

Teaching Local Anesthesia Injection for Carpal Tunnel Release: Can Learners Achieve a



“Hole-In-One”?

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I. Abstract
Administering local anesthetics in a painless manner is possible, and has been published this technique [1,2].

The objective of this study was to determine if we could consistently and reliably teach medical students and resident learners how to administer local anesthetics in an almost painless manner.

Using the published technique, 25 consecutive medical students and residents were taught how to inject local anesthetics for carpal tunnel release by watching the senior author perform the technique once. The learner then independently administered the anesthesia to the next patient who then scored the learner's ability to inject the local anesthetic from a pain perspective (Table 1).

The learners were consistently capable of administering local anesthetics with minimal pain (Table 1). Seventy-six percent of the time, the patients only felt pain once (“Hole-in-one”) during the injection process. This pain was attributed to the first 27-gauge needle stick poke. The other 24% of the time, patients felt pain twice (“Eagle”) during the 5-minute injection process. All 25 patients rated the whole pain experience to be less than 2/10. Eighty-four percent of the patients indicated that the experience was better than local anesthetic given at the dentist's office.

Medical students and residents can quickly and reliably learn how to deliver minimal pain local anesthesia for carpal tunnel release.

II. Objective

To evaluate if the method of minimal pain injection of local anesthesia could be reliably and consistently taught to medical students and resident who rotate through our service.

III. Method

Ethics approval was obtained from the Research Ethics Board of the Saint John Regional Hospital.

In this prospective study, 25 consecutive carpal tunnel surgery patients who were willing to be injected by medical students or residents for were recruited. They had to be capable of understanding the concept of being injected by a learner and had to be willing and capable of scoring the learner's performance. Prior to the study, informed consent was obtained from the volunteer patients. Patients were excluded from the study if they refused to be injected by a learner. The demographic data of the participants was collected.

III. Method

From February 2009 till June 2011, 25 consecutive medical students and residents (n=15) observed the senior author (DL) inject lidocaine and epinephrine in the distal wrist and palm of one patient who was going to have CTR. After watching the single injection by the surgeon, each learner then went on to inject the next subject volunteer patient without the supervision of the surgeon (watch one - do one). The learner was scored on this first post demonstration injection only. There were no “practice injections”.

After the injection, the patient scored the trainee's minimal pain injecting ability by filling out a questionnaire (Table 1) without the surgeon or the learner present. The patient was asked how many times he or she felt pain during the whole 5-minute injection process (once, twice, three time, etc). If the patient only felt the pain of the first poke of the first injection, the patient registered this as a single episode of pain during the injection (“Hole-in-one”). If the patient felt pain twice (Eagle), they said they felt pain twice, etc.

IV. Method of Injection

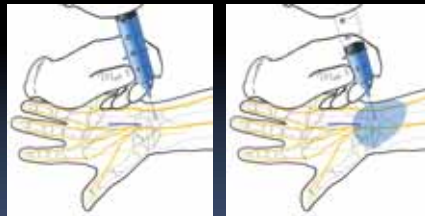


Figure 1: “Hole-in-one” technique for injecting local anesthetics. Step 1: A total of up to 20cc's of 1% lidocaine with 1:100,000 epinephrine (in blue for illustration purposes) and 2cc of 8.4% bicarbonate are injected with a 27 gauge needle. A 20cc syringe holds 22ccs. The first 10cc's are injected VERY SLOWLY under the skin and the forearm fascia between the median and ulnar nerves to never elicit paresthesias. The needle is inserted almost perpendicular to the skin and moved very little. Let the tumescent fluid fill the space slowly. It only takes 5 minutes to inject up to 20cc very slowly and have the patients feel just the first needle stick of pain (“hole in one”). Keep asking the patient to tell you if they feel any secondary pain after the first poke so you will improve your technique.

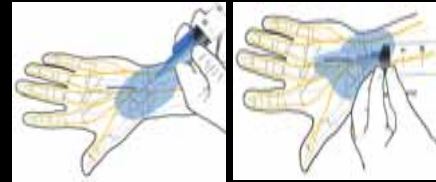


Figure 2: Step 2 The needle is reinserted well into the white previously tumesced (injected) numbed skin of the wrist aiming between skin and superficial palmar fascia under the incision. Never let the needle tip get ahead of 5mm of firm white tumesced subcutaneous tissue. Repeat in your head: “Blow slow before you go.” Let the tumescent spreading of the anesthetic solution do its work in a pain free manner ahead of the slowly advancing needle tip. Keep palpating with your finger to be sure the tissue is expanding so you know you are not in a vein. Move the needle down the palm slowly and evenly (not in jerks) as you inject the rest of the solution. The goal is to get at least 5mm of firm white tumesced subcutaneous tissue on either side of the incision.

V. Results

The average age of the patients was 56 with a standard deviation of 12. 60% of the patients were females, while 32% were male. The learner's level of training was either medical student (36%) or a resident (64%).

The results showed that all consecutive 25 learners were capable of administering local anesthetics with either only one or two episodes of pain felt by the patient during the injection process. Seventy-six percent of the learners were able to have the patient only feel the pain of the first poke of the first injection (“Hole-in-one”), while 24% had the patients feel pain twice during the injections (Eagle). None of the learners caused more than 2 pain events. When comparing the female and male patient samples separately, 71% and 88% experienced a “Hole-in-one”, respectively. Eighty-eight percent of all the patients rated the whole pain experience less than or equal to 1/10. The remaining 12% demonstrated a pain level between 1 and 2 on the 0-10 pain scale.

Eighty-four of our volunteer patients stated that the pain of the injection by the learners was less the pain suffered in an average dentist's office for local anesthetics. Sixty eight percent of the patients indicated that the experience was better than getting a needle for general anesthetic. All 25 of the patients would prefer local anesthesia to general anesthesia or sedation for CTR.

Table 1: Hole in One Questionnaire and Responses

1) How many times did you feel the pain?	Once (hole in one) Twice (eagle) Three times (birdie) Four times (pogie) > Four times (double bogie)	76% 24% 0% 0% 0%
2) How would you rate the pain of the whole experience? (Scale of 0-10)	0 = No pain at all 0.5 1 2 10 = Most pain imaginable	28% 20% 40% 12% 0%
3) How would you compare the pain of the local anesthesia compared with the average dentist's local anesthesia?	Worse Better Same I don't know	0% 84% 8% 8%
4) How would you compare the pain of the local anesthesia to the pain of an intravenous needle to be put to sleep for general anesthesia?	Worse Better Same I don't know	0% 68% 12% 20%
5) Would you rather have been put to sleep or given sedation to have your carpal tunnel surgery?	Yes No	0% 100%

VI. Conclusions

This study provides evidence that the pain of local anesthetic injection can be minimized with proper technique, and that this technique can be learned easily and reliably.

VII. References

1. Lalonde DH. “Hole-in-one” local anesthesia for wide-awake carpal tunnel surgery. *Plast Reconstr Surg* 2010;126:1642-1644
2. Mustoe TA, Buck DW, 2nd, Lalonde DH. The safe management of anesthesia, sedation, and pain in plastic surgery. *Plast Reconstr Surg* 2010;126:165e-176e