Impact Factor (SJIF): 6.126 E-ISSN: 2583-1615, P-ISSN: 3049-3498

International Journal of Research in Academic World

Received: 20/August/2025 **IJRAW:** 2025; 4(10):09-14 **Accepted:** 01/October/2025

Beyond the Scalpel: Functional Outcomes of Surgeon-Delivered Adductor Canal Block in Fifty Knees

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Abstract

Introduction: Adequate pain control after total knee replacement (TKR) is essential to enable early mobilization and optimize functional recovery. Adductor canal block (ACB) provides effective analgesia while preserving quadriceps strength. This study reports functional outcomes of surgeon-administered ACB in 50 consecutive patients undergoing unilateral TKR.

Case Series: Fifty patients undergoing unilateral primary TKR between January 2023 and June 2023 received surgeon-administered ACB intraoperatively. Pain relief, time to mobilization, walking distance, and functional outcomes were prospectively recorded.

Results: Mean VAS pain score was 2.1 ± 0.7 at 6 h, 2.8 ± 0.9 at 12 h, 3.2 ± 1.0 at 24 h, and 2.5 ± 0.8 at 48 h. All patients achieved bedside mobilization within 12–24 h (mean 18.4 ± 3.6 h). The mean distance ambulated on day 2 was 38.2 ± 10.6 m. Oxford Knee Score improved from a preoperative mean of 22.6 ± 4.1 to 38.7 ± 3.5 at 6 weeks and 44.3 ± 2.9 at 3 months. No block-related complications were noted.

Conclusion: Surgeon-administered ACB is a safe, reproducible, and effective technique that provides reliable analgesia and facilitates early rehabilitation after TKR.

Keywords: Adductor canal block, surgeon-administered block, total knee replacement, functional outcomes, case series.

Clinical Message: Surgeon-administered ACB is a practical and effective method for pain control in TKR, ensuring reliable analgesia and early rehabilitation without added risks.

Keywords: Adductor canal block, surgeon-administered block, total knee replacement, functional outcomes, case series.

Introduction

Total knee replacement (TKR) is associated with significant postoperative pain, which may delay mobilization and impair functional recovery. Femoral nerve block has long been used but carries the drawback of quadriceps weakness and increased fall risk [3, 6]. Adductor canal block (ACB) provides sensory blockade while sparing motor function, allowing earlier ambulation [2, 4, 14].

Traditionally, ACB is performed by anaesthesiologists under ultrasound guidance. However, surgeon-administered ACB under direct visualization at the time of wound closure is technically straightforward, avoids reliance on anaesthesiologist availability, and may be equally effective [9]. The present prospective case series evaluates the safety, analgesic efficacy, and functional outcomes of surgeon-administered ACB in 50 consecutive unilateral TKR patients.

Objectives

i). To evaluate the efficacy of surgeon-administered adductor canal block (ACB) in providing postoperative analgesia in patients undergoing unilateral total knee replacement (TKR).

ii). To assess the impact of surgeon-administered ACB on early mobilization and functional recovery using objective measures such as time to ambulation, walking distance, and Oxford Knee Score.

iii). To determine the safety profile and feasibility of intraoperative surgeon-administered ACB, including potential block-related complications.

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Methods

Design & Setting: Consecutive case series of 50 adults with surgeon-administered adductor canal block. This was a prospective, single-centre observational case series conducted at the Department of Orthopaedics in JJ hospital, Mumbai, a tertiary care academic institution.

Eligibility: Inclusion—Patients aged 50–75 years. Diagnosed with primary osteoarthritis of the knee. Scheduled for unilateral primary total knee replacement (TKR). Exclusion—Revision or bilateral TKR. Known allergy to local anaesthetic agents. Pre-existing neuropathy or neuromuscular disorders. Patients refusing regional analgesia or study participation.

Preoperative Work-up: Clinical assessment for pain, baseline VAS and OKS, routine haematological and biochemical tests, coagulation profile, viral markers, radiographs, cardiopulmonary assessment, anaesthetic clearance, comorbidity optimization, and physiotherapy-based prehabilitation before total knee replacement.

