

**Title:** What is the best type of needle for lumbar punctures?

**Author:** John E Golightly MD, Super B Visor MD, FRCPC; Department of Emergency Medicine, University of Hudson Bay, Churchill, MB

**Full Citation:** Nath S, et al. Atraumatic versus conventional lumbar puncture needles: a systematic review and meta-analysis. *Lancet*. 2018 Mar 24;391(10126):1197-1204.

**Abstract Link:** <https://www.sciencedirect.com/science/article/pii/S0140673617324510?via%3Dihub>

**Article Type:** Systematic Review

**Ratings:** Methods – 4/5      Usefulness – 4/5

**Introduction:**

*Background* - Clinicians' knowledge about the existence of atraumatic needles and their adoption in clinical practice is poor.

*Objectives* - To compare patient outcomes after lumbar puncture with atraumatic needles and conventional needles.

**Methods:**

*Design* – Systematic review and meta-analysis.

*Eligibility Criteria* – Randomized controlled trials comparing the use of atraumatic versus conventional needles for any lumbar puncture indication.

*Outcomes* - Primary outcome was post dural-puncture headache incidence; secondary were safety and efficacy outcomes.

**Main Results:** 110 trials were included yielding results for 13,264 patients with atraumatic needles and 18,148 with conventional needles. The majority of punctures were for anesthesia and only 5% for diagnosis; none were done by ED physicians. I<sup>2</sup> statistic was 45% suggesting moderate heterogeneity. Postdural-puncture headache was significantly reduced from 11·0% (95% CI 9·1–13·3) in the conventional needle group to 4·2% (3·3–5·2) in the atraumatic group (relative risk 0·40, 95% CI 0·34–0·47, p<0·0001). Atraumatic needles were also associated with significant reductions in the need for intravenous fluid or controlled analgesia (0·44, 95% CI 0·29–0·64; p<0·0001), need for epidural blood patch (0·50, 0·33–0·75; p=0·001), and severe headache (0·41, 0·28–0·59; p<0·0001). Success of lumbar puncture on first attempt, failure rate, mean number of attempts, and the incidence of traumatic tap and backache did not differ significantly between the two needle groups.

**Appraisal:**

*Strengths* -

- clear, sensible question
- exhaustive search
- adherence to the PRISMA statement
- primary studies of high methodological quality
- evaluation of all patient-important outcomes
- reasonable subgroups
- very large number of primary studies.

*Limitations* -

- 95% of punctures were done by anesthetists; none by ED physicians
- largest study by Eriksson (N=2598) was deemed to be at high risk of bias
- moderate heterogeneity in primary study results

- no quantitative assessment of ease of use between needles
- no cost-effectiveness analysis
- not all outcomes evaluated in all studies

**Context:** The largest study in the meta-analysis (Eriksson 1998) was performed by anesthetists. Emergency physician consensus strongly recommends use of atraumatic needles. A trial focused on diagnostic LPs performed by emergency physicians would be helpful. Local neurologists and senior emergency physicians support the findings of this study. Their consensus is to strongly recommend the use of atraumatic needles for diagnostic LPs in the ED.

**Bottom Line:** The results of this study are extremely compelling even though few LPs were for diagnosis, and most were performed by anesthetists. Nevertheless, there is no downside to using atraumatic needles and considerable advantages in terms of fewer adverse events. We suggest that use of atraumatic needles should be the standard of care in emergency medicine.

**References:**

1. Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ* 2009; 339: b2535.
2. Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008; 336: 924–26.
3. Eriksson AL, et al. Whitacre or Quincke needles--does it really matter. *Acta Anaesthesiol Scand Suppl.* 1998;113:17-20.