

Prevalence of Phimosis, Benefit of Manual Foreskin Retraction, and Parent's Perception about Phimosis in Thai Kindergarten and Primary School Aged Boys

Witchakorn Sungwalprakaisang MD¹, Valeerat Swatesutipun MD², Teerayut Tangpaitoon MD²

¹ Faculty of Medicine, Thammasat University, Pathum Thani, Thailand

² Thammasat University Hospital, Pathum Thani, Thailand

Background: Primary phimosis can be resolved naturally by aging, however, it can cause a serious complication such as infection, emergency visit to hospital, and risk of developing penile cancer. Circumcision is a good option for treatment but there is no exact cut-off point of the age that the procedure should be performed. Conservative treatment such as manual foreskin retraction has benefit according to literature but timing and how to do it are still questionable.

Objective: To evaluate the prevalence of phimosis in kindergarten and primary school aged boys, the benefit of manual retraction by parents, and to explore the awareness of parents of the complications of phimosis.

Materials and Methods: The present study was a cross-sectional study initiated between June 2020 and August 2020 at Thammasat kindergarten and primary school, Pathumthani, Thailand. Data from 264 boys were collected by online questionnaire. The questionnaire consisted of the grading of phimosis and parental awareness of the complications of the phimosis.

Results: The prevalence of phimosis from the present study was 68% in 3- to 4-year-old boys, 54% in 5- to 6-year-old, 51% in 7- to 8-year-old, 44% in 9- to 10-year-old, and 39% in 11- to 12-year-old boys. For parental awareness, 61% of parents knew that phimosis can be a risk for urinary tract infection, 48% for acute event such as urinary retention or paraphimosis, and only 24% knew that phimosis can be a risk for developing penile cancer. The benefit of the manual retraction was not demonstrated in the present study.

Conclusion: In the present study, the prevalence of phimosis was almost 50%, even in children older than 6-year-old. The authors encourage the education of parents about the complications of phimosis, especially penile cancer.

Keywords: Phimosis; Manual retraction; Penile cancer; Parental awareness; Urinary tract infection; Penile cancer

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“Phimosis” is an inability to retract the narrowed penile foreskin or prepuce to behind the glans of penis⁽¹⁾. As a result of phimosis, children are often brought to urological or pediatric office with urinary tract infection, urinary retention, and paraphimosis⁽²⁾. Not only causing problems in childhood, but also these problems are found in adult too. Moreover,

patients have developed penile cancer without realizing that their cancer is related to phimosis. For physiological phimosis, the prepuce gradually becomes retractable over time, which might take up to 3 to 4 years or older, however, 90% of 3-year-old boys, 6% of 6- to 7-year-old boys, and less than 1% of 16-year-old boys remain having phimosis⁽³⁻⁵⁾. To correct the phimosis and prevent its complication⁽⁶⁾, studies have explained the benefit of neonatal circumcision as prophylaxis. However, these were still debatable for both medical benefit and ethical issues⁽⁷⁻⁹⁾. There is an alternative treatment that helps enhance preputial retract ability of primary phimosis and that has been widely accepted. It is to inform the parents to manage the foreskin of their children by gentle manual retraction during diaper change or bathing to resolve phimosis. However, the result of this method remains controversial⁽¹⁰⁾. Furthermore, some parents had never been informed about this

Correspondence to:

Swatesutipun V.

Thammasat University Hospital, 95 Paholyothin Road, Khlong Luang, Klong Neung, Pathum Thani 12120, Thailand.

Phone & Fax: +66-2-9269523

Email: valeerat@gmail.com

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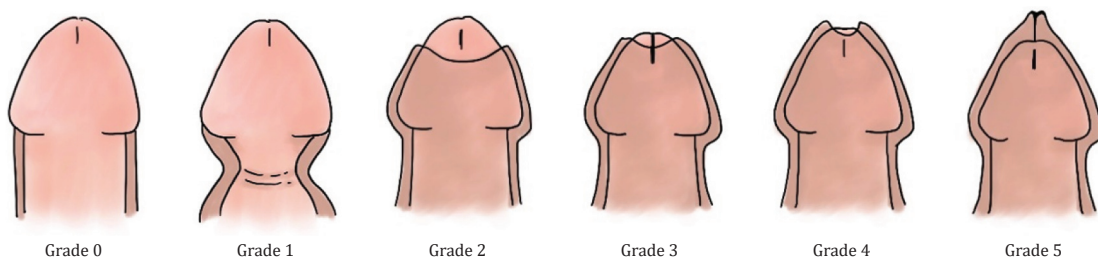


Figure 1. Grade of phimosis.

