

# Post-operative Peripheral Nerve Blockade for Total Knee Replacement

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## Abstract

**Background:** Total knee replacement (TKR) is a common and often painful operation. Femoral nerve block (FNB) is frequently used for postoperative analgesia. Prospective randomized case study done on 20 patients.

**Objectives:** The aim of the study is to assess efficacy of peripheral nerve blockade for relieving postoperative pain after total knee replacement. It also assesses patient comfort, pain scoring post-operative 4 days in ward.

**Indication:** POST-OP analgesia after TKR.

**Preparation:** Procedure explained in clinic to pt. and family/pre-operative/in recovery Rm/monitors on/O2/IV/P+D/Sterile gown/US/N stimulator/Pt Supine/Sedation midazolam 1 mg+fentanyl 50 mcg/procedure explained to Pt/Tough 22G insulated 10 cm+catheter.

**Findings:** Normal Sono anatomy, stimulation of Quads at 0.36 MA.

**Management:** No pain/blood or Resistance on initial aspiration-->1 ml injection with 5% Dextrose, good facial opening -->Ropivacaine 0.25% given incremental 5 ml to a total of 20 ml+10 ml Dextrose--total 30 ml then Patient tolerated procedure well+ stable vitals.

**Results:** Patient will be pushed to OR for GA will review patient in post op recovery then patients followed up in ward post-operative for 4 days-10 patients went smooth recovery with mild pain, VAS 2-5/10, needed small amounts of morphine iv with oral analgesics, on the other hand 20 patients had severe pain and needed morphine iv boluses for 3 days with oral analgesics.

**Conclusion:** Femoral nerve blockade (with or without concurrent treatments including PCA opioid) provided more effective analgesia than PCA opioid alone and less nausea/vomiting compared with PCA alone or epidural analgesia. Femoral nerve blockade (FNB) before knee

replacement surgery can provide superior pain relief and fewer side effects, compared to traditional patient-controlled opioid analgesia. Further research is needed to compare the effectiveness of FNB to other pain management strategies, such as local anesthetic infiltration and multimodal oral pain medication.

**Keywords:** Analgesia; Arthroplasty; Analgesics; Femoral Nerve Block (FNB); Knee; Pain; Painless time; Periarticular single-injection; Replacement; Total Knee Arthroplasty (TKR); Visual analogue pain scale

**Abbreviations:** FNB: Femoral Nerve Block; PCA: Patient-Controlled Analgesia; TKA: Total knee Arthroplasty; TKR: Total knee Replacement; US: Ultra Sound; VAS: Visual Analogue Scale; OT: Operation Theatre; GA: General Anesthesia

## Introduction

Total knee arthroplasty (TKA) is a worldwide-realized procedure, with 600,000 surgeries performed per year in the United States, with a 673% increase estimated until 2030 [1]. Functional and pain management improvement is expected in 90% of patients, with 85% of them satisfied after the procedure [2]. Immediate postoperative pain control is an important aspect to be considered [3]. Patients submitted to TKA endure pain with variations between 40-80 (according to analog visual scale -AVS - which goes from zero to 100) during the immediate postoperative, with slow decline in the first 24 hours. Pain classified as severe occurs in 60% and moderated in 30% of patients submitted to TKA during this period of time [4]. Therefore adequate pain management allows an earlier rehabilitation, with a higher satisfaction rate and decrease the hospitalization period. A multimodal control of pain can be reached by using non-steroidal anti-inflammatory, COX-2 anti-inflammatory inhibitors, peripheral nerve blocks and intra-articular anesthetics injections and decrease use of opioids given of potential collateral effects. The benefits of PNBs are numerous and include improvement in clinical, economic, and humanistic outcomes (**Table 1**) [5]. PNBs have been associated

with improvement in postoperative pain control and reduction in the use of opioids in a variety of surgical procedures. Peripheral blockings are associated to the smallest rate of collateral effects and complications when compared to the spinal anesthesia and analgesia controlled by the patients [5].

**Eligibility**

- Minimum Age Eligible for Study: 50 Years
- Maximum Age Eligible for Study: 75 years
- Genders Eligible for Study: Both

**Criteria**

Inclusion Criteria: - 20 patients undergoing total knee replacement under femoral block then general anesthesia - ASA I to III Exclusion Criteria: - Patient refusal - Coagulation disorders - Head injury or other associated injuries - Previous vascular surgery in the femoral area. - Loss of consciousness and signs of acute coronary syndrome - Mini-Mental Score <25 - Allergy to lignocaine, - Skin lesions/infection at site of injection - Sepsis [6].

**Table 1:** Benefits of PNB as a component of multi-model postoperative analgesia regimen.

Improvement in postoperative pain control and reduction in the use of opioids
Reduction in hospital length of stay
Prevention of hospital readmissions
Reduction in postoperative nausea and vomiting
Faster movement to phase 2 recovery and/or post anesthesia care unit bypass
Earlier participation in physical therapy
Improved patient satisfaction

**Purpose**

The aim of the study is to compare patient comfort and analgesic efficacy of ultrasound guided femoral nerve block using the following endpoints: circumferential spread, anterior or posterior local anesthetic deposition prior to giving general anesthesia then assess patient comfort, pain scoring post-operative 4 days in ward.

**Discussion and Results**

Peripheral nerve block techniques are now commonly incorporated into multimodal postoperative analgesic strategies. The consequences of expanded use of PNB include improvement in pain relief and postoperative opioid requirements, in addition to improved postoperative recovery and fewer opioid-related adverse events [5]. As an extension of these benefits, patients are able to be discharged from the hospital earlier, and surgical procedures are able to be performed in outpatient settings [7].

**Study:** Prospective randomized case study done on 20 patients. Procedure explained in clinic to pt. and family/pre-

operative/in recovery Rm/monitors on/O2/IV/P+D/Sterile gown/US/N stimulator/Pt Supine/Sedation midazolam 1 mg +fentanyl 50 mcg/procedure explained to Pt/Tough 22G insulated 10 cm.

**Findings:** Normal Sono anatomy, stimulation of Quads at 0.36 MA.

**Management:** No pain/blood or resistance on initial aspiration-->1 ml injection with 5% Dextrose, good facial opening -->Ropivacaine 0.25% given incremental 5 mls to a total of 20 ml+10 ml Dextrose--total 30 ml.

Nerve stimulation: 0.36 MA Skin to Needle Tip: 5 cm

-Patient tolerated procedure well+stable vitals.

**Results**

Patient will be pushed to OT for GA, then will review patient in post op recovery then patients followed up in ward post-operative for 4 days. 10 patients went smooth recovery with mild pain, VAS 2-5/10, needed small amounts of morphine IV with oral analgesics, on the other hand 20 patients had severe pain and needed morphine iv boluses for 3 days with oral analgesics.

**Conclusion**

Peripheral nerve block (PNB) improves pain control and reduces opioid requirements compared with opioids alone. The ideal PNB technique would have a sufficient duration of action and minimal risk of complications. A preoperative femoral nerve block alone produced partial and insufficient analgesia immediately after surgery and on the first postoperative day [8]. FNB (with or without concurrent treatments including PCA opioid) provided more effective analgesia than PCA opioid alone and less nausea/vomiting compared with PCA alone or epidural analgesia. Femoral nerve blockade (FNB) before knee replacement surgery can provide superior pain relief and fewer side effects, compared to traditional patient-controlled opioid analgesia. Further research is needed to compare the effectiveness of FNB to other pain management strategies, such as local anesthetic infiltration and multimodal oral pain medication [9].

**Conflict of Interests**

The authors declare no competing financial interests.

**Acknowledgment**

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