

# Improving Botulinum Toxin Therapy for Palmar Hyperhidrosis: Wrist Block and Technical Considerations

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Botulinum A exotoxin has become an excellent therapeutic option to treat focal hyperhidrosis, but when the problem affects the palmar region the technique has some drawbacks. Pain with injection is difficult to tolerate and the large dose needed to treat both hands are two concerns, as well as muscle weakness secondary to botulinum toxin diffusion and the

possibility of antibody production. All these problems limit the number of patients treated. The author's suggestion is to treat only the dominant hand, after performing a wrist block. The use of a device adapted from a cartridge rubber may help to control the injection depth and the risk of muscular weakness.

BOTULINUM A EXOTOXIN has become an excellent therapeutic option to treat axillary hyperhidrosis. The injection technique is relatively painless, easy to perform, free of relevant side effects, and usually anhidrosis can be achieved with 50 U of botulinum toxin per axilla.<sup>1-6</sup>

In palmar hyperhidrosis the amount of botulinum toxin needed is about 60-100 U per palm.<sup>6-8</sup> Pain with injection is a relevant issue since it is difficult to tolerate<sup>5,6</sup> and topical applications of anesthetics or ice packs provide little relief.<sup>6,9</sup> The numerous injection sites in each palm aggravate the problem.

Another potential limiting factor is muscle weakness that lasts from 2 to 5 weeks.<sup>2,4,6,8,10</sup> Attempts to prevent it have included intradermal rather than subcutaneous injections, smaller quantities per site, and fractionated doses. Application of the botulinum toxin by dermojet, although more comfortable, was less effective in reducing hyperhidrosis than needle injection.<sup>5</sup> Klein and Glogau<sup>11</sup> suggest that "treatment of the palmar skin requires modifications in technique using regional wrist block, anticipate decrease in grip strength and a more limited range of diffusion capacity away from the injection sites." Zaiac et al.<sup>12</sup> described a specialized needle with an adjustable device to control injection depth, allowing application of botulinum toxin in 10 patients without muscle weakness.

Another concern is the possibility of antibody production and immunoresistance, but to our knowledge, there are no published data on this issue for patients treated for local hyperhidrosis. While "Botox-using clinicians have used as a rule of thumb less than 300 units, more than 3 months apart,"<sup>13</sup> new batches of the product may probably allow the injection of larger doses per treatment session with a smaller risk of immunogenicity.<sup>11</sup>

Based on our experience and a review of the literature, in order to optimize the use of botulinum toxin for palmar hyperhidrosis, we suggest treating only the dominant hand, after performing a wrist blockade. This will reduce the amount of toxin used, the cost, and the risk of antibody development. Patient distress will also be reduced because only one hand will be anesthetized.

## Wrist Block

To anesthetize the entire hand we block the superficial branch of the radial nerve (R), and the median (M) and ulnar (U) nerves (Figure 1). Also, to anesthetize the palmar surface of the thumb, the superficial branch of the radial nerve has to be blocked. For this we inject 4-6 ml of 2% lidocaine in a subcutaneous infiltration that begins laterally to the radial artery and extends toward the dorsum of the wrist. Care must be taken not to extend this infiltration to the entire wrist circumference.<sup>14,15</sup> Since this is a small area of the palmar surface, one can choose not to infiltrate this region.

The median nerve lies between the palmaris longus (PL) and the flexor carpi radialis tendons. The patient is asked to put the thumb and the last two fingers together. This position helps to show the palmaris lon-

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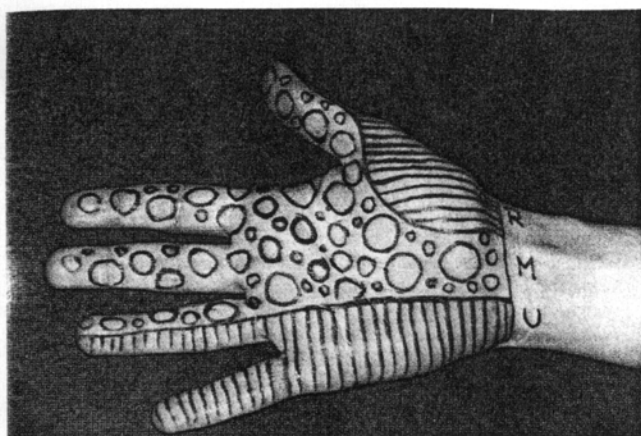


Figure 1. Sensitive innervation areas of radial, median, and ulnar nerves at the palmar surface.

us tendon (Figure 2). At the proximal crease of the wrist a 1.5 cm 25-gauge needle is inserted, either perpendicular to the skin surface in the medial aspect of this tendon or between it and the flexor carpi radialis tendon. Then 3–5 ml of 2% lidocaine is slowly injected around the nerve (care must be taken not to inject inside the nerve). Blocking this nerve will make the radial side of the palmar surface of the hand insensitive.

