To Circ or Not to Circ: Indications, Risks, and Alternatives to Circumcision in the Pediatric Population with Phimosis

Barbara Steadman
Pamela Ellsworth

Egyptian mummies and wall carvings offer some of the earliest recorded history of circumcision dating over 15,000 years ago. Ritualistic circumcision has been carried out in West Africa for over 5,000 years and in the Middle East for at least 3,000 years (Warner & Strashin, 1981). Muslims incorporated ritualistic circumcisions as a pubertal rite of passage into manhood among older boys.

The transformation of this ancient ritual into a routine medical operation began late in the 19th century. This was primarily the result of several published works by prominent physicians of the time. They believed that constriction of the glans by the prepuce led to nervous irritation in other organ systems. Several published works cited “reflex neuroses,” puzzling syndromes with no somatic explanation, as being caused by constriction of the glans (Alanis & Lucidi, 2004).

Soon the list of medical indications grew, and physicians in England and America began to offer circumcision for masturbation, headache, strabismus, rectal prolapse, asthma, enuresis, and gout (Gollaher, 1994). By the early 20th century, there was near universal agreement among physicians that circumcision should be done on a routine basis.

Rates of circumcision began to drop in Britain in 1948, when a nationalized health care system analyzed cost versus benefit. Circumcision is currently available through National Health Insurance for medical indications only. In the early 1970s, both the Australian and the Canadian Pediatric Societies followed, stating that routine neonatal circumcision was not medically indicated. Despite these changes, rates of circumcision remained high in the United States.

Circumcision, the removal of the foreskin, is perhaps the oldest identified and currently the most frequently performed elective surgical procedure for males throughout the world. Neonatal circumcision may be performed for medical, cultural, or religious reasons. A review of risks and benefits of circumcision, individual indications for circumcision, as well as both medical and surgical alternatives to circumcision in the pediatric population with phimosis are presented. The intent is to offer providers and parents current information that will assist them in making a responsible decision about pediatric circumcision.

Neonatal Circumcision: The World’s Most Controversial Operation

Today, approximately 25% of men globally are circumcised for religious, cultural, medical, or parental choice reasons (Moses, Bailey, & Ronald, 1998). They are largely concentrated in the United States, Canada, countries in the Middle East and Asia with Muslim populations, and large portions of Africa. Circumcision is a widely observed religious practice performed almost universally among Jewish and Islamic societies. Jewish males are usually circumcised on the 8th day after birth in a ceremony called the Bris Milah.

A review of the literature about circumcision yields a multitude of information that is solidly anti or pro circumcision. The pro-circumcision argument is that infant circumcision provides a valid prevention against infections and diseases. The
emphasis is on an increased risk of cancer and AIDS, arguing that a full circumcision is the best prevention over partial procedures or medical treatment (Stuart, 2005).

It is the general feeling of anti-circumcision advocates that from an ethical or moral standpoint, routine infant circumcision is an infringement of personal rights. Terms such as “barbaric” and “mutilation” are frequently heard in association with circumcision. A great majority of anti-circumcision supporters are extremists, and are not only against routine infant circumcision but also any form of circumcision or operation. Anti-circumcision proponents maintain that phimosis is a rarity, occurring at a frequency of only 1%. However, recent literature reports that between 2.4% and 14% of uncircumcised youths experience phimosis (Stuart, 2005).

Both extremes suggest routine approaches with no consideration for appropriate individual measures. A complete evaluation and physical examination of the genitalia and the expertise in being able to identify any malformation before puberty is paramount. In that way, any abnormalities can be monitored, and conservative treatment can be initiated before physical and psychological problems interfere with sexual health and well-being. Emphasis should be placed upon individual solutions to individual problems, depending upon the degree of severity of the phimosis, variation in culture, preferences, etc. Parents, who have the responsibility of making the decision on behalf of their sons should be made aware of the most recent literature concerning the potential health benefits and risks as well as alternatives to circumcision.

In the United States, the American Academy of Pediatrics (AAP) (1971) has vacillated on its stance regarding circumcision. In 1971, the American Academy of Pediatrics Task Force on Circumcision concluded that “there are no valid medical indications for circumcision in the neonatal period” (AAP, 1977, p. 110). Similar views were expressed in 1975 and 1977. When new evidence showed that circumcision effectively reduced male urinary tract infections (UTIs) and sexually transmitted diseases, the AAP concluded that newborn male circumcision “has potential health benefits and advantages as well as disadvantages and risks” (Task Force on Circumcision, 1989, p. 391). However, the AAP returned to a more cautious view on routine circumcision, stating “existing scientific evidence demonstrates potential medical benefits of newborn male circumcision; however, these data are not sufficient to recommend routine neonatal circumcision” (Task Force on Circumcision, 1999, p. 693).

**Epidemiology**

Circumcision today is uncommon in Asia, South America, Central America, and most of Europe. In Canada, 48% of boys are circumcised; in the United Kingdom, the number is approximately 24% (Blecher, 2001).

More recent surveys show a continuing decline in the incidence of circumcised males in Great Britain, and predict only 1.5% of boys born today will be circumcised by their 15th birthday if current trends continue (Rickwood, 2000).

