



## Research Article

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# Experiences in The Care and Treatment of Children and Adolescents with Phimosis

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## Abstract

Phimosis is the inability or difficulty to expose the glans by retracting the prepuce due to changes in the prepuce. It is the most commonly observed disorder in boys and accounts for a large number of visits in all levels of pediatric care. The objective of the present study is to report an experience of treating boys diagnosed with Phimosis in a pediatric surgery referral center. This was a retrospective observational study of pediatric patients referred with an initial diagnosis of Phimosis. Phimosis was classified as grade I, grade II, moderate preputial ring, and loose preputial ring. The following data were collected: Age at admission; history of balanoposthitis, paraphimosis, and previous treatments: Rate of diagnostic confirmation of phimosis; indicated treatment; and therapeutic outcome. Of the 944 boys who received care, diagnosis of phimosis was confirmed in 475 (50.32%), of which 417 (87.79%) were successfully treated through topical treatment. Surgical treatment was more frequent among patients with grade I phimosis, and all cases of moderate or loose preputial ring were resolved with topical treatment. History of balanoposthitis or paraphimosis did not interfere with the treatment, and previous treatment with corticosteroids was associated with low risk of surgery. It was difficult for physicians in non-specialized healthcare settings to establish a diagnosis of phimosis. Topical treatment was effective in most cases of phimosis, and surgery was reserved for boys with inflammation of the foreskin that was refractory to local treatment and who were usually older.

## Keywords

Phimosis, Children, Teenagers, Epidemiology, Treatment

## Introduction

Phimosis is the most common disorder of the penis in children and adolescents. In the first year of life, it occurs in 95-96% of children, although by age 3-4 years, it spontaneously resolves in up to 90% of cases [1-4]. Therefore, approximately 10% of children aged more than 3-4 years have some degree of phimosis and will probably receive treatment for it [5-6]. Phimosis is the inability or difficulty to expose the glans by retracting the foreskin due to changes in the dermis of the prepuce, including the loss of collagen and tissue elasticity and foreskin scar tissue resulting from repeated inflammation or local trauma [1-8].

The distinction between normal genitalia and phimosis remains difficult. For this reason, and because phimosis affects 1-10% of all boys aged less than 18 years, there is a high demand for management and treatment of this disorder in

pediatric health settings [1,3,5]. When Phimosis is diagnosed, it is vital to classify it and define its degree [1,3,4,9].

The treatment of patients with Phimosis after diagnosis remains controversial [2,6,8,10,11]. In some countries, especially in the US and Canada, circumcision is advocated for all boys, even during the neonatal period, regardless

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of cultural or religious backgrounds [8,12-15]. In other countries, it is believed that surgical treatment should only be considered for children with preputial scarring, chronic inflammatory changes such as balanitis xerotica obliterans, or repeated urinary tract infections, with or without associated urinary malformations [3-6,16]. In the last two decades, the emergence of topical treatment for Phimosis with corticosteroids has promoted discussions on this topic [4, 6,10-11,17].

In this context, the present report describes the experience of treating children and adolescents with suspected Phimosis who were referred to a pediatric surgery referral center. Another aim is to recommend standardization of the nomenclature used in the classification of Phimosis and to assess the treatment outcomes, including the success rate of non-surgical treatment and rate of surgical indication in this series of patients.

## Materials and Methods

### Ethical aspects

The present study was approved by the Research Ethics Committee of the FEPCS/SES-DF through Plataforma Brasil, under CAAE no. 10433119.3.0000.5553, and was in accordance with all ethical aspects described in Resolution CNS/MS 466/2012.

### Study design and sample

This was a retrospective observational study and data was collected from physical and electronic records of pediatric patients referred with suspected phimosis (ICD N47). It was conducted over a period of 30 months, between April 1, 2017 and September 30, 2019, in a pediatric surgery referral center.

### Diagnostic evaluation

All children and adolescents were evaluated by the same pediatric surgeon. A diagnosis of normal-for-age genitalia was made when the glans could be exposed without difficulty. A patient whose prepuce was adherent to the glans without signs of changes in the foreskin dermis that could prevent its opening was also considered as not having Phimosis [1,5,9,11]. These boys' parents or guardians were given guidance on general care and hygiene, and the patients were scheduled for outpatient follow-up.

Phimosis was defined as changes in the prepuce that hindered or prevented the exposure of the glans. In this series of patients, Phimosis was classified as grade I, grade II, moderate preputial ring, and loose preputial ring, based on classifications proposed by other authors who recommended grades ranging from the absence of Phimosis to tight Phimosis [3, 9,12,18-20].

