



NON-SURGICAL TREATMENT OF IN-GROWING TOE NAIL- A FIVE YEAR EXPERIENCE OF 161 PATIENTS

Subash Abrol¹, Vikrant Singh² and Vanita Gupta^{3*}

¹Department of General Surgery Government Medical College Jammu

²Department of Surgical Gastroenterology Government Medical College Jammu

³Department of Anatomy Acharya Shree Chander College of Medical Sciences

ARTICLE INFO

Article History:

Received 06th October, 2018

Received in revised form 14th
November, 2018

Accepted 23rd December, 2018

Published online 28th January, 2019

Key words:

Ingrown, toe, nail

ABSTRACT

Introduction: Ingrown toenails mostly occur in males aged 15-40 years. Approximately 20 percent of patients presenting to a family physician with a foot problem have an ingrown toe nail. Ingrown toenails are classified into three categories: mild, moderate, and severe. Conservative management is initially offered to patients with mild cases of ingrown toenail.

Material and methods: Total no of 161 patients with in growing toe nail were treated using a special instrument to put methylated spirit soaked gauze wicks under the nail bed. The age ranged from 5yrs to 72yrs out of which 98.13% were in the age group 5yrs to 45yrs

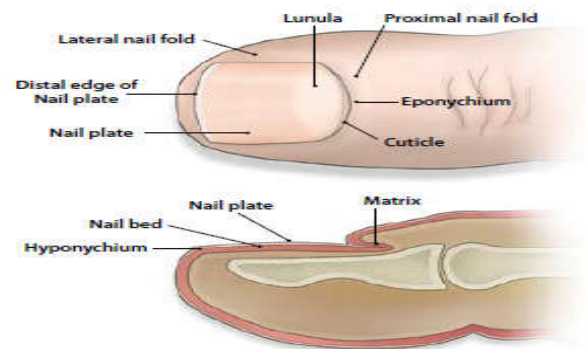
Results: The time taken for total healing by this procedure varied from six weeks to three months depending upon the severity of the condition.

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INTRODUCTION

Ingrown toenails, also known as onychocryptosis or unguis incarnates, are a painful condition due to the sides or corner of the toenail digging into the surrounding soft tissue. This results in a breach of the underlying skin and leads to pain, inflammation, formation of granulation tissue, and in some cases infection. The most commonly affected area is the lateral edge of the great (big) toe, although the medial edge and other toes can also be affected. Ingrown toenails mostly occur in males aged 15-40 years.¹ Approximately 20 percent of patients presenting to a family physician with a foot problem have an ingrown toenail.²

Based on clinical experience, ingrown toenails are thought to be caused by improper nail trimming or tearing nails off. Because of poor visualization or instrumentation, a barb is created that anchors itself in the soft periungual tissues and penetrates deeply as the nail plate grows distally. Force during ambulation, pressure from constricting footwear, and obesity (if present) drives the nail barb penetration and worsens its severity.³



Vandenbos and Bowers suggested that pressure necrosis of the soft tissue surrounding the nail contributes to the pathogenesis of ingrown toenails. Indeed, increased nail-fold skin width in patients with ingrown toenails, greater weight-bearing on the soft tissue of the nail fold and repetitive rotation of the toe have all been suggested to be important contributing factors.⁴⁻⁶

Factors traditionally associated with the development of ingrown toenails, and supported by varying degrees of evidence, include.⁷⁻⁹

- Inappropriate nail trimming which can cause the corner of the nail to dig in to the surrounding skin.

*Corresponding author: Vanita Gupta

Department of Anatomy Acharya Shree Chander College of Medical Sciences

- Tight or narrow footwear which can compress the toes and result in changes in the shape of the toenail
- Hyperhidrosis and poor foot hygiene
- Onychomycosis (fungal nail infection)
- A family history of ingrown toenails
- Repetitive trauma, e.g. running, kicking or stubbing of the toe
- Abnormally shaped nail plates or nail folds
- Diabetes and obesity
- Thyroid, cardiac and renal disorders
- Some medicines, e.g. retinoid, oral antifungals, cyclosporine and docetaxel (an IV chemotherapy medicine)

Classification^{10, 11}

Ingrown toenails are classified into three categories: mild, moderate, and severe.

Mild cases are characterized by nail-fold swelling, erythema, edema, and pain with pressure.

Moderate cases are associated with increased swelling, seropurulent drainage, infection, and ulceration of the nail fold.

The most severe cases of ingrown toenail exhibit chronic inflammation and granulation, as well as marked nail-fold hypertrophy.

