

Treatment of Ingrown Nails

Ingrown toenails are one of the most frequent nail disorders of young persons. They may negatively influence daily activities, cause discomfort and pain. Since more than 1000 years, many different treatments have been proposed. Today, conservative and surgical methods are available, which, when carried out with expertise, are able to cure the disease. Packing, taping, gutter treatment, and nail braces are options for relatively mild cases. Phenolisation of the lateral matrix horn is now the safest, simplest, and most commonly performed method with the lowest recurrence rate. Wedge excisions may be required when it recurs.

1. Introduction

Ingrown toenails are a common condition of school children and young adults but may be observed at virtually any age. Their treatment is often frustrating for the patient as it may be associated with considerable and long-lasting morbidity and quite frequently with permanently distorted toes and nails.

2. Terminology

- ingrown or ingrowing nail
- unguis incarnates
- Onychocryptosis

3. Types and Aetiopathogenesis of Ingrown Nails

The most common form is distal-lateral ingrowing.

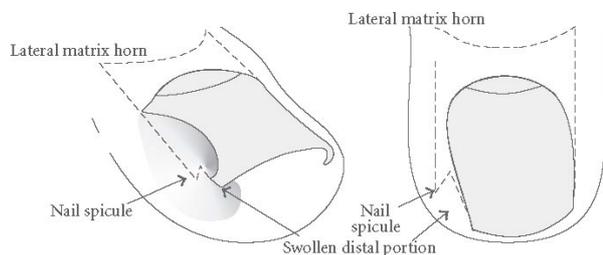
The aetiopathogenesis

1. Markedly curved nail plate
2. The distal lateral corners of which have been cut obliquely leaving a tiny spicule that digs into the lateral nail groove and finally pierces the epidermis when the nail grows forward. This causes a foreign body reaction with inflammation, granulation tissue, secondary bacterial colonization, and eventually infection.
3. Precipitating factors are narrow pointed shoes, tight socks, hyperhidrosis, juvenile diabetes mellitus.

In the most common form, ingrowing usually starts at the distal end of one or both of the lateral nail grooves.

Age of onset/growth direction	Common cause	Treatment
Neonatal	Free nail margin has not yet overgrown the tip of the toe	Conservative: massage
Infantile		
(1) Congenital malalignment of the big toenail	Malformation, probably genetic	Spontaneous healing in about 50%, if not by the age of 2 years: operation
(2) Hypertrophic lateral lip	Harmless malformation	Massage usually sufficient
Adolescent	Distal lateral ingrowing due to narrow nail bed	Conservative: packing, taping, gutter, acrylic nail; selective lateral matrix horn resection
Adult	Sharply bent lateral margin	Packing, gutter; surgical narrowing of the nail
Distal embedding	Big toenail too short	Taping of the distal nail wall, surgery
Retronychia	Chronic trauma with marked onycholysis leading to proximal ingrowing	(Proximal) nail avulsion
Pincer nail	Wide base of the distal phalangeal bone with large medial and smaller lateral osteophytes. Some drugs	Orthonyxia (braces) Narrowing of the nail, in severe cases with nail bed plasty

The patient tries to relieve the discomfort by cutting more of the nail corner; however, in order to cut the nail smoothly, one would have to insert the tip of the scissors far deeper, which in turn would mean that one would have to pierce oneself into the soft tissue. This is painful and not done, thus a hook-like piece of the lateral border is left. When the nail grows out, the hook pierces into the nail groove causing even more pain. A vicious cycle of pain.



From adulthood on, many people develop a progressive transverse over curvature that pinches the nail bed—hence the term pincer nail or unguis constringens—and heaps its distal part up. Often, it remains painless.

The symmetrical form of pincer nails is probably a complex dominant genetic trait with the phalangeal bones being at fault for the development of the over curvature. Systematic X-ray investigations have shown that there is always a very wide base of the distal phalanx with osteophytes that are bigger on the medial than on the lateral aspect.

Infants sometimes present with a grossly hypertrophic medial nail wall that covers up to one half of the nail.



