

REVIEW ARTICLE

To Circumcise or Not to Circumcise

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Keywords:

Circumcision

Bioethics

Urology

Disease Prevention
& Wellness

Pediatrics

Abstract: This review article takes an evidence-based approach in the discussion of circumcision. International and national statistics are described to give context to the practice. The article reviews preventative health benefits of circumcision. There is also a summary of the bioethical reasons for and against circumcision and a short discussion of the research on the physiologic impact of removing the foreskin on sexual health. Complications of the procedure are reviewed. We discuss when to refer to a urologist and care of the uncircumcised penis. In conclusion, there are medical and ethical reasons to support circumcision but also plausible reasons to oppose it. Similarly to the American Academy of Pediatrics 2012 guidelines, we advocate discussion of these issues with concerned parents and helping them to make a decision based on medical, ethical, religious, and cultural beliefs.

INTRODUCTION

Male circumcision is a procedure to remove the foreskin of the penis. It is a surgery that has been present for millennia—for example, it was documented in Egyptian art dating from 2300 BC.¹ A number of contributing factors for male circumcision were identified by the World Health Organization (WHO) in 2010, such as religion, ethnicity, perceived social desirability, socioeconomic factors in some countries, and perceived health and sexual benefits.² The age at which the procedure is done varies greatly depending on the cultural and religious context.² Statistics may help to reflect the different influences on circumcision for family physicians who often have patients from different cultural and religious backgrounds.

According to WHO, 30% of males around the world are circumcised and approximately 69% of these are Muslim.² The most recent data published in 2013 from the Centers for Disease Control and Prevention (CDC) estimates the rate of circumcision in the United States at 80.5%.³ Within the United States, there is significant variation among ethnicities: male circumcision was seen in 90.8% of non-Hispanic whites, 75.7% in non-Hispanic blacks, and 44.0% in Mexican Americans.³ By contrast, most areas of Europe, Latin America, Russia, and East Asia have <20% prevalence of circumcision.²

WHO reported that religious male circumcision is primarily seen in Judaism and Islam and accounts for most male circumcisions globally. Approximately 30% of global male circumcisions are for nonreligious reasons.¹ In the United States, 75% of circumcisions are done for nonreligious reasons.¹

Historical reasons for a nonreligious circumcision include prevention of sexually transmitted diseases (STDs), as well as other, less well-established rationale, such as the prevention of masturbation and nocturnal enuresis.¹ Medical indications for circumcision include phimosis, irreducible paraphimosis, balanoposthitis, and balanitis xerotica obliterans.²

This paper presents an overview of foreskin anatomy and physiology, evidence-based overview of the possible medical, physiologic, and ethical advantages and disadvantages of circumcision. There is a discussion of the care of the uncircumcised penis for parents and patients and a review of emergencies that are unique to uncircumcised males.

Foreskin Anatomy & Physiology

What is the role of the foreskin, or prepuce? Perhaps surprisingly, there is no consensus on this issue.⁴ Lao and Raynor note that the innervation of the prepuce is different from the glans, and has somatosensory and autonomic innervation.⁴ Possibilities for the role of the foreskin include: protecting the moisture of the glans, protecting the fetal penis as it develops, or improving sexual pleasure.¹

What is known is that poor hygiene can cause the area under the foreskin to harbor bacteria and viruses.¹ The WHO 2007 report on circumcision discusses several ways that infections may occur.¹¹ Uropathogenic bacteria are able to adhere more easily to the type of skin under the foreskin and can proliferate and ascend in the urinary tract system.² Because the foreskin's inner mucosa is keratinized only thinly, it could be more easily damaged and allow entry of pathogens.³ Genital ulcers are more common in uncircumcised men and can provide a route of entry for HIV.⁴ The foreskin contains HIV-1 target cells, such as CD4+ T cells, macrophages, and Langerhans cells, so the cells are vulnerable to HIV infection.

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PREVENTATIVE HEALTH BENEFITS OF CIRCUMCISION

The position of WHO,² CDC⁵ and the American Academy of Pediatrics (AAP)⁶ on neonatal circumcision is that the preventative health benefits, such as decreasing STD transmission, penile cancer, and limiting balanitis, outweigh the risks. In particular, WHO recommends circumcision as part of a plan to reduce HIV transmission in heterosexual sex, citing a decreased risk of around 60%.⁷ These position papers also note that neonatal circumcision is relatively well tolerated with significantly fewer complications than when the procedure is done on older patients. Data on complication rates are presented in a later section.

