

Care of the uncircumcised penis

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Literature review current through: May 2015. | **This topic last updated:** Mar 18, 2014.

INTRODUCTION — In most parts of the world, male circumcision, the elective surgical removal of the skin covering the end of the penis (ie, prepuce or foreskin), is uncommon.

The care and complications of the uncircumcised penis will be reviewed here. The procedures, risks, benefits, and complications of circumcision are discussed separately. (See "[Techniques for neonatal circumcision](#)" and "[Neonatal circumcision: Risks and benefits](#)" and "[Complications of circumcision](#)".)

NORMAL DEVELOPMENT OF THE FORESKIN — The foreskin is the redundant skin that typically extends about 1 cm beyond the glans ([picture 1](#) and [figure 1](#)). It provides protection to the urethral meatus and glans penis.

The normal foreskin begins to develop as an epithelial fold that grows inward from the base of the glans penis at eight to nine weeks gestation with normal completion by 4 to 4.5 months gestation. The squamous epithelial lining of the inner prepuce is contiguous with the glans penis, resulting in the normal circumferentially initial adhesions between the inner layer of the prepuce and the glabrous epithelium of the glans penis.

FORESKIN RETRACTION — Separation of the foreskin from the glans penis occurs by desquamation and begins late in gestation, but remains incomplete in most male infants at birth. Only about 4 percent of males have a completely retractable foreskin at birth, and in more than half of newborn males, the foreskin cannot be retracted far enough to visualize the urethral meatus [1].

After birth, penile growth and physiologic erection aid in the desquamation process and the formation of keratinized pearls (smegma) between the layers, which loosens the adhesions and allows retraction of the preputial skin.

Phimosis — Phimosis is defined as an inability to retract the foreskin (prepuce). The incidence of fully retractable foreskin increases with age as the rate of phimosis decreases [2-4]. This was illustrated in a study of 2149 Taiwanese school boys, which reported the incidence of the following five categories of preputial anatomy for three different age groups based on grade level; 1st, 4th, and 7th grade [2]:

- Fully retractable: 8, 21, and 58 percent, respectively
- Partial retraction with part of the glans penis visible: 40, 41, and 29 percent, respectively
- Partial phimosis with only the urethral meatus visible and none of the glans penis: 33, 25, and 7 percent, respectively
- Phimosis with nonvisualization of the meatus and glans: 17, 10, and 1 percent, respectively
- Circumcised: 3, 4, and 5 percent, respectively

Phimosis is divided into physiologic and pathologic forms.

- Physiologic phimosis, which is seen in almost all newborn males, is due to the normal development of congenital adhesions between the foreskin and glans. Physical examination reveals a pliant unscarred preputial orifice [5]. (See '[Physiologic phimosis](#)' below.)
- Pathologic phimosis is defined as foreskin that is truly nonretractable secondary to distal scarring of the

prepuce, such as occurs with preputial fibrosis due to infection and inflammation. This scarring often appears as a contracted white fibrous ring around the preputial orifice ([picture 2](#)) [5]. The reported incidence of pathologic phimosis ranges from 0 to 16 percent [6]. Differences in cohort age and the definition of pathologic phimosis are responsible for this great rate variability.

It is important for primary care clinicians to be able to distinguish between physiologic and pathologic phimosis so that unnecessary referrals to pediatric urologists can be avoided for the patient and his family. Based on the results of the above study and other reports, it appears that the incidence of pathologic phimosis that requires intervention is very low, especially in preadolescent and adolescent males [2,7,8].

ROUTINE CARE AND HYGIENE — As the circumcision rates decline in both Canada and the United States, it has become increasingly important to educate both parents and care providers on the routine care and hygiene of the uncircumcised male infant [9,10]. Optimal education reduces parental anxiety and unnecessary referrals to subspecialists [5,11], and, perhaps, lowers the risk of pathologic phimosis [12].

Evidence-based guidelines directing preputial care do not exist, but the following approach to routine care is based on expert opinions and observational studies [1,5].