In grade I Phimosis, also designated as tight Phimosis, the pathological prepuce prevented the exposure of the glans. In grade II Phimosis, children exhibited a pathological prepuce that allowed partial exposure of the glans. Moderate preputial ring classification was used for cases with complete or almost complete exposure of the glans but with moderate retraction difficulty and high risk of developing paraphimosis after erection. Finally, loose preputial ring classification was

used in cases with complete exposure of the glans, albeit with the presence of a preputial ring along with a mild risk of paraphimosis. The described grading is shown in (Figure 1).

### Treatment

Based on clinical criteria, patients with grade I phimosis could be treated with primary surgery or topical treatment. Non-surgical topical treatment was initially indicated for patients with grade II phimosis or moderate or loose preputial ring. This treatment involved the application of 0.5% clobetasol propionate for five minutes, twice a day, for at least four weeks but no longer than nine weeks [4-5,10,18-19]. Cases that did not resolve with topical treatment were referred for surgery.

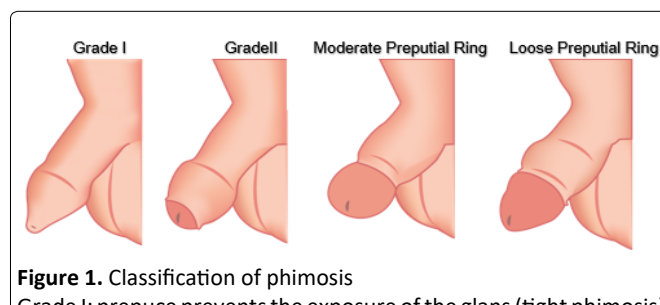
### Data Collection and Statistical Analysis

The following parameters were investigated: Age at admission; history of balanoposthitis, paraphimosis, or previous treatments; correlation between referral of patients with suspected Phimosis and diagnostic confirmation of the disorder: Grade of Phimosis: And rate of Phimosis resolution with non-surgical (topical) treatment or with surgery.

Data were collected using Excel® spreadsheets. The study data were subjected to descriptive analysis and correlation analysis. Data analysis was performed using the IBM SPSS (Statistical Package for the Social Sciences) software, version 23. Values of  $p < 0.05$  were considered statistically significant.

Qualitative variables were presented using frequency and percentage. The normality null hypothesis of the age distribution data was rejected, therefore, the Kruskal-Wallis test (nonparametric) was chosen to verify the association between age and Phimosis classifications. For the comparison in pairs, the Dunn-Bonferroni post-hoc test was performed.

Pearson's chi-square test was used to analyze the association between diagnostic confirmation with previous history (previous treatment with glucocorticoid, balanoposthitis and paraphimosis), with continuity correction when necessary (at least one cell expected a value less than 5). To assess the association between final resolution and age at admission, the Mann-Whitney U nonparametric test



**Figure 1.** Classification of phimosis  
Grade I: prepuce prevents the exposure of the glans (tight phimosis)  
Grade II: prepuce prevents the complete exposure of the glans;  
Moderate preputial ring: complete or almost complete exposure of the glans but with moderate difficulty and high risk of developing paraphimosis  
Loose preputial ring: complete exposure of the glans but with the presence of pathological preputial ring along with a milder degree of pathology and lower risk of paraphimosis.

was used. And the analysis of the association of the clinical or surgical outcome with the classification of Phimosis and previous history of the patients was performed using Pearson's chi-square test.

## Results

During the study period, 944 patients referred with suspected Phimosis received care at our department. Their mean age was  $8.08 \pm 3.16$  years (range 1 to 18 years, median 8.00). Of these, 544 (56.57%) patients had not received treatment previously, and only 2.86% (27/944) and 0.11% (1/944) had a history of balanoposthitis and paraphimosis, respectively (Table 1).

Phimosis was confirmed in 475 children, who accounted for about half of the patients referred for pediatric surgery evaluation. Approximately half of the boys (46.53%) had grade I phimosis (Table 2). There was a positive correlation between a diagnosis of Phimosis and history of previous treatment with topical agents ( $p < 0.001$ -RR 2.224, 95% confidence interval [CI] 1.170-2.893). Patients with a loose preputial ring were significantly younger than the patients with other grades of Phimosis (Figure 2).