Surgical Technique and Intervention: All surgeries were performed by the same surgical team using a standard medial parapatellar approach. Following prosthesis implantation and before wound closure, a surgeon-administered adductor canal block (ACB) was performed. Under direct visualization, 20 ml of 0.25% bupivacaine with 4 mg dexamethasone was infiltrated into the adductor canal medial to the femoral artery. Perioperative Protocol: All patients received spinal anaesthesia with standard sedation. Multimodal analgesia (paracetamol and NSAIDs, unless contraindicated) was administered perioperatively. Standard postoperative physiotherapy and enhanced recovery protocols were followed uniformly.

Outcomes & Follow-up: Pain assessment: Visual Analogue Scale (VAS) at 6, 12, 24, and 48 hours postoperatively. **Mobilization:** Time to first bedside mobilization and ambulation distance on day 2. Functional outcome: Oxford Knee Score (OKS) preoperatively, at 6 weeks, and at 3 months.

Safety: Complications related to ACB (hematoma, infection, systemic toxicity, motor weakness).

Case Series Summary (n=50)

Study Design: Prospective observational study.

Setting: Single tertiary care orthopaedic centre.

Duration: January–June 2023.

Patients: Fifty consecutive patients (32 females, 18 males).

Mean Age: 66.2 years (range: 58–74). Diagnosis: primary osteoarthritis. Exclusion: revision TKR, bilateral TKR, allergy to local anaesthetic, neuropathy.

Technique: Standard medial parapatellar approach for TKR. Before closure, 20 ml of 0.25% bupivacaine with 4 mg dexamethasone was injected into the adductor canal under direct visualization by the surgeon.

Outcome Measures: Pain (VAS at 6, 12, 24, and 48 h). Mobilization (time to first bedside mobilization, ambulation distance on day 2). Function (Oxford Knee Score preoperatively, at 6 weeks, and at 3 months). Complications (block-related events).

Results

Fifty consecutive patients (32 females, 18 males).

Mean Age: 66.2 years (range: 58–74).

Pain: VAS at 6, 12, 24, and 48 h.

Pain Control

VAS scores demonstrated effective analgesia:

- **6 h:** 2.1 ± 0.7
- **12 h:** 2.8 ± 0.9
- **24 h:** 3.2 ± 1.0
- **48 h:** 2.5 ± 0.8

Mobilization

- **Time to First Mobilization:** 18.4 ± 3.6 h (range 12–24 h).
- **Day 2 Ambulation:** 38.2 ± 10.6 m.

Functional Outcomes:

- **Pre-op OKS:** 22.6 ± 4.1
- **6 Weeks:** 38.7 ± 3.5
- **3 Months:** 44.3 ± 2.9

Complications

No hematoma, nerve palsy, infection, or systemic toxicity.

Discussion

In this prospective series, surgeon-administered ACB provided effective analgesia, preserved quadriceps strength, and enabled early mobilization after TKR. Patients mobilized within 24 hours and achieved functional milestones consistent with enhanced recovery protocols.

Our results compare favourably with literature on anaesthesiologist-administered ACB. Importantly, no block-related complications were observed, supporting the safety of surgeon-performed ACB.

Advantages: Direct anatomical visualization ensures accurate injection, avoids anaesthesiologist delays, and integrates into surgical workflow.

Limitations: Single-centre, non-comparative design, and short-term follow-up of 3 months. Future RCTs comparing surgeon- vs anaesthesiologist-administered ACB are warranted.

Tables

Table 1: Patient data collected (n=50)

Patient ID	Age (years)	Sex	VAS 6h	VAS 12h	VAS 24h	VAS 48h	Time to Mobilization (h)	Ambulation Distance Day 2 (m)	OKS Pre-op	OKS 6 weeks	OKS 3 months	Complications
1	64	Female	2.7	4.1	4.1	1.1	17.7	30.8	25	37	42	None
2	72	Female	2.1	4.1	3	2.8	18.6	38.1	27	43	42	None
3	68	Female	1.7	2	4.4	2.2	20.7	16	26	42	44	None
4	65	Male	1.1	2.9	3.7	2.6	18.9	57	29	40	44	None
5	64	Male	1.5	2.4	5.9	1.8	11.6	34.9	25	39	41	None
6	68	Male	2.6	3.6	3.3	2.2	23	46.7	22	41	42	None
7	68	Male	2	4.3	1.8	3.7	16.2	44.7	22	38	42	None