Circumcision rates in the United States vary according to racial, ethnic, and socioeconomic factors, as well as geographic region. Whites are considerably more likely to be circumcised than blacks or Hispanics (81% vs. 65% or 54%). Over the past 10 years, circumcision rates have declined in Caucasians, Hispanics, and African-Americans, but have increased in Asians and American Indians. In the United States, the frequency of circumcision varies directly with maternal educa-

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>69.6</td>
<td>68.3</td>
<td>66.5</td>
<td>68.3</td>
<td>68.0</td>
<td>65.4</td>
<td>64.6</td>
<td>66.9</td>
<td>68.9</td>
<td>64.7</td>
</tr>
<tr>
<td>North Central</td>
<td>80.1</td>
<td>79.8</td>
<td>80.9</td>
<td>81.6</td>
<td>82.9</td>
<td>81.4</td>
<td>81.4</td>
<td>81.0</td>
<td>81.0</td>
<td>77.8</td>
</tr>
<tr>
<td>South</td>
<td>64.7</td>
<td>66.1</td>
<td>63.6</td>
<td>64.5</td>
<td>64.6</td>
<td>64.1</td>
<td>63.9</td>
<td>62.5</td>
<td>64.0</td>
<td>57.7</td>
</tr>
<tr>
<td>West</td>
<td>34.2</td>
<td>42.6</td>
<td>36.3</td>
<td>38.0</td>
<td>38.3</td>
<td>37.3</td>
<td>37.3</td>
<td>40.9</td>
<td>32.6</td>
<td>31.4</td>
</tr>
<tr>
<td>All Regions</td>
<td>62.7</td>
<td>64.1</td>
<td>60.2</td>
<td>62.8</td>
<td>63.2</td>
<td>61.5</td>
<td>62.4</td>
<td>63.1</td>
<td>60.1</td>
<td>55.9</td>
</tr>
</tbody>
</table>

*Source:* Bollinger, 2005
Physiologic or Pathologic Phimosis?

As a result of the declining neonatal circumcision rate in the United States, pediatricians are seeing more uncircumcised males than in the past. Many of these physicians are unfamiliar with the normal process of foreskin retraction, and will refer these male infants and children to pediatric urologists, recommending circumcision for phimosis. The term “phimosis” remains ambiguous to many health care providers, and has been applied to forekins that do not retract, have preputial adhesions to the glans, have a “tightness” with retraction, are elongated, are redundant, are thickened or inflamed, have a fibrotic ring, or have a narrowed orifice.

Definition

Phimosis is a condition in which the narrowed foreskin cannot be retracted. This can be physiologic or pathologic. This term, when applied to neonates, refers to a physiologic process in which there may be an inability to retract the foreskin due to naturally occurring adhesions between the prepuce and glans. The natural shedding of skin cells from the foreskin lining and the glans helps in the process of separation of these two structures. The epithelial debris which has been shed forms a white cheesy substance known as infant smegma which accumulates under the foreskin. During the first few years of life, nocturnal erections assist with expression of the smegma, promoting gradual separation of the foreskin from the glans.

An infant phimosis has an easily recognizable tubular form, which looks like the trunk of an elephant. Normal healthy babies will playfully pull the “trunk” forward, which is a natural way for infants to release their epithelial adhesions. Approximately 96% of male newborns have physiologic phimosis (see Figure 1). By the age of 3, the foreskin can be retracted in 90% of uncircumcised boys (Choe, 2005) (see Table 2). True phimosis (pathologic) may occur at any age, and can be caused by several underlying conditions.

Traumatic tearing of the foreskin. This occurs when well-meaning parents attempt to stretch the naturally occurring

Table 2. Physiologic Preputial Retraction

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage of Boys Able to Retract Foreskin</th>
</tr>
</thead>
<tbody>
<tr>
<td>At birth</td>
<td>4%</td>
</tr>
<tr>
<td>At 6 months</td>
<td>20%</td>
</tr>
<tr>
<td>At 3 years</td>
<td>90%</td>
</tr>
<tr>
<td>At 17 years</td>
<td>99%</td>
</tr>
</tbody>
</table>

Source: Choe, 2005
adherent foreskin by forcefully pulling back on it on their own, or at the recommendation of their primary care provider. Parents may not be aware that it is normal for the infant foreskin to be phimotic at birth, or they may be merely trying to hasten the physiologic process. This trauma could result in lacerations, bleeding, and inflammation of the foreskin, with subsequent scar formation and a true phimosis (see Figure 2).

Persistent infant adhesions. Adhesions form when the foreskin adheres entirely or partially to the glans and does not release by the age of 3 (see Figure 3). A tight foreskin predisposes boys to recurrent UTIs and balanitis, as urine becomes trapped and balloons underneath the foreskin. Because it is not possible for these boys to fully retract the foreskin to clean thoroughly, recurrent infection of the glans and foreskin result. Some young children do not feel comfortable discussing these issues with their parents, and the phimosis may not be addressed until the onset of puberty, when the immobility of the foreskin makes erections intensely painful. This pain may have an effect on the behavioral habits and psychological attitudes of the child.

Frenulum breve. This term refers to a shortened sheet of skin underneath the glans which joins the glans to the foreskin. Because it is not adequate in length, the frenulum holds the foreskin forward and bends the glans downward, a “tethering effect.” During intercourse, the frenulum can tear, causing pain and bleeding.

Phimotic ring. This ring is a thin band of tough fibrous tissue which curves over the front of the inner foreskin and branches out into the frenulum, forming a stricture. The phimotic ring is less elastic than the rest of the foreskin; therefore, any difficulty with retraction is magnified during erection. A primary phimotic ring from birth will stretch; a secondary ring developing later in life will tighten.