Stages of Ingrown Nails

- (1) stage one: inflammation, swelling, and pain,
- (2) stage two: inflammation, pain, nonhealing wound and oozing, and granulation tissue,
- (3) stage three: plus abscess formation and chronic induration of the lateral nail fold.

Treatment of Ingrown Toenails

Conservative Approach.

1. Taping. Taping is the least aggressive method. It uses tape to pull the lateral nail fold away from the offending lateral nail edge. Most patients require repeated education how to perform it. An elastic strip of tape, approximately 15 to 20 mm wide and 5 cm long, is cut and applied so that it allows the lateral nail fold to be pulled away from the nail. This is usually done in an oblique and proximal direction over the the pulp of the toe without impairing the joint movement and avoiding a circular constriction of the toe.

The problem is with toenails that have caused granulation tissue as this is wet, and the tape does not remain stuck on this area.

2. Packing. Packing is another simple method. A wisp of cotton is inserted between the corner of the nail and the nail fold. This may first be a bit painful but the patients usually report immediate relief as soon as it has been done. The cotton may be soaked with an antiseptic or disinfectant. The procedure is repeated on a daily basis, each time trying to use a bit more cotton.

3. Gutter Treatment. Gutter treatment is the insertion of a small guard between the lateral nail margin and the nail fold.

In contrast to the original publication, we do not excise the granulation tissue. The gutter not only protects the lateral nail groove, but also exerts some pressure on it making the granulation tissue disappear even faster.

4. Nail Braces: Plastic bands are glued on the nail and due to their memory will gently uncurve the nail

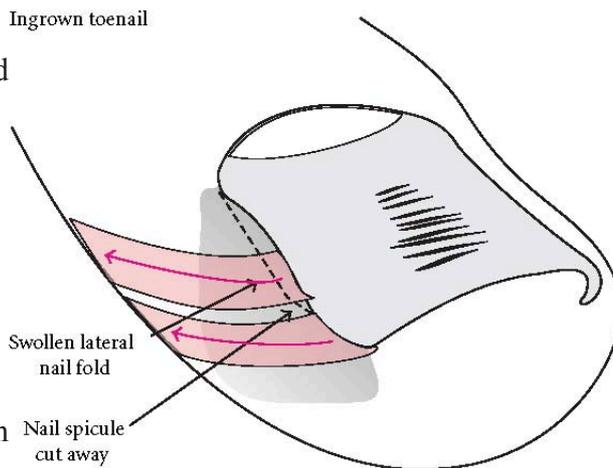


FIGURE 5: Schematic illustration of taping.

5. Antibiotics. Many physicians give antibiotics when a patient presents with inflammation and granulation tissue. In my view, this is almost always a useless waste of resources as the nail that digs into the soft tissue is the cause of both the inflammation and granulation tissue. No nail has ever been shown to be sensitive even to the most powerful antibiotic.

5. Hygienic Measures. Foot baths and consistent foot hygiene are important factors during conservative treatment, to maintain its effect and as a preparation for surgery.

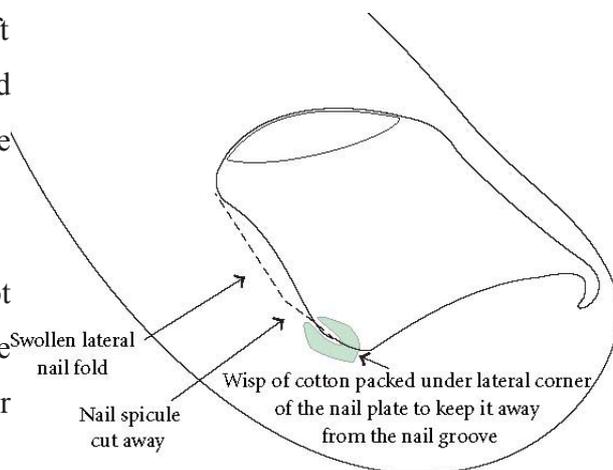


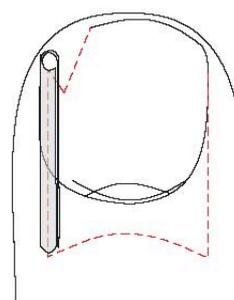
FIGURE 6: Schematic illustration of packing.

