat ms	Amp $\mu$ V	Distance cm	Vel m/s
<b>R Sural - (Anti)</b>					
Lat Mall	Calf	2.40	35.9	11.2	46.7
<b>L Sural - (Anti)</b>					
Lat Mall	Calf	2.76	24.0	12	43.5
<b>L Superficial peroneal</b>					
Lat leg	Ankle	2.66	28.2	12	45.2
<b>R Superficial peroneal</b>					
Lat leg	Ankle	2.81	25.2	12.5	44.4
<b>R Saphenous</b>					
Med Leg	Ankle	2.14	3.8	9	42.1
<b>L Saphenous</b>					
Med Leg	Ankle	NR	NR		

### Motor NCS

Nerve / Sites	Rec. Site	Latency ms	Amplitude mV	Distance cm	Velocity m/s
<b>L Median - APB</b>					
Wrist	APB	2.71	18.7		
<b>L Peroneal - EDB</b>					
Ankle	EDB	4.58	5.3		
Fib Head	EDB	11.77	4.9	30.5	42
<b>R Peroneal - EDB</b>					
Ankle	EDB	4.06	6.5		
<b>L Tibial - AHB</b>					
Ankle	AHB	4.27	10.0		
<b>R Tibial - AHB</b>					
Ankle	AHB	3.59	18.0		

## Surgical Procedure

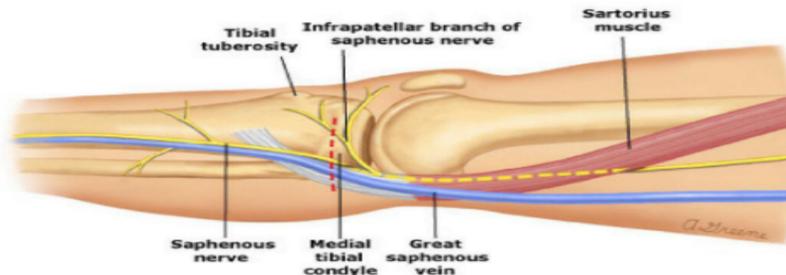
270 patients were identified who had undergone lower extremity procedures under general anesthesia. Type of block, type of procedure, and complications including numbness and muscle weakness were recorded via retrospective chart review and phone survey. Regional anesthesia was delivered using standardized procedural technique. Logistic regression analysis was used to measure the relationship between level of block and complications. Chi square statistical analysis was performed to calculate p values where <0.05 was statistically significant.

## Results

222 patients received popliteal nerve blocks (PNB), while only 11 ankle blocks (AB) were delivered. In the PNB group, 26 patients (11.71%) developed neurologic issues compared to 2 of 11 patients (18.18%) in the AB group. In the PNB group, 11 patients (4.96%) still had neurologic symptoms at least six months after surgery, with 1.8% (n=4) persisting after 12 months. Both patients with complications in the AB cohort had symptoms resolve uneventfully by six months.

Table 1: Complication Rate PNB vs. AB

Popliteal Nerve Blocks	Ankle Blocks
N =222	N =11
Complication Rate = 11.71%	Complication Rate= 18.18%
At 6 months: 4.96%	At 6 months: 0%
At 12 months: 1.8%	At 12 months: 0%



## Analysis & Discussion

In studies that relied on chart review or self-reporting, the incidence of nerve injury was lower in studies that used prospective questioning and direct follow-up<sup>7</sup>. Causes for neurologic complications after PNB are thought to include intraneural injection, mechanical trauma, pressure injury, local anesthetic neurotoxicity, and neuronal ischemia<sup>8,9,10</sup>. In a prospective cohort study of 147 patients who received continuous PFB, 41% demonstrated neurologic symptoms at 2 weeks.<sup>11</sup> In another retrospective case series of 915 patients, 5% reported neurologic complications at 1 week and 0.7% had unresolved symptoms at final follow-up<sup>12</sup>. In Park et al., retrospective review of 827 patients, 2.6% showed PNB-related neurologic symptoms, of which 0.8% had unresolved complications at the last follow-up<sup>13</sup>. Our results demonstrated an increased risk of nerve injury stemming from regional anesthesia compared to what has been previously reported in the literature. Etiology of postoperative neuralgia, neuropathy and paresthesia continues to be an area of contention between surgeons and anesthesia teams and warrants further examination. The reported incidence of complications following PNB is not entirely known and changes based on timing, definition of neurological injury, and anatomic location of the block.

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