Chronic balanoposthitis. This defines a recurrent infection of the glans and/or foreskin resulting in inflammation and scarring. The thick fibrous scar tissue will not stretch, thus making retraction of the foreskin impossible. The child may present with burning and spraying with urination, frequent urination, hematuria, or urinary tract infection.

All of these conditions are associated with a true phimosis and will require a medical intervention.

Physical Assessment

The majority of referrals to pediatric urologists for circumcision are for males with a developmentally nonretractile foreskin, and not for a true phimosis. Careful examination helps to delineate between physiologic phimosis/developmentally nonretractile foreskin and pathologic/true phimosis. When examining the normal but nonretractile foreskin, the distal portion of the foreskin puckers with gentle traction. The narrowed portion is proximal to the preputial tip. In the child with true phimosis, gentle traction on the foreskin results in a cone-shaped foreskin with a fibrotic circular band forming the distal and most narrow part of the prepuce.

Thus, when initially faced with a child with a nonretractile foreskin, it is important to take into account the age of the child and whether or not there is a physiologic or true phimosis. In a child less than 3 to 5 years of age with a physiologic phimosis and no medical indication for circumcision, parental support and education should be given. Those children older than 5 years of age,
with either a physiologic or true phimosis, are candidates for treatment. Even in this setting, however, circumcision should be offered as a first-line option only to those children with a significant urologic history, such as recurrent balanoposthitis, recurrent urinary tract infections, or a history of congenital urologic anomalies such as vesicoureteral reflux.

The majority of complications from circumcision are minor, the most common being local infections and bleeding. Meatal stenosis is noted exclusively in circumcised males, and may be secondary to intraoperative vascular injury to the frenular vessels, or from chronic diaper irritation. Meatal stenosis more commonly can cause deflection of the urine stream, dysuria, and occult hematuria. Skin bridges can occur if the separated adhesions are allowed to come into contact with each other again. Small connecting bands of tissue between the foreskin and glans form skin bridges, which contribute to pain and penile curvature with erection.

In the last 2 decades, more attention has been paid to the neonatal pain experience. Descriptive studies have shown a relationship between neonatal circumcision and the physiologic responses to pain, including increased heart rate, respiratory rate, and serum cortisol level, decreased serum oxygen saturation, and decreased vagal tone (Marshall, 1989). Today, anesthesia is safe and effective in reducing the physiologic responses associated with neonatal pain and local anesthesia is recommended for neonatal circumcision.

Long-term psychological, emotional, and sexual adverse effects from male circumcision have been reported in anecdotal accounts, but scientific evidence is lacking. It has been proposed that penile sensation and therefore sexual satisfaction is decreased in the circumcised male. Research by Masters and Johnson (1966), however, showed no tactile differences on the glans of circumcised and uncircumcised men. Williamson and Williamson (1988) examined female attitudes toward male circumcision. Eighty-seven percent of college-aged women expressed preference for pictures of circum-

Proposed Health Risks of Circumcision

Although circumcision is felt by many to be a simple, effective management for the persistent nonretractile foreskin, there can be significant associated risks requiring additional surgeries for the neonate. For this reason, parents should be made aware of the possibility of such risks (see Table 3).

Table 3. 
Risks of Circumcision

<table>
<thead>
<tr>
<th>More Common</th>
<th>More Serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buried penis</td>
<td>Urethral fistula</td>
</tr>
<tr>
<td>Meatal stenosis</td>
<td>Injury to glans and frenulum</td>
</tr>
<tr>
<td>Meatitis/meatal ulceration</td>
<td>Sepsis</td>
</tr>
<tr>
<td>Poor cosmesis</td>
<td>Penile necrosis/amputation</td>
</tr>
<tr>
<td>Skin bridges</td>
<td>Risk of anesthesia</td>
</tr>
<tr>
<td>Removal of too much/too little tissue</td>
<td>Hemorrhage</td>
</tr>
</tbody>
</table>

Source: Heinius, Hansson, & Jarhult, 1993

Figure 3. 
Pathologic Phimosis with Tiny Preputial Opening (arrow) in a 3-Year-Old Boy

Source: Belman, 1990
circumcision is not confined to the male or female sexual pleasure.

**Proposed Health Advantages Of Circumcision**

An investigation of health benefits of circumcision over the past 70 years has led to a vast collection of studies indicating a relationship between circumcision and a reduction in occurrences of the following medical conditions.

**Urinary tract infections.** Data from multiple studies suggest that uncircumcised male infants are as much as ten times more likely than circumcised male infants to develop a UTI in their first year of life (Task Force on Circumcision, 1999). Spach (1992) surveyed men in their 30s who suffered from UTIs. He found that urinary infection was three times more likely in those who were uncircumcised. This suggests that the protective factor of circumcision is not confined to childhood.

**Sexually transmitted disease.** Research suggests that being uncircumcised is a risk factor for herpes, syphilis, and gonorrhea. The most consistent evidence shows an association between circumcision and a reduction in the risk of genital ulcerative disease and HIV. Although circumcision may not prevent the occurrence of genital warts, it makes them more easily visible by the patient and his sexual partner, thus leading to earlier identification and management (Learman, 1999).

**HIV.** Overall, studies report a 2 to 8-fold increased risk of HIV infection among uncircumcised males. The strongest protective effects are seen in those circumcised before 12 years of age. Circumcision after 20 years showed no significant effects on STD or HIV infection (Kelly et al., 1999).

