



ISSN: 0975-833X

## RESEARCH ARTICLE

### INGROWN NAIL: A NOVEL SURGICAL SOLUTION

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#### ARTICLE INFO

##### Article History:

Received 15<sup>th</sup> August, 2014  
Received in revised form  
06<sup>th</sup> September, 2014  
Accepted 06<sup>th</sup> October, 2014  
Published online 18<sup>th</sup> November, 2014

##### Key words:

Foot nail,  
Onychocryptosis,  
Surgical technique

#### ABSTRACT

**Objective:** Onychocryptosis (Ingrown nail) is an important disease for community life. Various medical and surgical methods are utilized about treatment. There is no option for radical treatment which both reduce to recurrence or diminish and which is ideal about cosmetic aspect. In our study, for the treatment of ingrown nail we aimed to apply a new surgical method that both reduced the recurrence or diminish and success better result cosmetically.

**Methods:** The results of 26 patients, who applied to Malatya State Hospital, the Cosmetic/ Plastic Surgery Polyclinic between the dates, April 2012- April 2013 with complaints of pain and gleet in the 1<sup>st</sup> toe and / or deformation in the nail, and whom we operated on through the new technique in our clinic which is support to nail bed without excision, were evaluated. The patients were followed and evaluated 20<sup>th</sup> day, and in the 3<sup>rd</sup>, 6<sup>th</sup> and 12<sup>th</sup> months.

**Results:** we retrospectively analyzed the results of those 26 patients we had operated on. 20 of these patients suffered from ingrown nail in a single toe, while 6 of them suffered from the same in two of their toes. After operation, in these patients that we had operated on ingrown nails complaint was resolved and no relapse was observed.

**Conclusion:** It seems that this new technique has a very low incidence of relapse and better cosmetic result, which can be achieved by correcting the angle of nail without extirpation of nail tissue

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#### INTRODUCTION

Onychocryptosis (ingrown nail) is caused by the twist of the nail fold within the nail bed as the result of the deformation in the normal nail anatomy depending on various factors, (Rammelt *et al.*, 2003). Factors, such as ill-fitting footwear, poor foot hygiene, incorrect nail clipping, genetics and trauma, play a role in ingrown nail (Richardson *et al.*, 2003). Due to these factors mentioned, tissue injury occurs in consequence of the pressure that the nail exerts on the skin. On the damaged tissue, typical findings show up with the development of infection and the formation of granulation tissue (Richardson *et al.*, 2003). Diverse classifications were made according to the findings of ingrown nail. Of these classifications; in the commonly-used Heifetz classification are pain and inflammation in Phase 1, infection and abscess in Phase 2, and in phase 3, the lesion becomes chronic and there is a granulation tissue (Richardson *et al.*, 2003). Medical and surgical treatments are applied for ingrown nail. While the medical treatment is sufficient in Phase 1, the surgical treatment is generally required in Phase 2 and 3 (Murray *et al.*, 1989; Dereli *et al.*, 1995; Eisele, 1994; Reijnen *et al.*, 1989). In medical treatment, we can consider the applications, such as

the use of antibiotics, daily medical dressings, and the placement of gauze strip between the nail and the soft tissue. In surgical treatment, on the other hand, there are methods where the removal of nails, the cuneiform tissue excision from the nail and nail bed or the soft tissue excision are applied (Rammelt *et al.*, 2003). There is no standard treatment of ingrown nail, therefore, the treatment must be chosen according to the patient.

The method to be chosen must be a simple one with a less recurrence rate, prioritizing the patient comfort and enabling the patient to return to his/ her social life fast (Gabriel *et al.*, 1979). In surgical treatment, the Winograd, Bardlett methods and their modifications are applied (Gabriel *et al.*, 1979; Burov *et al.*, 1984; Caprioli *et al.*, 1989; Aslan *et al.*, 2006; Aksoy *et al.*, 2009; Alptekin *et al.*, 2011; Sargin *et al.*, 2013). Winograd, in his method, described that the stinging / in growing part of the nail and the germinal matrix of the nail belonging to that area should be excised together (Caprioli *et al.*, 1989). Barlett, in his method, on the other hand, indicated a soft tissue excision in the area where the nail stung / grew (Burov *et al.*, 1984). In our clinic, we analyzed retrospectively the results of the new method we applied without excising a tissue from the germinal matrix and and by preserving the aesthetic appearance as much as possible in the surgical treatment of ingrown nail.

