

# Local Infiltration Anesthesia in Total Knee and Total Hip Arthroplasty: A Brief Review



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## Abstract

High-volume local infiltration analgesia (LIA) is widely used in total hip arthroplasty (THA) and total knee arthroplasty (TKA) to reduce postoperative pain and opioid requirements. In TKA this method of postoperative pain treatment seems to be effective. The efficacy of LIA in THA with different approaches to the joint remains unclear. Therefore, we conducted a systematic brief review of randomized clinical trials until June 1, 2017. We investigated LIA for THA and TKA to evaluate the analgesic efficacy of LIA for early postoperative pain treatment. We examined whether intraoperative high-volume LIA in addition to a multimodal oral analgesic regimen, with different approaches for THA would further reduce acute postoperative pain and early opioid requirements consumption.

**Keywords:** Local Infiltration anesthesia; Total hip arthroplasty; Direct anterior approach

## Introduction

Since Kerr & Kohan [11] in 2008 described the Local Infiltration Anesthesia (LIA) as an affective technique to control acute postoperative pain following total hip (THA) and total knee arthroplasty (TKA), it is widely used to reduce postoperative pain and opioid requirements. Since the length of stay in TKA and THA have diminished, fast recovery and rehabilitation demands an optimized pain relief, allowing early mobilization. The ultimate goal is to achieve adequate pain relief in combination with optimal muscle function. Multi modal analgesia in combination with LIA is meant to reduce the need of opioids and its side effects (nausea, vomiting, reduced gut mobility and urinary retention) to facilitate fast and safe recovery and enhance rehabilitation. The efficacy of this method in THA is still not completely clear.

## Methods and Discussion

In our brief review group until June 2017, we only looked at the randomized studies comparing LIA with saline injections. We evaluated the analgesic efficacy of intra-operative LIA in THA and TKA and the abuse of opioids in the early (<72h) postoperative period. Is LIA in combination with multimodal analgesia effective in both hip and knee surgery? In a systematic review of randomized clinical trials in 2014, investigating LIA for TKA and THA, the analgesic efficacy of LIA for early postoperative pain treatment was evaluated [1]. In the TKA group of Andersen & Kehlet [1], 6 randomized trials [2-6] investigated the analgesic efficacy of LIA compared with saline or no injection. Only two of

these trials had low risk of bias. But all six of these trials reported reduced pain scores and less opioid consumption in the early postoperative period (0-32 hrs).

In the THA group until 2017, 5 trials had low risk of bias and in these trials postoperative pain scores were very low and no statistically significant differences in pain scores or opioid requirements were observed in the early post operative period (0-24 hrs). This group was diverse in use of systemic analgesia and surgical approach used to perform a hip replacement and varied from posterior, direct lateral, posterolateral to direct anterior approach. (Andersen Lø et al. [7] (posterior), Lunn et al. 2011, Karen V Andersen et al. [1] (postero-lateral), Den Hartog et al. [8] (anterior approach), Hofstad et al. [9] (direct lateral). Based on these results, you could say that LIA should be recommended in TKA but not in THA. However if dividing the different THA trials into sub groups of type of anesthesia and surgical approach the results are conflicting and the role of LIA in THA surgery still needs to be clarified.

Some studies have reported superior outcome with LIA regarding postoperative analgesia and opioid consumption with different approaches to the joint [10-14] in combination with shortening of the hospital stay [15,16]. Other studies reported no additional benefit in analgesic effect or reduction of opioid consumption after a single dose of ropivacaine with epinephrine following THA with different approaches [1,7,8,17,18] (Lunn et al. 2011). A recent systematic review of Johnson et al. [19] showed no

statistically significant differences between neuraxial and general anaesthesia for mortality, surgical duration, surgical site or chest infections, nerve palsies, postoperative nausea and vomiting, or thromboembolic disease when antithrombotic prophylaxis was used.

Although spinal or epidural anesthesia is concerned to be the golden standard for total hip replacement, the grade of relaxation of the musculature around the hip joint seems to be more profound under general anesthesia [19,20]. This effect could reduce operative tissue damage at the surgical site associated with lesser pain, swelling and hematoma [2]. Especially using the tissue sparing direct anterior approach the muscular relaxation could be crucial to diminish postoperative pain and abuse of opioids. In the study of Den Hartog [8] in 2015 using LIA with patients undergoing a DAA THA under spinal anesthesia no clinically relevant effect was seen 4 hours after surgery [7]. If the prolonged anesthetic effect, due to spinal anaesthesia with bupivacaine, plays a role in direct postoperative pain reduction, remains unclear.

### Conclusion

Despite the many studies of LIA in THA, final interpretation is hindered by methodological insufficiencies in most studies, especially because of differences in use of systemic analgesia and surgical approach between groups. However we can conclude that the randomized clinical trials in TKA reported an analgesic efficacy of LIA in the early postoperative period with reduction in opioid requirements. In THA the effect of LIA is questionable and this method seems to have limited additional analgesic value. Further studies are necessary to explore the potential of LIA in the tissue sparing anterior approach and other minimal invasive hip surgery under general anesthesia with an optimal level of relaxation for evaluating the effect on postoperative pain and opioids consumption. In accordance to the efficacy of LIA in TKA, some effect of LIA in tissue sparing THA could be expected after early mobilization in fast track treatment.

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