



ingrown toenail surgical excision

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topics to be covered



- clinical anatomy digits & nail bed
- anatomical landmarks
- examination
- types of conditions seen in clinical practice
- operative management

ingrown toenail



key issues

- check & mark side
- check pulse/circulation
- digital block
- tourniquet
- operation
- dressing/bandaging
- follow-up

aetiology



- ingrown toenails are a painful condition usually affecting the big toe
- thought to be due to the nail edge growing into the adjacent skin as a result of a combination of:
 - pressure from footwear
 - rapid growth (common in adolescents)
 - incorrect nail trimming

pathogenesis



- irritation results in inflammation, which can lead to infection and the formation of pus (micro-abscess formation)
- leading to hypertrophic granulation tissue or proud flesh

conservative measures



in the early stages
conservative
measures may
alleviate the
problem:

- bathing frequently
- elevation of the nail
- correct trimming

conservative measures



- antibiotics are commonly used as the first line of treatment for infection
- this does not resolve the underlying cause
- but does often settle the infection down and give relief of pain and reduce the discharge
- however if multiple courses are required then this is an indication for surgery

surgical options



- where there is persisting pain with or without chronic infection surgery is also advised
- 'wedge resection' is the definitive operation
- it removes a 'wedge' of the offending nail edge, and the underlying germinal matrix of the nail bed

surgical options

- the aim is to prevent the edge of that nail regrowing



clinical anatomy - matrix



- nail is a keratin structure
- it grows from what is termed the matrix
- the matrix is deeper to the nail and firmly attached to the underlying periosteum
- it can extend to the surrounding soft tissues

germinal matrix



- germinal matrix grows all along the nail bed and on the periosteum, but only about one centimetre of this that actually grows a new nail
- it extends distally to approximately the edge of the white lunulae
- it is the germinal matrix that needs to be removed to prevent that portion of the nail regrowing

phenol

- some doctors use phenol to destroy the germinal matrix rather than surgical excision

surgical options



- some GP's prefer to remove the nail edge – under digital block, as this is a less traumatic procedure than wedge resection
- this is a reasonable method of treatment initially and may get good results - there is a definite incidence of recurrence
- if the problem recurs wedge resection is indicated
 - note that recurrence can also recur following a formal wedge resection

pre-op assessment



- careful assessment of the patient is required before surgery
- 'best practice risk management' should be carried out - particularly in the elderly
- circulation to the toe should be checked
- arrangements need to be in place for the patient to be transported home
- informed consent needs to be obtained

pre-op advice



- information booklet
- local anaesthetic procedure
- what to expect from surgery – outcomes
- post-op care
- possible complications

digital nerve block



- site should be marked
- 1% or 2% lignocaine can be used – **NO adrenaline**
- 23G (or finer) needle
- when first giving the injection the patient may jump, so it is prudent to warn the patient
- the toe can be grasped distally, but care must be taken to avoid a needle stick injury to oneself and also to avoid passing the needle right through the toe

digital nerve anatomy

- for a unilateral wedge resection digital block may only be necessary on one side of toe
- excessive volume should not be given as this constricts the circulation – compartment syndrome
- adrenaline should never be used, as digital arteries are end arteries and its use may result in ischaemia

tourniquet

- having ensured that the digital block has worked a tourniquet rubber band can be applied



case study

patient presents with:

- painful swollen great toe
- not responsive to conservative measures

ingrown toenail operation



- check circulation
 - appearance
 - capillary return
 - pedal pulses
- ? infection
- mark side

surgical management



- make sure all necessary equipment at hand and working
- tourniquet
- sharp pointed scissors
- skin hooks
- #15 blade
- strong & fine toothed dissecting forceps
- artery forceps
- dressings/bandages

operative technique (contd.)



- digital nerve block
- 1% or 2% lignocaine
 - NO adrenaline
- fine, long needle
 - 25G or finer
- inject from dorsum
- 1 or 2 sides as appropriate

operative technique

- dorsal & ventral digital nerves on lateral aspect of toe



operative technique



- dorsal & ventral digital nerves on medial aspect of toe
- wait appropriate time then test block
- may require extra measures

operative technique

- exsanguinate toe
 - two methods
 - before or after tourn.
- apply tourniquet



operative technique (contd.)



- after tourniquet consider extra injection of LA to base of nail bed

operative technique (contd.)



- evert lateral edge of nail with artery forceps
- edge of the nail is then removed using pointed scissors under the nail to avoid damaging the underlying structures
- it also avoids lifting off the remaining nail



operative technique (contd.)