Grade 2 to 5 were defined as having phimosis, adapt from by kikiros's grading

method and “what is phimosis?” because some experts refuse this method because the retraction could result in pain and trauma, inducing scar formation⁽⁸⁾. The primary endpoint of the present study was to evaluate the prevalence of phimosis and the benefit of manual retraction by parents. Another aim was to explore the awareness of parents about complications of phimosis in kindergarten and primary school age boys.

Materials and Methods

Study oversight

The present study was a cross-sectional study initiated between June 2021 and August 2021 at Thammasat kindergarten and primary school, Pathum Thani, Thailand. The authors collected the data relating to phimosis and parental awareness about the complication of phimosis by using a questionnaire answered by parents. The ethic committee approval was granted by the Thammasat University Ethic Committee in Human Research (reference MTU-EC-SU-1-111/63), dated October 6, 2020, and in full compliance with the international guidelines such as the Declaration of Helsinki, The Belmont Report, the CIOMS Guidelines, and the International Conference on Harmonisation-Good Clinical Practice (ICH-GCP). The written informed consents were obtained from parents prior to the study. The authors confirmed the availability of, and access to, all original data reported in the present study.

Participants and test method

Two hundred twenty boys from kindergarten school and 450 children from primary school were included in this study. Children aged 3 to 12 years were recruited in the present study. Parents of the boys were asked to answer the online survey questions. The questionnaires consisted of the grading of phimosis (Figure 1) and parental awareness of complications of phimosis. The grade of phimosis was evaluated by parents using the reference figure

in the questionnaire. All parents were taught to do proper gentle foreskin retraction by the fact sheet that was attached with the questionnaire to evaluate the grade of phimosis. Boys who had grade 2 to 5 were defined as having phimosis. The parental awareness about the complications were evaluated by using the questions about their realization that phimosis can result in urinary tract infection, acute urinary retention that requires emergency visit to hospital, and risk of developing penile cancer. The answers were divided into three categories, know, misunderstand, and unknown. Misunderstand and unknown were defined as unknown. The authors also asked about how often they had retracted the prepuce for their children. The frequency of manual retraction was defined as every day, more than one time per week, more than one time per month, and less than one time per month. The parents also estimated whether they thought that manual retraction could enhance the resolving of phimosis. The children who had previous penile surgery from any condition and circumcised were excluded from the present study.

Statistical analysis

All analyses were performed by the Stata Statistical Software, version 15.1 (StataCorp LLC, College Station, TX, USA). The authors divided subjects into two groups, having phimosis and no phimosis. Age was classified into two groups as less than or equal to six years old and more than six years old. This classification was based on the previous data indicating that the prevalence of phimosis is significantly smaller at ages of more than six years old. To assess to prevalence of phimosis, the study size was calculated by using prevalence from previous studies^(3,4). The prevalence in under six years old and above six years old were 10% and 5%, retrospectively, and the hypothesized was 30% and 20%, retrospectively, based on power of 0.8 and alpha-error of 0.05. Therefore, the authors needed

at least 56 patients six years and younger and 75 patients older than six years. Continuous data between the two groups were tested by independent t-test for parametric distribution data, and Mann-Whitney U test for non-parametric distribution data. Chi-square test or Fisher's exact test was used for categorical data. All statistical analyses were two-tailed, and the statistical significance were defined as p-value less than 0.05 and 95% confidence interval.

Results

One hundred eighteen boys from kindergarten and 146 boys from primary school met with the eligible criteria and their parents agreed to participate in the survey. Table 1 demonstrates the prevalence of phimosis in each age group. The prevalence of phimosis from the present study was 68% in 3-to 4-year-old boys, 54% in 5-to 6-year-old, 51% in 7- to 8-year-old, 45% in 9- to 10-year-old, and 39% in 11- to 12-year-old boys. The prevalence of phimosis gradually decreased with age (Figure 2). Table 2 demonstrates the demographic data of 264 participants and the prevalence of phimosis in each age group. The mean age of children was seven years old (7.19 ± 2.83). The median age of children who had phimosis was six years old, in contrast to children who had no phimosis, which was eight years old. The authors divided children into two age groups as less than or equal to six years old and more than six years old. The cut-off point of six years old was made according to the previous data indicating that the prevalence of phimosis is significantly smaller at ages of more than six years old. Most children aged greater than six years will spontaneously resolve the primary phimosis at 54.79% versus 45.21% ($p=0.005$).

