

Preputial retraction in children

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ABSTRACT

Objective: The aim of the study was to assess preputial retractability in children at various ages.

Materials and Methods: Nine hundred and sixty boys attending the hospital were included in the study. Children with hypospadias or history of preputial manipulation were excluded. Preputial anatomy was studied and subjects were classified into five groups as described by Kayaba *et al.*

Results: The prepuce could not be retracted at all so as to make even the external urethral meatus visible in 61.4% children aged 0–6 months while this decreased to only 0.9% in children aged 10–12 years. At the other end of the spectrum, while prepuce could not be fully retracted in any child below 6 months, it could be done in about 60% in the age group of 10–12 years.

Conclusion Preputial nonseparation is the major cause of preputial nonretraction in the pediatric age group. Prepuce spontaneously separates from the glans as age increases and true phimosis is rare in children. Surgical intervention should be avoided for nonseparation of prepuce.

KEY WORDS: Circumcision; phimosis; prepuce; retraction

Circumcision is the most commonly performed surgical procedure in children. Most common indications for this procedure include religious reasons and phimosis.

Prepuce develops and separates from the glans. As it takes time to do so, normal physiological nonseparation is mistaken as phimosis and referred for circumcision.

The present study was carried out to study the preputial anatomy at various ages to understand the natural history of preputial separation in pediatric population so that unnecessary circumcisions due to over diagnosis of phimosis could be avoided.

MATERIALS AND METHODS

The present study was carried out in the University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi. After obtaining parental consent, boys under 12 years of age attending the hospital were examined for preputial retractability. They were divided into eight age groups of less than 6 months; 6 months to 1 year; 1–2 years; 2–4 years; 4–6 years; 6–8 years; 8–10 years, and 10–12 years. Patients having hypospadias or any previous surgical intervention on the prepuce were excluded from

the study.

The preputial retractability was assigned as per the classification given by Kayaba *et al.*^[1]

- Type I – No retraction of prepuce at all.
- Type II – External urethral meatus exposure only.
- Type III – Glans exposure halfway to the sulcus of the corona.
- Type IV – Glans exposure to above the corona at the site of preputial adhesion.
- Type V – Easy exposure of whole glans.

RESULTS

A total of 960 boys below the age of 12 years visiting the hospital as outpatients or inpatients were examined for the preputial retraction. Distribution of the preputial anatomy in the subjects according to classification is given in Table 1.

The prepuce could not be retracted at all so as to make even the external urethral meatus visible in 61.4% children aged 0–6 months while this decreased to only 0.9% in children aged 10–12 years. At the other end of the spectrum, while the prepuce could not be fully retracted in

Table 1: Distribution of subjects

	Type I	Type II	Type III	Type IV	Type V
0–6 months (n = 171)	105 (61.4)	47 (27.4)	26 (15.2)	3 (1.7)	0 (0)
7–12 months (n = 113)	56 (49.5)	30 (26.5)	18 (15.9)	8 (7)	1 (0.8)
1–2 years (n = 116)	20 (17.2)	32 (27.5)	33 (28.4)	20 (17.2)	11(9.4)
2–4 years (n = 121)	23 (19)	21 (17.3)	34 (28)	27 (22.3)	20 (16.5)
4–6 years (n = 117)	2 (1.7)	7 (5.9)	38 (32.4)	48 (41)	22 (18.8)
6–8 years (n = 90)	1 (1.1)	3 (3.3)	20 (22.2)	41 (45.6)	25 (27.8)
8–10 years (n = 107)	1(0.9)	1 (0.9)	18 (16.8)	49 (45.7)	38 (35.5)
10–12 years (n = 105)	1 (0.9)	3 (2.8)	12 (11.4)	24 (22.8)	69 (65.7)

Figures in parentheses indicate percentage.

any child below 6 months, it could be done in about 60% in the age group of 10-12 years. There was increase in the number of children with higher degree of preputial separation with increasing age.

It is evident that the prepuce separated on its own with age without any intervention.

True phimosis was seen in only three children in the age group of 8-10 years and two children in the 10-12 years age group.

DISCUSSION

Deibert^[2] in 1933 studied the separation of prepuce in human beings and concluded that it occurs due to a process of keratinization of the epithelium. The prepuce appears in the fetus at eight weeks as a ring of thickened epidermis, which grows forward at the base of the glans penis.^[3] By 16 weeks, the prepuce has grown forwards to the tip of the glans. At this stage, the epidermis of the deep surface of the prepuce is continuous with the epidermis covering the glans. By a process of desquamation, the preputial space is formed. The squamous cells arrange themselves in whorls, forming epithelial cell nests. The centers of these degenerate, so forming a series of spaces; these, as they increase in size, link up, until finally a continuous preputial space is formed. The prepuce is still in the course of developing at the time of birth and incomplete separation renders it nonretractable. Gairdner^[3] in his landmark study found that of the newborns, only 4% had a fully retractable prepuce, in 54% the glans could be uncovered enough to reveal the external meatus, and in the remaining 42% even the tips of the glans could not be uncovered.