- In the newborn and infant, the foreskin requires no special care other than what is provided to the rest of the body. The penis should be washed regularly when a bath is given. Soap can be used provided it is nonirritant and safe for the child's age.
- Frequent diaper changes to prevent diaper rash and decrease skin irritation.
- Avoid forcible retraction because tearing may cause bleeding, and can result in fibrosis and the development of pathologic phimosis. Gentle retraction of the foreskin with diaper changes and bathing will allow gradual and progressive retraction of the foreskin over the glans. As the foreskin naturally begins to retract, cleaning and then drying underneath the foreskin can be performed. After bathing, the retracted foreskin should always be pulled down to its normal position covering the glans penis. Failure to do so may result in paraphimosis (when the foreskin is retracted behind the glans penis and cannot be returned to its normal position), which results in venous and lymphatic congestion of the glans ([picture 3](#)). (See "[Paraphimosis: Definition, pathophysiology, and clinical features](#)".)

As the boy becomes older, he should be instructed on retraction of the foreskin, regular cleaning and drying of the glans, and returning the foreskin to its normal position.

During the newborn examination and well-child visits, assessment should include evaluation of the urinary stream and include the following questions:

- Is the urinary stream strong?
- Is the urinary stream straight? If the answer is no, is there any dribbling or spraying noted?
- Does the foreskin balloon out when voiding?
- Does the infant/child appear comfortable while voiding?

If the answer to any of these questions is no, a more in-depth assessment should be performed including, if possible, direct observation of the urinary stream. In some cases, urinary stream abnormalities may be due to complications of the foreskin. (See '[Pathologic conditions](#)' below.)

ASSOCIATED CONDITIONS — Several conditions can be seen in uncircumcised boys; some are benign and only require reassurance to patients and parents, and others are complications that require intervention.

Benign conditions — Benign conditions that do not usually require intervention, but only reassurance, include:

- Physiologic phimosis
- Preputial cysts due to smegma
- Transient ballooning of the foreskin

Physiologic phimosis — As discussed previously, physiologic phimosis is present in almost all newborn males. Although the spontaneous resolution of physiologic phimosis is high, the rate is variable so it is not possible to set an age by which the foreskin should be normally retractile [2,3,10]. School-age boys without a fully retractible foreskin and their parents should be counseled that there is normally a wide range of retractibility rate, and over time, there is a very high likelihood physiologic phimosis will spontaneously resolve. The clinician should also reinforce proper preputial hygiene; patients and/or parents can be taught to perform gentle stretch exercises [11]. A four- to eight-week course of topical corticosteroids (eg, 0.05 percent [betamethasone](#) cream) applied directly to the preputial outlet twice daily speeds up the natural process of obtaining foreskin retractility [5,9,11-13]. (See '[Recurrent urinary infection](#)' below.)

Smegma and preputial cysts — Desquamated epithelial cells that are trapped under the foreskin are referred to as smegma [5]. In boys without a fully retractible foreskin, smegma may form white lumps under the foreskin, often referred to as preputial cysts. Preputial cysts are benign and usually are located around the corona. They aid in the process of separation between the foreskin and the glans penis, and are extruded once the foreskin becomes more retractible.

Foreskin ballooning — Transient ballooning of the foreskin during voiding is usually benign [5]. However, if urinary retention can only be resolved after applying manual pressure, the parent or care provider should seek medical attention. In all other cases, parents should be assured this is a benign condition that will resolve over time as there is increasing retractibility of the foreskin.

Pathologic conditions — Complications of the foreskin that typically require intervention include:

- Pathologic phimosis
- Paraphimosis
- Recurrent urinary tract infections
- Severe/recurrent balanoposthitis
- Balanitis xerotica obliterans

Pathologic phimosis — Pathologic phimosis is defined as foreskin that is truly nonretractable secondary to distal scarring of the prepuce, such as that which occurs with preputial fibrosis due to trauma, infection, and/or inflammation. A fibrotic preputial ring (cicatrix) may form from scarring due to forcible retraction or following episodes of balanoposthitis. Cicatrix may also occur from scarring after circumcision. (See "[Complications of circumcision](#)", section on '[Cicatrix](#)'.)