Surgical Treatments. The number of surgical methods for the treatment of ingrown nails is huge; probably, there is hardly anyone knowing them all.

There are two fundamentally different approaches.

(i) Those authors believing that the soft tissue is primarily at fault propose to take away the soft tissue so that there remains no substrate for the nail to grow in.

(ii) Most authors favour the view that a wide nail in relation to a narrow nail bed, whatever the cause, is the primary event and consequently propose narrowing of the nail plate so that it does no longer grow in.



Nail Avulsion. Nail avulsion causes significant postoperative morbidity. When the nail regrows, the plate is still as wide as it was before and will therefore grow in again. Further, during the period where there was no plate, the nail bed usually shrinks both longitudinally as well as transversely.

The matrix continues to produce nail substance, which turns into a thickened, yellowish, and opaque nail with considerable onycholysis. Unfortunately, there are still practitioners and surgeons that avulse ingrown nails. This is almost invariably followed by a recurrence 75%.

Wedge Excisions.

Technique:

1. Local anaesthesia and toe tourniquet
2. A nail elevator or the closed tips of iris scissors are slid under the cuticle to separate the nail plate from the overlying proximal nail fold.
3. The lateral one fourth or one fifth of the nail plate is identified as the site for the partial lateral nail removal.
4. Uses a nail splitter or bandage scissors, cutting from the distal (free) end of the nail straight back (proximally) beneath the proximal nail fold
5. A straight, smooth, new lateral edge to the nail plate is created. When the scissors cut through the most proximal edge of the nail beneath the cuticle, a “give” can be felt.
6. The lateral nail plate is removed, in one piece if possible, by rotating the fragment outward toward the lateral nail fold, while pulling straight out toward the end of the toe
7. Electro cautery ablation/curette is used to destroy the nail-forming matrix beneath the area where the nail plate has been removed. The flat matricectomy electrode is coated on one side to avoid damage to the overlying proximal nail fold.
8. If excessive lateral granulation tissue is noted, the physician may consider removal with electrocautery ablation.
9. Antibiotic ointment is applied, a bulky gauze dressing is placed, and the patient's foot is put in a disposable surgical slipper.

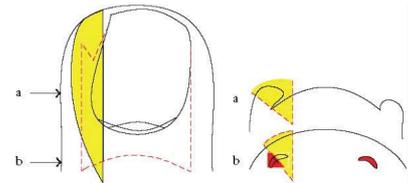
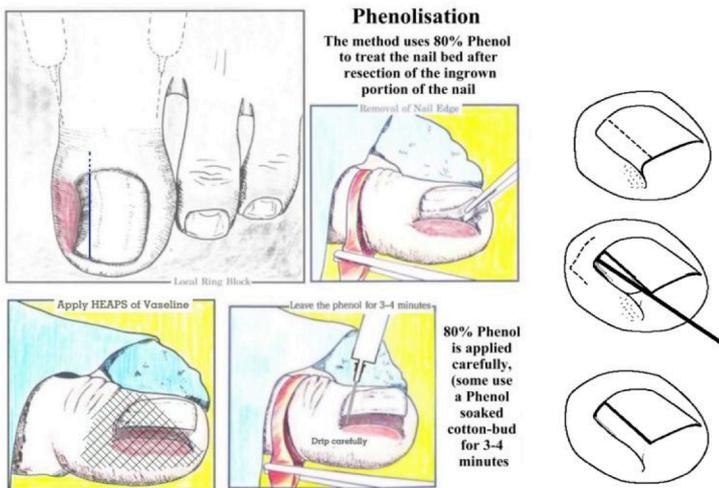


FIGURE 8: Schematic illustration how wedge excisions are most commonly performed; the wedge is very wide in the middle of the lateral nail fold, but the lateral matrix horn is not completely excised. (a) Transverse section at the level of the midnail bed, (b) transverse section at the level of the matrix horns.