**Penile cancer.** Cancer of the penis is a rare malignancy, which can be prevented by circumcision at birth. The risk is much higher in uncircumcised men with poor hygiene who do not consistently retract the foreskin for thorough cleaning. Circumcision later in life does not provide the same degree of protection against malignancy (Kaufman, Clark, & Castro, 2001).

**HPV and cervical cancer.** Circumcision was shown to significantly reduce the risk of penile human papilloma virus infection in men and cervical cancer in the female partners of men who practice high-risk behaviors. A moderate but significant reduction was also noted in the general population (Svare, Kjaer, & Worm, 2002).

**Circumcision: Cost and Reimbursement**

Although deemed to be a “simple minor inpatient procedure,” neonatal circumcision has a huge economic impact. The cost of an inpatient circumcision procedure should be one of the factors that a well-educated provider should take into account when providing circumcision counseling to parents of a child with physiologic phimosis. Mansfield, Hueston, and Rudy (1995) estimated that in-hospital circumcisions resulted in increased hospital charges for services of $234 million to $527 million in 1990-1991. Van Howe (1998) reported the cost of a post-neonatal circumcision to be $3,009 to $3,241 per case. The total cost of an in-hospital, non-therapeutic neonatal circumcision in the United States has risen from $1,154 in 1992 to $1,869 in 1999, an increase of 62%. The total cost of all hospital neonatal circumcisions in the United States was $2.1 billion in 1999 (Bollinger, 2005).

Most insurance providers in the United States reimburse hospitals for the inpatient neonatal circumcision procedure; although some individuals argue that the benefit of neonatal circumcision does not justify the cost (Cadman, Gafni, & McNamee, 1984; Chessare, 1992; Ganiats, Humphrey, Taras, & Kaplan, 1991; Lawler, Bisonni, & Holtgrave, 1991; Van Howe, 2004). Wayne (2000) went so far as to point out that neonatal circumcision fails to meet the Health Care Financing Administration requirements for reimbursement, and, in fact, may be fraudulent. Even in those children with persistent inability to retract the foreskin or pathologic phimosis, circumcision may not be the most cost-effective treatment (see Table 4).

**Who Should Be Circumcised? Who Should Not?**

There are select groups in whom circumcision is warranted, and other groups in which it is contraindicated. Indications and contraindications are listed in Table 5.

**Indications**

**Recurrent UTIs.** A 10-year survey in the United States of over 200,000 boys found that although uncircumcised boys made up less than 20% of the population, they suffered more than 75% of the urinary tract infections, a ten-fold increase (Wiswell, 1995).

**History of balanoposthitis.** Boys with phimosis and UTIs may develop an infection of the prepuce and glans, balanoposthitis, with a chronically thickened and inflamed foreskin and possible fissure formation. They frequently experience pain, spraying of urine, urinary retention, and ballooning of urine underneath the foreskin. This is suspect of a secondary phimosis due to infection, and is generally difficult to stretch. The stricture is less responsive to medical thera-
pies and frequently requires circumcission. Congenital urologic anomalies such as vesicoureteral reflux (VUR). Recurrent urinary tract infections are problematic and especially significant for male infants diagnosed with vesicoureteral reflux, since infected urine that flows backward from the bladder to the kidneys can progress to pyelonephritis, renal scarring, and renal failure. Although boys with VUR are routinely placed on antibiotic prophylaxis, Cascio, Colhoun, and Puri (2001) point out that such prophylaxis in boys with VUR is not effective in reducing the bacterial colonization of the foreskin. Because it is so critical that patients with reflux remain free of UTIs, removal of the foreskin is the recommended treatment over foreskin-sparing procedures for these individuals.

History of paraphimosis. Paraphimosis occurs when a tight foreskin is retracted behind the head of the penis but then cannot be replaced. This is an emergency, and a temporary simple dorsal slit may be required initially, followed by circumcision at a later date.

Infants requiring continuous intermittent catheterization (CIC). Male infants with congenital spinal abnormalities requiring CIC are another population where circumcision is recommended. These patients have chronic neuropathic bladders and require CIC on a routine basis. Those male infants in whom the foreskin is unable to be retracted sufficiently to pass a catheter may require removal of the foreskin. In addition, the bacteria, which comfortably reside under the foreskin, will easily be transmitted up the urinary tract several times a day during routine catheterizations, predisposing to infection.

Balanitis xerotica obliterans (BXO). Repeated infections may result in a rigid fibrous foreskin with the changes of BXO, including lymphocytic infiltration and basal cell degeneration with atrophy. BXO is a rare skin disease of unknown etiology that affects only 6 of 1,000 males (Parsad & Saini, 1998). It is usually distinguished by a ring of hardened tissue with extensive scarring, a whitish color at the tip of the foreskin, and edema. The hardening of the tissue prevents retraction of the foreskin and can cause meatal stenosis. Definitive diagnosis is reached with biopsy. Conservative treatment by stretching or the use of cortisone ointment has not been very successful. More recently, carbon dioxide laser treatment has shown some success. Although tissue-sparing procedures may be attempted in these individuals, circumcision remains the gold standard for BXO.

Contraindications

Prematurity. Premature infants may have multiple anomalies, which will need to be addressed as the child develops. In addition, the size of the penis makes circumcision technically difficult.