- variety of ways of gaining access to the nail bed which include:
- exposing nail bed by cutting from base of nail fold vertically or obliquely to gain wider access
- edge of the nail can be lifted up for a better viewing if an assistant is present

operative technique (contd.)



operative technique (contd.)

- expose nail bed using skin hook (if assistant present)



operative technique (contd.)



- nail bed is then removed – the germinal matrix right down to the bone and out into the lateral edges
- if there is some matrix embedded in the underlying surface of the over hanging skin this may need to be trimmed

operative technique (contd.)



- the granulation tissue can be excised
- this tends to cause more bleeding

operative technique (contd.)

- excise down to bone



operative technique (contd.)



- dressing applied
- good practice to make a note about tourniquet
- defined method of checking the circulation
- one technique is to remove the tourniquet at the first or second loop of the bandage

operative technique (contd.)

- dressing with paraffin gauze



operative technique (contd.)

- then dry gauze



operative technique (contd.)

- then crepe bandage



operative technique (contd.)

- remove tourniquet before bandaging is completed



operative technique (contd.)



- re-check circulation to make sure bandage not too tight
- after the bandages are complete the circulation must be tested again
- toe should be checked in both recumbent and sitting positions

operative technique (contd.)



- complete crepe bandage wrap

operative technique (contd.)



- cover with surgical bootie
- this keeps the area clean and if there is some oozing it will not stain the carpets
- if there is too much of an ooze when the patient stands up the patient must lie down and elevate the foot and pressure applied +/- bandaging adjusted

operative technique (contd.)



- walk on heel
- 'stiff knee' gait

follow up

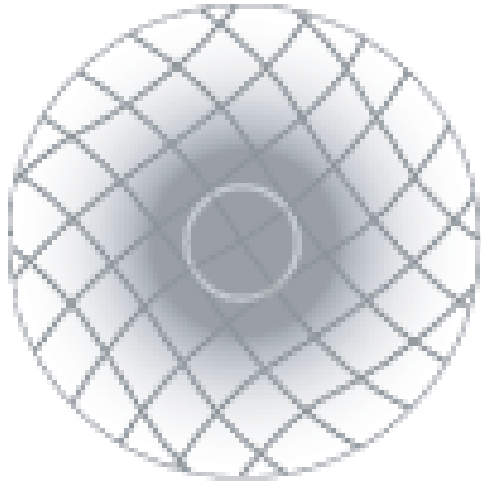


- patient to call next day - reassurance
- dressing removed 2-3 days post-op
- avoid tight closed footwear 1/52
- review in clinic 7-10 days post-op
- earlier if any problems

complications

- pain
- bleeding
- infection
- recurrence
- nail deformity

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surgical options



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pre-op assessment



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- circulation to the toe should be checked
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Ingrowing toenails can also occur in older patients and maybe associated with diabetes, trauma, fungal infection or ischemia

It is important to fully assess the older patient where there are associated problems.

It is sometimes best just to remove the nail, particularly if it is a fungal infection or a result of trauma.

With trauma the nail is often distorted.

Other conditions, which commonly require surgical intervention, are onychogryposis and fungal infections.

pre-op advice



- information booklet
- local anaesthetic procedure
- what to expect from surgery – outcomes
- post-op care
- possible complications

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It is best practice to discuss the procedure and give a patient information leaflet. The patient is asked to read this before the procedure and the surgeon's day sheet is ticked that this has been given and read.

It is explained to the patient and family if the patient is an adolescent that the procedure is usually done under local anaesthetic and digital block. The patient is warned that the injection can sting and in fact can be very difficult to carry out a digital block on young adolescents, in this case sedation or admission for a General Anaesthetic may be required.

It is explained to the patient however that once the injection has been given there will be no pain with the procedure. This is essential. It is rare for a digital block not to work and one of the keys is to wait after the block has been given for 5-10 minutes then test. There are little tricks to ensure the digital block works, particularly where there is infection. The presence of infection the local anaesthetic may not work as well, these extra steps ensure success.

