The long-term esthetic results of two surgical methods for treating ingrown toenails

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ABSTRACT

Aims: Ingrown toenails can be treated using several surgical methods. The long-term esthetic outcome of such treatments is important for the patients, but the physicians often neglect it. This study aimed to compare the long-term esthetic results of 2 different surgical methods to treat ingrown toenails: lateral foldplasty and lateral matricectomy. **Methods:** Postoperative photographs of patients' toes were retrospectively evaluated using a visual analog scale (VAS) and seven criteria: general esthetic appearance of the great toe, nail plate, proximal periungual fold, medial periungual fold, lateral periungual fold, toe distal to the nail plate, and scars. **Results:** Two investigators evaluated the photographs of 16 great toes (8 treated via lateral foldplasty and 8 treated via lateral matricectomy). Both investigators gave significantly higher VAS scores to the photographs of toes treated via lateral foldplasty, indicating better esthetic results. **Conclusions:** The present findings showed that lateral foldplasty yields better long-term esthetic results than lateral matricectomy. We suggest that surgeons treating ingrown toenails should choose the lateral foldplasty instead of lateral matricectomy to achieve better esthetic results.

Introduction

Ingrown toenail (onychocryptosis) is a common nail unit disorder that primarily affects adolescents and young adults (1). Ingrown toenail negatively affects quality of life and daily activities (including work, school, and sports) because it causes pain and impairs ambulation (1). Ingrown toenail develops due to structural characteristics of the nail, such as being flat and splayed, genetic factors, use of improper footwear resulting in microtrauma and pressure on nails, and excessively deep and elliptical nail trimming (1,2). Ingrown toenail causes edema, soft tissue hypertrophy, discharge, and pain (1).

In mild cases such conservative treatment methods as straight nail trimming, and placing cotton and dental floss underneath the ingrown part can be effective (2), but surgical methods of treatment are required in moderate-severe cases (2). Chemical matricectomy with phenol and surgical lateral matricectomy are the 2 most common surgical methods that are used to narrow the ingrowing nail plate (1,2). In an earlier study (2009) we showed that surgical treatment of hypertrophied periungual tissue rather than the nail plate (referred to as lateral foldplasty) is effective in selected patients with ingrown toenail (3). Lateral foldplasty can be combined with minimal surgical lateral matricectomy in select patients with a wide nail plate (3). Both methods of treating an ingrown wide nail plate or hypertrophied periungual tissue are effective treatments for ingrown toenail that are associated with low recurrence rates (1-3).

There exist multiple scoring methods used to objectively evaluate clinical findings and scars that are used by clinicians and patients (4,5). Multipl scoring methods are used to standardize findings and compare studies (4). A visual analogue scale (VAS) is a type of scale that was originally used to score pain, but has been adapted to score clinical findings and scars (4,5). The present study aimed to retrospectively compare the long-term esthetic results in ingrown toenails treated via lateral foldplasty and lateral matricectomy.

Methods

Postoperative photographs of patients with ingrown toenails treated via lateral foldplasty (lateral foldplasty group) and lateral matricectomy (lateral matricectomy group) were retrospectively evaluated for this pilot study. All lateral foldplasty surger-

ies were performed by the same surgeon (HMA) between 2010 and 2015. Postoperative photographs were taken by HMA during the last postoperative follow-up visits (at least after 4 months), at which time periungual scars were noted. Lateral matricectomies were performed by surgeons other than HMA (an orthopedist or general surgeon) between 2010 and 2015. Postoperative photographs were taken by BA during dermatological examination for another complaint, at which time periungual scars were noted. Patient sociodemographic and clinical data were obtained from medical records.

Lateral matricectomy aims to narrow nail plate in order to prevent penetration of the lateral or medial distal edges of the nail plate into the corresponding nail folds (2). It is a technique commonly performed by physicians from surgical specialities like orthopedicians and general surgeons. It is a good technique when properly executed but spicule formation is a problem following this procedure. Lateral matricectomy consisted of resection of 3-5 mm of the lateral matrix, nail plate, and nail bed (2).

Procedures aimed at re-orienting lateral nail folds in order to prevent penetration by distal lateral and medial edges of nail plates are usually preferred for mild to moderate cases of ingrown toenails. This procedure when combined with limited lateral matrix resection can be used to treat severe forms of ingrown toenails (3). Lateral foldplasty was used to re-orient the hypertrophied periungual lateral nail fold laterally and downwards away from the ingrowing corner of the nail plate (3). In selected patients with wide nail plates, minimal (2-3 mm) lateral matricectomy can be performed in addition to lateral foldplasty, so as to narrow the nail plate (3).

