The occasional regional nerve block of the hand

Len Kelly, MD, MClinSci, FCFP, FRRM
Sioux Lookout Meno Ya Win Health Centre, Sioux Lookout, Ont.

Correspondence to:
Len Kelly,
lkelly@mcmaster.ca

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This is the second of 2 articles on regional hand anesthesia. The general concepts are described in "The Occasional Digital Nerve Block."[1]

This article describes nerve blocks at the wrist for the median, ulnar and radial nerves. As with all procedures, our performance can improve over time, if we take our time. Also, an inadequate regional nerve block at the wrist may be supplemented with a related digital nerve block or local infiltration when required.

EQUIPMENT LIST

- 25-gauge 1.5-inch needle
- 1% or 2% lidocaine or bupivacaine
- 5 mL syringe

MEDIAN NERVE BLOCK

The median nerve block is useful for working on the middle and ring fingers and uses a similar technique to carpal tunnel injection. Inject 3–5 mL lidocaine at the wrist flexor crease between the palmaris longus and flexor carpi radialis muscles (Fig. 1). Withdraw the needle and deposit a 2 mL subcutaneous bleb above the palmaris longus muscle to anesthetize the superficial branch as well.[2] One of the simplest explanations I encountered in researching this article was to proceed slowly to the bone just to the thumb side of the palmaris longus, back up 1–2 mm and inject if there are no paresthesias.[3] If paresthesias are encountered, back up a bit more and redirect the needle. Do not inject in the presence of an ongoing paresthesia (Fig. 2).

ULNAR NERVE BLOCK

The ulnar nerve block, used for repair of the little and ring fingers, can be done in 3 ways. The first 2 methods — traditional and medial approaches — require aspiration before injection owing to the proximity of the adjacent artery. Both approaches also require blocking of the dorsal branch of the ulnar nerve. This is accomplished by establishing a subcutaneous wheal from the initial point of injection and "walking" under the skin around to the dorsal aspect of the wrist to the midpoint.[4]

To use the traditional method, enter the wrist crease at 90° lateral to the tendon of the flexor carpi ulnaris muscle[5,6] (Fig. 3). Abduct the little finger against resistance, as it attaches to the pisiform

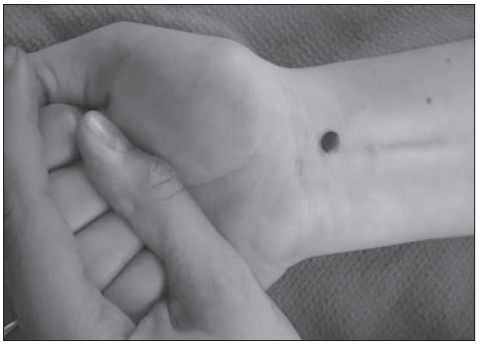


Fig. 1. Location of the median nerve.

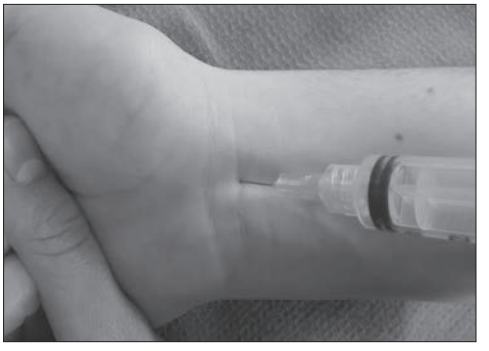


Fig. 2. Needle passing through the tough retinaculum to reach the median nerve.

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bone, to string the tendon out. The ulnar nerve can be reached by injecting just on the thumb side of this tendon to reach the ulnar nerve by this volar approach (Fig. 4). The injection for the nerve essentially lies between the tendon and the nearby ulnar artery. A 2004 cadaveric study found damage to this artery almost 40% of the time.[7]

A medial approach to the nerve has demonstrated less risk of arterial damage.[3,7] Place the needle parallel to the wrist crease and slip it under the tendon, which is usually very easy to palpate (Fig. 5.) Advance the needle beneath the tendon to its far side where the nerve lies, and then inject 3–5 mL (Fig. 6).

Consider an alternative, less commonly described approach that is done more proximally, before the palmar and dorsal branch of the ulnar nerve bifurcate.[2,8] Find the spot 3 fingerbreadths (5–7 cm) proximal to the wrist crease, slide the needle under the flexor carpi ulnaris tendon and inject 3–5 mL of lidocaine. The artery is not so closely applied to the nerve, and this approach is safer and simpler (Figs. 7 and 8).

