

## Original Research

### A comparative analysis of phenol and sodium hydroxide for chemical matricectomy in patients with ingrown toenails

Meenakshi Kapoor

Associate Professor, Department of Dermatology, Gauri Devi Institute of Medical Sciences & Hospital, Durgapur, West Bengal, India

#### ABSTRACT:

**Background:** When a toenail's edge or corner grows into the surrounding skin rather than over it, it's known as an ingrown toenail. The present study was conducted to assess the efficacy of phenol and sodium hydroxide for chemical matricectomy in the management of ingrown toenails. **Materials & Methods:** 70 cases of matricectomy of both genders were divided into 2 groups of 35 each. Group I patients received 88% phenol and group II received 10% NaOH chemical matricectomy. Recorded were the length of complaints, the degree of ingrown toenails, the length of postoperative pain, the length of postoperative discharge, and the amount of time needed for tissue normalization. **Results:** Out of 70 patients, 38 were males and 32 were females. The mean the duration of postoperative pain was 6.2 days and 12.3 days, duration of complaints was 13.6 months and 9.2 months, time taken for tissue normalization was 9.1 days and 16.5 days and the duration of postoperative discharge was 14.6 days and 19.1 days in group I and group II respectively. The difference was significant ( $P < 0.05$ ). The severity of ingrown toenail in group I and group II was stage 1 in 10 and 11, stage 2 in 7 and 9 and stage 3 in 18 and 15 patients respectively. The difference was significant ( $P < 0.05$ ). **Conclusion:** 10% sodium hydroxide treatment for ingrown toenails works just as well as 88% phenol chemical matricectomy. It has a slightly better unfavorable impact profile.

**Keywords:** toenail, swelling, redness

Received: 15-07-2019

Accepted: 17-08-2019

**Corresponding Author:** Meenakshi Kapoor, Associate Professor, Department of Dermatology, Gauri Devi Institute of Medical Sciences & Hospital, Durgapur, West Bengal, India

**This article may be cited as:** Kapoor M. A comparative analysis of phenol and sodium hydroxide for chemical matricectomy in patients with ingrown toenails. J Adv Med Dent Sci Res 2019;7(9):318-321.

#### INTRODUCTION

When a toenail's edge or corner grows into the surrounding skin rather than over it, it's known as an ingrown toenail. Pain, swelling, redness, and occasionally infection can be symptoms of this frequent illness.<sup>1</sup> Although they can happen on any toe, ingrown toenails most frequently affect the big toe. Ingrown toenails can be encouraged by rounding the edges or cutting them excessively short.<sup>2</sup> Excessively tight shoes can squeeze the toes and push the nails into the flesh. An ingrown toenail can occasionally result from trauma to the toe, such as a stub. A genetic susceptibility to ingrown toenails may exist in certain individuals.<sup>3</sup>

Lateral matricectomy, or the removal of the matrix's lateral horns, is an essential component of treating ingrown toenails. Either surgery or, more commonly, chemical matricectomy—the destruction of the lateral matrix—can be used to achieve this.<sup>4</sup> Phenol (88%

solution) has been one of the most widely used and successful agents for decades; yet, even with cautious application, it may cause prolonged postoperative drainage and delayed recovery.<sup>5</sup> Examining alternate drugs to lower postoperative morbidity is standard procedure. Sodium hydroxide (NaOH; 10% solution) is an option that has been shown to be safe, effective, and to reduce postoperative drainage; however, there are few long-term efficacy studies available.<sup>6</sup> The present study was conducted to assess the efficacy of phenol and sodium hydroxide for chemical matricectomy in the management of ingrown toenails.

#### MATERIALS & METHODS

The present study consisted of 70 cases of matricectomy of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 35 each. Group

I patients received 88% phenol and group II received 10% NaOH chemical matricectomy. Recorded were the length of complaints, the degree of ingrown toenails, the length of postoperative pain, the length of

postoperative discharge, and the amount of time needed for tissue normalization. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Total- 70		
Gender	Male	Female
Number	38	32

Table I shows that out of 70 patients, 38 were males and 32 were females.

**Table II Assessment of parameters**

Parameters	Group I	Group II	P value
duration of postoperative pain (days)	6.2	12.3	0.01
Duration of complaints (months)	13.6	9.2	0.02
time taken for tissue normalization (days)	9.1	16.5	0.01
duration of postoperative discharge (days)	14.6	19.1	0.05