From 9545 observations of the state of the prepuce in 1968 schoolboys aged 6-17 years examined annually for up to 8 years, Øster^[4] concluded that physiological phimosis is a rare condition in schoolboys, and it has a tendency to regress spontaneously. Preputial nonseparation (adhesion) occurs frequently but epithelial separation takes place gradually and spontaneously as a normal bio-

logical process in childhood and may continue till the age of 17 years. Attempts at retraction probably cause secondary phimosis, due to tissue damage and scar formation, which may then require operation.

According to Wright,^[5] the prepuce is designed to be nonretractable in infancy and early childhood when the developing glans needs protection from the mechanical trauma due to clothing and chemical trauma of ammonical urine and he stressed that the time to pull the foreskin back is when the child is old enough to do it himself. Kayaba *et al.*^[1] studied the process of preputial separation in Japanese population and concluded that the degree of preputial separation increases with age.

Phimosis is defined as an abnormal degree of the narrowing of preputial opening, causing obstruction to urine flow, or nonretractability persisting into childhood.^[5] It could be phimosis with supple but inadequately yielding skin or associated with abnormal skin or scarring of the prepuce. Rickwood *et al.*^[6] stressed the need to differentiate between true phimosis and nonseparation of prepuce. The nonretractile skin is asymptomatic and harmless requiring no intervention. Shankar *et al.*^[7] found an incidence of pathological phimosis in only 0.4 cases/1000 boys per year and found that the number of circumcisions far exceeded the estimated number.

The usual reason for referral and the most common indication for circumcision is phimosis. However, it is has been observed that phimosis is over-diagnosed. This diagnosis is made not only by the family of the parents but also the primary physician and the pediatrician.

By their studies, Gairdner^[3] and Øster^[4] concluded that prepuce is adherent to glans during the natural course of development of prepuce and separates gradually with age. Most of the cases diagnosed as phimosis are due to nonseparation of the prepuce from the glans. Gairdner^[3] found that of the newborns, only 4% had fully retractable prepuce while in 42%, even the tip of the external meatus could not be uncovered. The present study has shown that 65% children belonged to Category I in which the

external meatus cannot be seen. In none of the subjects in this study the prepuce could not be fully retracted. In the older age group, the number of the children in Category I decreased with age and in 65.7% subjects the foreskin could be fully retracted. Only one child had Category I prepuce.

To study the true natural history of preputial separation in children, it is necessary to follow the children over years as Øster^[4]. He asserted that any manipulation or surgical intervention is unnecessary to hasten the separation of prepuce from the glans.

The practice of circumcision proliferated during World War I and II with the view that it could aid hygiene and prevent venereal disease. Circumcision decreases the incidence of urinary tract infections and also the incidence of invasive penile cancer. In Turkey, circumcision is a necessity for boys to gain masculine identity.^[8] Thus, common indications for circumcision include phimosis along with religious, ritual, cultural, and medical indications such as balanoposthitis and balanitis xerotica obliterans. Although phimosis is one of the most important indications, it is necessary to differentiate between pathological and physiological phimosis (nonseparation).^[9,10]

Although circumcision is considered to be a simple procedure devoid of much morbidity, it is associated with many complications like hemorrhage, edema, infection, meatal stenosis, urethral fistulae, unsightly scars, penile curvature, shortness of shaft skin, and partial, or total penile loss.

Preputial skin has been used as a graft in many procedures such as urethroplasty for hypospadias or strictures, the reconstruction of skin defects of various sizes caused from trauma, acute burn, release of burn contractures,^[11] and syndactyly repair.^[12] The advantages of using preputial skin as a graft donor site include minimal donor site morbidity, low tendency to contract, and hairless skin.

In view of the various studies including the present one and the versatile use of preputial skin as a graft, it is suggested that circumcision should be avoided as far as pos-

sible especially for nonseparation of prepuce in early childhood. Alternatives to circumcision such as a topical steroid such as betamethasone valerate 0.05% applied to the tip of the phimotic prepuce;^[13] use of EMLA cream (eutectic mixture of lignocaine and prilocaine) to separate adhesions in the outpatient clinic;^[14] dorsal relieving incision operation;^[15] and retraction under GA alone^[16] were found to be less invasive and had less postoperative complications. These procedures along with local hygiene will help preserve preputial skin for further use if required.

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