8	61	Female	1.8	3.6	3.2	2.6	26	52.6	21	33	43	None
9	65	Male	2.5	2.8	2.2	2.9	20.9	33.6	24	39	45	None
10	60	Female	2.9	2.5	4.2	1.5	18.7	40.4	18	40	47	None
11	59	Male	2.3	3.4	3.2	4.4	20	44.1	24	43	47	None
12	69	Male	2.3	1.7	3.1	4	18	47.4	22	34	46	None
13	63	Female	3.1	3.3	3.1	3.6	16.6	50.4	24	38	42	None
14	59	Male	2.2	2	3.9	3.2	19.1	33.1	24	38	44	None
15	58	Female	1.9	3.4	2.7	2.5	21.6	31.2	13	35	51	None
16	69	Male	2.6	2.7	4	2.9	16.7	52.6	19	40	47	None
17	69	Female	1.9	2.5	4.2	3.3	16.2	16.6	22	41	43	None
18	74	Female	1.8	2	2.9	2	17.1	54.8	22	38	49	None
19	67	Male	3	2.5	2.3	2.1	21.8	35	24	46	43	None
20	73	Male	1.9	3.3	2.7	1.2	23.6	38.2	24	38	42	None
21	72	Female	0.2	3.7	3.9	1.9	19.7	31	29	37	48	None
22	72	Female	2.3	3.3	3.3	3.8	20.5	37.7	24	37	41	None
23	69	Female	1.8	4	3.8	2.2	16.1	51.7	21	36	39	None
24	60	Female	1.9	5.1	5	2.2	21.6	46.4	16	37	47	None
25	62	Male	2.4	2.5	3.4	2.8	20.4	43.4	17	34	44	None
26	64	Male	2	2.6	2.4	1.2	15.8	39.1	25	38	45	None
27	66	Male	2.3	1.5	4.3	3.3	12	22.9	27	39	43	None
28	64	Female	0.7	3.9	3.3	3.5	14	29.3	29	31	44	None
29	61	Female	1.4	4	4.1	2.8	16	34.6	19	38	43	None
30	71	Male	3.1	2	4.3	3.8	22.6	43.1	21	39	42	None
31	66	Male	2.1	3.4	2.2	1.4	24	38.9	24	41	43	None
32	59	Male	0.9	3.9	4.6	4	16.8	48.6	31	43	43	None
33	72	Male	1.3	3	4.1	1.9	16.9	43.2	23	42	42	None
34	64	Female	1.4	3.6	2.6	1.5	19.3	38.8	29	37	43	None
35	69	Female	2.2	3	3.5	2.3	18.4	62.3	23	36	37	None
36	65	Female	1.8	1.7	3.5	4	21.8	42.5	27	41	46	None
37	72	Female	1.6	3.7	3.2	2.5	16.5	33.6	27	37	45	None
38	60	Male	2.1	4	4.1	1.8	21.8	57.9	23	34	44	None
39	71	Female	2.4	3.5	4.6	1.5	17.5	50.9	18	47	45	None
40	74	Female	1.9	1.9	3.2	2.4	21.5	57.5	21	38	45	None
41	61	Female	1.7	2.1	4.5	0.9	17.4	37	29	37	42	None
42	65	Female	1.8	1.8	4.2	1.5	16.2	48.5	26	31	43	None
43	61	Female	2.3	3.5	3.4	3.7	25.3	22.8	21	42	46	None
44	59	Female	2.1	3.9	3.4	3.6	22.2	46.5	21	35	45	None
45	63	Female	2.6	3.2	2	2.4	11.9	36.5	16	39	50	None
46	67	Male	1.3	3.6	1.7	2.1	16.8	23.8	29	42	49	None
47	61	Male	1.6	2	3.4	2.5	22.7	49.1	26	35	47	None
48	69	Male	2.6	2.9	2.3	4.4	14.1	19	22	39	42	None
49	59	Female	1.5	1.6	3.2	2.8	21.2	17.9	23	44	43	None
50	67	Male	3.1	2.1	2.7	3.2	20.8	42	14	30	41	None