Nine children (1.89%) were lost to follow-up, and Phimosis resolution was achieved with non-surgical treatment in 87.79% of patients (Table 2). Surgery was significantly more frequent among patients with grade I Phimosis than among those with other grades of the disorder ( $p < 0.001$  - Pearson's chi-square test). All boys with moderate and loose preputial rings had their Phimosis resolved without surgical intervention.

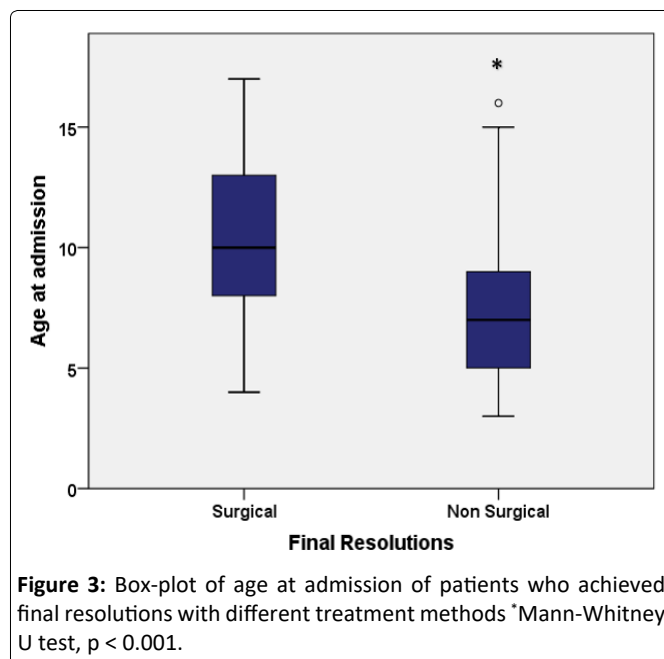
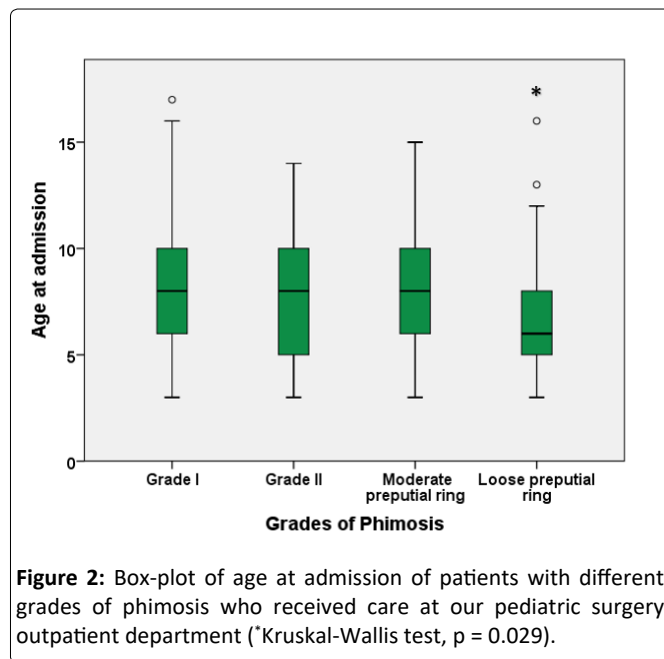
There was a significant association between age at admission and final resolution. Patients who required a surgical approach to the treatment of Phimosis were

**Table 1:** Descriptive analysis of the qualitative variables of patients aged up to 18 years with suspected phimosis.

		N	%
Phimosis	Yes	475	50.32
	No	469	49.68
Previous treatment	Yes	410	43.43
	No	534	56.57
Balanoposthitis	Yes	27	2.86
	No	917	97.14
Paraphimosis	Yes	1	0.11
	No	943	99.89
	Total	944	100

**Table 2:** Descriptive analysis of the qualitative variables of patients aged up to 18 years with phimosis and treatment outcomes.

Classification of phimosis	Grade I	221	46.53
	Grade II	91	19.16
	Moderate preputial ring	112	23.58
	Loose preputial ring	51	10.74
Resolution	Clinical	417	87.79
	Surgical	49	10.32
	Loss to follow-up	9	1.89
	Total	475	100



significantly older than those whose Phimosis resolved with topical treatment, as shown in (Figure 3).