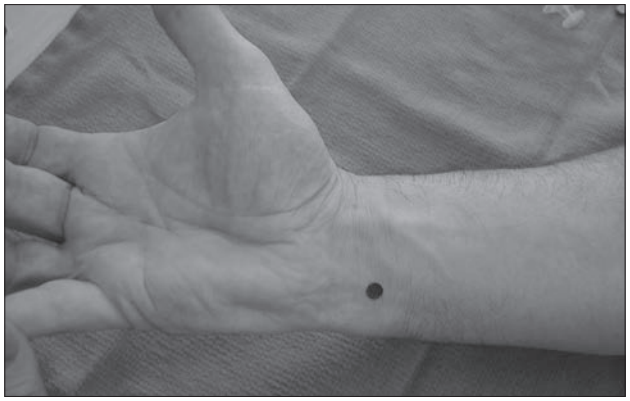


Fig. 3. Traditional distal approach to the ulnar nerve.

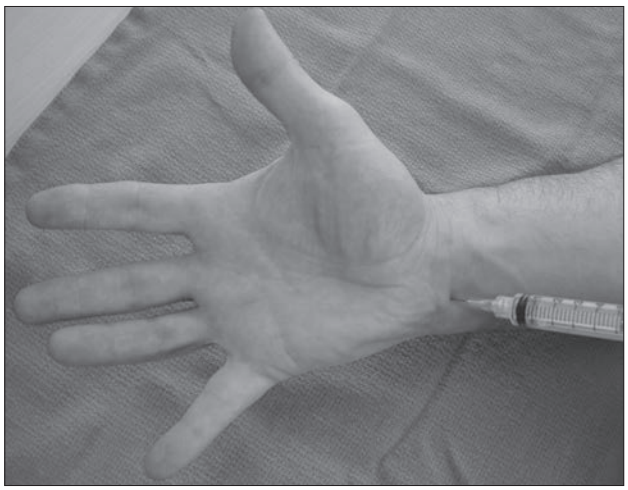


Fig. 4. Entering just lateral (thumb side) to the flexor carpi ulnaris muscle, located by flexing the wrist and abducting the little finger.

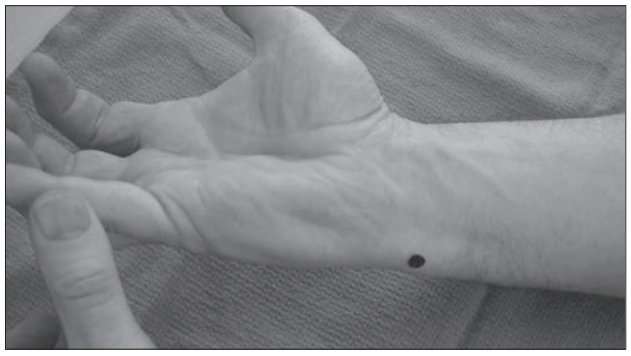


Fig. 5. The medial approach to the ulnar nerve.

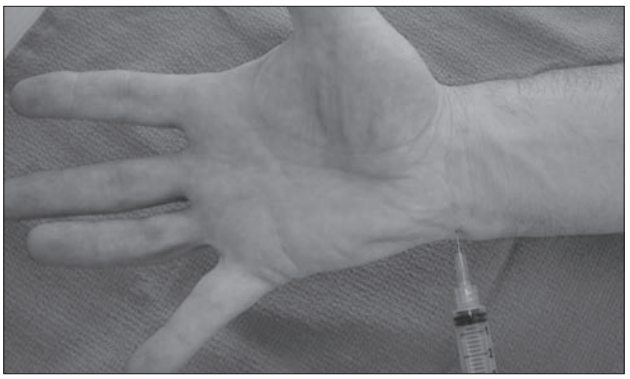


Fig. 6. Slipping the needle under the flexor carpi ulnaris tendon from the medial aspect is more protective of the ulnar artery.

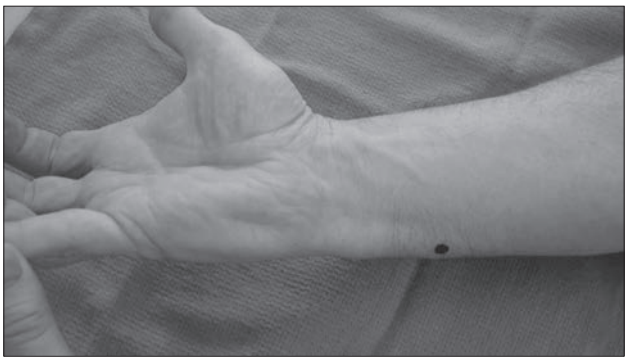


Fig. 7. Both branches of the ulnar nerve can be blocked 3 fingerbreadths (5–7 cm) proximal to the wrist crease.