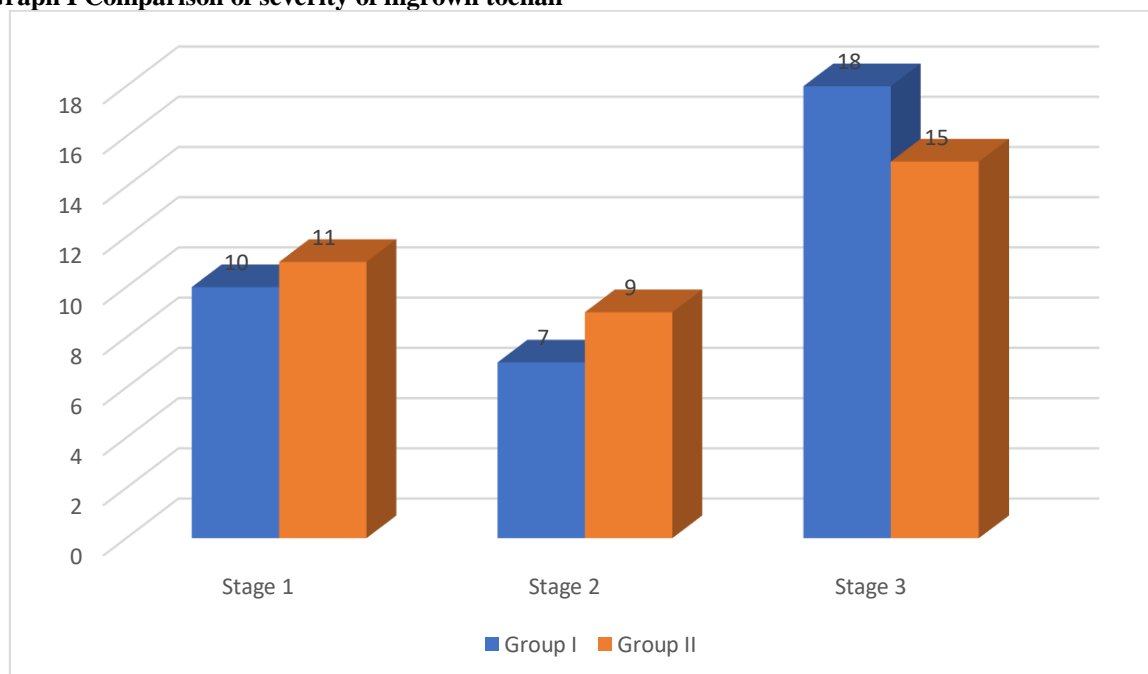
Table II shows that the mean the duration of postoperative pain was 6.2days and 12.3days, duration of complaints was 13.6months and 9.2months, time taken for tissue normalization was 9.1days and 16.5 days and the duration of postoperative discharge was 14.6days and 19.1days in group I and group II respectively. The difference was significant (P< 0.05).

**Table III Comparison of severity of ingrown toenail**

Stage	Group I	Group II	P value
Stage 1	10	11	0.95
Stage 2	7	9	
Stage 3	18	15	

Table III, graph I shows that the severity of ingrown toenail in group I and group II was stage 1 in 10 and 11, stage 2 in 7 and 9 and stage 3 in 18 and 15 patients respectively. The difference was significant (P< 0.05).

**Graph I Comparison of severity of ingrown toenail**



**DISCUSSION**

Ingrown toenail is one of the most common painful nail conditions presenting to a dermatologist. It is a result of the lateral edge of the nail plate getting embedded in the nail fold (where it acts as a foreign

body) resulting in a cascade of inflammation, infection and the reparative process.<sup>7</sup> The condition most commonly involves the great toes and mainly affects young adults. Partial nail plate avulsion and chemical cauterization of the matrix edge is a

successful method for the treatment of ingrowing nails which in recent years has been the treatment of choice of many doctors dealing with the problem.<sup>8</sup> Classically, two chemical agents were used in this procedure: phenol and sodium hydroxide. Phenol is the first agent used and is described to provide effective results with high success rates over 95%.<sup>9</sup> The present study was conducted to assess the efficacy of phenol and sodium hydroxide for chemical matricectomy in the management of ingrown toenails. We found that out of 70 patients, 38 were males and 32 were females. Kocyigit et al<sup>10</sup> assessed the best time to apply sodium hydroxide, which resulted in excellent success rates and low postoperative morbidity. Three groups of sixty-six patients with 225 ingrown nail edges were treated with sodium hydroxide treatments lasting thirty seconds, one minute, and two minutes. After surgery, each patient was examined for tissue injury, discomfort, and drainage. 14 months was the median length of the long-term follow-up. The success rate of the therapy was 70.9% in the first group, 92.7% in the second group, and 94.4% in the third group. Within 48 hours after the procedure, almost half of the patients in all groups reported having little pain; however, only 20% of the patients in the third group reported having little pain for at least a week. All groups saw little to no tissue injury or drainage, which went away in the first and second groups after three weeks, but took six weeks in the third.

