

A practical guide to the care of ingrown toenails

Choose either a conservative or surgical treatment approach based on severity. The Vandenbos procedure, described here, is an effective surgical option.

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The author reported no potential conflict of interest relevant to this article.

PRACTICE RECOMMENDATIONS

- › Consider conservative therapy as first-line treatment for patients with mild to moderate cases of onychocryptosis. **(A)**
- › Surgical interventions are more effective than nonsurgical interventions in preventing the recurrence of ingrown toenails. **(A)**
- › Offer the Vandenbos procedure to patients with severe or refractory onychocryptosis because it is definitive and has a good aesthetic outcome. **(B)**

Strength of recommendation (SOR)

- (A)** Good-quality patient-oriented evidence
- (B)** Inconsistent or limited-quality patient-oriented evidence
- (C)** Consensus, usual practice, opinion, disease-oriented evidence, case series

CASE ►

A 22-year-old active-duty man presented with left hallux pain, which he had experienced for several years due to an “ingrown toenail.” During the 3 to 4 months prior to presentation, his pain had progressed to the point that he had difficulty with weight-bearing activities. Several weeks prior to evaluation, he tried removing a portion of the nail himself with nail clippers and a pocket knife, but the symptoms persisted.

A skin exam revealed inflamed hypertrophic skin on the medial and lateral border of the toenail without exudate (FIGURE 1A). The patient was given a diagnosis of recurrent onychocryptosis without paronychia. He reported having a similar occurrence 1 to 2 years earlier, which had been treated by his primary care physician via total nail avulsion.

How would you proceed with his care?

Onychocryptosis, also known as an ingrown toenail, is a relatively common condition that can be treated with several nonsurgical and surgical approaches. It occurs when the nail plate punctures the periungual skin, usually on the hallux. Onychocryptosis may be caused by close-trimmed nails with a free edge that are allowed to enter the lateral nail fold. This results in a cascade of inflammatory and infectious processes and may result in paronychia. The inflamed toe skin will often grow over the lateral nail, which further exacerbates the condition. Mild to moderate lesions have limited pain, redness, and swelling with little or no discharge. Moderate to severe lesions have significant pain, redness, swelling, discharge, and/or persistent symptoms despite appropriate conservative therapies.

The condition may manifest at any age, although it is more common in adolescents and young adults. Onychocryptosis is slightly more common in males.¹ It may present as a chief complaint, although many cases will likely be discovered incidentally on a skin exam. Although there is no firm evidence of

➤ **Conservative therapies focus on allowing the nail to grow past the lateral nail fold and keeping it trimmed long so that the overgrowing toe skin can't encroach on the free edge of the nail.**

causative factors, possible risk factors include tight-fitting shoes, repetitive activities/sports, poor foot hygiene, hyperhidrosis, genetic predisposition, obesity, and lower-extremity edema.² Patients often exacerbate the problem with home treatments designed to trim the nail as short as possible. Comparison of symptomatic vs control patients has failed to demonstrate any systematic difference between the nails themselves. This suggests that treatment may not be effective if it is simply directed at controlling nail abnormalities.^{3,4}

Conservative therapy

Conservative therapy should be considered first-line treatment for mild to moderate cases of onychocryptosis. The following are conservative therapy options.⁵

■ **Proper nail trimming.** Advise the patient to allow the nail to grow past the lateral nail fold and to keep it trimmed long so that the overgrowing toe skin cannot encroach on the free edge of the nail. The growth rate of the toenail is approximately 1.62 mm/month—something you may want to mention to the patient so that he or she will have a sense of the estimated duration of therapy.⁶ Also, the patient may need to implement the following other measures, while the nail is allowed to grow.

■ **Skin-softening techniques.** Encourage the patient to apply warm compresses or to soak the toe in warm water for 10 to 20 minutes a day.

■ **Barriers** may be inserted between the nail and the periungual skin. Daily intermittent barriers may be used to lift the nail away from the lateral nail fold during regular hygiene activities. Tell the patient that a continuous barrier may be created using gauze or any variety of dental floss placed between the nail and the lateral nail fold, then secured in place with tape and changed daily.