Reduction and Removal of the Lateral Nail Fold. As a consequence of the foreign body irritation by the ingrown nail, the lateral nail fold often becomes swollen, overlaps the lateral aspect of the nail plate, and develops granulation tissue. Over a long period, the nail fold becomes fibrotic and has no tendency to return to a normal size. Excision of a fusiform piece of skin from the lateral aspect of the distal phalanx and suture pulls the exuberant nail fold laterally and away from the nail.

Zadics Procedure

Advocated a radical nail bed and matrix ablation.

Amputation of the Tip of the Toe.

The terminal Syme operation is in fact an amputation of the tip of the toe. It involves resection of the nail bed and matrix, amputation of the distal half of the terminal phalangeal bone, and defect closure with a flap formed by the ridged skin of the tip of the toe. It results in a shortened, bulbous toe. As even this method is not free from recurrences, it is a mutilating and obsolete technique.

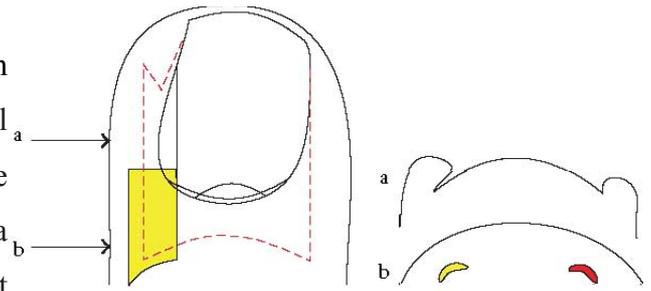


FIGURE 12: Schematic illustration of the selective lateral matrix horn resection.

Electrocautery. Instead of surgical dissection of the matrix horn, it may be cauterized electrosurgically or with a radiosurgery device. Again, it has to be secured that no matrix horn remnants remain. The potential disadvantage is that classical electrocautery delivers a lot of heat that may eventually lead to a thermal periostitis with long-term postoperative pain.

Segmental Matrix Horn Cauterization

Phenol. Selective lateral matrix horn cauterization with liquefied phenol is now probably the most commonly used method. It is technically extremely simple, time-honouring, and safe with a recurrence rate between <1 and 2%.

Liquefied phenol is made using 100 g of crystalline phenol, which is gently warmed in a water bath to about 45° when the crystals start melting.

Phenol has three positive properties for the treatment of ingrown nails; it is a chemical cauterant [protein coagulating power], it is a potent disinfectant, and it has local anaesthetic activity.

Under local anaesthesia

The ingrown side of the nail plate is separated from the nail bed and the overlying proximal nail fold. The nail plate is cut straight forward till under the proximal nail fold and avulsed.

This almost always shows a spike at the distal lateral end of the nail strip.

A wisp of cotton is dipped into the liquefied phenol. It is then vigorously rubbed into the lateral matrix horn for about 2-3 minutes.

Any granulation tissue may be gently touched with the phenol, but it will anyhow disappear spontaneously as soon as the offending lateral nail strip has been removed.

In a method so widely used, there are of course many small variations. Some authors prefer to swab the phenol treated area with alcohol in order to stop the phenol action. This is dilution of the remaining

phenol, but no neutralization.

Phenolization can be used in diabetics with the same complication rate as in nondiabetics. It is not contraindicated in persons with impaired arterial blood supply.

Phenolization causes a controlled necrosis of the matrix epithelium and subjacent connective tissue. This is the prerequisite for a successful therapy.

Phenolization can be safely used in children

Controversies

As outlined above, there are many areas of debate. The first question is to whether treat conservatively or surgically. The noninvasive methods require consistent patient compliance and experience from the side of the treating physician. Among the surgical procedures, either narrowing of the nail or removal of the hypertrophic nail fold, or sometimes both, may be carried out. Judging from the literature and own experience, selective matrix horn resection is the surgery of choice; which modality is used is of secondary importance provided it is radical enough. Recurrence rates vary in the literature reflecting different levels of experience.