In a review of the literature by Morris, Bailis, and Wiswell (2014),⁸ they note that 50% of uncircumcised males will have medical complications relating to their foreskin in their lifetimes. The possible complications range from the relatively simple, like balanitis, to the potentially fatal, like penile cancer or HIV (see Table 1). A 2009 Cochrane Review indicated that there was strong evidence for male circumcision for the prevention of HIV in heterosexual sexual encounters.⁹ However, there was no association between circumcision and the prevention of HIV acquisition with homosexual sexual encounters.¹⁰ Of note, generally urinary tract infections in infants are associated with greater severity, including pyelonephritis and sepsis, and with potential problems later on, such as renal scarring.¹¹

Female partners of uncircumcised men are also more likely to acquire cervical cancer (2.4-fold), chlamydia (5.6-fold), HSV type 2 (2.2-fold), trichomonas (1.9-fold), and bacterial vaginosis (1.4-fold).⁸

There is controversy among some laypeople, bioethicists,¹² and some medical professionals^{13,14} about the preventative health benefits of circumcision, which is discussed further in a following section (Ethics of Circumcision).

POTENTIAL REASONS NOT TO CIRCUMCISE

Within the past few decades, there has been a growing international movement of laypeople, bioethicists, and medical professionals against neonatal and infant circumcision, also known as “intactivists.”¹³ There are several arguments that they use to argue against circumcision, including potential future sexual side effects and ethical questions.^{21,22} This group has a very strong Internet presence but also has been driving legislation. In 2011, there was a proposed ballot measure to outlaw male circumcision in San Francisco and, in response, California Governor Jerry Brown signed a bill to prevent local governments from banning it.²³ In 2012, a Higher Regional Court in Cologne, Germany, ruled that male religious circumcision was considered “bodily harm” and the physician who had done the circumcision was brought to trial.²⁴ The physician was acquitted but the case caused a furor from Jewish and Muslim groups. In response, in 2013, the Bundestag, or German Parliament, passed a law that allowed circumcision for religious reasons.²⁴ After another case in 2013 involving a boy of part-Kenyan heritage, the German court ruled that parents can make the decision for circumcision if the boy cannot make such a decision himself. Otherwise, the boy would have to be informed about the procedure in an age-appropriate fashion and his wishes considered.²⁴

TABLE 1:

Relative risk of uncircumcised males to acquire disease as compared to circumcised males and the incidence rates with a given disease.

Disease	Relative Risk in Uncircumcised Males ⁸	Rate or % of Male Population in US with Disease
Balanitis	3.1	1% ¹⁵
UTI <1 year old	9.9	2.7% ¹⁶
UTI over lifetime	3.6	1-2% ¹⁷
HIV through heterosexual sex	2.4	83 ^{18*}
High risk HPV	1.5-2.7	(25.1% ^{19*})
Syphilis	1.9	9.8 ²⁰
Penile cancer	>20	0.69 ⁴²

**Calculated by taking the population of HIV patients in the United States in 2010 (1.1 million) and multiplying by reported percentage of men with HIV (76%), resulting in 836,000 men with HIV. This paper quoted 69% of these males were men who have sex with men, so the percentage of men with HIV who had heterosexual encounters was calculated to be 31%. 836,000 was multiplied by 31%, resulting in 259,160 men with HIV who were practicing heterosexual sex. This was then divided by the population of the United States in 2010 (309.3 million) and multiplied by 100,000.*

^Percentage of 1868 men in study by NHANES

Because of the strong Internet presence of intactivists, parents will likely come in with some of these issues in mind when discussing circumcision with their family’s physicians. We will address the arguments on ethics and physiology below. Preventative medicine was discussed in the previous section.

Ethics of Circumcision

There have been a wide variety of bioethical opinions to neonatal and infant male circumcision and it has been the subject of many articles in bioethical journals (e.g., there was an entire issue dedicated to this question in the Journal of Medical Ethics, July 2013). A sample of opinions is represented below.

Bioethicists Svoboda, Adler, and Van Howe view the AAP and CDC guidelines as being flawed.¹² The authors review the Cardinal Ethical Rules of autonomy (self-determination), non-maleficence (not doing harm), beneficence (doing good), and justice (fairness). They state that because the parents make a decision about removing a part of the male’s sexual organ without his consent, neonatal or infant circumcision violates autonomy. With regards to non-maleficence, the authors argue that there have not been any proven substantial benefits specifically regarding UTIs, HIV, and penile cancer, so circumcision violates this ethical rule.