Postoperative photographs of the ingrown toenails in both groups were scored by 2 independent blinded investigators (AH, a dermatologist and HB, an orthopedist) using a VAS (5). Both investigators were unfamiliar with lateral foldplasty and both were blinded to which surgical technique was used for each toe. Postoperative photographs were scored according to 7 criteria: general esthetic appearance of the toe; general esthetic appearance of the nail plate; general esthetic appearance of the proximal periungual fold; general esthetic appearance of the medial periungual fold; general esthetic appearance of the lateral periungual fold; general esthetic appearance of the toe distal to the nail plate; general esthetic appearance of scars. Study form is presented in Figure 1.

Figure 1: Post lateral foldplasty photographs.

In VAS a 10 cm straight line drawn on a paper is used and the distance of the point put on this line from the zero point is accepted as objective evaluation criteria (5). Markings were measured in mm (0-100 mm), 0 indicating worst and 100 indicating the best cosmetic results (Table 1). The 2 investigators' scores were compared statistically to determine differences in the long-term esthetic results between the 2 surgical methods. As this study is a pilot retrospective evaluation of postoperative photographs obtained from personal archieves patient approval or ethical committee permission was not obtained.

Table 1. The study form.

Toe No:..... Patient Name.....
Age of the patient at the time of operation..... ex.....
Toe right..... Medial.....Operation date .....
Lateral.....Operation date .....
left.....Medial.....Operation date .....
Lateral.....Operation date .....
History of previous nail drawing .....how many times.....
Postoperative photography date .....Postop duration.....months
Evaluation of general aesthetic appearance of operations:
General aesthetic appearance of toe
Worst 0 I----------I 100 Best
General aesthetic appearance of nail plate
Worst 0 I----------I 100 Best
General aesthetic appearance of proximal periungual fold
Worst 0 I----------I 100 Best
General aesthetic appearance of medial periungual fold
Worst 0 I----------I 100 Best
General aesthetic appearance of lateral periungual fold
Worst 0 I----------I 100 Best
General aesthetic appearance of toe that is distal to nail plate
Worst 0 I----------I 100 Best
General aesthetic appearance of the scars
Worst 0 I----------I 100 Best

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows v.22 (IBM Corp., Armonk, NY, USA). Between-group differences were analyzed via the independent samples T-test. The level of statistical significance was set at $P < 0.05$.

Results

The study included postoperative photographs of 8 ingrown toenails that were treated using lateral foldplasty (Figure 1) and 8 that were treated using lateral matricectomy (Figure 2). The lateral foldplasty group included 8 ingrown toenails (3 were treated bilaterally) in 5 male patients aged 14-28 years. All surgeries in the lateral foldplasty group were performed by the same surgeon (HMA). In four toes of lateral foldplasty group, limited (2-3 mm) lateral matricectomy was combined with lateral foldplasty because of widened toe nail plate with /without granulation tissue formation and nail fold hypertrophy. The other four toes were not wide and there was neither granulation

Figure 2: Post lateral matricectomy photographs.

tissue formation nor nail fold hypertrophy in these toes. In patients without widened toe nail plate and nail fold hypertrophy we performed lateral foldplasty without additional limited lateral matricectomy. The median postoperative follow-up period in lateral foldplasty group was 15 months (range: 4-53 months). The lateral matricectomy group included 8 ingrown toenails (4 were treated bilaterally) in 7 patients (3 male and 4 female) aged 16-39 years. All lateral matricectomies were performed by surgeons other than HMA (orthopedists or general surgeons). According to patients' declarations in the lateral matricectomy group, there were widened toe nail plates with nail fold hypertrophy in five toes preoperatively. The other patients in this group declared that there were neither widening of nail plates nor nail fold hypertrophy in three toes. All patients in this group were treated by the same technique namely lateral matricectomy. The median postoperative follow-up period in the lateral matricectomy group was 18 months (range: 7-84 months). All the patients in both groups were satisfied with the postoperative functional results, and were free of disease and pain at the time the postoperative photographs were taken.

Esthetic results of both surgical methods, based on the postoperative photographs, were scored and compared by 2 independent investigstors; there weren't any significant differences between the investigators' scores. Both investigators' VAS scores for lateral foldplasty were higher than those for lateral matricectomy, indicating better esthetic results. Statistical analysis of both investigators' VAS scores showed that lateral foldplasty yielded better esthetic results than did lateral matricectomy (Table 2).

