

Original Research Article

How to resolve zip injury of prepuce? Better way of manipulation

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ABSTRACT

Background: Entrapment of prepuce in a zipper is a common cause of prepuceal injury in children. It is seen in boys of age group 5-12 years who usually do not wear underpants. About 80% of these injuries occur accidentally while zipping up.

Methods: We reported 20 cases with zipper injury during our study period, which were divided in two groups. In Group A, Patients were managed by conventional techniques while in Group B; we managed patients with our technique of manipulation. Final Outcomes were compared with need of circumcision.

Results: All patients in this study were male patients. All were from pediatric age group, except one case in Group A was Adult. In Group A, 7 patients (70%) required Circumcision while in Group B study, only 1 patient (10%) required circumcision. Moreover we found this technique more Simple and Easy.

Conclusions: We found this technique very easy, less time consuming, less trauma to prepuce and need of Circumcision is less with this manipulation.

Keywords: Children, Circumcision, Painless, Prepuce injury, Simple solution, Zip injuries

INTRODUCTION

Although first conceived in the mid-1800s by Whitcomb Judson, an engineer named Gideon Sundback is credited with the development of the modern zip in 1913. On garments, the device was first marketed as a fastener for children's clothes because of its ease of use. The device gained popularity for use on trousers, where it has since become nearly ubiquitous as a mechanism of closure.¹

Objective of the study is to develop a quick, simple and non-traumatic approach to the zipper manipulation. The reported interventions include dismantling the zipper with bone or wire cutters, to circumcision. Preputial injuries are common genital injuries due to entrapment of penile foreskin into the zipper. Entrapment of penile foreskin is quite a distressing situation for the child and the parents and can be a frustrating management problem. Improper

intervention would worsen the situation. The approach to release the foreskin should be some form of mechanical disengagement of the zipper from the skin should be simple, quick, non traumatic and easily reproducible, irrespective of the site of entrapment, tissues involved and design of the zip. Owing to their location, trouser zips are thought to account for a significant proportion of penile injuries, particularly of the prepuce.² This has been particularly noted that multiple techniques for the release of entrapped tissue within the zip teeth and slider. Here we present a small case series of 20 patients had prepuceal injury by zip and managed in emergency.

METHODS

We collected data of patients with suspected zip injuries to prepuce and data on patient age, type of injury, locale where injury occurred, body part affected, disposition

from the Emergency Department in duration of June 2015 to May 2018 at C U Shah Medical College in Gujarat. Moreover we found only 20 cases confined to zip injuries.

Inclusion criteria

Patients with simple zip injury to prepuce only.

Exclusion criteria

Zipper injury in neonates was not included. Traumatic injuries to genitals in other modes were not included in our study. Moreover, injury to frenular artery was also not included in our study. Neonates with Zip Injury were also excluded.

We did detail study of the parts of the Zip. Zip injuries rarely involved any other genital organ than the penis. The next most common organ involved was the scrotum, which was involved in <1% of all zip injuries. Zip injuries in females were exceedingly rare. We did not get any case of zip injury in Female patient in same study duration.

Techniques to resolve zip injury

Before learning the technique, we must understand the basic parts of zip which are shown in Figure 1 (Source: msdmanuals.com).

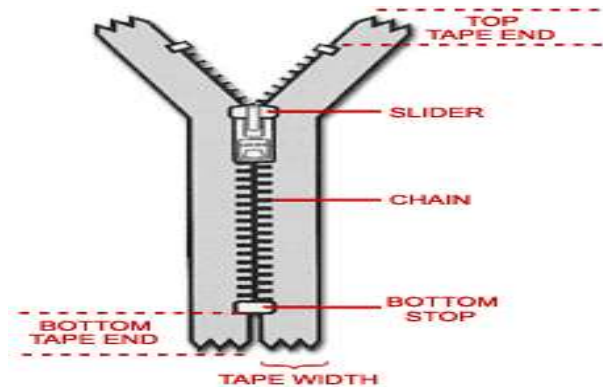


Figure 1: Parts of zip.