Family history of bleeding disorders. Bleeding is a complication of circumcision and a bleeding disorder would further increase this risk.

Buried/concealed penis. This is a normal-sized penis that lays hidden in a suprapubic fat pad. Buried penis can be congenital or can occur as a result of circumcision (see Figure 4).

Bilateral large hydroceles. These boys should not be circumcised due to the risk of penile concealment.

Penile abnormalities, such as hypospadias, epispadias, micropenis, ambiguous genitalia, megalourethra, and webbed penis. With these conditions, the foreskin may be necessary in order to reconstruct the penis at a later date.

Congenital penile lymphedema. This is a rare disease caused by a congenital abnormality of

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumcision</td>
<td>$3,009 – $3,241</td>
</tr>
<tr>
<td>Preputial plasty</td>
<td>$2,515 – $2,580</td>
</tr>
<tr>
<td>Topical steroid therapy</td>
<td>$758 – $800</td>
</tr>
</tbody>
</table>

Source: Choe, 2005

<table>
<thead>
<tr>
<th>Indications</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent UTIs</td>
<td>Prematurity</td>
</tr>
<tr>
<td>Severe balanoposthitis</td>
<td>Family history of bleeding disorders</td>
</tr>
<tr>
<td>Balanitis xerotica obliterans</td>
<td>Hypospadias/Epispadias</td>
</tr>
<tr>
<td>Vesicoureteral reflux</td>
<td>Webbed penis</td>
</tr>
<tr>
<td>Paraphimosis</td>
<td>Micropenis</td>
</tr>
<tr>
<td>Congenital spinal anomalies</td>
<td>Megalourethra</td>
</tr>
<tr>
<td>(infants requiring intermittent catheterization)</td>
<td>Ambiguous genitalia</td>
</tr>
<tr>
<td></td>
<td>Bilateral large hydroceles</td>
</tr>
<tr>
<td></td>
<td>Buried/concealed penis</td>
</tr>
<tr>
<td></td>
<td>Congenital penile lymphedema</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Absolute Indications and Contraindications for Circumcision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent UTIs</td>
</tr>
<tr>
<td>Severe balanoposthitis</td>
</tr>
<tr>
<td>Balanitis xerotica obliterans</td>
</tr>
<tr>
<td>Vesicoureteral reflux</td>
</tr>
<tr>
<td>Paraphimosis</td>
</tr>
<tr>
<td>Congenital spinal anomalies</td>
</tr>
<tr>
<td>(infants requiring intermittent catheterization)</td>
</tr>
<tr>
<td>Prematurity</td>
</tr>
<tr>
<td>Family history of bleeding disorders</td>
</tr>
<tr>
<td>Hypospadias/Epispadians</td>
</tr>
<tr>
<td>Webbed penis</td>
</tr>
<tr>
<td>Micropenis</td>
</tr>
<tr>
<td>Megalourethra</td>
</tr>
<tr>
<td>Ambiguous genitalia</td>
</tr>
<tr>
<td>Bilateral large hydroceles</td>
</tr>
<tr>
<td>Buried/concealed penis</td>
</tr>
<tr>
<td>Congenital penile lymphedema</td>
</tr>
</tbody>
</table>

Table 4. Cost Comparison of Treatment Strategies for Phimosis

Table 5. Absolute Indications and Contraindications for Circumcision
the lymphatic system. Extensive resection of tissue and reconstruction with skin grafting necessitates preservation of the foreskin.

If there is any question of a genitourinary congenital abnormality, infant circumcision should be delayed until the child can be evaluated by a pediatric urologist.

**Alternative Treatments To Circumcision**

Since the majority of children presenting for circumcision do not have a medical indication, it is important to be aware of the alternatives to circumcision and to counsel parents on the pros and cons of all available therapies for managing non-retractile foreskin. A variety of effective alternatives to circumcision have been described, including topical steroid therapies and several variations of prepuce plasty. All of these therapies have as their goal the ability to retract the foreskin and, unlike circumcision, do not involve the removal of the entire foreskin.

**Topical Steroid Therapy**

The mechanism of action of topical steroid therapy has not been completely identified. It appears that steroid cream acts through local anti-inflammatory mechanisms, rather than through moisturizing or the mere local effect of the application itself. Prior use of moisturizing agents alone has failed to produce successful results.

There are two possible mechanisms involved in the action of steroid cream resulting in the resolution of phimosis. First, there is an anti-inflammatory and immunosuppressive effect. According to Kragballe (1989), corticosteroids stimulate the production of lipocortin. Lipocortin inhibits the activity of phospholipase A2, which releases arachidonic acid. Corticosteroids also inhibit the mRNA responsible for interleukin-1 formation. These actions of corticosteroids on arachidonic acid metabolism and interleukin-1 formation produce the anti-inflammatory, both early phenomena and late manifestations, and immunosuppressive effects.

Second, there is a skin thinning effect. Steroids inhibit the dermal synthesis of gycosaminoglycans (especially hyaluronic acid) by fibroblasts, resulting in the loss of ground substance secondary to decrease binding of tissue fluid to the hyaluronic acid. Consequently, the dermal extra-cellular matrix is reduced, and collagen and elastin fibers become tightly packed and rearranged. In addition, steroids have anti-proliferative effects on the epidermis, resulting in a thin epidermis with virtual deletion of the stratum corneum (Zheng, Lavker, Lehman, & Kligman, 1984).