Symptoms of pathologic phimosis include:

- Secondary nonretractability of the foreskin after retractibility at an earlier age
- Irritation or bleeding from the preputial orifice
- Dysuria
- Painful erection
- Recurrent balanoposthitis
- Chronic urinary retention with ballooning that is only resolved with manual compression

Pathologic phimosis increases the risk of other foreskin complications including paraphimosis, recurrent urinary tract infections, recurrent/severe balanoposthitis, and balanitis xerotica obliterans.

When pathologic phimosis is present, pediatric urologic consultation should be sought. Several options exist for treatment of pathologic phimosis, and families should never be counseled that their child “needs” a circumcision without considering more conservative interventions.

- Stretching exercises of the prepuce have been reported to have some success in treating pathologic phimosis. In one study that compared stretching and topical corticosteroids with a control group with stretching alone, 60 of 90 children in the control group responded with resolution of phimosis using a

protocol of retraction as far back as the appearance of stricture for one minute, performed four times daily for one to three months [11].

- Topical corticosteroids, usually administered concomitantly with routine stretching exercises, are effective in most boys with pathologic phimosis. [Betamethasone](#) cream (0.05 percent) is the topical agent most frequently used; other agents include 0.01 percent [triamcinolone](#) and 0.05 percent [fluticasone](#) propionate [11,12,14-16].

In two case series, the daily application of 0.05 percent [betamethasone](#) cream for at least four weeks resulted in complete resolution of phimosis in over 90 percent of patients [11,12].

- In one study of 137 boys (median age 5.4), the administration of topical corticosteroid applied twice a day, and stretching exercises, which were started five days after the initial application, resulted in a 90 percent rate of retractable foreskin [12]. In this study half of the patients had a phimotic but retractable prepuce, one-third had a nonretractable phimotic ring, and one third had a pinpoint opening. There were no differences in the response rate among the three groups.
- In another study of 247 boys referred for surgical treatment for phimosis (mean age 7.6 years), the protocol of [betamethasone](#) cream applied twice a day for 15 days and then once a day for 15 more days, and stretching exercises started seven days after the first application of betamethasone, resulted in a 77 percent resolution rate after one protocol cycle, and an additional 20 percent of patients had resolution after a second course [11]. There were no differences in response rate based on the phimosis grade; grade 1: fully nonretractable, grade 2: partial or complete exposure of the glans with a lacerated foreskin, and grade 3: phimotic ring.
- Although rarely used, alternative surgical procedures to circumcision include preputioplasty (surgical release of the scarred tissue), preputial balloon dilation, and various prepuce preserving plastic surgical procedures designed to widen the preputial ring.
- Circumcision. (See ["Techniques for neonatal circumcision"](#) and ["Neonatal circumcision: Risks and benefits"](#).)

In our practice, we initially treat pathologic phimosis with 0.05 percent [betamethasone](#) cream applied twice a day directly on and around the phimotic ring for six weeks, and stretching exercises (gentle retraction of the foreskin) performed several times a day. In patients who fail topical corticosteroid therapy, surgical options are presented to the patient/family, and the choice of intervention is based on the clinical findings and the patient/family preference.

Paraphimosis — Paraphimosis is caused by foreskin entrapment behind the coronal sulcus, which may result in venous and lymphatic congestion of the glans, and ultimately arterial compromise ([picture 3](#)). Paraphimosis is a medical emergency and its clinical features and management are discussed separately. (See ["Paraphimosis: Definition, pathophysiology, and clinical features"](#) and ["Paraphimosis reduction"](#).)

Recurrent urinary infection — There is a 4- to 10-fold increased risk of urinary tract infection (UTI) in uncircumcised versus circumcised male infants. In boys with recurrent UTI or who have UTI and/or evidence of genitourinary abnormality (eg, renal scarring and vesicoureteral reflux), circumcision may be considered as a potential intervention to decrease the risk of future UTI.

Balanoposthitis — Balanoposthitis is an inflammatory condition of the glans penis and the foreskin ([picture 4](#)). Although the etiology is multifactorial in children, balanoposthitis typically results from poor hygiene that is sometimes complicated by secondary infection. In severe cases, patients may be unable to void, in which case bladder catheterization is indicated. In patients with urinary obstruction, in whom bladder catheterization is unsuccessful, dorsal slit procedure or incision of a constricting band resulting in phimosis may be required. In patients with recurrent balanoposthitis, pathologic phimosis may be an underlying contributing factor, which should be corrected. (See ["Pathologic phimosis"](#) above.)