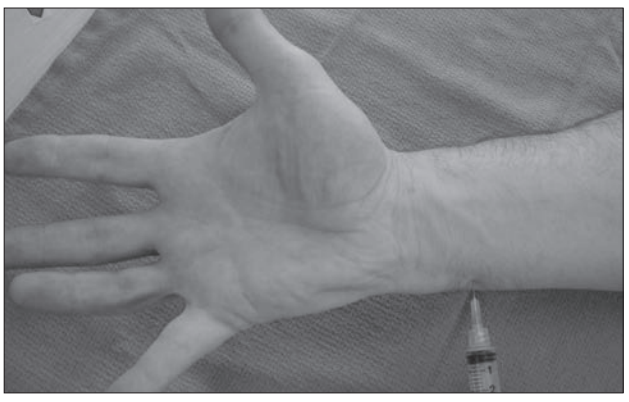


Fig. 8. Needle enters just under the flexor carpi ulnaris tendon and travels to the other side of it.

RADIAL NERVE BLOCK

The radial nerve innervates the dorsum of the hand and the first 3 fingers — but only up to the proximal interphalangeal joint, then the median nerve takes over. Remember this distinction for fingertip work.[9]

This nerve block is considered a field block because anesthesia is obtained by diffusion of a generous amount of solution rather than accurate placement of the needle beside a nerve, given that the nerve has multiple and varying bifurcations.[3] The first step is to place 3–5 mL of lidocaine subcutaneously in the anatomical snuff-box. Identify it by extending the thumb in typical hitchhiker style (Figs. 9 and 10). Other authors describe forming a subcutaneous wheal extending along one-half of the back of the wrist using another 3–5 mL of lidocaine[10] (Figs. 11 and 12). Some also extend a shorter subcutaneous wheal around the volar aspect of the wrist to cover the radial styloid[3,11] (Fig. 13). These additional subcutaneous wheals can be accomplished via a single needle puncture by withdrawing and reangling the needle under the skin.[12]

The regions of sensation to the hand are shown in Figure 14. The ultrasound-guided method allows direct visualization of the needle, artery and the

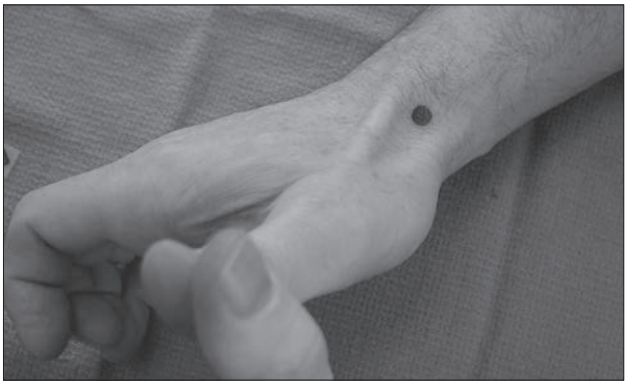


Fig. 9. Anatomical snuff-box formed by the extensor pollicis brevis and longus muscles.



Fig. 10. Place 5 mL of lidocaine subcutaneously in the anatomical snuff-box.



Fig. 11. Follow that with 2 subcutaneous wheals as shown.



Fig. 12. The dorsal subcutaneous wheal should travel several inches around the back of the hand above the tendons.



Fig. 13. A volar subcutaneous wheal is shorter and also stays above the tendon.

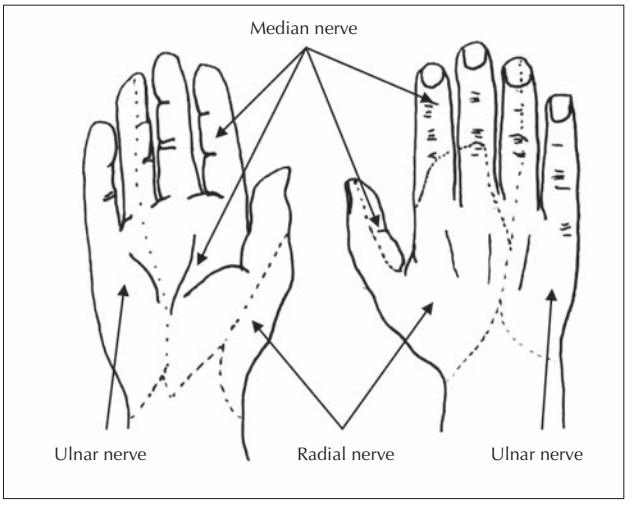


Fig. 14. Nerve regions of the hand.

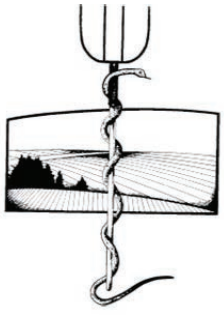
nerve. With this approach, a smaller volume of anesthetic may be used, and there is less potential for trauma to the nerve.[13] Although such training is rapidly percolating throughout rural emergency departments, knowledge of the relevant anatomical landmarks and the ability to deliver regional hand anesthesia without technical aids will always be an asset. Epinephrine is sometimes used for prolonged surgeries by hand surgeons: the use of 5 mL of 2% lidocaine with 1:100 000 epinephrine can provide up to 9 hours of anesthesia.[14]

Competing interests: None declared.

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