

# Femoral nerve sheath infusion with fentanyl causes analgesia with sustained strength after total knee replacement

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## BACKGROUND

Major surgery involving the knee is often associated with severe postoperative pain. Postoperative pain control remains a significant contributor to delayed recovery and length of hospital stay<sup>1-3</sup>. Approaches to minimize postoperative pain after surgery are a matter of major concern due to the need for early mobilization, a crucial factor in good postoperative rehabilitation. This study compared postoperative pain and muscle strength among three femoral nerve sheath (FNS) catheter infusates: fentanyl alone, ropivacaine alone and fentanyl and ropivacaine in combination after TKR.

## METHODS

After IRB approval, sixty-one patients who underwent TKR participated in this prospective, double-blinded, randomized study. Post-operatively, a randomly assigned infusion of fentanyl, ropivacaine, a combination of fentanyl and ropivacaine, or saline was initiated through the catheter at an infusion rate of 10ml/hr (Table 1). All patients were given supplemental morphine as needed. Preoperative and postoperative visual analog scale (VAS) scores for pain, bilateral knee strength, supplemental morphine use and side effects were obtained.

Table 1. Treatment Groups

Group	Infusate
F	Fentanyl 3 µg/ml
R	Ropivacaine 0.1%
FR	Fentanyl 3 µg/ml + Ropivacaine 0.1%
C	0.9% Normal saline

## RESULTS

Strength retention was greater in the fentanyl only group compared to the other treatment groups (Fig 1). Post-operative morphine supplementation was lower in all groups that received a femoral nerve infusion of an analgesic compared to the saline-infused control (Fig 2). VAS scores were not different between the groups.

Figure 1. Post-operative strength demonstrated through flexion and extension on the operated knee

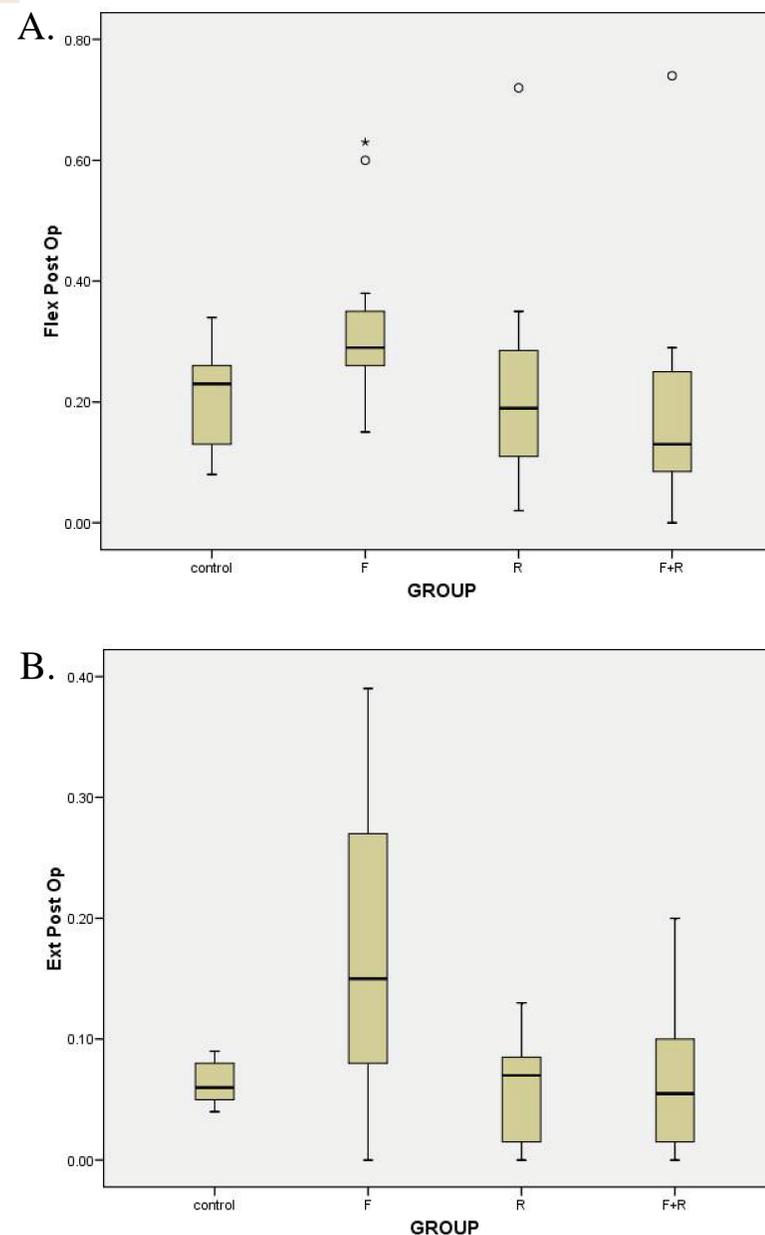


Figure 2. Post-operative strength demonstrated through flexion and extension on the operated knee. The data show mean values  $\pm$  SD. A) Post-operative extension values B) Post-operative flexion values. F= fentanyl group; R=Ropivacaine only group; F+R= fentanyl plus Ropivacaine group.  $\circ$ = outliers; \*=extreme value. Fentanyl, infused via a nerve catheter, showed greater post-operative extension and flexion compared to the other nerve catheter infused treatment groups: ropivacaine only and fentanyl plus ropivacaine.

Figure 2. Total supplemental morphine use within 24 hours post-TKR

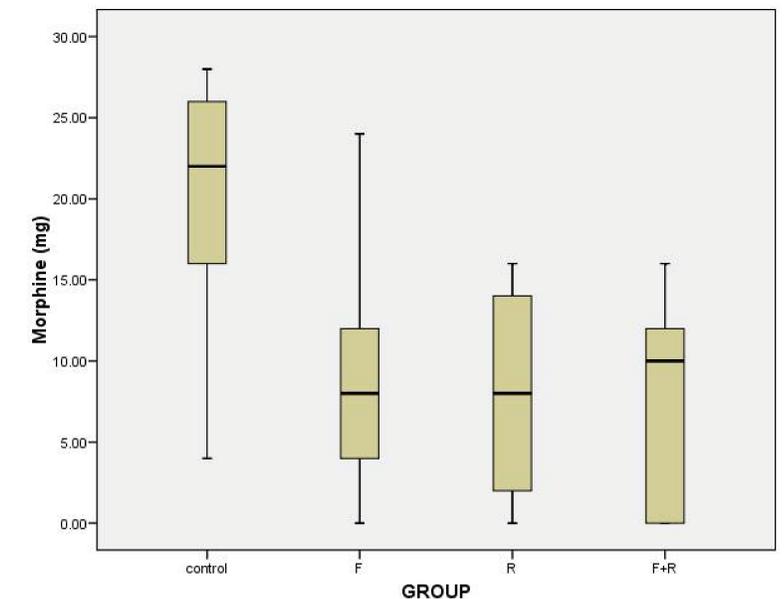


Figure 1. Total Morphine use within 24 hours post-operation. The data depict the average amount of morphine in mg  $\pm$  SD. The control group required significantly greater amounts of morphine compared to all catheter infused treatment groups. F= fentanyl group; R=Ropivacaine only group; F+R= fentanyl plus Ropivacaine group.

## CONCLUSION

This small study revealed trends for greater strength retention and good analgesia in subjects treated with FNS fentanyl infusion alone opposed to those receiving ropivacaine containing solutions.

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