Indications for the treatment of an ingrown toenail include significant pain or infection; onychogryposis (a deformed and curved nail); or chronic, recurrent paronychia (inflammation of the nail fold).¹²

Conservative management is initially offered to patients with mild cases of ingrown toenail.¹³

A simple conservative treatment option is to soak the affected toe and foot for 10 to 20 minutes in warm, soapy water. After each soak, expert recommendation is to apply a topical antibiotic ointment (e.g., polymyxin/neomycin [Neosporin]) oral mid- to high-potency steroid cream or ointment to the affected area several times daily for a few days until resolution.¹⁴

Wisps of cotton placed under the ingrown lateral nail edge using a nail elevator or a small curette can also be attempted, with the patient repeating this process if the cotton falls out.¹⁴

The cotton wick (packing) method: Involves elevating the lateral edge of the toenail and inserting a small piece of cotton wick (which can be soaked in disinfectant or antiseptic) under the edge of the nail to prevent it digging in to the surrounding tissue.¹⁵

Dental floss technique involves inserting dental floss obliquely under the in growing nail corner. This has also been found to be effective in mild to moderate cases, producing minimal, if any, pain and no secondary infection, with almost immediate relief from pain and the ability to resume normal activities.¹⁶

Another conservative treatment approach is to use a gutter splint (e.g., a sterilized vinyl intravenous drip infusion tube slit from top to bottom with one end cut diagonally for smooth insertion) that can be affixed to the ingrown nail edge with either adhesive tape or a formable acrylic resin such as cyanoacrylate.¹⁷

Orthoxyia (brace technique) uses a small metal brace to pull the edge of the ingrown toenail away from the underlying soft tissue, after removal of the spicule. A study that investigated

nail bracing in patients with an ingrown toenail reported that all 12 patients were pain-free after six to 10 months of treatment.¹⁸

Angle correction technique: This technique aims to correct the convex nature of the toenail by filing the entire surface of it with the intention of decreasing its thickness by 50-75%. The process is then repeated by the patient every two months making the nail thin and soft which reduces the pressure on the nail fold.

Most surgical techniques for correcting an in growing toe nails are variations of two different approaches which either target the nail plate itself or the lateral skin folds that surround the toenail. Surgical treatments have traditionally focused on the nail as the causative agent, and the most commonly performed procedure is the "wedge resection" technique that involves partial removal of the toenail with segmental phenolablation.¹⁹

Partial nail avulsion (wedge resection) with segmental phenol ablation

This procedure is performed under a partial ring block with 1% plain lidocaine injected at the base of the toe on the plantar aspect of the digit. A ring tourniquet is applied to the toe followed by longitudinal removal of the outer part (usually 3 - 5 mm) of the affected toenail, including the nail matrix. Segmental ablation of the exposed toenail matrix is then performed using liquefied phenol.²⁰

A 2006 randomised study that compared partial nail avulsion with or without phenol ablation of the matrix reported that the one-year recurrence rates were significantly lower when phenol ablation was used (14% vs. 41%).²¹

Longitudinal band method

This technique involves longitudinal removal of the middle 4 - 5 mm of the affected toenail as far back as the skin at the base of the toenail, i.e. the most distal portion of the nail and nail matrix are left intact. Although limited clinical trial data are available for this technique, the advantages appear to include low recurrence rates (approximately 2%) and minimal limitation of daily functioning.²²

MATERIAL AND METHODS

It is an office procedure done in good focussed light.

1. A specially designed stainless steel instrument for packing.
2. Two mosquito sized artery forceps (one straight and one curved)
3. Methylated spirit (ethyl alcohol)
4. Sterilized Gauge piece and 2 ½" inch rolled bandage.



Figure no 1 showing three instruments for the surgery

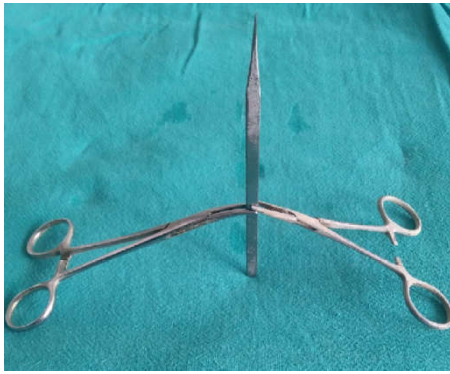


Figure no 2 showing three instruments for surgery

The patient is explained the whole procedure and the likely time taken beforehand to have his/her cooperation on the first day to alleviate the apprehensions, since the procedure involves the instruments. The patient sees the whole procedure himself and will cooperate better. He/she has to come for dressing daily initially but later may be called on alternate day or even after two or three days depending upon the local response. This is an office procedure and requires an examination couch and good light.