The epidemiology, clinical features, diagnosis, and acute management of balanoposthitis are discussed separately. (See "[Balanoposthitis in children: Clinical manifestations, diagnosis, and treatment](#)" and "[Balanoposthitis in children: Epidemiology and pathogenesis](#)".)

Balanitis xerotica obliterans — Balanitis xerotica obliterans (BXO) is a chronic atrophic dermatitis of unknown etiology. It is the genital analog of lichen sclerosus et atrophicus and is characterized by white atrophic plaques on the glans penis and foreskin. These plaques eventually enlarge and coalesce into a sclerotic mass with resultant adhesions, phimosis, and meatal stenosis. Because it is uncommon in children, BXO disorder is rarely diagnosed by pediatricians ([picture 5](#)).

Although topical corticosteroids have been used to treat BXO, the results are poor except in mild cases [17]. In patients with pathologic phimosis and/or meatal involvement, circumcision is the preferred intervention as it is curative in most patients. However, if after circumcision BXO is persistent, then meatal reconstruction and/or a dermatology consult may be necessary.

In one case series from Children's Hospital Boston over a 10-year period from 1992 to 2002, none of the 41 patients (mean age 10.6 years) with pathologically confirmed BXO were diagnosed prior to referral [18]. In this cohort of patients, 19 patients underwent curative or repeat circumcision, 11 with BXO involvement of the urethral meatus underwent circumcision with meatotomy or meatoplasty, and 9 patients required extensive plastic surgery, including two who received buccal mucosa grafts.

INFORMATION FOR PATIENTS — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "[Patient information: Circumcision in baby boys \(The Basics\)](#)" and "[Patient information: Caring for an uncircumcised penis \(The Basics\)](#)")
- Beyond the Basics topics (see "[Patient information: Circumcision in baby boys \(Beyond the Basics\)](#)")

SUMMARY AND RECOMMENDATIONS

- The foreskin typically extends about 1 cm beyond the glans and provides protection to the urethral meatus and glans penis ([picture 1](#) and [figure 1](#)).
- At birth, almost all male infants do not have a retractable foreskin because of the normal circumferential adhesions between the foreskin and the glans penis. After birth, penile growth and physiologic erection aid in the desquamation process that loosens the adhesions and leads to progressive foreskin retraction. (See '[Foreskin retraction](#)' above.)
- Phimosis is defined as an inability to retract the foreskin (prepuce) and is divided in two forms. (See '[Phimosis](#)' above.)
 - Physiologic due to the normal congenital adhesions between the foreskin and glans seen in almost all normal male newborn infants. This condition normally resolves throughout childhood with an incidence of about 1 percent in 7th grade boys.
 - Pathologic due to scarring of the foreskin leading to a true nonretractable foreskin.

