

# Effect of femoral nerve block versus adductor canal block on muscle strength following anterior cruciate ligament reconstruction: adductor canal block causes an unexpected loss of knee flexor strength

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## INTRODUCTION:

Anterior cruciate ligament (ACL) reconstruction is associated with moderate-to-severe pain; hence, postoperative pain management is important. Peripheral nerve blocks are recommended for early postoperative pain management and to reduce opioid requirements.

The most commonly used methods are femoral nerve block (FNB) and adductor canal block (ACB). Both methods are excellent for postoperative pain management; however, as FNB affects the motor nerves, recent reports have raised concerns about its involvement in causing muscle weakness from the early to 6-month postoperative period. FNB has also been reported to increase graft rupture rate. On the contrary, ACB targets the saphenous nerve, which is the sensory branch of the femoral nerve. Thus, ACB manages pain by sensory blockade only.

Therefore, it is imperative to establish an association between knee muscle strength and peripheral nerve blocks used in pain management following ACL reconstruction (ACLR).

The objective of this study was to compare the effect of FNB and ACB on knee muscle strength three and six months after ACL reconstruction.

**METHODS:** One hundred and eight patients who underwent ACL reconstruction between 2017 and 2021 were included in this retrospective study. All the patients underwent postoperative pain management with either ACB or FNB. The exclusion criteria were re-injury, multiple ligament injuries, and Tegner activity score < 6. Patients were divided into two groups on the basis of the method of postoperative pain management employed; The FNB group included 70 patients (34 males, 36 females, mean age: 21.9±11.7 years) and the ACB group included 38 patients (21 males, 17 females, mean age: 21.4±9.0 years). Patients in both groups were injected with 10 mL of 0.75% ropivacaine under ultrasound guidance. The isokinetic peak torque of the knee flexor and extensor strengths were measured three and six months after ACLR. Muscle strength was measured using the BIODEX dynamometer at velocities of 60°/s and 180°/s. Peak torque of knee extensor and flexor strengths and limb symmetry index (LSI) were compared between the two groups.

**RESULTS:** There were no statistically significant differences in all the parameters between both the groups with respect to the knee extensor strength three and six months after ACLR (Table 1, 2). However, the ACB group had a significantly lower LSI of knee flexor strength six months after ACL reconstruction (Table 2).

**DISCUSSION AND CONCLUSION:** FNB, following the ACL reconstruction, did not affect the knee extensor strength three and six months post-surgery. On the contrary, ACB unexpectedly resulted in decreased knee flexor strength. One reason for this is the possibility of myotoxicity, which may have resulted from infiltration of the local anesthetic into the posterior compartment while harvesting the semitendinosus tendon. Hence, caution should be exercised when selecting ACB for postoperative pain management, and the dosage of ropivacaine should also be considered.

Table 1 Peak Torque of Involved Limb (Nm)

		FNB group	ACB group	p Value	
3 months	60°	Ext	99.6±31.9	107.8±39.0	0.23
		Flex	50.9±18.5	57.3±19.0	0.07
	180°	Ext	72.6±24.1	81.1±31.0	0.09
		Flex	46.0±16.7	52.1±19.7	0.06
6 months	60°	Ext	124.4±38.0	136.3±46.9	0.14
		Flex	63.7±22.6	68.5±24.0	0.27
	180°	Ext	89.2±29.1	100.7±37.0	0.06
		Flex	56.2±19.8	62.4±23.8	0.12

Table 2 Limb Symmetry Index of Involved Limb (%)

		FNB group	ACB group	p Value	
3 months	60°	Ext	76.9±18.7	74.6±23.8	0.65
		Flex	88.6±20.2	88.1±14.4	0.98
	180°	Ext	83.7±19.0	84.6±22.2	0.67
		Flex	93.6±25.2	93.7±22.8	0.79
6 months	60°	Ext	95.7±21.5	91.2±19.3	0.35
		Flex	110.0±24.3	97.0±21.0	<0.01
	180°	Ext	103.0±24.2	98.0±21.6	0.39
		Flex	116.5±32.8	101.2±26.3	0.01