The effect of stimulating versus nonstimulating catheter techniques for continuous regional anesthesia: a semiquantitative systematic review

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CRD summary
This review found that stimulating catheters were associated with superior regional anaesthesia compared with non-stimulating catheters. Potential methodological flaws in the review and the unknown quality of the included trials mean that the authors' conclusions should be interpreted with caution.

Authors' objectives
To compare clinical outcomes of stimulating and non-stimulating catheter techniques for post-operative analgesia.

Searching
MEDLINE and EMBASE were searched from 1999 to 2009 for relevant studies; search terms were reported. Reference lists of all retrieved articles were checked to identify additional references. It was unclear if there were any language restrictions.

Study selection
Randomised controlled trials (RCTs) that compared stimulating catheters with non-stimulating catheters for postoperative analgesia were eligible for inclusion. The blinding of observers was also required for inclusion.

The eligible outcomes included pain scores, the requirement for rescue medication and functional recovery.

The patients in the included trials underwent surgery for total knee replacements, foot surgery, hallux, anterior cruciate repair shoulder surgery, and hand surgery. Patients were scheduled for continuous femoral nerve blocks, popliteal sciatic nerve blocks, anterior interscalene nerve block, and infraclavicular brachial plexus block. The anaesthetic medications used in the trials were lidocaine, prilocaine, mepivacaine and ropivacaine; these were given at a range of doses. Rescue medications included: ketorolac; piritramide and/or metamizol; ropivacaine; intravenous patient-controlled analgesia with morphine, fentanyl and piritramide; nurse-controlled tramadol; and intraoperative supplementation with fentanyl, midazolam, propofol or sufentanil. The outcomes evaluated were the requirement for rescue analgesic medication, pain measured by visual analogue scale at one to five days, onset time of sensory and/or motor block, catheter placement time, patient satisfaction, loss of sensation, motor strength, and functional outcomes (such as disability, knee flexion and walking distance).

Two reviewers independently performed the study selection.

Assessment of study quality
The authors did not state they assessed the methodological quality of included trials, but the blinding of observers was used as an inclusion criterion for trials in the review.

Data extraction
Two reviewers independently extracted data as reported on the outcomes in each trial. The authors estimated the overall effect of catheter choice by calculating the percentage difference between the two study groups in each trial.

Methods of synthesis
The results were summarised in a narrative synthesis because of substantial variation in the outcomes used across the included trials.

Results of the review
Eleven RCTs (n=649 patients) were included in the review; sample sizes ranged from 40 to 98 patients, where reported.
Nine trials that reported on analgesic medication showed better analgesic action associated with stimulating catheters in the intraoperative and postoperative phases, with reductions in rescue analgesic requirements from 8 to 56%. Stimulating catheters placed at the sciatic nerve and the brachial plexus showed superior efficacy than non-stimulating catheters.

Of the seven trials that investigated pain scores, one study found significant differences between groups at rest or during exercise.

One trial, that investigated functional outcomes in the operated limb with an intrascalence block, found that there was a functional improvement of 65 to 88% in the stimulating catheter group at six weeks post-surgery compared with the non-stimulating catheter group. Three trials that investigated femoral nerve blocks did not find any differences in functional outcomes between the groups.

There were no differences observed between stimulating and non-stimulating catheter groups in patient satisfaction or in complications.

**Authors’ conclusions**
The use of stimulating catheters was associated with improvement in regional anaesthesia compared with non-stimulating catheters, but effects on functional outcomes were unproven.

**CRD commentary**
The review addressed a defined question. Criteria for the inclusion of studies in the review were stipulated. It was unclear to what extent restrictions were placed on language and publication status, so the possibility of respective biases could not be ruled out. Steps were taken to minimise errors and bias for the study selection and data extraction.

There was no formal assessment of methodological quality, which meant it was difficult to establish the reliability of the results. The authors provided only percentage change to demonstrate the direction of intervention effect, so a robust assessment on the magnitude and reliability of this effect was not possible.

Potential methodological flaws in the review and the unknown quality of the included trials mean that the authors' conclusions should be interpreted with caution.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice:

**Research:** The authors stated that future trials are required account for differences between the primary anaesthetic block and secondary analgesic blocks. Future research should also consider: administering no more than 20mL of intermediate-acting local anaesthetic for the primary block with no adjuncts; assessing of visual analogue scles for pain at rest and during exercise for up to five days; using standardised concomitant pain medication in both study groups; assessing short-term and long-term complications; and measuring functional outcomes.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.