The patient should also be warned that the nail will be narrower. There is also the possibility of damage to the nail bed, and that a deformed nail may result, but this is uncommon. It is more common however where both sides are being done or complete with or without removing the nail bed. Most patients are not concerned regarding this, but wise to check beforehand. To avoid starting the procedure too quickly it is advised to leave the room for a few minutes and do something else.

digital nerve block



- site should be marked
- 1% or 2% lignocaine can be used – **NO adrenaline**
- 23G (or finer) needle
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- the toe can be grasped distally, but care must be taken to avoid a needle stick injury to oneself and also to avoid passing the needle right through the toe

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The nerves supply to the toe comes from a digital nerve. This digital nerve, which is on the plantar surface, which branches pass dorsally. The nail bed and nail developmentally are plantar and dorsal structures and they migrate on to the dorsum of the toe making this area more difficult to anaesthetise and requiring a little extra time because of the distance. To gain complete anaesthesia these dorsal branches of the nerve can be anaesthetised with direct infiltration along the dorsum of the toe subcutaneously and an additional technique is to also after the local anaesthetic has worked – 95% to give a extra little injection into the nail bed can usually be tolerated well.

tourniquet

- having ensured that the digital block has worked a tourniquet rubber band can be applied



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operative technique (contd.)



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operative technique (contd.)



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- exposing nail bed by cutting from base of nail fold vertically or obliquely to gain wider access
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operative technique (contd.)

- Click to add an outline



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operative technique (contd.)

- expose nail bed using skin hook (if assistant present)



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- excise down to bone

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operative technique (contd.)



- dressing applied
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- defined method of checking the circulation
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operative technique (contd.)

- dressing with paraffin gauze



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Initially a non-adhesive dressing is placed over the defect. It is unusual for it to require any suturing. The gauze is placed over the non-adhesive dressing and then a 2-inch crepe bandage is applied usually. The bandaging should be firm, but not too tight. If it is not firm enough the wound will bleed when the patient stands up. If it is too tight it is very painful and there is a risk of impeding the circulation and causing necrosis.

operative technique (contd.)

- then dry gauze



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operative technique (contd.)

- then crepe bandage



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operative technique (contd.)

- remove tourniquet before bandaging is completed



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operative technique (contd.)



- re-check circulation to make sure bandage not too tight
- after the bandages are complete the circulation must be tested again
- toe should be checked in both recumbent and sitting positions

operative technique (contd.)



- complete crepe bandage wrap

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operative technique (contd.)



- cover with surgical bootie
- this keeps the area clean and if there is some oozing it will not stain the carpets
- if there is too much of an ooze when the patient stands up the patient must lie down and elevate the foot and pressure applied +/- bandaging adjusted

operative technique (contd.)



- walk on heel
- 'stiff knee' gait

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follow up



- patient to call next day - reassurance
- dressing removed 2-3 days post-op
- avoid tight closed footwear 1/52
- review in clinic 7-10 days post-op
- earlier if any problems

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Arrangements are made for follow up. The patient can be instructed to ring the next day to ensure there is not too much pain. The pain is usually worse on the day of the procedure and settles considerable by the next day. If there is increasing pain this is an indication that something may be wrong and the dressing should be checked and loosened then.

The dressing can be changed on the first postoperative day, but it is probably easier to remove 2-3 days after the procedure. If left longer the dressing often becomes smelly particularly if there has been infection.

After the postoperative review the patients are given further instructions about continued dressings. They should avoid tight footwear for probably a week and are advised on the way home to keep the foot up in the back of a car to reduce the risk of bleeding and to reduce post operative swelling and pain.

complications



- pain
- bleeding
- infection
- recurrence
- nail deformity

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The main issues after wedge resections are pain or bleeding.

Excessive pain may mean ischaemia, this needs to be checked. Most patients require some analgesia such as Panadeine Forte.

Infection – If the patient is on antibiotics these should be continued to the end of course. Following the procedure infection can be a complication as signified by increasing pain and erythema. This will need treatment with antibiotics. If there is any necrotic tissue this will require debridement drainage. Incidences of this type of problem is low.

Recurrent – it is difficult to estimate as there are very few well-controlled trials. There is however a recurrence rate.

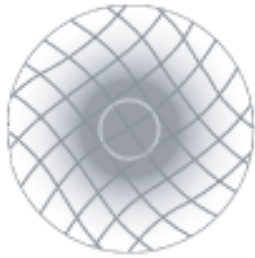
Later problems – this may include nail spike growing out. This can be dealt with in a similar way to a wedge resection.

Occasionally an abscess may develop one or two months later. It can be due to a sliver of skin remaining embedded or a portion of the nail bed, and this behaves like any plantation dermoid cyst. This is a foreign body and results are infection. Drainage under digital block and removal of the offending material usually resolves the matter.

Occasionally the patient complains of pain, the nail grows back particularly after the removal of the whole nail. This pain is at the distal tip of the toe and the nail is pushing against the raw skin. The nail needs to be trained to protrude upwards.

Following wedge resection the patient is given advise in a nail care – the trimming, the avoidance of pressure and general care. The whole area should not be exposed to dirty socks.

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