Table 2: Visual Analogue Scale (VAS) Pain Scores

Time Point	Mean VAS	SD
6 h	2.1	0.7
12 h	2.8	0.9
24 h	3.2	1.0
48 h	2.5	0.8

Table 3: Oxford Knee Score (OKS)

Time Point	Mean OKS	SD
Pre-op	22.6	4.1
6 weeks	38.7	3.5
3 months	44.3	2.9

Table 4: Treatment details and outcomes

Parameter	Mean ± SD	Range
Age (years)	65.6 ± 4.7	58 – 74
VAS pain score at 6 h	2.0 ± 0.6	1 – 4
VAS pain score at 12 h	3.0 ± 0.9	1 – 5
VAS pain score at 24 h	3.4 ± 0.9	2 – 6
VAS pain score at 48 h	2.6 ± 0.9	1 – 5
Time to first mobilization (h)	18.4 ± 3.6	12 – 24
Ambulation distance on Day 2 (m)	38.2 ± 10.6	15 – 60
Oxford Knee Score – Preoperative	22.6 ± 4.1	15 – 30
Oxford Knee Score – 6 weeks	38.7 ± 3.5	32 – 45
Oxford Knee Score – 3 months	44.3 ± 2.9	38 – 48

Figures

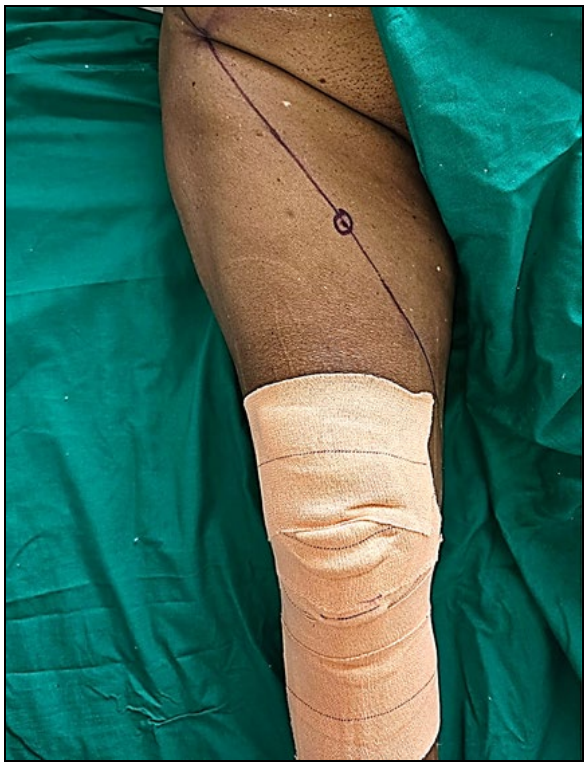
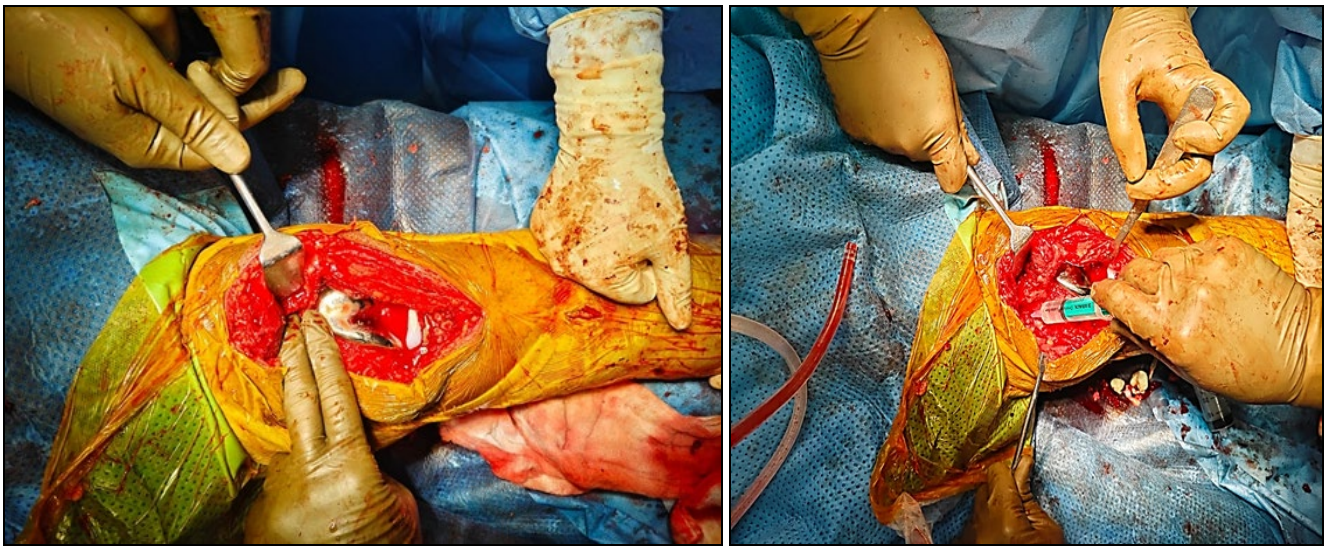