The patient sits up in the examination/procedure couch with leg flexed at hip and knee and keeps the affected foot flat on the couch. The doctor stands in front of the patient. The toe and the nail are cleaned thoroughly with spirit to remove the dirty discharge without disturbing the granulation. Surprisingly by just cleaning the dust, dirt and discharge, the problem is actually less as it initially looks to be. Now a cotton wisp dipped in the spirit is slipped in the space between the nail plate and the granulation tissue with the help of the sterilised pointed steel instrument using the nail plate as the working ground with minimal disturbance to the granulation tissue. In the first dressing the size of the cotton wisp is minimal and also the manipulation so that the procedure is painless or it is minimally painful to gain the confidence of the patient. The toe is bandaged. The patient is requested not to soak the bandaged toe while taking bath. The size of the cotton wisp is gradually increased with every dressing so that the granulation tissue is adequately compressed which is indicated by the paleness of the granulation and the surrounding skin of the nail fold. This packing causes the ischemic necrosis of the granulation and it is reduced to a scab only in the subsequent dressings. As the nail edge gets in to view with the shrivelling of the granulation, now is the time to see the actual problem whether an in growing nail or an infected nail fold only. If the nail has a spike it can be cut with help of a nail cutter and the dressings continued like the one in infected nail fold only till healed.

During dressing there is another attempt to create a space under the nail and by pushing another cotton wisp under the nail from front towards the affected corner. Surprisingly this space is very easily created under the nail and on the side of the affected nail. This nail corner can be levered up with the sterilised straight or curved artery forceps as is convenient. Now the cotton wisp can be placed under the nail edge and the corner with the same pointed packing instrument so that the nail edge now lies on the cotton. This gives free space to the nail to grow over the cotton.

Once the nail edge and the corner is exposed and the granulation has been reduced to a scab the affected toe is not bandaged but exposed to air and the spirit dressings continued.

Exposure makes this skin of the nail fold firm and hard and will not allow the nail to grow in to it.

The removal of the previous day packed cotton needs attention. While the bandage is being removed, see that the packed cotton if found adherent should be soaked well with 5% povidone iodine lotion adequately and removed gradually so that there is no bleeding from the under lying granulation tissue.

Oral antibiotics generally are not required but if there is heavy infection, tab. Ciprofloxacin may be given for a period of five to seven days. Analgesics again are not required but may be given if the patient demands.

Initially the patient is allowed to wear open toed sandals and later one size larger shoe with bigger toe box can be allowed so that there is no crowding of the toes within shoe.

The procedure is continued till the toe restored to normal. Now the patient also learns the procedure and takes care of the toes in future.

The methylated ethyl alcohol (SPIRIT) is a very good antiseptic, clear solution so does not obscure the field and also causes desensitisation of the exposed nerves with slight initial irritation.



Figure no 3 Comparing the preoperative picture with 7th post procedure day





Figure no 4 comparing preoperative picture with completely healed picture after 22 days of treatment



Figure no 5 showing gauze wick soaked in methylated spirit on 5th post-procedure day



Figure no 6 Showing in growing toe nail and comparison with 12th post procedure day where medial side has healed and gauze wick in seen along lateral border



Figure no 7 showing complete healing on 9th day

Observations

Total number of patients who were treated was 161 during period of last 5 years. The age ranged from 5yrs to 72yrs out of which 98.13% were in the age group 5yrs to 45yrs

Table no 1 Showing age range of patients

Age range	Number of patients	Percentage
5yrs to 15yrs	32	19.87%
16 yrs to 30yrs	118	73.29%
31 to 45 yrs	8	4.96%
45yrs to 60 yrs	2	1.24%
60 yrs onwards	1	1.61%
Total	161	

Table no 2 showing sex distribution of patients

Age range	Number of male patients	Number of female patients
5yrs to 15yrs	23	9
16 yrs to 30yrs	44	74
31yrs to 45 yrs	3	5
45yrs to 60 yrs	1	1
60 yrs onwards	1	0
Total	72(44.72%)	89(55.27)

Table no 3 showing the duration of symptoms before presentation to surgeon

Duration of symptoms	Number of patients
10 days to 20 days	1
21 days to 30 days	2
31 days to 40 days	8
41 days to 50 days	118
51 days onward	32

Table no 4 showing average duration of symptoms before presentation in relation to the age of patient