- We recommend the following routine care of the uncircumcised penis (**Grade 1C**). (See '[Routine care and hygiene](#)' above.)
 - The penis should be washed routinely during the normal bathing of any male infant or boy.
 - Avoid forcible retraction. As the foreskin naturally begins to retract, cleaning and then drying underneath the foreskin can be performed. The foreskin should always be pulled down to its normal position covering the glans after drying.
 - In any child who is not toilet trained, frequent diaper changes to prevent diaper rash and foreskin/urethra irritation.
 - During routine well-child visits, inclusion of a voiding history to uncover any urinary stream abnormality.
- Benign conditions seen in uncircumcised males include physiologic phimosis, preputial cysts due to smegma, and transient ballooning of the foreskin that resolves without manual pressure. Parents should be reassured that these are normal variations/findings that generally do not need any intervention. (See '[Benign conditions](#)' above.)
- Complications that typically require intervention include:
 - Pathologic phimosis increases the risk of other foreskin complications, such as paraphimosis, recurrent/severe balanoposthitis, and recurrent urinary tract infections. Although several treatment options are available, we suggest initial treatment with a topical corticosteroid (eg, 0.05 percent [betamethasone](#) cream twice daily) along with gentle retraction (**Grade 2B**). Other options include stretch exercises alone and corrective surgery including circumcision. (See '[Pathologic phimosis](#)' above.)
 - Paraphimosis, a medical emergency, is caused by foreskin entrapment behind the coronal sulcus, which may result in venous and lymphatic congestion of the glans and ultimately arterial compromise ([picture 3](#)). (See "[Paraphimosis: Definition, pathophysiology, and clinical features](#)" and "[Paraphimosis reduction](#)".)
 - The risk of recurrent urinary tract infection (UTI) is 4- to 10-fold greater in uncircumcised versus circumcised male infants. In boys with recurrent UTI, or who have UTI and evidence of genitourinary abnormality (eg, renal scarring and vesicoureteral reflux), circumcision may be considered as a potential intervention to decrease the risk of future UTI.
 - Balanoposthitis, inflammation of the glans penis and the foreskin ([picture 4](#)), typically results from poor hygiene that is sometimes complicated by secondary infection. In severe cases, patients may be unable to void, in which case bladder catheterization is indicated. In patients with urinary obstruction, in whom bladder catheterization is unsuccessful, dorsal slit procedure or incision of a constricting band resulting in phimosis may be required. (See "[Balanoposthitis in children: Clinical manifestations, diagnosis, and treatment](#)" and "[Balanoposthitis in children: Epidemiology and pathogenesis](#)".)
 - Balanitis xerotica obliterans is a chronic atrophic dermatitis characterized by white atrophic plaques on the glans and prepuce. These plaques eventually enlarge and coalesce into a sclerotic mass with resultant adhesions, pathologic phimosis, and meatal stenosis. In these patients, we suggest circumcision because other treatment options have not been effective (**Grade 2C**). (See '[Balanitis xerotica obliterans](#)' above.)

ACKNOWLEDGMENT — The editorial staff at UpToDate would like to acknowledge Jason Wilson, MD, who contributed to an earlier version of this topic review.

