Pathology of the ungual and periungual structures causes pain and suffering in many people. Onychocryptosis, onychomycosis, and paronychia are among the most common conditions treated in the podiatric physician’s office. Partial or total nail avulsion, chemical nail matrixectomy, and nail bed and nail fold biopsy or skinplasty constitute a significant proportion of the procedures performed on a daily basis.

The hallux block has been the standard technique for providing anesthesia for the above-mentioned procedures.1-3 The hallux block is commonly performed using 3 to 5 mL of local anesthetic administered with a 3- or 5-mL syringe and a 1- to 1.5-inch, 25- or 27-gauge needle. Usually two or three entry points in various sequences are used to inject the anesthetic solution into the subcutaneous tissues. Often the needle is advanced along a curved path, cautiously bent and redirected to follow the plane of the subcutaneous layer and avoid bone and tendons.

The nail block technique introduced here is applied at an anatomically advantageous location. An equally effective level of anesthesia and significantly reduced tissue trauma are achieved in selected procedures.

**Technique**

At a predetermined point, the base of the hallux nail is injected with 0.5 mL of 2% lidocaine with epinephrine in a 1:100,000 concentration using a 1-mL syringe with a 0.5-inch, 30-gauge hypodermic needle (Fig. 1). The point of injection is determined by finding the midpoint of the line connecting the corner of the nail with the prominent base of the distal phalanx (Fig. 2). The opaque markers in the radiographs demonstrate the exact locations of these points as they relate to the underlying osseous anatomy (Fig. 3).

The base of the distal phalanx is visually identified as the most prominent side point distal to the interphalangeal creases, and located by palpation. The target point of needle penetration is in the middle of the line. Once the point of injection is identified, ethylene chloride spray is used for skin desensitization prior to the needle stick. The needle is oriented perpendicular to the surface and introduced in a straight path (Fig. 4). Immediately after skin penetration, 0.25 mL is slowly injected directly under the dermis. Next, the needle is fully advanced and 0.25 mL is deposited in the deeper tissues (Fig. 5). When needed, the opposite nail side can be blocked in the same fashion. The procedure is performed 3 to 5 min later, after the hallux is prepared and draped.

Fifty patients were selected for the nail block technique on the basis of the following inclusion and exclusion criteria. Patients were included if they needed one of the following procedures: partial nail avulsion, total nail avulsion, partial phenol matrixectomy, nail bed biopsy, nail fold biopsy, or skinplasty. Patients were excluded if the diagnosis, medical history, or allergies included any of the following: toenail infection spreading proximal to the interphalangeal joint; present or past ischemic disease anywhere in the foot, such as gangrene, thromboembolism, or Raynaud’s disease; or an allergy to lidocaine or epinephrine.

The nail block was performed and the patients un-
derwent one of the five procedures. At the start of the procedure, the patient was asked whether there was a feeling of pain, pressure, or discomfort. Each patient was seen 1 week after the procedure and evaluated for any complications. Of the 50 patients who received the nail block, only one complained of pain or discomfort. The pain lasted only a moment and did not require additional anesthesia. Twenty-eight patients felt pressure from the instruments; however, none described it as discomfort or pain, and no additional anesthesia was needed. No complications were observed at the 1-week follow-up.

Discussion

The nail block technique provided an adequate level of anesthesia in the selected procedures: partial and total hallux nail avulsion, chemical matrixectomy, nail bed biopsy, and nail fold biopsy or skinplasty.

The nail block technique takes full advantage of the regional anatomy. The precise needle placement avoids collision with the prominent and sometimes spurlike medial and lateral condyles of the distal pha-
lanx. At the same time, it allows effective access to pain-controlling dorsal and plantar digital nerves, just before they branch into the vast number of terminal nerve endings. The buttressing effect of the condyles, together with the soft-tissue restrictions from the joint–skin flexion lines, directs the diffusion of the anesthetic distally along the nail fold. Thus the concentration of the agent in the target tissues is prolonged, lengthening its anesthetic effect.

While providing equally effective anesthesia, the nail block technique has significant advantages over the hallux block technique when performed for the procedures discussed here. The nail block is performed with a 1-mL syringe, which allows the use of a 30-gauge needle with precision while easily regulating the flow of local anesthetic to accommodate the sensitivity of each patient. In the hallux block, the syringe is three times as large, which would require a significantly greater amount of force to push 3 to 5 mL of anesthetic agent against the resistance of a 30-gauge needle. This makes the simultaneous deposition of anesthetic and redirection of the needle much more challenging to the dexterity of the physician and accounts for the preference for the larger-caliber, lower-resistance 25- or 27-gauge needles.

A smaller hypodermic needle means fewer disturbances to the sensitive human tissues. The total area of the syringe is \( \pi r^2 \). A diameter that is almost twice as large (0.5 mm for the 30-gauge needle, 0.3 mm for the 25-gauge needle) will correspond with an area almost three times as large (0.8 mm\(^2\) versus 0.3 mm\(^2\)) and may be associated with more trauma. Besides the diameter of the needle, the short and straight path of the nail block technique eliminates the need for bending and redirection of the needle as in the hallux block. This decreases the demand not only in the strength (diameter) of the needle but also in its length. Both decreased length and decreased diameter make the 0.5-inch, 30-gauge needle less traumatic than the 1.5-inch, 25-gauge needle.

The nail block technique is also potentially safer because of its anatomical location. There is no risk of damage to tendons and no risk of skewering through a large nerve branch, digital artery, or vein that could cause hematoma, traumatic neuroma, or tendinosis. A decreased number of needle sticks also minimizes tissue trauma and postoperative patient discomfort and eliminates the possibility of a tourniquet effect due to high-volume circumferential distribution of the local anesthetic.

Ten milligrams of lidocaine and 0.005 mg of epinephrine are contained in 0.5 mL of 2% lidocaine with epinephrine in a 1:100,000 concentration. These amounts pose no risk of systemic effects and eliminate the need for tourniquet use. Adverse local effects from epinephrine use are largely theoretical in nature. From a practical perspective, epinephrine has the same contraindications as tourniquet use.
The nail block technique is much simpler and easier to master than the hallux block technique. It takes less time to perform one straight needle stick than to manage two or three injection sites with bending and redirection of the needle. The low anesthetic volume of the nail block technique also translates to significant economic value. A 20-mL vial of local anesthetic would provide 40 single-sided or 20 double-sided nail procedures, as opposed to only 4 to 6 procedures if used in the hallux block technique.

Although lesser-toenail procedures were not included in this study, I have used the nail block technique in such procedures, with similar success. The amount needed per nail side is further reduced to 0.2 mL of 2% lidocaine with epinephrine in a 1:100,000 concentration, and the exact placement described above is used. Theoretically, the nail block technique could also be used to provide anesthesia for the fingernails.

**Conclusion**

The nail block technique has demonstrated significant advantages over the hallux block in providing anesthesia to ungual and periungual structures during selected office procedures. The nail block technique allows the use of less volume of anesthetic, fewer injection sites, and smaller needles, while providing a comparable level of anesthesia. The superiority of the nail block technique in selected toenail procedures makes it a powerful technique in the armamentarium of the podiatric physician.

**References**