Clearly, the action of topical steroids goes beyond a lubrication effect. Golubovic, Milanovic, Vukadinovic, Rakic, and Perovic (1996) demonstrated that use of a placebo, Vaseline® ointment, had little effect on phimosis compared to use of topical steroids. Forty boys with phimosis received either 0.05% betamethasone cream (20 males) or Vaseline (20 males). Patients were treated twice daily for 4 weeks, and outcomes were assessed. Good retraction of the foreskin was achieved in 19 of 20 patients receiving betamethasone, while only 4 of 20 patients receiving Vaseline were able to retract the foreskin.

Atilla et al. (1997) evaluated the effectiveness of a local non-steroidal anti-inflammatory ointment, diclofenac sodium, applied three times a day on 52 children with phimosis over a 4-week period. Twenty phimotic patients treated with petroleum jelly served as controls. Of the 32 patients receiving diclofenac, 24 responded. Older, thicker, fibrous rings did not respond as
well to therapy. Of the 20 patients in the control group, petroleum jelly did not improve foreskin retractibility in any of them. Although application of a nonsteroidal drug may be preferable, in some cases, to that of a steroid due to safety, it is clearly not as efficacious for the treatment of phimosis.

A study was conducted at the University of Massachusetts Memorial Medical Center evaluating success rates of phimotic boys receiving 0.05% betamethasone cream applied twice daily for 4 weeks. Of 42 patients who received steroid cream, phimosis resolved in 24 (73%) and persisted in 9 (27%). Success rates were highest in the older boys (>10 years), and lowest in the 3 to 10 year age group. Treatment failures were noted to be secondary to poor compliance (Ellsworth & Berry, 2005).

Patient selection is an important consideration when choosing a topical therapy. Parents are instructed to apply a small dab of steroid cream directly to the phimotic ring on a twice a day basis for up to 1 month. The state of the foreskin, the age of the patient, the proper application of the ointment, and the necessity of pulling back on the foreskin on a regular basis are all important contributing factors to either the success or failure of the medication.

Overall, studies using topical creams for phimosis have produced dramatic results. Efficacy figures range from 65% to 95%, with no significant side effects reported. Betamethasone 0.05% applied twice a day over a 4-week period has consistently shown good results; however, clobetasol propionate 0.05%, a less-potent steroid, is also very effective (see Table 6).

Patients with BXO repeatedly did not respond to topical steroid treatment. Topical steroid use with BXO may have a role as a screening tool to identify those patients with more advanced BXO who would require circumcision (Fortier, Thomine, Mitrofanof, Lauret, & Hemet, 1990).

Of concern to parents and providers alike is the degree to which there is systemic absorption with the application of a steroidal topical cream, which can cause hypothalamic-pituitary-adrenal axis suppression. Conditions that enhance corticosteroid absorption include inflammation, use over a large surface area, prolonged use, and the use of an occlusive dressing. Systemic absorption following corticosteroid application for phimosis should not be a major concern for parent or provider when used appropriately. When

---

**Table 6.**

**Success Rate of Steroidal and Nonsteroidal Applications**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Agent</th>
<th>Total # of Patients/ Mean Age of Patient</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jorgensen &amp; Svensson, 1993</td>
<td>0.05% clobetosol propionate</td>
<td>54/69</td>
<td>70%</td>
</tr>
<tr>
<td>Muller &amp; Muller, 1993</td>
<td>0.1% estrogen</td>
<td>30/ *</td>
<td>90%</td>
</tr>
<tr>
<td>Wright, 1994</td>
<td>0.05% betamethasone</td>
<td>139/ *</td>
<td>80%</td>
</tr>
<tr>
<td>Dewan et al., 1996</td>
<td>1% hydrocortisone</td>
<td>20/ *</td>
<td>65%</td>
</tr>
<tr>
<td>Golubovic et al., 1996</td>
<td>0.05% betamethasone</td>
<td>20/4.1</td>
<td>95%</td>
</tr>
<tr>
<td>Lindhagen, 1996</td>
<td>0.05% clobetosol propionate</td>
<td>30/ *</td>
<td>89%</td>
</tr>
<tr>
<td>Attila, 1997</td>
<td>Diclofenac sodium</td>
<td>32/4.6</td>
<td>75%</td>
</tr>
<tr>
<td>Chu et al., 1999</td>
<td>0.06% betamethasone (nonsteroidal anti-inflammatory)</td>
<td>276/6.7</td>
<td>95%</td>
</tr>
<tr>
<td>Monsour, 1999</td>
<td>0.05% betamethasone</td>
<td>25/8.3</td>
<td>95%</td>
</tr>
<tr>
<td>Pless, 1999</td>
<td>0.05% betamethasone</td>
<td>91/ *</td>
<td>74%</td>
</tr>
<tr>
<td>Orsola et al., 2000</td>
<td>0.05% betamethasone</td>
<td>137/5.4</td>
<td>90%</td>
</tr>
<tr>
<td>Ashfield et al., 2003</td>
<td>0.1% betamethasone</td>
<td>228/ *</td>
<td>87%</td>
</tr>
<tr>
<td>Ellsworth &amp; Berry, 2005</td>
<td>0.05% betamethasone</td>
<td>59/ *</td>
<td>73%</td>
</tr>
</tbody>
</table>

* Author did not report an age range.
topical steroids are used for phimosis, the surface area being treated is small, and the diaper replaces a nonocclusive dressing. Golubovic et al. (1996) found that morning cortisol levels were not significantly elevated in patients who received betamethasone ointment versus controls.