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## MATERIALS AND METHODS

The results of 26 patients, of which 16 were male and 10 female, who applied to Malatya State Hospital, the Cosmetic/ Plastic Surgery Polyclinic between the dates, April 2012- April 2013 with complaints of pain and gleet in the 1<sup>st</sup> toe and / or deformation in the nail, and whom we operated on through the new technique in our clinic were evaluated. 20 of these patients suffered from ingrown nail in a single toe, while 6 of them suffered from the same in two of their toes. According to the classification of Heifetz, there were onychocryptosis (ingrown nail) - Grade 2 in 15 nails and onychocryptosis (ingrown nail) - Grade 3 in 17 nails. All the patients we performed surgery on were administered an antibiotherapy of ciprofloxacin 500 mg 2x1 for both preoperative 5 days and postoperative 5 days. Medical dressing was applied for the first 10 days, The patients were allowed to return to their normal activities on the post op 10<sup>th</sup> day. The sutures were removed on the post op 20<sup>th</sup> day. The patients were called for check-up on the post op 20<sup>th</sup> day, and in the 3<sup>rd</sup>, 6<sup>th</sup> and 12<sup>th</sup> months.

### Surgical technique

The patients were taken under operation under a digital block anaesthesia in the operating room environment. Local field cleaning with povidone iodine was done and tourniquet was applied to the toe. The granulation tissue in the nail lateral was excised with the help of a scalpel (bistoury). From the nail and nail bed lateral, a vertical incision reaching the proximal area



**Figure 1. Representative illustrations of surgical treatment stages. A1 & A2: Preop Image; B1 & B2: The infected granular tissue was excised; C1 & C2: Incision is performed in order to release the tissue in the nail bed and nail bed lateral; D1 & D2: The incision is canalized/deepened and the bands in the nail bed lateral are cut.; E1 & E2: The nail bed and the nail are elevated / removed through the use of an obtuse tool; F1 & F2: The skin in the lateral part was de-epithelialized; G1 & G2: The suture is being removed through the Mayo Suture Technique; H1 & H2: Postop Image**

of the germinal matrix was performed. By the incision, the nail and nail bed was separated from the soft tissue in its lateral. The lateral bands of the nail bed were incised via a horizontal incision. The nail bed and the nail were elevated / removed with an dissector. The skin in the lateral part was de-epithelialized. The tissue de-epithelialized by using the Mayo suture technique was sutured by forwarding it under the nail bed (Langer *et al.*, 2003).

## RESULTS

32 nails (26 patients) operated, 9.4% (3) patient were observed post operative infection. In three male patient who were infected had not used antibiotics as advised during the post-op period. One of these three patients was hospitalized, his infected wound recovered secondarily with antibiotherapy and daily medical dressing application. Other two patients recovered same as secondarily without hospitalization. On the other hand, no finding of an infection was observed on 29 nails. There was not any recurrence in any of the patients (26 patient) during their 12-month-follow ups, except for one of the infected patient, and all of them returned to their daily activities on the 10<sup>th</sup> day.

## DISCUSSION

A number of conservative and surgical techniques were identified in the treatment of onychocryptosis (Ingrown nail). In our literature review, various surgical methods are described as a general approach in the treatment of ingrown nail, including the excision of the ingrowing / stinging part of the nail and the excision of the soft tissue where the nail grows / stings (Winograd, 2007). Aslan *et al.* (2006) have identified a recurrence in one of the 17 patients they had operated on through the excision of germinal matrix and nail bed (Aslan *et al.*, 2006). Sargin S., in one of his studies, stated that he saw a recurrence in one patient in the results of the modified winograd method he had applied to 52 patients. In the patient contentment survey, 49 patients were stated to be in good condition, while 3 of them were in bad condition (Sargin, 2013). In the study conducted by Aksoy *et al.* (2009) the recurrence rate of the lateral foldplasty and the ingrown nail (onychocryptosis) was reported to be 4 %. On the other hand, Alptekin *et al.* (2011) in their studies published in 2011, stated that different from the other techniques, there was no recurrence with the triangular tissue excision from the lateral fold and with the primary suturing (Alptekin *et al.*, 2011).

The nail grows follows to the shape of the nail bed. Therefore, while planning the surgical treatment of ingrown nail, the primary objective should be towards fixing the nail bed. Through the method we applied, the nail angle is fixed by elevating the nail bed and the nail. To stop the angle from getting distorted over again, the recurrence of ingrown nail is prevented by providing a soft tissue support under the nail bed. In severe nail deformities where nail flexibility fails, on the other hand, we consider that fixing the nail bed through our method after the nail is removed will increase the chance of success. Development of wound infection in 9.4% of the patient operated on, who had not used antibiotics as advised during the post-op period indicates how importance of

antibiotherapy in our surgical technique. In our study, no recurrence was seen in 32 nail cases we had operated on through medium of the new method identified. Thanks to this new method, it is possible to apply the treatment of ingrown nail by preserving the aesthetic appearance all the way, without minimizing the nail. Consequently, we suppose that the application of this method would be appropriate for the surgical treatment of ingrown nail (onychocryptosis) due to a better aesthetic appearance and a lower rate of recurrence.

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