



Partial nail avulsion and chemical matricectomy: Ingrown toenails

Intervention

Removal (avulsion) of an ingrowing section of toenail and application of a caustic chemical to destroy the nail matrix (matricectomy).

Indication

Possible causes of ingrowing toenails include improper trimming of the nail, tearing nail off, overly curved nail, certain activities (eg running) and wearing constricting footwear.

Partial nail avulsion and chemical matricectomy relieve symptoms and prevent regrowth of the nail edge or recurrence of the ingrowing toenail.

Ingrown toenails are a common problem and occur when the edge of the nail grows into flesh at the side of the nail, causing a painful injury. The punctured skin can become inflamed and infected. Ingrown toenails can be classified into three stages (see Figure 1):

- mild (or Stage I)
 - oedema, erythema and pain
- moderate (or Stage II)
 - inflammation and inflection with or without purulent discharge, in addition to the symptoms of Stage I
- severe (or Stage III)
 - chronic inflammation, epithelialised hypertrophic granulation tissue.

Figure 1. Three stages of ingrown toenails



Source: Eekhof JA, Van Wijk B, Knuistingh Neven A, van der Wouden JC. Interventions for ingrown toenails. The Cochrane Database of Systematic Reviews 2012;4:CD001541.

Surgical interventions are commonly performed for patients in Stages II and III, and are more effective than non-surgical interventions in preventing the recurrence of an ingrowing toenail.

The addition of chemical cauterisation (most commonly with phenol) at Stages II and III, may be more effective in preventing recurrence and regrowth of the ingrowing toenail than surgery alone.

Contraindications

Diminished vascular supply to the digit is a relative contraindication to nail surgery.

Overt bacterial infection of the operative site is a relative contraindication to chemical cauterisation. Treatment with a systemic antibiotic for two to three weeks before performing the procedure may be required.



Precautions

Potential factors to consider:

- Infection/inflammation can reduce the effect of the local anaesthetic in a toe.
- Phenol is classified as 'hazardous' according to Safe Work Australia.
- Phenol is systemically absorbed following application to the skin, and has been shown to have fetotoxic effects in animal studies.

Use caution with people who have a bleeding disorder or who are taking anticoagulant therapy.

Adverse effects

Pain is the most common complication following nail surgery and is more likely to occur when infection is present before the procedure.

Even with meticulous patient preparation and technique, postoperative infection may occur. Infection within the first few days postoperatively is likely to be bacterial (usually *Staphylococcus aureus*). However, infections occurring after a week may be fungal (usually *Candida*).

Note: Postoperative interventions do not decrease the risk of postoperative infection, postoperative pain or healing time (see Description).

Availability

Surgical treatment of ingrown toenails may be performed by general practitioners (GPs) and podiatrists.

Description

Multiple surgical techniques and combinations have been used to treat ingrown toenails. Partial nail avulsion and chemical (phenol) matricectomy is the most common procedure performed for patients in Stages II and III. This procedure is illustrated in Figure 2 and is described below.

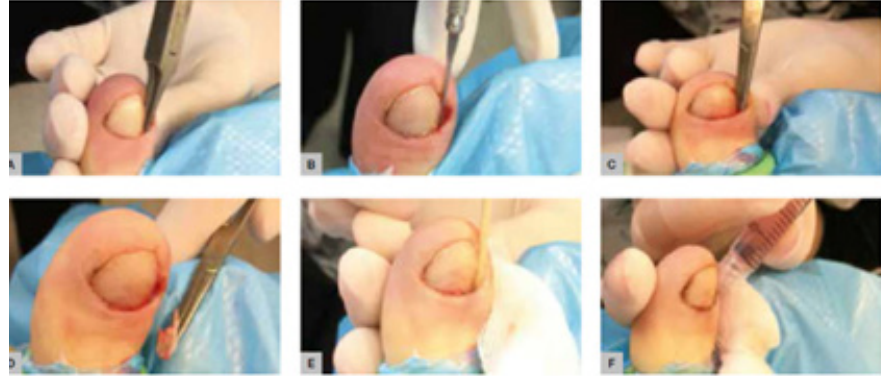
Instruments and materials required:

- alcohol wipes
- lignocaine 1–2% plain
- povidone-iodine ointment (eg Betadine)
- sterile saline
- digit tourniquet (eg Tourni-Cot ring)
- English anvil nail splitter
- Beaver handle with #62 Beaver blade
- eponychium retractor
- straight haemostat or locking forceps
- sterile cotton-tipped applicators
- liquefied phenol BP
- alcohol and chlorhexidine solution for irrigation
- non-stick antiseptic gauze (eg Bactigras paraffin-wax gauze).