■ **Gutter splint.** The gutter splint consists of a plastic tube that has been slit longitudinally from bottom to top with iris scissors or a scalpel. One end is then cut diagonally for smooth insertion between the nail edge and the periungual skin. When placed, the gutter splint lies longitudinally along the edge of the nail, providing a barrier to protect the toe during nail growth. The tube may be obtained by trimming a sterilized vinyl intravenous

drip infusion, the catheter from an 18-gauge or larger needle (with the needle removed), or a filter straw. This tube can be affixed with adhesive tape, sutures, or cyanoacrylate.⁷

■ **Patient-controlled taping.** An adhesive tape such as 1-inch silk tape is placed on the symptomatic edge of the lateral nail fold and traction is applied. The tape is then wrapped around the toe and affixed such that the lateral nail fold is pulled away from the nail.⁸

■ **Medications.** Many practitioners use high-potency topical steroids, although evidence for their effectiveness is lacking. Oral antibiotics are unnecessary.

One disadvantage of conservative therapy is that the patient must wait for nail growth before symptom resolution is achieved. In cases where the patient requires immediate symptom resolution, surgical therapies can be used (such as nail edge excision).

Surgical therapy

Surgery is more effective than nonsurgical therapies in preventing recurrence^{2,9} and is indicated for severe cases of onychocryptosis or for patients who do not respond to a trial of at least 3 months of conservative care.

While there are no universally accepted contraindications to surgical toenail procedures, caution should be taken with patients who have poor healing potential of the feet (eg, chronic vasculopathy or neuropathy). That said, when patients with diabetes have undergone surgical toenail procedures, the research indicates that they have not had worse outcomes.^{10,11}

The following options for surgical therapy of onychocryptosis are considered safe; however, each has variable effectiveness. Each procedure should be performed under local anesthesia, typically as a digital nerve block. The toe should be cleansed prior to any surgical intervention, and clean procedure precautions should be employed. Of the procedures listed here, only phenolization and the Vandenbos procedure are considered definitive treatments for onychocryptosis.⁵

■ **Total nail removal without matrixectomy.** In this procedure, the nail is removed entirely, but the nail matrix is not destroyed. The nail regrows in the same dimensions as

it had previously, but during the time it is absent the nail bed tends to contract longitudinally and transversely, increasing the likelihood that new nail growth will cause recurrence of symptoms.⁵ Due to a recurrence rate of > 70%, total nail removal without matricectomy is not recommended as monotherapy for ingrown toenails.⁹

■ **Nail edge excision without matricectomy.** This procedure involves removing one-quarter to one-third of the nail from the symptomatic edge. This procedure takes little time and is easy to perform. Recurrence rates are > 70% for the same reasons as outlined above.⁹ (Often during preparation for this procedure, a loose shard of nail is observed puncturing the periungual skin. Removal of this single aberrant portion of nail is frequently curative in and of itself.) Patients typically report rapid relief of symptoms, so this procedure may be favored when patients do not have the time or desire to attempt more definitive therapy. However, patients should be advised of the high recurrence rate.

■ **Nail excision with matricectomy using phenol (ie, phenolization).** In this procedure, the nail is avulsed, and the matrix is destroyed with phenol (80%-88%).^{9,12} Typically, this is performed only on the symptomatic edge of the nail. The phenol should be applied for 1 to 3 minutes using a cotton-tipped applicator saturated in the solution. Recurrence rates are as low as 2% when the phenol is applied for 3 minutes, although the risk for symptomatic drainage of the wound after 2 weeks is > 50%. When applied for only 1 minute, the recurrence rate is approximately 12% but the risk for drainage at 2 weeks is also 12%.¹² (Other studies have reported recurrence rates up to 50%.¹³)

While phenolization is relatively quick and simple—and is associated with good cure rates—it causes pain and disability during the healing process and takes several weeks to heal. Phenolization also has a slightly increased risk for infection when compared to nail excision without matricectomy. Giving antibiotics before or following the procedure does not appear to reduce this risk.⁷ If the matrix is incompletely destroyed, a new nail spicule may grow along the lateral nail edge and a repeat procedure may be re-

quired.⁷ When properly performed, the nail will be narrower but should otherwise maintain a more-or-less normal appearance. The use of phenolization for the treatment of onychocryptosis in the pediatric population has been found to be successful, as well.¹⁴

■ **The Vandenbos procedure.** This procedure involves removing a large amount of skin from the lateral nail fold and allowing it to heal secondarily. When performed correctly, this procedure has a very low recurrence rate, with no cases of recurrence in nearly 1200 patients reported in the literature.¹⁵ The cosmetic results are generally superior to the other surgical methods described here⁵ and patient satisfaction is high.¹⁵ It has been used with similar effectiveness in children.¹⁶

Full recovery takes about 6 weeks. Overall, the Vandenbos procedure can definitively treat the condition with a good cosmetic outcome. (See “How to perform the Vandenbos procedure” on page 202.)