Fig 1: Clinical photograph showing the surgical limb after total knee replacement with sterile draping. The thigh is marked with surface anatomical landmarks for surgeon-administered adductor canal block (ACB). A line is drawn from the anterior superior iliac spine (ASIS) to the medial border of the patella. The midpoint of this line corresponds to the adductor canal, marked with a circle (injection site).

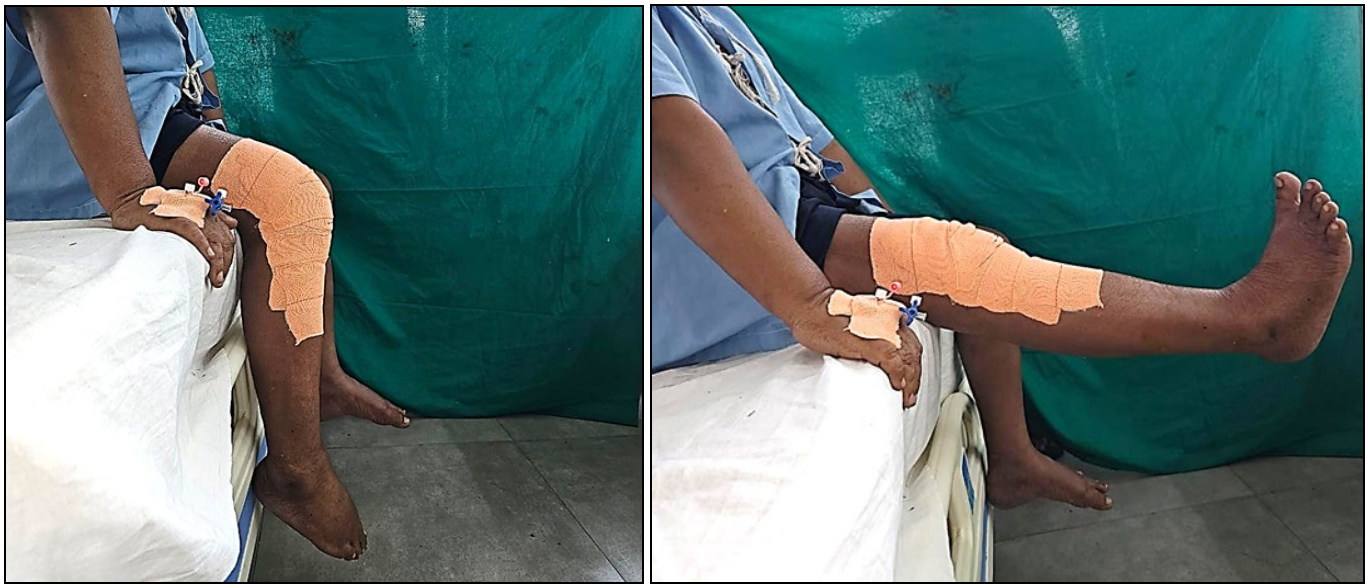


(a) **(b)**

Fig 2: Intraoperative image showing

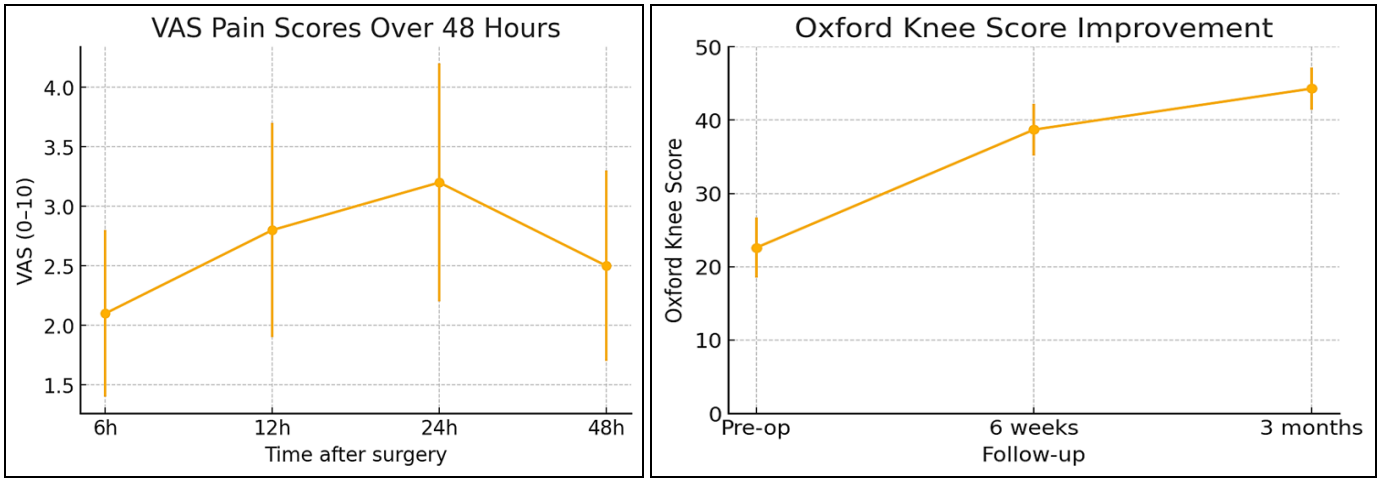
a) Palpation and identification of the adductor canal during knee surgery. The incision exposes the distal femur and surrounding soft tissue. The surgeon's gloved finger and blunt dissector are used to palpate the adductor canal, delineating the anatomical boundaries for the targeted nerve block. Meticulous soft tissue handling and adequate exposure of the medial aspect of the thigh are evident.

b) Intraoperative image depicting infiltration of local anaesthetic into the adductor canal using a syringe. The needle is carefully advanced under direct visualization to ensure accurate deposition around the saphenous nerve within the canal. Retractors are maintaining exposure, and the field demonstrates proper haemostasis. This step provides regional analgesia following surgical intervention around the distal femur or knee joint.



(a) (b)

Fig 3: Clinical photographs showing knee range of motion following surgeon-administered adductor canal block (ACB) after total knee replacement. (A) Active knee extension demonstrating quadriceps function with the operated limb elevated. (B) Active knee flexion while seated at the bedside, indicating preserved motor strength, reduced pain and early mobilization potential.



(a) (b)

Fig 4: A) Line graph showing mean Visual Analogue Scale (VAS) pain scores over the first 48 hours following TKR with surgeon-administered adductor canal block. Pain scores remained in the mild-to-moderate range, peaking at 24 hours and declining by 48 hours. B) Line graph showing improvement in Oxford Knee Score (OKS) from preoperative baseline to 6 weeks and 3 months after TKR with surgeon-administered adductor canal block. Functional outcomes improved significantly, with most patients achieving good-to-excellent scores by 3 months.

Conclusion

Surgeon-administered adductor canal block is a safe, reproducible, and effective technique that improves analgesia, facilitates early mobilization, and enhances functional recovery following TKR.

Declarations

Patient Consent: Written informed consent for treatment and publication of anonymized clinical details/images was obtained from all patients.

Ethical Approval: Conducted in accordance with institutional policies and the Declaration of Helsinki; institutional approval/exemption documented.

Conflicts of Interest: None declared.