We observed that the mean the duration of postoperative pain was 6.2 days and 12.3 days, duration of complaints was 13.6 months and 9.2 months, time taken for tissue normalization was 9.1 days and 16.5 days and the duration of postoperative discharge was 14.6 days and 19.1 days in group I and group II respectively. In their study, Ozdemir et al<sup>11</sup> separated 60 patients into two groups and performed 156 partial chemical matricectomy surgeries using 10% sodium hydroxide. While the second group (76 nail sides) received a combination of curettage of the lateral matrix area and a 1-minute application of sodium hydroxide, the first group (80 nail sides) received a 2-minute application of sodium hydroxide. Two days following the procedure and at three further visits spaced one week apart, postoperative discomfort, drainage, and tissue damage were assessed. In both groups, partial matricectomy using 10% sodium hydroxide was 100% successful ( $P > 0.05$ ). The vast majority of patients had either no postoperative discomfort or very little tissue damage, and there was no statistically significant difference between the two groups ( $P > 0.05$ ). On the 2nd day, more patients in the first group experienced mild drainage than the patients in the second group ( $P = 0.001$ ), but in the following control visits, this difference disappeared.

We found that the severity of ingrown toenail in group I and group II was stage 1 in 10 and 11, stage 2 in 7 and 9 and stage 3 in 18 and 15 patients respectively.

In the study by Grover et al<sup>12</sup>, individuals with ingrown toenails were randomized in order of enrollment into two treatment groups to receive chemical matricectomy with either 88% phenol (Group 1,  $n = 26$ ) or 10% NaOH (Group 0,  $n = 23$ ). The median duration of postoperative pain was 7.92 days for Group 0 and 16.25 days for Group 1 ( $P < 0.202$ ), indicating that both groups responded effectively to therapy. The median duration of postoperative discharge was 15.42 days for Group 0 and 18.13 days for Group 1 ( $P < 0.203$ ). After 7.50 days for Group 0 and 15.63 days for Group 1, the tissue condition returned to normal ( $P < 0.007$ ). The shortcoming of the study is the small sample size.

## CONCLUSION

Authors found that 10% sodium hydroxide treatment for ingrown toenails works just as well as 88% phenol chemical matricectomy. It has a slightly better unfavorable impact profile.

## REFERENCES

1. Travers GR, Ammon RG. The sodium hydroxide chemical matricectomy procedure. *J Am Podiatry Assoc* 1980;70:476-8.
2. Yang KC, Li YT. Treatment of recurrent ingrown great toenail associated with granulation tissue by partial nail avulsion followed by matricectomy with a Sharpulse carbon dioxide laser. *Dermatol Surg* 2002;28:419-21.
3. Espensen EH, Nixon BP, Armstrong DG. Chemical matricectomy for ingrown toenails: Is there an evidence basis to guide therapy? *J Am Podiatr Med Assoc* 2002;92:287-95.
4. Baran R, Haneke E. Matricectomy and nail ablation. *Hand Clin* 2002;18:693-7. 16. Siegle RJ, Stewart R. Recalcitrant ingrowing nails: Surgical approaches. *J Dermatol Surg Oncol* 1992;18:744-52.
5. Chiacchio ND, Belda W Jr, Chiacchio NG, Kezam Gabriel FV, de Farias DC. Nail matrix phenolization for treatment of ingrowing nail: Technique report and recurrence rate of 267 surgeries. *Dermatol Surg* 2010;36:534-7.
6. Tatlican S, Yamangöktürk B, Eren C, Eskioğlu F, Adiyaman S. Comparison of phenol applications of different durations for the cauterization of the germinal matrix: An efficacy and safety study. *Acta OrthopTraumatolTurc* 2009;43:298-302.
7. Byrne DS, Caldwell D. Phenol cauterization for ingrowing toenails: A review of five years' experience. *Br J Surg* 1989;76:598-9.
8. Bostanci S, Kocyigit P, Gürgey E. Comparison of phenol and sodium hydroxide chemical matricectomies for the treatment of ingrowing toenails. *Dermatol Surg* 2007;33:680-5.
9. Bostanci S, Ekmekçi P, Gürgey E. Chemical matricectomy with phenol for the treatment of ingrowing toenail: A review of the literature and follow-up of 172 treated patients. *Acta Derm Venereol* 2001;81:181-3.
10. Kocyigit P, Bostanci S, Ozdemir E, Gürgey E. Sodium hydroxide chemical matricectomy for the treatment of ingrown toenails: Comparison of three different application periods. *Dermatol Surg* 2005;31:744-7.

11. Ozdemir E, Bostanci S, Ekmekci P, Gurgey E. Chemical matricectomy with 10% sodium hydroxide for the treatment of ingrowing toenails. *Dermatol Surg*2004;30:26-31.
12. Grover C, Khurana A, Bhattacharya SN, Sharma A. Controlled trial comparing the efficacy of 88% phenol versus 10% sodium hydroxide for chemical matricectomy in the management of ingrown toenail. *Indian J Dermatol Venereol Leprol*2015;81:472-7.