For parental awareness about complications of phimosis, 61% (160/264) parents knew that phimosis could be a risk for urinary tract infection (Table 3). Additionally, 48% (126/264) knew that a phimosis can be a risk for acute event such as urinary retention or paraphimosis. Only 24% (64/264) knew that a phimosis can be a risk for penile cancer. The number of parents, who performed retraction and realized that phimosis could result in urinary tract infection and acute event was statistically significantly greater than the number of parents who were unaware of these problems at 81.6% versus 18.4% and 56% versus 44%, respectively ($p<0.05$). However, most parents did not know that phimosis can result in penile carcinoma. Moreover, most parents who knew that the manual retraction has a benefit for phimosis did not perform manual retraction (70.50%).

Table 1. Incidence of phimosis by age group

Age	Phimosis/total; n (%)	95% CI
3 to 4 years	49/72 (68.05)	56.01 to 78.55
5 to 6 years	25/46 (54.34)	39.01 to 69.10
7 to 8 years	22/43 (51.16)	35.46 to 66.69
9 to 10 years	29/65 (44.62)	32.26 to 57.46
11 to 12 years	15/38 (39.47)	24.03 to 56.61
Total	140/264 (53.03)	46.81 to 59.17

CI=confidence interval

Table 2. Demographic data and the prevalence of phimosis in each age groups

	No phimosis (n=124)	Phimosis (n=140)	p-value
Age (year); median (IQR)	8.00 (5.00, 10.00)	6.00 (4.00, 9.00)	0.001†
Age group; n (%)			0.005†
≤6 years	44 (37.29)	74 (62.71)	
>6 years	80 (54.79)	66 (45.21)	

IQR=interquartile range

† $p<0.05$ is statistically significant

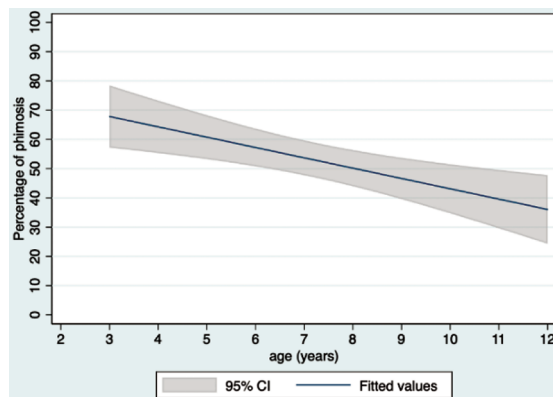


Figure 2. Prevalence of phimosis.

From Table 4, manual retraction decreased the prevalence of phimosis but was not statistically significant since 52.42% of patients had previously performed manual retraction while 47.58% never performed it in the non-phimosis group. Meanwhile, in the phimosis group, parents who had never performed manual retraction totaled 57.14% while 42.86% had previously performed manual retraction, but this was not statistically significant ($p=0.12$). Patients in non-phimosis group performed manual retraction more than once a month, more than once a week, and every day greater than phimosis group, however, it was not statistically significant.

Table 3. Parental awareness of the complications of phimosis

Parent awareness	Not perform retraction (n=139); n (%)	Perform retraction (n=125); n (%)	Known/total; n (%)	p-value
Is phimosis associated with UTIs				<0.001†
Known	58 (41.73)	102 (81.60)	160/264 (60.6)	
Unknown	81 (58.27)	23 (18.40)		
Is phimosis associated with ER visit				0.011†
Known	56 (40.29)	70 (56.00)	126/264 (47.73)	
Unknown	83 (59.71)	55 (44.00)		
Is phimosis associated with CA penis				0.101
Known	28 (20.14)	36 (28.80)	64/264 (24.24)	
Unknown	111 (79.86)	89 (71.20)		
Does manual retraction have a beneficial effect on phimosis				<0.001†
Known	98 (70.50)	54 (43.20)	152/264 (57.57)	
Unknown	41 (29.50)	71 (56.80)		

UTI=urinary tract infection; ER=emergency room; CA=carcinoma

† p<0.05 is statistically significant

Table 4. The frequency of manual foreskin retraction by parents

	No phimosis (n=124); n (%)	Phimosis (n=140); n (%)	p-value
Perform manual retraction			0.120
Yes	65 (52.42)	60 (42.86)	
No	59 (47.58)	80 (57.14)	
Retraction frequency			0.349
Never	59 (42.45)	80 (57.55)	
Less than once a month	29 (46.03)	34 (53.97)	
More than once a month	7 (63.64)	4 (36.36)	
More than once a week	12 (54.55)	10 (45.45)	
Every day	17 (58.62)	12 (41.38)	

Discussion

Most primary phimosis could be spontaneous resolved, however from the present study, the prevalence of phimosis was higher than the previous studies in every age group. This might be because neonatal circumcision in the present study country is not as popular as in the western countries.