Funding: None

References

1. Andersen HL, Gyrn J, Møller L, Christensen B, Zaric D. Continuous adductor canal block for adjuvant postoperative analgesia after total knee arthroplasty: A randomized, double-blind study. *Anesth Analg*. 2013; 116(5):1094–1102.
2. Jaeger P, Zaric D, Fomsgaard JS, Hilsted KL, Bjerregaard J, Gyrn J, *et al*. Adductor canal block versus femoral nerve block for analgesia after total knee arthroplasty: A randomized, double-blind study. *Reg Anesth Pain Med*. 2013; 38(6):526–532.
3. Sharma S, Iorio R, Specht LM, Davies-Lepie S, Healy WL. Complications of femoral nerve block for total knee arthroplasty. *Clin Orthop Relat Res*. 2010; 468(1):135–140.
4. Kwofie MK, Shastri UD, Gadsden JC, Sinha SK, Abrams JH, Xu D, *et al*. The effects of ultrasound-guided adductor canal block versus femoral nerve block on quadriceps strength and fall risk: A randomized controlled trial. *Anesth Analg*. 2013; 117(5):1017–1023.
5. Lund J, Jenstrup MT, Jaeger P, Sørensen AM, Dahl JB. Continuous adductor canal block for postoperative pain

treatment after total knee arthroplasty: A randomized, double-blind study. *Anesth Analg*. 2011; 113(3):701–707.
6. Elkassabany NM, Antosh S, Ahmed M, Nelson CL, Israelite CL, Nelson JB, *et al*. The risk of falls after total knee arthroplasty with the use of a femoral nerve block versus adductor canal block: A double-blinded randomized controlled study. *Anesth Analg*. 2016; 122(5):1696–1703.
7. Memtsoudis SG, Poeran J, Rasul R, Cozowicz C, Zubizarreta N, Ozbek U, *et al*. Peripheral nerve block anesthesia/analgesia for total knee arthroplasty: A population-based study of risks and benefits. *Anesthesiology*. 2013; 118(4):885–892.
8. Chen J, Lesser JB, Hadzic A, Reiss W, Resta-Flarer F. Adductor canal block can result in motor block of the quadriceps muscle. *Reg Anesth Pain Med*. 2014; 39(2):170–171.
9. Sharma R, Dua A, Krishna A, Mathur S, Sharma N. Surgeon-administered adductor canal block in total knee arthroplasty: A safe and effective alternative. *J Arthroplasty*. 2019; 34(7S):S128–S132.
10. Kehlet H, Dahl JB. Anaesthesia, surgery, and challenges in postoperative recovery. *Lancet*. 2003; 362(9399):1921–1928.
11. Kehlet H. Fast-track hip and knee arthroplasty. *Lancet*. 2013; 381(9878):1600–1602.
12. Wang D, Yang Y, Li Q, Ma L, Ma J, Lu B. Adductor canal block versus femoral nerve block for pain control after total knee arthroplasty: A meta-analysis. *Medicine (Baltimore)*. 2017; 96(27):e7383.
13. Kuang MJ, Ma JX, Fu L, He WW, Zhao J, Ma XL. Is adductor canal block better than femoral nerve block in primary total knee arthroplasty? A GRADE analysis of the evidence through a systematic review and meta-analysis. *J Arthroplasty*. 2017; 32(10):3238–3248.
14. Mudumbai SC, Kim TE, Howard SK, Workman JJ, Giori NJ, Woolson S, *et al*. Continuous adductor canal blocks are superior to continuous femoral nerve blocks in promoting early ambulation after TKA. *Clin Orthop Relat Res*. 2014; 472(5):1377–1383.
15. Grevstad U, Mathiesen O, Lind T, Dahl JB. Effect of adductor canal block on pain and ambulation after total knee arthroplasty: A randomized controlled trial. *Acta Anaesthesiol Scand*. 2015; 59(7):847–856.
16. McIsaac DI, Cole ET, McCartney CJ. Impact of including adductor canal block in multimodal analgesia for total knee arthroplasty: A systematic review and meta-analysis. *Reg Anesth Pain Med*. 2017; 42(6):746–755.
17. Ramesh S, Kakar PN, Kaul N, Bhalotra AR, Srivastava A, Pant V. Adductor canal block for knee surgery: An emerging concept. *Indian J Anaesth*. 2016; 60(12):874–878.
18. Gandhi K, Viscusi ER, Schwenk ES, Ponzio D, Pulido L, Parvizi J. Adductor canal block for postoperative analgesia following total knee arthroplasty: A review. *J Knee Surg*. 2017; 30(6):452–458.