Description

Figure 2. Sequential illustration of the phenol-ablation technique



Reproduced from Bryant A, Knox A. Ingrown toenails: The role of the GP. *Australian Family Physician* 2015;44:102–5. Available at www.racgp.org.au/afp/2015/march/ingrown-toenails-the-role-of-the-gp

Description of procedure:

- Prepare the toe using alcohol skin wipes and inject 3–4 mL of lignocaine 1–2% plain as digital ring block.
- While waiting for the anaesthesia to take effect, the digit can be soaked in an antiseptic bath (povidone-iodine or chlorhexidine). Before beginning the procedure, test for adequacy of anaesthesia by inserting a needle into the digital tip and under the nail.
- Use standard sterile technique after preparing the foot.
- Use a digit tourniquet to exsanguinate the toe.
- Use a nail splitter to split 2–3 mm of the affected side of nail longitudinally (Figure 2A) and complete to the proximal edge with the #62 Beaver blade (Figure 2B).
- With an eponychium retractor, free the nail plate from all skin attachments (including subungal).
- Perform avulsion of the nail by grasping the sectioned nail with a haemostat or locking forceps and using a gentle distraction technique to rotate it towards the midline of the nail plate and ease the nail free of the nail bed (Figure 2C, 2D).
- Apply liquified phenol BP directly to the site of the germinal nail matrix using small cotton wool applicator tips (Figure 2E). Application of phenol should be carefully confined to the immediate surgical area, avoiding excess phenol contact with surrounding skin as this may result in unnecessary tissue injury. It is important to ensure that the nail sulcus and matrix area are dried immediately before applying phenol as the chemical is quickly neutralised by body fluid.
- Flush the site using alcohol and chlorhexidine solution (Figure 2F).



- Remove the tourniquet and use local pressure to control any bleeding, which is usually minimal or absent.
- Dress the toe with povidone-iodine ointment (eg Betadine), antiseptic gauze (eg Bactigras) and crepe bandage.

Note: When a single irrigation step is performed after phenolisation, alcohol plus chlorhexidine is more effective than alcohol alone for removing residual phenol. When multiple steps are performed, the two solutions are equally effective.

Postoperatively, advise the patient of the following:

- Postoperative analgesics are rarely required.
- Keep the toe dry overnight.
- Monitor for signs of increasing pain/discomfort (infection).
- Return in three days for a check and redress.
- After the redressing at three days, clean the site daily after showering using salt water and redress with Betadine ointment and a simple toe dressing until fully healed (two to three weeks).

Postoperative treatments such as antibiotics or manuka honey; povidone-iodine with paraffin; hydrogel with paraffin; or paraffin gauze have not been shown to reduce the risk of postoperative infection or postoperative pain, or to improve healing time.

Alternative techniques to partial nail avulsion and chemical matricectomy include:

- radical excision of the nail fold (Vandenbos procedure)
- rotational flap technique of the nail fold
- wedge excision, wedge segmental excision, or wedge resection (Winograd procedure)
 - combined with chemical matricectomy (phenol or sodium hydroxide)
- total nail avulsion (Zadik procedure)
 - combined with total (chemical or surgical) matricectomy
- partial nail avulsion (Ross procedure)
 - combined with surgical (partial) matricectomy
 - combined with physical (electrofulguration) matricectomy (electrofulguration is a method of electrosurgery used to produce superficial desiccation of tissue).

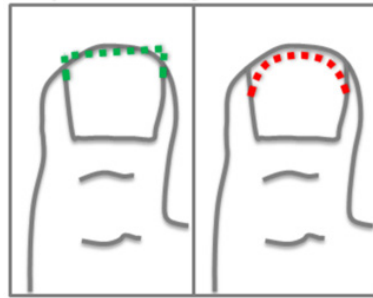
Evidence for these procedures has not been reviewed.



Tips and challenges

As improper nail trimming is a cause of ingrown toenails, patients should be advised on correct nail trimming (Figure 3).

Figure 3. Correct (left) and incorrect (right) nail trimming



Source: Eekhof JA, Van Wijk B, Knuistingh Neven A, van der Wouden JC. Interventions for ingrowing toenails. The Cochrane Database of Systematic Reviews 2012;4:CD001541.

Grading

NHMRC Level 1 evidence.

Training

Conservative management and both partial nail avulsion with chemical matricectomy and the Winograde technique are described in Bryant A, Knox A. [Ingrown toenails: The role of the GP](#). Australian Family Physician 2015;44:102–5. Available at www.racgp.org.au/afp/2015/march/ingrown-toenails-the-role-of-the-gp

References

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Eekhof JA, Van Wijk B, Knuistingh Neven A, van der Wouden JC. [Interventions for ingrowing toenails](#). Cochrane Database Syst Rev 2012;4:CD001541. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001541.pub3/abstract;jsessionid=6D400E278B18C87B05B5F7A437DD56AD.f02t04>

Consumer Resources

To find a local podiatrist, visit The Australasian Podiatry Council's website www.findapodiatrist.org