The analysis of the correlation between previous treatment and final resolution showed that patients who had previously undergone topical treatment were 1.905 times more likely than those who did not receive such treatment to achieve Phimosis resolution with non-surgical treatment (Pearson's chi-square test,  $p = 0.035$ , 95% CI 1.038-3.4). The only patient who had a history of paraphimosis had his phimosis resolved with topical treatment. A previous history of balanoposthitis did not significantly influence the final resolution, i.e., the same proportion of patients with balanoposthitis was observed in the surgical and non-surgical treatment outcomes (Pearson's chi-square test,  $p = 1.00$ , RR 1.001, 95% CI 0.224-4.469).

## Discussion

Approximately one in every two boys referred for pediatric surgery had their diagnosis of Phimosis confirmed. This finding provides further evidence of the difficulty that physicians not specialized in pediatric surgery or pediatric urology have in differentiating between normal and altered male genitalia (Phimosis in this case) [3,5,9]. In the present study, the boys whose diagnoses of phimosis were not confirmed had the prepuce adherent to the glans or some excessive foreskin, but they had no difficulty in exposing the glans due to changes in the prepuce. In addition, some children had normal-for-age genitalia [3,5,9,11,18,20]. The development of strategies for training these physicians in common pediatric disorders, such as Phimosis, could be useful in improving the care of pediatric patients.

Different classifications have been proposed by some authors with the aim of helping the diagnostic evaluation of Phimosis: these grades range from total inability to expose the glans to mild preputial rings with less difficulty in glans exposure [3,9,12,18-20]. Given that there is no established, uniform, and widely used classification in the publications on this topic, we herein proposed the standardization of the nomenclature used in the classification of Phimosis: We recommend using four grades and exclude the absence of phimosis as a grade. We aimed to test this simpler version of the previously used classifications in order to facilitate the assessment and therapeutic management of these patients.

The analysis of the correlation between age and grade of Phimosis showed that children with a loose preputial ring (those at a low risk of complications) tended to be younger and that there was no significant difference in the age at admission of children with other grades of the disorder. Some studies have reported that younger boys with a loose preputial ring should not be treated and only be monitored over the course of development of the genitalia as their disorder usually resolves without needing any additional treatment [3,5, 9,20].

However, other studies indicate that treatment is required for all patients, regardless of the grade of Phimosis, to avoid any further complications; the most serious complication being increased risk of cancer of the penis [8,10,14-19]. Thus, given the socio-economic characteristics of the population that received care in our pediatric surgery department, and with the aim of avoiding potential local complications and difficulties accessing specialized medical care, all boys with Phimosis (regardless of the grade of Phimosis and their age) were treated and monitored until the disorder was resolved. According to our experience, topical treatment should be administered initially. When this approach is not successful, or in complicated cases, surgical intervention is indicated.

After the diagnosis of Phimosis was confirmed by the surgical team, the children's parents or guardians received guidance on the use of topical corticosteroids (0.5% clobetasol propionate), which were to be applied for a minimum of five minutes, twice a day, for at least four weeks, as recommended in established protocols [5,10,19,21-22]. This treatment routine led to resolution of the disorder in 87.89% of all cases

in this series, and resolution was achieved in all children with moderate or loose preputial rings. These findings confirm the results obtained in similar studies on Phimosis that reported resolution with topical corticosteroid therapy in 65% to 90% of patients [6,16, 21-23].

Surgical intervention, either by circumcision or posthectomy, for Phimosis should be considered only in specific cases because more complications are associated with this treatment than with topical treatment [4,12,17,24]. The need for surgical intervention was more frequent among older children with grade I Phimosis whose prepuce is probably less responsive to treatment with corticosteroids [5-6,9, 25-26].

Regardless of their age, patients who received topical treatment with corticosteroids on the foreskin were less likely to need surgery. This can be explained by the protective effect of this medication against the development of local inflammation, balanitis xerotica obliterans, and local fibrosis, which are conditions associated with Phimosis that require surgical correction [2,7,21,27].

This was a retrospective observational study that focused on the experience of a pediatric surgery referral center. The study did not involve random assignment of groups: Therefore, some factors might constitute limitations to the analysis of the obtained results. Moreover, it was not possible to control all the potential confounding factors during the study.

Despite the study's limitations, this was an important study given the size of the sample included and the limited loss to follow-up (1.89%). In accordance with the protocols used in the treatment of Phimosis in various pediatric surgical centers, all children and adolescents in the present study were evaluated by a single pediatric surgeon. This might have favored the standardization of the diagnosis, grading, and management of phimosis.

Considering the prevalence of Phimosis in the pediatric population, there are relatively few studies on the topic conducted in Latin countries. Studies like ours are important to help improve the knowledge and management strategies of this common disorder that is a great burden on healthcare.

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