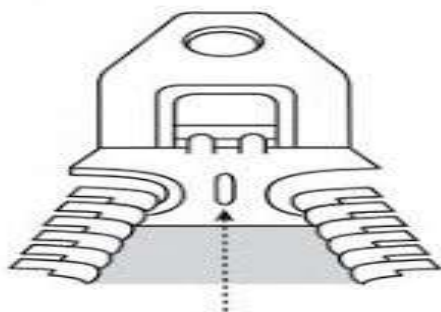


Figure 2: Median bar of zipper fastener.

Zip is basically made up of top and bottom tape ends with slider moving over chain. There is a median bar in the slider of the zip which is usually getting stuck with prepuce (Figure 2).

Just ahead of the entrapped foreskin, using an ordinary wire cutter, the two unzipped halves were first given transverse cuts over the free margin so that the tooth line is divided, and then, further cutting the cloth strips just lateral to the tooth lines, the cuts were extended along the sides of the zip fastener.³ The zip fastener was then held with pliers from side to side ensuring that the lateral margins of its both anterior and posterior faceplates were within the grip of the pliers (Figure 3).

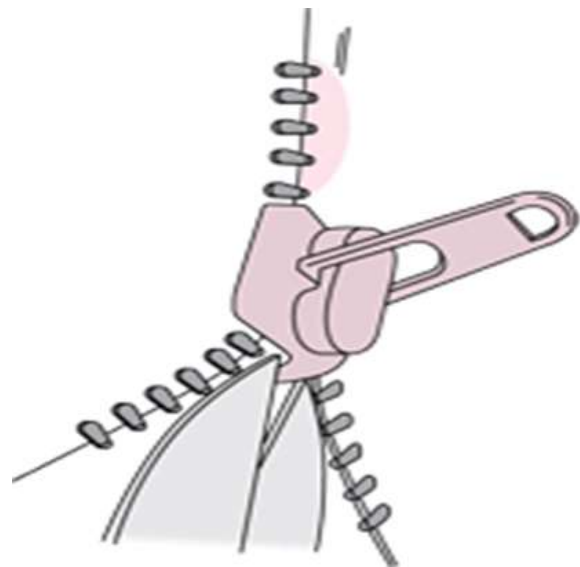


Figure 3: Technique of giving compression by Plicer.

Applying a strong compression, the entrapped foreskin was released instantaneously. This maneuver was painless. It was due to an increased gap between the two faceplates of the zip fastener when compression was applied from the lateral sides.

The increased gap resulted in loosening the interdigitation of the teeth of the two halves of the zip, allowing the prepuce to be slipped off.

RESULTS

In our study all patients were male in both Groups. We included 10 patients in each group which manages conventionally in group A while with this special technique in group B.

Table 1: Gender of patient.

Gender	Male	Female
Group A	10	00
Group B	10	00

Table 2: Age group of patient.

Age group	Group A	Group B
	N (%)	N (%)
Pediatric	09 (90)	10 (100)
Adult	01 (10)	00 (00)

We excluded neonates in this study. There were 9 pediatric patients in group A while 1 adult patient of 22 years age. While in Group B, we had all 10 pediatric patients.

Table 3: Need of circumcision in both groups.

Group	Circumcision not required	Circumcision required
	N (%)	N (%)
Group A	03 (30)	07 (70)
Group B	01 (10)	09 (90)

Table 4: Development of preputial edema.

Development of edema	Yes	No
	N (%)	N (%)
Group A	06 (60)	04 (40)
Group B	02 (20)	08 (80)

In Group A patients, 6 patients developed preputial edema (60%) while in Group B patients only 2 patients developed preputial edema (20%). The suspected cause for developing edema can be considered due to excessive manipulation, which can cause microscopic injury to prepuce.