Age group	Average Duration of symptoms
60 years onwards	10 days
60 years to 45 years	17 days
45 years to 31 years	26 days
30 years to 16 years	46 days
15 years to 5 years	31 days

Table no 5 showing unilateral or bilateral presentation

Other variables	Number of patients	
One side patients	70.80%	114
Both sides	29.19%	47

Table no 6 Showing the duration of time taken to heal with our method

Healing rates	Number of patients
10 days to 20 days	122
21 to 30 days	33
31 days to 40 days	2
41 days to 50 days	1
51 days onward	1

DISCUSSION

The treatment of in growing toe nail is so controversial that many surgical and non-surgical treatments have been devised because of high rate recurrence and the disfigurement of the great toe especially in the females who are of fond of nail paint for beautification of feet and wear the open toed sandals when the disfigured toe stands out conspicuously. A typically thorough Cochrane search yielded nine randomised studies examining different methods of surgical nail treatments. The primary aim in the study was nail re growth in a follow up period of six months. Combining data, all studies suggest that nail avulsion with phenolisation is statistically better than the surgical excision but the difference between two methods is small (20.83% in partial nail avulsion PNA and 22% in surgery) and the appropriateness will depend upon the local circumstances. Many conservative (non surgical) methods of treatments have been devised as mentioned above. These are complex, highly skilled methods, require costly materials and are helpful in early stages But the type of patients we see here are very advanced.

In our technique, the intention is to compress the exuberant infected granulation by sliding the graduated sized cotton whisks daily between the nail plate and the granulation tissue adequately Adequacy of the packing is indicated by the change of colour of the granulation and the adjoining nail fold. This spongy and highly vascular granulation tissue ultimately gets reduced to a black scab due to ischemia and will be removed subsequently during dressings .This exposes the nail edge and the nail margin.

The reason of maximum no of cases between 15 years to 40 years is the increased activity, fast growing nails, wearing sports shoes which make the foot skin soft and sweaty. The

highly virulent bacteria present there are already waiting for the opportunity. The disease severity is more in younger population because of their tendency to ignore the initial problems, wearing narrow toed fashion shoes and also the tight socks.

Females are affected more because of their tendency to cut their nail below the critical level on the sides in an attempt to make them round so that he painted nails look more attractive. Cutting the nail below critical level makes the nail to lose the original tract and it starts splaying in to the adjoining nail fold. Hereditary probably plays the role by shaping the nails. "V" type nails are more prone to cause in growing toe nail problem The antiseptic used is methylated ethyl alcohol (SPIRIT).This has been found to be the best in the dressing of the in growing toe nail. This is transparent and one can see the cotton wisp sliding clearly. It also desensitizes the nerve endings so the dressing which is slightly uncomfortable becomes painless later.

The time taken for total healing by this procedure varies from six weeks to three months depending upon the severity of the condition, whether the nail is in growing or it is simply an infection of the nail fold. The regularity of the patient to come for dressing also affects the duration of treatment. The average time taken for healing in PAN or the total nail avulsion is also the same.

Ingrown toenails are common worldwide, and diverse treatment options exist. There is no gold standard treatment currently available, but theoretically, such an approach would be technically simple, cost effective and yield good cosmetic results with low recurrence rates. Furthermore, the procedure would be done on an outpatient basis with a quick return to normal activities and low complication rates. The approach described in this study meets all of these criteria and is the first to detail the long-term outcomes of soft-tissue nail-fold excision in the treatment of ingrown toenails.

A randomized control trial comparing nail matrix destruction using either surgical excision or phenol ablation reported recurrence rates at 1 year to be 13.8% for phenol ablation and 40.7% for surgical excision.²⁰

Many reports in the literature reported conflicting results in regards to the effectiveness, cure rates, and complications as a result of using phenol for matrix cauterization in the treatment of ingrown nails.²³

CONCLUSION

In growing toe nail is a severely painful condition of foot. It is most common in young and active patients. The females are affected more than the males because of their tendency to manipulate their nails for beautification of their toes. The young have the tendency to delay the treatment so they present with severe type hence the long-time taken for healing. This non- surgical treatment is very effective for in growing toe nail. It preserves the nail and keeps the anatomy intact and the patient, especially the ladies do not suffer from a complex when they wear the open toed sandals. This treatment is carried out in front of the patient so he/she understands the pathology and takes adequate measures to avoid such problem in future

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How to cite this article:

Subash Abrol *et al* (2019) 'Non-surgical Treatment of in-Growing Toe Nail- a Five Year Experience of 161 Patients', *International Journal of Current Medical And Pharmaceutical Research*, 05(01), pp. 4014-4019.