Use of steroid ointments have not been extensively studied in children younger than 3 years, and should be used with caution. In general, children less than 3 years are primarily evaluated for a physiologic phimosis, where watchful waiting would be the recommendation. Elmore, Baker, and Snodgrass (2002) evaluated 27 boys with phimosis, ranging in age from 1 to 31 months (mean 11.3), who were treated with betamethasone 0.05% cream twice a day for 1 month. At 1 month, 74% had fully retractable foreskins, and an additional 18% had fully retractable foreskins at 2 months. There were no adverse effects, even in the younger patients.

Surgical Treatment

Although circumcision is regarded as the definitive therapy for pathologic phimosis, prepuce plasties are alternative tissue-sparing surgical techniques that can achieve full resolution of phimosis. The underlying surgical technique for these procedures is the placement of a longitudinal incision in the phimotic ring and closing the incision transversely in order to increase the circumference of the prepuce, thereby allowing foreskin retraction. The various techniques described here differ in the physical placement and number of incisions in the foreskin. Although single plasties do not yield as good a cosmetic result, they are easier to perform than multiple plasties in children.

Dorsal Slit

Simple dorsal slit. A simple dorsal slit procedure may be performed as a first stage procedure in boys with symptomatic phimosis (balanitis, paraphimosis), or when urethral instrumentation is needed but cannot be performed because of the phimosis. In such cases, formal circumcision is often performed at a later date. A simple dorsal slit can also be performed as definitive treatment for phimosis in families who request a foreskin-sparing procedure. However, as previously noted, cosmesis may not be ideal.

A dorsal slit incision is a simple and minimally invasive procedure. The foreskin is pulled down and held under mild tension. The dorsal foreskin is double clamped at the 12 o’clock position. The crushed tissue is then incised. The amount of tissue left below the coronal sulcus should be no more than 1 cm long to prevent edema, adhesions, and, occasionally, paraphimosis. Edges are approximated with absorbable sutures.

The simplicity of this technique, and, in particular, the avoidance of the frenular area of the penis, makes it a quick, easy, and safe operation, with few complications. Patient dissatisfaction over cosmetic results has been reported, “dog ears deformity,” and has been touted to justify more complex procedures, which allow for a more natural appearance to the foreskin (see Figure 5).

Full dorsal slit with transverse closure. A longitudinal incision of a few millimeters is made on the dorsal preputial skin at the maximum point of tension. After the outer preputial skin has been excised, a white circular and constricting fibrous ring can be visualized and is cut. The inner preputial skin is then divided and any smegma present is removed. The frenulum is evaluated, and if its point of attachment is close to the urethral orifice (frenulum breve), it is divided. Finally, the longitudinal incision is closed with loose transverse absorbable sutures (Cuckow, Rix, & Mouriquand, 1994). Bacitracin® ointment is applied directly on the glans before the foreskin is returned to its normal anatomical position. The ointment application prevents the formation of new adhesions between the glans and the inner foreskin. Parents and children are instructed to move the foreskin back and forth twice a
day for a few weeks, along with application of ointment, to prevent adhesion formation.

This method of prepuce plasty has been associated with an edematous and hypertrophied ventral prepuce and a poor cosmetic result. As a result, there have been several variations developed in an attempt to maintain simplicity of procedure, yet achieve better cosmetic results.

**Two Comparative Studies Of Circumcision and Full Dorsal Slit**

Saxena, Schaarschmidt, Reich, and Willithal (2000) report a 13 year experience with 2,554 patients with nonretractile foreskin at the Pediatric Surgical University Clinic in Munster, Germany. Dorsal slit was the technique of choice performed in 2,177 patients, circumcision in 73 (primarily at the request of the parents frequently for religious reasons, and, in two cases, secondary to BZO), and preputial adhesiolysis was sufficient to retract the foreskin in 284 patients.

The dorsal slit with transverse closure procedure resulted in satisfactory aesthetic results, an extremely low rate of postoperative complications, 1.8% minimal to mild edema, with a recurrence rate of only 0.8% in this series. Cosmetically, unacceptable foreskin due to long incisions was documented in only 0.27% of the cases. In the circumcision group, mild to severe edema was reported in 38.4%, mild bleeding in 6.8%, and a longer hospital stay in 19.2%. Two patients returned to the operating room for revision after bleeding. In comparison, fewer complications were associated with dorsal slit versus circumcision with edema (1.8% vs. 38.4%) and bleeding (0.1% vs. 6.8%).

Another study reviewed two similar groups of males, one undergoing circumcision, and the other, the less-invasive prepuce plasty. Twenty percent of the males who underwent circumcision required an overnight hospital stay, 14% had anesthetic complications, and 6% required re-operation for bleeding. None of the prepuce plasty group required re-operation and no bleeding problems were noted, with only 8% requiring an overnight stay (Van Howe, 1998).

**Lateral preputial plasty**. This operative variant to the full dorsal slit was described by Lane and South in 1999. Thirty patients underwent a lateral prepuce plasty. In this procedure, the foreskin was retracted, the fibrous ring was identified, and two laterally placed longitudinal incisions, one on each side of the penis, were made directly over the fibrous band. The defect was then closed transversely.