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Topic 14539 Version 15.0

GRAPHICS

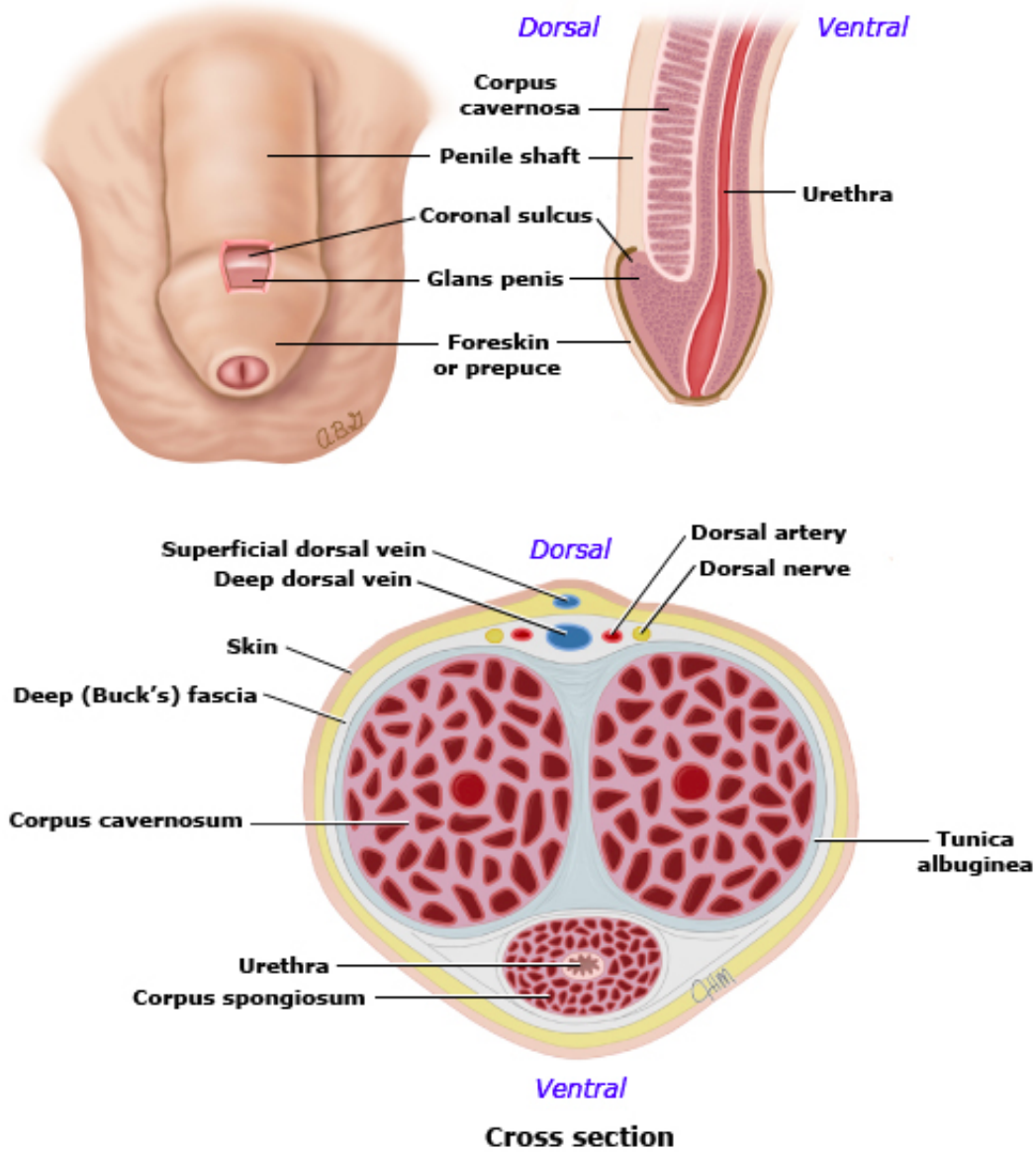
Uncircumcised penis



Courtesy of David G Weismiller, MD.

Graphic 57953 Version 1.0

Anatomy of the penis



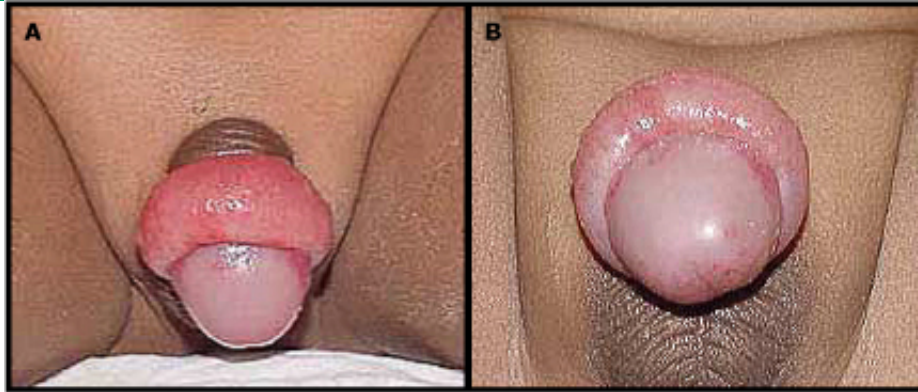
Graphic 76391 Version 3.0

Pathologic phimosis



Graphic 53082 Version 2.0

Paraphimosis



Paraphimosis caused by excessive retraction of a physiologic phimosis in a male infant. Note the marked swelling at the coronal sulcus and the flaccid penile shaft.

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Balanoposthitis



This uncircumcised boy developed a moderately severe case of balanoposthitis.

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Balantitis xerotica obliterans



These photographs depict three foreskins with the classic appearance of balanitis xerotica obliterans. The phimotic ring is closed, but the indurated, white scar is readily discernible from normal, healthy skin.

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Disclosures

Disclosures: **Duncan Wilcox, MD** Nothing to disclose. **Laurence S Baskin, MD, FAAP** Nothing to disclose. **Jan E Drutz, MD** Nothing to disclose. **Melanie S Kim, MD** Nothing to disclose.

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