# ‘Needle to nerve time’ comparison of four different echogenic ultrasound guided regional anaesthesia nerve block needles

**S.R Nagpaul, N kaur, D kamming, M Edwards**

**University College London NHS Foundation Trust**
*Department of Anaesthesia*
*235 Euston Road, London, England, NW1 2BU*

## Introduction

Ultrasound guidance for regional anaesthesia (UGRA) has been showed to improve the speed of neural blockade when compared with traditional techniques[1]. The success and safety of UGRA is dependent on being able to dynamically visualise the nerve block needle's trajectory towards the nerve[2]. This is known to be more difficult with deep nerves as compared to superficial nerves. Using 'echogenic' needles for UGRA may make it easier to visualise the needle's trajectory towards the nerve and may therefore improve the 'needle to nerve time' of UGRA.

## Aim

Primary aim : Direct comparison of 'needle to nerve time' to reach two phantom nerves (Blue Phantom - Peripheral Nerve Block Ultrasound Training Model) i.e. superficial nerve(10 mm deep) and deep nerve (20 mm deep) using the following four different 'echogenic' nerve block needles :

1) Needle A-Braun Stimuplex® D (22G × 50mm)
2) Needle B-Braun Stimuplex D® plus (22G × 50 mm)
3) Needle C-Pajunk Sonoplex Stim cannula (22G × 50mm)
4) Needle D-Polymedic® needle (22G × 50mm)

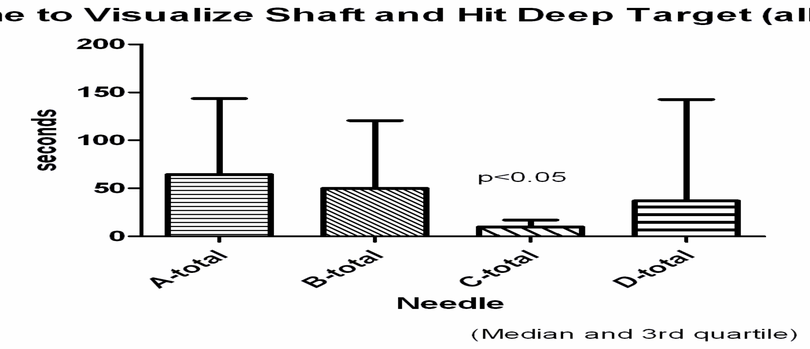
Secondary aim: To see whether level of UGRA experience influenced 'needle to nerve time'.

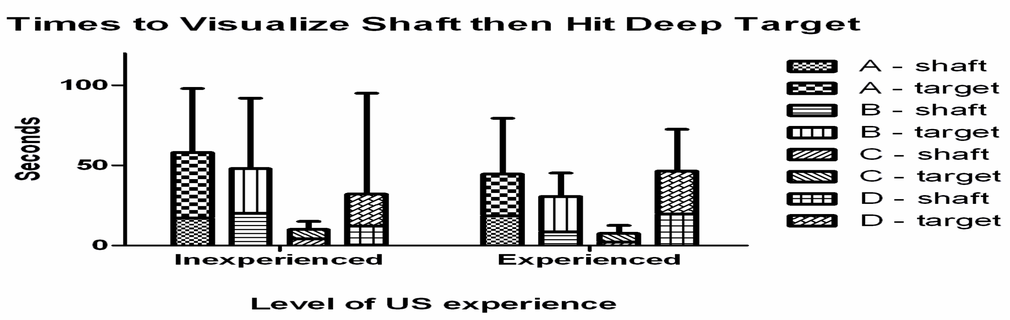
## Methods

46 anaesthetists from our hospital volunteered to be the subjects of our study. The anaesthetist placed each of the four needles using an in-plane approach and linear array probe (6-10Mhz) (Sonosite S nerve ) into the phantom to firstly aim for the superficial phantom nerve followed by aiming for deep nerve. The time taken for each needle shaft to be fully visualised and the needle tip to be identified just above the target by the subject were recorded for both superficial and deep targets respectively by the researchers. The needles were not inserted near any prior needle-track marks. A randomised schedule predetermined the order in which the needles were placed into the phantom.

Statistical analysis: 1-way ANOVA (Friedman) was used to compare different needle types for all subjects, using the total time taken to hit the target. For finding out whether level of ultrasound guided regional anaesthesia experience influenced time taken using different needles, 2-way ANOVA was used.

## Results




**Graph 1: Total time to visualise shaft and hit deep target**

**Graph 2: Comparison of times to visualise shaft and hit deep target between experienced ( > 50 UGRA blocks) and inexperienced anaesthetists ( < 50 UGRA blocks)**

For superficial target there was no difference between any of the needles and level of experience did not influence the overall time taken with any needle. For deep targets, needle C was significantly quicker for the total time taken ($p<0.05$) than any other needle, although interestingly this was again irrespective of level of experience of the anaesthetists.

## Conclusions

We have demonstrated that echogenic needle C (Pajunk Sonoplex Stim cannula) has the fastest 'needle to nerve time' compared to other echogenic needles included in this study. Both experienced and inexperienced UGRA anaesthetists demonstrated improved 'needle to nerve time' with this echogenic needle. A limitation of this study is its in vitro nature. Nevertheless this needle would be a very useful addition to any nerve block trolley for deep UGRA blocks or patients with high body mass index for both inexperienced and experienced UGRA anaesthetists.

## References

1) Williams, Stephan R, Chouinard, Philippe, Arcand Genevieve , Harris “Ultrasound guidance speeds execution and improves the quality of supraclavicular block” *Anesthesia & Analgesia* 97(5), November 2003, 1518-1523

2) R K Deam, R Kluger, M J Barrington, and C A McCutcheon. "Investigation of a new echogenic needle for use with ultrasound peripheral nerve blocks.” *Anaesthesia and Intensive Care* 35.4 (2007): 582-586

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