From the authors' experiences, men visited the hospital because of penile cancer due to phimosis and were not aware that phimosis could cause penile chronic inflammation, eventually leading to carcinoma. Similarly, boys visiting the hospital each year because of the complications of phimosis had parents who were not aware of the problems of phimosis and how to give a proper hygiene genitalia care for their boys. This might be related to the result of the present study that only 24% of the parents realized that phimosis could cause penile cancer and about 50% to 60% of parents knew about phimosis

causing urinary tract infection and acute urinary retention. Moreover, most parents did not know how to prevent it and how to deal with it, resulting in a lower number of parents doing a manual retraction and a high number of boys remaining with phimosis. This might be because the parents were not aware of the consequences such as cancer. If parents knew about this issue, they would be more concerned about phimosis and would have attempted to correct it.

The limitation of the present study was the grading of phimosis and whether they had secondary phimosis or not, because the participants were not evaluated by medical personnel as the present study was performed during the COVID-19 pandemic. Therefore, the school was closed, and the children stayed home with their parents. The result might be inaccurate from the parental evaluation, and it was also difficult to estimate whether their children had secondary phimosis. However, this method had the advantage of avoiding the psychic trauma, stress, and anxiety experienced by the children resulting from this sensitive area being examined by a physician. Although the present study did not demonstrate that manual foreskin retraction for asymptomatic primary phimosis was beneficial, the present study has not yet collected the data about the complications of this method. There might be need for further study to observe the result in the long term compared to the neonatal circumcision, especially relating to the development of cancer and complications. Manual foreskin retraction for patients with symptomatic phimosis would be an alternative method to neonatal circumcision to correct the phimosis without the

need for surgery. Furthermore, manual retraction for patients with symptomatic phimosis would help parents notice that their children have phimosis. Then, they then might take their children to the hospital early to correct this problem before developing further complications. Another limitation was that the number of participants was 53.64% (118/220) from the kindergarten and 32.44% (146/450) from primary school. Another 406 boys had parents who were not willing to participate and boys who met the exclusion criteria that will be excluded at the beginning by the questionnaire because there was a message in the questionnaire informing that boys who met with the exclusion criteria did not have to answer the questionnaires or participate in the study. Moreover, parents' responsiveness decreased as the age increased, which might be because parents were not involved when their child took a bath when they were old enough to do so themselves. Therefore, this might limit the analysis of prevalence of phimosis in the present study. Further studies in the future should be designed to encourage more participation of the parents and boys.

From the result of the present study, the benefit of manual foreskin retraction does not show statistical significance, therefore, the authors could not recommend routine manual retraction as the standard protocol to treat asymptomatic primary phimosis. However, the authors suggest doing daily gentle manual retraction in patients with symptomatic primary phimosis, who develop complications, and might be concomitant with topical steroid application that demonstrates significant benefit from previous studies^(11,12).

The medical personnel should improve the awareness of parents about phimosis and its complication. Nevertheless, medical personal should teach the proper technique, which should be performed gently to avoid pain and trauma in patients with symptomatic primary phimosis. At the same time, the authors recommend educating the parents about the chance of getting the complications of phimosis if they let it remain until adulthood.

Conclusion

In the present study, the prevalence of phimosis was almost 50%, even in children aged more than six years. However, the benefit of the manual retraction to treat asymptomatic primary phimosis was not demonstrated in the present study. The authors recommend that parents should be educated about the complications of phimosis to prevent future

complications and their child should be treated when they develop problems.

What is already known on this topic?

As a result of phimosis, children are often brought to urological or pediatric office with urinary tract infection, urinary retention, and paraphimosis. For physiological phimosis, from data of the previous studies in western countries, the prepuce gradually becomes retractable over time, which might take up to three to four years or more. However, 6% of 6- to 7-year-old boys remain having phimosis. Studies explained the benefit of neonatal circumcision as prophylaxis; however, these were still debatable for both medical benefit and ethical issues. The alternative treatment to enhance preputial retractability of primary phimosis has been widely accepted. Informing parents to manage the foreskin of their children by gentle manual retraction during diaper change or bathing to resolve phimosis should be done. However, the result of this method from studies remained controversial

What this study adds?

The prevalence of phimosis in Thai boys was higher than the previous studies from the western countries in every age group. The daily manual retraction tends to enhance resolving the primary phimosis condition. For parental awareness about complications of phimosis, only 24% of the parents realized that phimosis could cause penile cancer and about 50% to 60% of parents knew about phimosis causing urinary tract infection and acute event such as urinary retention.

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Conflicts of interest

The authors declare no conflict of interest.

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