Postoperatively, one patient went on to circumcision secondary to wound infection. The remaining 29 reported no postoperative problems. Lane and South (1999) reported high patient satisfaction. Advantages to this procedure were attributed to (a) the lateral placement of the incisions, which are thought to provide improved cosmesis over the dorsal approach, and (b) the technique avoids the frenular area of the penis, thereby reducing time and risk.

**Triple incision plasty**. Fifty-two children underwent a triple incision preputial plasty described by Wahlin (1992). Twenty-two children were satisfied with the function and 80% reported a good cosmetic outcome (Wahlin, 1992). Pascotto/Giancotti preputial plasty. Pascotto and Giancotti (1998) described a modification to the triple incision preputial plasty described by Wahlin (1992). Twenty-two children underwent a triple incision preputial plasty, adding frenulotomy and two more incisions between the previously described three incisions, which are left to heal spontaneously. Followup evaluations at 6 to 24 months showed good cosmetic results with no recurrence in all 22 children.

**La Vega slit (ventral slit)**. Dean, Ritchie, and Zaontz (2000) described treatment of eight patients in the Dominican Republic with severe phimosis with a self-described variant of the dorsal slit procedure. This procedure allowed for preservation of the appearance of an intact foreskin, which is culturally important in this country. A ventral slit was made, the frenulum was divided, and the sutures
were placed in the distal foreskin to triangulate the slit into a V pattern. In all eight males, the operative time was less than 10 minutes, the foreskins were able to be fully retracted, and the appearance of the penis was consistent with that of an intact foreskin. The surgical result was only apparent with the penis elevated, thereby exposing the ventral aspect. There were no initial or late (1 year postoperative) complications.

**Balloon dilation.** He and Zhou (1991) evaluated the efficacy of balloon dilation in 512 boys with phimosis, ages 5 months to 12 years. Treatment consisted of placing a specially designed balloon catheter which was gradually inflated. Under local anesthesia, a lidocaine topical anesthetic, the preputial orifice was pulled slightly opened with curved retractors, a balloon catheter was inserted in place, and the retractors were removed. The balloon was inflated gradually until the opening of the foreskin was 3 to 5 mm greater than the maximal diameter of the glans for a period of 30 seconds. Dilatation was repeated three times before the balloon was removed. The foreskin was fully retracted several times. Of the 512 treated males, 509 were completely cured after a single balloon dilatation. Three patients required two to three applications of balloon dilatation to accomplish foreskin retraction.

Balloon dilation was reported to be simple and safe, requiring no sophisticated skills or equipment. The success rate was 99%, in this series, and was recommended for males 2 to 4 years of age (He & Zhou, 1991). However, in older children with recurrent infection and a fibrotic ring, several attempts are necessary and the procedure should not be performed in the presence of inflammation. Balloon dilation appears to be a simple and less-traumatizing treatment option than conventional circumcision.

**Multiple Y-V plasties (the Ebbbehøj procedure).** Hoffman, Metz, and Ebbbehøj (1984) described a method in which multiple Y-V plasties relieve the phimosis without resecting any preputial tissue. Four longitudinal incisions are made in the outer layer, incising the edge of the preputial ring. The foreskin is then retracted, and the incisions are continued in the inner layer, all four curving a little until they reach the neighboring curved incision. Care is taken with the ventral incision to clear the area of the frenulum, thus avoiding excess bleeding.

A saw-toothed incision is made along the circumference. The Vs of the saw-toothed incision are converted into Ys by longitudinal incisions in both directions. The tips of the flaps are fastened with sutures, transforming each Y into a tall narrow V. This procedure takes less than 30 minutes, and functional and cosmetic results are excellent (Hoffman et al., 1984).

Additional variations to this technique include the Z plasty, a four V flap repair described by Emmett (1982), and helicoid plasty performed by Codega, Guizzardi, and Di Guinea (1983). Unfortunately, there is little objective data to support the claims of excellent results with these procedures, and no complication rates are reported. The more complex nature of these procedures has increased the risk for complications and has limited their acceptance by specialists in plastic surgery and urology.

**Summary**

Although there continues to be considerable debate over the merits of circumcision, it is clear that preservation of the pediatric foreskin, even in the presence of phimosis, is a viable option. Steroid topical cream is a painless, less-complicated, and more economical alternative to circumcision for treating phimosis. Success rates are quite high, especially when patient selection is appropriate and parents are adequately instructed on application. In those children in whom topical steroid therapy has failed, there remains a variety of foreskin-preserving surgical options for treating phimosis. Compared to circumcision, these less-invasive techniques are associated with lower morbidities and cost. Furthermore, depending on the tissue-preserving technique used, satisfactory cosmesis is also achieved.

Thus, those males who were not circumcised at birth now have medical and surgical options, which will decrease the likelihood of requiring circumcision at an older age. As health care providers in the United States see more and more uncircumcised male children, it is important for these children and their parents to understand the natural history of physiologic phimosis. Additionally, it is the responsibility of health care providers to present the management options available for the treatment of the persistent nonretractile foreskin and/or pathologic phimosis. These options are particularly important for those individuals whose religious, cultural, or personal preference is to retain the foreskin.

**References**


Atilla, K., Dundaroz, R., Odabas, O., Ozturk, H., Akin, R., & Gokcay, E.


---

COGNITIVE TEST LOCATED ON PAGE 197. (6)

**Need CE Credit?**

Visit the “Education” section at [www.suna.org](http://www.suna.org)