The cutaneous branch of the ulnar nerve is blocked on the proximal crease of the wrist at the ulnar styloid process. The patient is asked to actively bend the wrist. This makes the flexor carpi ulnaris tendon (FCU) more prominent and easier to identify (Figure 2). The needle is inserted just radial to this tendon, perpendicularly to the cutaneous surface and 3–5 ml of 2% lidocaine are injected slowly. This block will anesthetize the cubital portion of the palmar surface of the hand, the little finger, and the medial half of the 4th finger. When blocking the median and ulnar

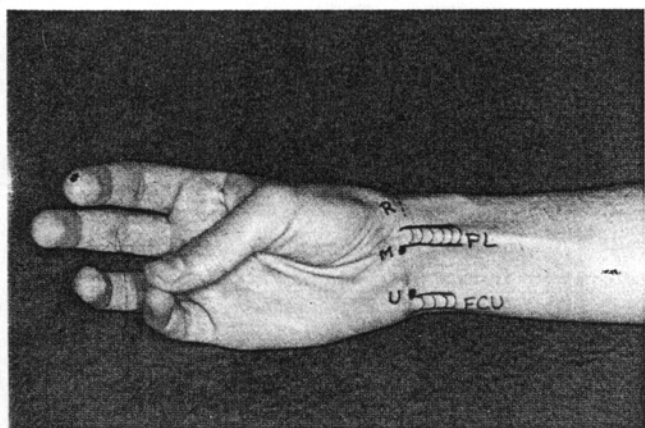


Figure 2. Major nerves and tendons. R: radial nerve; M: median nerve; PL: palmaris longus tendon; U: ulnar nerve; FCU: flexor carpi ulnaris tendon.

nerves the patient may feel paresthesias. This is not obligatory but may help to localize the target region.

### Technical Considerations

Our technique includes iodine-starch test and gravimetric analysis before and after treatment (1 week and monthly to 1 year). One vial of botulinum toxin is reconstituted in 2 ml of 0.9% sterile normal saline without a preservative, for a final concentration of 5 U/0.1 ml. The entire palm is marked with 40–50 sites 1.0 cm apart. To control the injection depth we make use of a device adapted from a cartridge rubber used in dental syringes. The 7 mm length of the 30-gauge needle is shortened to 3 mm with this device. The cartridge rubber is cut and sterilized before being adjusted to the needle (Figure 3).

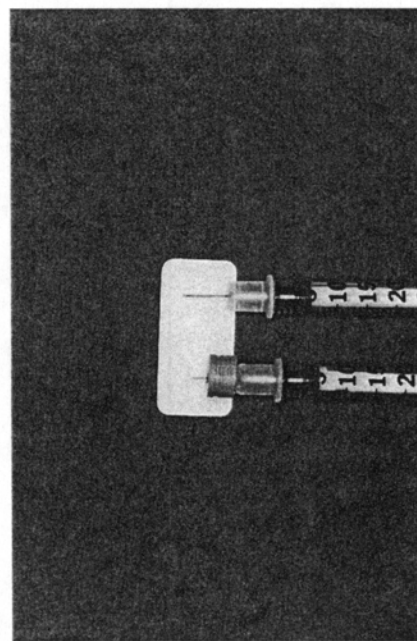
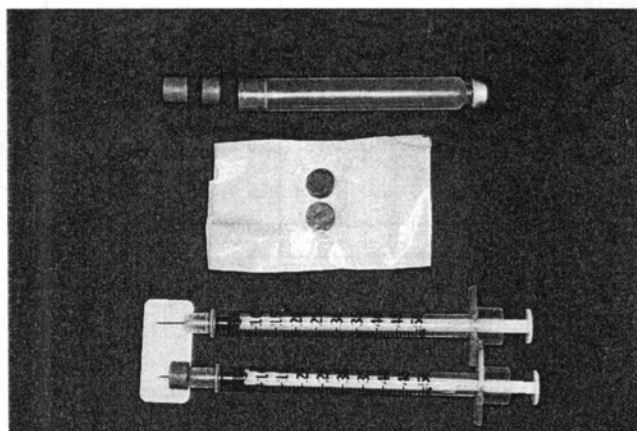


Figure 3. A) The 7 mm, 30-gauge needle is shortened to 3 mm with the cartridge rubber device. B) A closer view of the shortened needle.

When the entire palm is no longer sensitive, 2 U of botulinum toxin are injected in each site except at the fingertips, where only 1 U is injected. We usually grasp each site with two fingers before injection in order to ensure intradermal application of the toxin. Each point is then pressed with sterile gauze to prevent bruising.

The wrist block can be easily performed by dermatologic surgeons. It will turn the previously painful botulinum toxin treatment of palmar hyperhidrosis into a more comfortable procedure. The concentrated solution, the use of a device to control injection depth, along with grasping puncture sites between fingers are methods that limit the spread of botulinum toxin, reducing the risk of muscle weakness. The option to treat only the dominant hand uses half the amount of botulinum toxin needed to treat both hands, reducing the probability of antibody development and the final cost of the therapy session. With these suggestions, our expectations are that a greater number of patients are more likely to be treated successfully.

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