CASE ►

Due to the chronic nature and recurrence of the 22-year-old patient's symptoms, he elected to undergo definitive therapy with the Vandenbos procedure. The patient recovered appropriately and had no recurrence of symptoms at 1-year follow-up. **JFP**

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► Approximately 6 weeks after the Vandenbos procedure, the wound should be healed completely with the nail remaining above the skin.

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Surgical therapies are indicated for severe cases of onychocryptosis or for those who do not respond to a 3-month trial of conservative care.

How to perform the Vandenbos procedure

The Vandenbos procedure, also known as soft-tissue nail fold excision, was first described in 1958 by Kermit Q. Vandenbos, a surgeon for the US Air Force. He felt that overgrown toe skin was the primary causative factor in onychocryptosis.⁴

In the procedure, the hypertrophic skin is removed to such a degree that it cannot encroach on the growing nail. After the toe is fully healed, the toe and nail should have a fully normal appearance. Indications and contraindications are the same as for other surgical procedures for the treatment of onychocryptosis. Pain and disability following the procedure is similar to phenolization, and the recovery period takes several weeks for the patient to fully heal.

Equipment needed:

- alcohol swab
- tourniquet (optional)
- 3 mL to 5 mL of local anesthetic (eg, 2% lidocaine)
- topical antiseptic (eg, iodine or chlorhexidine)
- number 15 blade scalpel
- tissue forceps
- cautery device (electrocautery or thermocautery)
- dressing supplies (topical ointment, gauze, tape)

The steps¹⁵:

1. Perform a digital nerve block using an alcohol swab and anesthetic. The anesthetic may be used with or without epinephrine.
2. Place a tourniquet at the base of the toe if the anesthetic does not contain epinephrine. The tourniquet is not required if epinephrine is used during anesthesia.¹⁷
3. Cleanse the toe with iodine, chlorhexidine, or a similar agent.
4. Make a 5-mm incision proximally while leaving the nail bed intact. Begin approximately 3 mm from the lateral edge of the base of the nail. The incision should extend around the edge of the toe in an elliptical sweep towards the tip of the nail, remaining 3 mm from the edge of the nail. This is best accomplished in a single motion with a #15 blade. An adequate portion of skin must be removed, leaving a defect of approximately 1.5 × 3 cm (approximately the size of a cashew) (FIGURE 1B).
5. Electrocauterize or thermocauterize along the edges and subcutaneous tissue of the wound. This reduces postoperative bleeding and pain. The matrix should not be damaged.
6. Dress the wound with ample amounts of petrolatum followed by nonstick gauze. Profuse bleeding can be expected unless pressure is applied, so apply ample amounts of additional gauze to absorb any blood. The foot is elevated and the tourniquet (if used) removed. In order to reduce postoperative bleeding and pain, instruct the patient to lie with the foot elevated as much as possible for the first 24 to 48 hours.
7. Advise the patient that moderate pain is expected for the first 2 to 3 days. Analgesia may be obtained with an acetaminophen/opiate combination (eg, hydrocodone/acetaminophen 5/325, 1 tablet every 4-6 hours as needed) for the first 2 to 3 days. This may be followed by acetaminophen or nonsteroidal anti-inflammatory drugs thereafter at usual dosing, which can either be prescribed or obtained over the counter.

Postoperative care

After 48 hours, the patient can remove the dressing and gently rinse the wound and reapply a new dressing as before. The dressing should be changed at least once daily and whenever it becomes soiled or wet. After 48 hours, while the dressing remains on the toe, the patient may begin taking brief showers. After showering, the toe should be gently rinsed with clean water and the dressing changed. Blood or crust should not be scrubbed off, as this will impair re-epithelialization, but it may be rinsed off if able. Otherwise, the wound should not be soaked until re-epithelialization has occurred.

Patient follow-up should occur after 1 to 2 weeks (FIGURE 1C). After approximately 6 weeks, the wound should be healed completely with the nail remaining above the skin. (FIGURE 1D shows wound healing after 3 months.)

Advise patients that erythema and drainage are expected, but the erythema should not extend proximally from the metatarsophalangeal joint. Prophylactic antibiotics are not required, although they may be used if infection is suspected. Despite the proximity of the procedure to the distal phalanx, there have been no reported cases of osteomyelitis.¹⁵

FIGURE 1
Before and after the Vandembos procedure



The patient in the case study elected to undergo the Vandembos procedure to treat his recurrent onychocryptosis (without paronychia). Shown here is the patient's left hallux at presentation (A), immediately following completion of the Vandembos procedure (B), and then 1 week (C) and 3 months after the procedure (D).

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➤ The Vandembos procedure can definitively treat onychocryptosis with a good cosmetic outcome.

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