In Group A patients, 7 patients out of 10(70%) required circumcision at later stage due to pain and unable to retract prepuce at the site if injury due to stretching. While in Group B study, there was only 1 patient out of 10 (10%) required circumcision. In long term follow up, there was no pain while retracting prepuce in Group B patients. Moreover, occurrence of edema in our study was also less in patients of group B.

DISCUSSION

In majority of studies, zipper injury found to be in the pediatric age group and to male patients only.^{3,4} This is similar to our study outcomes. In our study, all 20 patients were male and among them 19 patients (95%) were from pediatric age group.

Management strategies reported in the literature for such injuries are variable. For skin that has become entrapped between the locked teeth of a zip, cutting the cloth between interlocked dentition is generally adequate.⁴

When skin is caught within the buckle of the fastener itself, however, removal can be more challenging. A reasonable initial approach is to attempt unzipping with or without a lubricant such as mineral oil.

In our study, majority patients presented with accidental zip injury. All patients were not wearing undergarments that cause direct injury to prepuce. Another similar study has noticed that all of the patients presented as outpatients during working hours, within 1hr of sustaining entrapment injury. All children were extremely apprehensive, anxious and agitated at the time of presentation.⁴

Results showing less requirement for circumcision in this modified technique in only 10% of patients while in conventional techniques, almost 70% of patients required Circumcision. If this fails, owing to pain, edema or complicated entanglement, multiple other strategies have been advocated.⁵ Cutting the median bar of the zip with bone or wire cutters to separate the two faceplates and release entrapped skin is one known method.⁶ Others have noted that complete separation of the faceplates can be difficult and have therefore proposed limited separation of these elements to relieve entrapment.

As per another study based on 2695 actual cases, an estimated 81 448 individuals (95% CI: 66 555–96 341) presented to US EDs with penile injuries from 2002 to 2010. Two thirds of all penile injuries occurred in the paediatric population (0–18 years). Based on 523 actual cases, 17 616 patients (95% CI: 10 477–24 755) sustained zip injuries to the penis, making this aetiology responsible for 21.6% of all penile injuries presenting to US EDs.⁶

Techniques have included wedging a screwdriver between the faceplates or promoting separation with torque forces by squeezing the top faceplate with pliers.^{7,8} The teeth of the zip mechanism can also be removed one at a time to release the skin. Finally, in refractory cases, circumcision or elliptical incision of penile skin is another option for removing a zip.⁹

The goal of our study was to influence prevention and preparedness for treatment of such injuries by raising awareness of their epidemiology. Given that previous reports have suggested that most injuries occur unintentionally during zip fastening, an important element of prevention is probably simply more attentive use of the zip by the operator; however, parents may consider the use of trousers with an elastic strap or Velcro-fly fasteners until they are confident of their child's manual dexterity and attentiveness during zip fastening. Typically, the pathophysiology is with direct tissue damage to the prepuce or penile skin from entrapment. This injury may be associated with bleeding, swelling, pain, and direct tissue damage. Rapid extraction from the zipper is usually recommended. In general, the longer the tissue is trapped and damaged, the greater the degree of edema, scarring and tissue trauma.¹⁰ Our study also shows more chances of development of edema in Group A patients (60%) compared to that of group B (20%). Main reason for it may be due to excessive manipulation in Group A patients.

When injury does occur, however, practitioners should be familiar with various zip-detachment strategies to treat patients of all ages, from children to adults. It was not documented if patients were circumcised, were wearing underwear at the time of injury, or what types of zips or trousers were used.¹¹ We are now studying the same with longer duration and more number of patients with same cases.

CONCLUSION

All the above given techniques are suitable solutions but our technique seems to be simple, safe, quick, needing just a surgical blade or scissors. We suggest children with long prepuce to undergo circumcision to avoid such injuries and inhabitat wearing underpants or use alternative to zip for clothing in children. With our given technique, there ll be less chances of penetrating injury to prepuce while releasing zip, reducing requirement for circumcision.

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