A comparison of traditional digital blocks and single subcutaneous palmar injection blocks at the base of the finger and a meta-analysis of the digital block trials


CRD summary
This review evaluated digital block techniques for treating finger injuries. The authors concluded that traditional digital blocks and single subcutaneous palmar injection blocks produce similar injection pain, and are less painful than the transthecal digital block. Palmar techniques are associated with incomplete anaesthesia. Given the small number of variable and poor-quality studies, the reliability of the authors' conclusions is unclear.

Authors' objectives
To compare the effectiveness of different digital block techniques for the treatment of finger injuries. The meta-analysis was conducted in conjunction with a single randomised controlled trial (RCT) carried out by the authors. This abstract focuses on the meta-analysis.

Searching
MEDLINE (via PubMed; 1966 to 2006), EMBASE (1988 to 2006), the Cochrane Controlled Trials Register (Issue 1, 2006) and the Chinese Biomedical Database (1978 to 2006) were searched for relevant studies; the search terms were reported. Reference lists were screened for additional studies. Unpublished material was sought from preprint publications at Plastic and Reconstructive Surgery's Enkwell. Only studies reported in English or Chinese were included.

Study selection
There were no inclusion criteria for the participants. Those included in the review were patients or volunteers aged between 18 and 51 years. RCTs that compared different digital block techniques to determine the extent of injection pain and anaesthesia distribution were eligible for inclusion in the review. The comparisons of interest were palmar blocks versus dorsal blocks, and transthecal blocks versus subcutaneous blocks. The majority of included studies used plain or buffered lidocaine, and all used room temperature anaesthetics. The outcomes were measured by visual analogue scale or numerical ratings, and were converted to a 0- to 10-cm scale.

Two independent reviewers selected studies for the review and any disagreements were resolved by consensus.

Assessment of study quality
The quality of the included studies was assessed according to method of randomisation, allocation concealment, blinding, drop-outs and intention-to-treat analysis. The outcome was classified as level A, B or C, indicating (respectively) minimal, moderate and strong possibilities of bias.

Two independent reviewers assessed the quality of the studies and any disagreements were resolved by consensus.

Data extraction
Data were extracted in order to calculate relative risks (RRs) for dichotomous outcomes and weighted mean differences (WMDs) for continuous outcomes, along with 95% confidence intervals (CIs). Where the standard deviation was not reported, an average was assumed based on other studies with a similar outcome.

Two independent reviewers extracted the data and any disagreements were resolved by consensus.

Methods of synthesis
The included studies were pooled in a meta-analysis using a random-effects model. Heterogeneity was assessed using the I² statistic. Further exploration of heterogeneity was conducted by subdividing the block techniques (palmar blocks...
were separated into transthecal block and single subcutaneous palmar block; and subcutaneous blocks were separated into dorsal block and single subcutaneous palmar block) and type of anaesthetic. Sensitivity analysis was performed by excluding a trial without assessor blinding.

Results of the review
Seven RCTs (involving 726 digits) were included in the review. One trial achieved a level A quality rating; the remaining 6 trials were considered to be level B, largely due to inadequate reporting of randomisation and allocation concealment.

Palmar blocks versus dorsal blocks.
Six trials (involving 609 digits) were pooled, revealing no significant difference in injection pain between palmar and traditional blocks. A large degree of heterogeneity ($I^2=80.6\%$) was reported. The differences remained statistically non significant when separate pooling was carried out for trials of transthecal block ($I^2=86.2\%$) (4 trials) and single subcutaneous palmar injection block ($I^2=0\%$) (3 trials), and when heterogeneity was explored according to the use of plain lidocaine ($I^2=82.5\%$) (5 trials) or buffered lidocaine. The only significant difference for distribution of anaesthesia was found in favour of the traditional block (RR 10.71, 95% CI: 3.95, 29.05, $p<0.00001$; $I^2=0\%$) (2 trials) compared with palmar block for the proximal phalanx only. There were no significant differences in pain scores resulting from the sensitivity analysis.

Transthecal blocks versus subcutaneous blocks.
Four of 6 trials (involving 304 digits) reporting injection pain were pooled, showing results in favour of subcutaneous blocks (WMD 0.76 cm, 95% CI: 0.06, 1.46, $p=0.03$). There was high heterogeneity ($I^2=81.7\%$) which was not reduced when the subcutaneous blocks were subdivided. However, when one study using buffered lidocaine was removed from the analysis, the effect size was increased to 0.90 cm (95% CI: 0.10, 1.70, $p=0.03$) and heterogeneity was reduced ($I^2=75.3\%$). The comparison of transthecal block with single subcutaneous palmar block at the level of the A1 pulley in one trial revealed no statistically significant difference in terms of distribution of anaesthesia.

Authors' conclusions
Traditional digital blocks and single subcutaneous palmar injection blocks are similar in terms of injection pain and are less painful than the transthecal digital block. Palmar techniques are associated with incomplete anaesthesia.

CRD commentary
The review addressed a clear question and was supported by detailed inclusion criteria for all aspects, except participants. The limited information on those included in the review means that it would be difficult to comment on the generalisability of the findings. The search strategy was adequate and included attempts to retrieve unpublished material. However, the restriction to studies reported in English or Chinese means that language bias cannot be ruled out. The quality assessment criteria were appropriate, although the majority of included studies failed to meet key criteria for good-quality RCTs. Adequate study details were provided (except for participants), the method of synthesis was appropriate, and the exploration of heterogeneity was thorough. The review process was carried out with appropriate methods to minimise error and bias. Whilst the review was reasonably well-conducted, the possibility of language bias, and the fact that findings were based on a small number of heterogeneous studies of suboptimal quality, means that the extent to which the authors' conclusions are reliable is unclear.

Implications of the review for practice and research
Practice: The authors stated that the single subcutaneous palmar injection block should be used at the base of the fingers. Where anaesthesia of the dorsum of proximal phalanx is needed, an additional dorsal block or the traditional block is the preferred option.

Research: The authors did not state any implications for research.

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