We did not aim to compare preoperative and postoperative aesthetic improvement in this study. But we did want to compare results of two different techniques with regard to aesthetic appearance of toes postoperatively. However aesthetic appearance of all toes in lateral foldplasty group were better postoperatively and there were four toes in lateral matricectomy group that were aesthetically compromised when compared to preoperative aesthetic appearance ot these toes.

Discussion

Ingrown toenails can be categorized according to etiology; those that develop in the context of normal nail shape due to improper nail trimming in otherwise healthy individuals and those that develop due to abnormal nail shape, such as a pincer nail or abnormally wide nail (6). Pearson et al. (7) attempted to identify which nail abnormalities cause ingrown toenail, but did not observe any causative abnormalities. They reported that nail shape and curvature are similar in ingrown and normal toenails, and suggested that nail abnormality is not the cause of ingrown toenail and shouldn't be the target of treatment for ingrown toenail (7). Ingrown toenail due to improper trimming can be treated via conservative methods (6,8). In severe cases the hypertrophied nail fold can be treated surgically (8,9). Lateral foldplasty is a method of treating a hypertrophied nail fold instead of the nail plate (3,8). Abnormal toenails need to be treated surgically via partial nail avulsion, and surgical or chemical lateral matricectomy (6); however, chemical or surgical lateral matricectomy with partial nail avulsion is the most commonly used surgical method for all types of ingrown toenail (6,8). Chemical matricectomy with phenol is the most effective treatment method, according to a Cochrane Database review (10).

When treating ingrown toenails postoperative long-term esthetic results are as important to patients as curing the presenting complaints; As such, wedge excision is no longer recommended because it is associated with a very high recurrence rate, significant morbidity, and poor esthetic and functional results (8). Additionally, Zadik's procedure and amputation of the tip of the toe have become obsolete for the same reasons (7). Although they are very important to patients, surgeons commonly neglect the importance of long-term esthetic results. As most patients trim their nails on a regular basis and continuously observe the esthetic results of surgery, if the results are not cosmetically pleasing they will be unhappy. Ideally, the aim of treatment is to surgically treat the ingrown toenail while not disturbing the appearance of the nail and surrounding tissue; therefore, esthetic results must be taken into account when

Table 2. General esthetic appearance scores (P < 0.05 considered significant)

	Lateral foldplasty (mean ± SD)	Lateral matricectomy (mean ± SD)	P
Toe	73.13 ± 15.18	40.56 ± 33.91	0.027
Nail plate	76.50 ± 13.17	39.56 ± 35.58	0.016
Proximal nail fold	76.56 ± 18.33	39.81 ± 31.24	0.012
Medial nail fold	70.88 ± 15.32	40.81 ± 33.62	0.037
Lateral nail fold	78.75 ± 13.25	41.19 ± 28.72	0.005
Distal part of toe	83.19 ± 7.84	39,81 ± 32.03	0.002
Scars	73.69 ± 20.53	35,13 ± 31.52	0.012

choosing which method to use for surgically treating an ingrown toenail.

The present pilot study on the esthetic evaluation of postoperative photographs of ingrown toenails has some limitations, including the small number of postoperatively photographed toes evaluated, unintentional selection bias as photographs are retrieved by retrospective evaluation of authors' personal archives, and the fact that 1 surgeon performed all lateral foldplasties and several surgeons performed lateral matricectomies. So it is not possible to know if the performances of the physicians affected the results. Additional prospective comparative studies of both of the surgical methods described herein performed by 1 surgeon that include patients with homogeneous severity of ingrown toenails affecting one or both sides might yield more useful data concerning long-term esthetic results.

The present study evaluated the long-term esthetic results of 2 surgical methods for the treatment of ingrown toenail; lateral foldplasty, which aims to treat the hypertrophied nail fold, and lateral matricectomy, which aims to treat the abnormal nail plate by decreasing its width. Two independent blinded investigators (a dermatologist and an orthopedist) scored the postoperative photographs using a VAS. They scored photographs comparably and similarly to each other. The present findings show that lateral foldplasty yields better long-term esthetic results than lateral surgical matricectomy. We advise all physicians to carefully consider the long-term esthetic results of the surgical treatment of ingrown toenails.

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Conflict of Interest

The author declared they do not have anything to disclose regarding conflict of interest with respect to this manuscript.

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