Another argument is that “there are no medical indications for male circumcision in the neonatal period,” so neonatal circumcision violates the rule of beneficence.¹¹ The authors analyze specific ethical rules from the American Medical Association, such as no unnecessary surgery, equality, a physician’s duty is to the patient, and ethical preventative medicine and argue that male circumcision violates these rules as well. For example, equality is violated because females are protected against female circumcision, or female genital mutilation, while males are not. They state that physicians are not respecting their male patients’ health and well being in this matter. The authors point out that medical associations from other countries (such as Denmark, Sweden, and South Africa) have called for bans on infant male circumcision as violations of human rights and medical ethics.

Other bioethicists hold opposing views, such as Benatar and Benatar.²⁵ They note that despite the varying quality of medical research on UTIs, it is important that the available data points to circumcision improving preventative health. Their major caveat is the practice of not using anesthesia during circumcision when it is easy to administer and decreases pain in the patient. Their conclusion is that “nontherapeutic circumcision of infant boys is a suitable matter for parental discretion. In exercising that discretion, religious and cultural factors, though preferably subject to critical evaluation, may reasonably play a role.”²⁵

Brady²⁶ discusses a study done by Sansom, Prabhu, Hutchinson, et al. that modeled an American male’s lifetime risk of HIV if circumcised at birth, based on the HIV incidence of circumcised men in three randomized controlled trials in Africa.²⁷ These authors found that in this model, circumcision reduced the lifetime risk of acquiring HIV among all American males by around 16%, varying by ethnicity. Brady also notes that if male circumcisions were done at the consenting age of 18 years old, the procedure would be more complicated with a higher risk of adverse events (as noted above) and there would be an increased risk of sexually transmitted disease, given that 47% of high school seniors acknowledge sexual activity and 24% reported four or more sexual partners. Brady posits that it is ethical for parents to make an informed medical decision on what they felt was most beneficial for their child, based on medical advice, culture, and parents’ experience—the way many decisions are already made.

Morris, Bailis, and Wiswell⁸ argue that the United Nations Convention on the Rights of the Child allows for parents to authorize procedures in their children’s best interests. Because of the body of evidence for the health benefits of circumcision, these authors argue that neonatal and infant circumcision is ethical and in boys’ best interests.

The British Medical Association (BMA) views non-therapeutic male circumcision to be lawful if it “is performed competently, believed to be in the child’s best interests, and there is valid consent.”²⁸ Regarding the issue of consent, the BMA states that competent children should be involved in the decision making process and that if the parents disagree, the procedure should not be done without a court order.

Research on Foreskin Sexual Physiology

There has been controversy about the role of the foreskin in sexual pleasure. Individual studies have looked at physiologic responses to stimulation and qualitative data, and have had mixed results. A systematic review from Morris and Krieger looked at whether circumcision affected the experience of sex as measured by sexual function (performance, erectile dysfunction, premature ejaculation, ejaculatory latency time, orgasm difficulties, and dyspareunia), sensitivity (touch perception of a flaccid penis), sensation (neurophysiologic perception of the penis or portion of the penis during sexual stimulation), and satisfaction (patient-reported pleasure and patient-reported orgasm intensity).²⁹ In their review, the high quality studies showed that circumcision had no effect on sexual function in these parameters. Two large randomized controlled trials were done in Kenya and Uganda. In the Kenyan study, 2,784 men were involved.³⁰ The group that was randomized for circumcisions were given questionnaires before and after circumcision at 6-month intervals until two years after the circumcision. The other group was given the questionnaires at the same intervals. At two years after circumcision, 99.9% of respondents were satisfied with the procedure. Circumcised participants had increased penile sensation in 71.8% and increased ease of reaching orgasm in 63.1%. In the Ugandan study, 2,246 men were uncircumcised and another 2,210 were randomized to receive circumcisions. There was no difference between the two groups in medium/high level of sexual desire, difficulty in achieving or maintaining an erection, difficulty with vaginal penetration, difficulty with ejaculation, or dyspareunia. Both groups had an equal level of sexual satisfaction at one and two years after one group had the circumcision. Morris and Krieger also take note of a national survey of 1,410 men in the US, aged 18-59 years old, that found that sexual dysfunctions were more common among uncircumcised men.³¹ A similar telephone study was conducted in Australia, with circumcised men noting less sexual dysfunction for a month or more in the previous year.³²

Another systematic review and meta-analysis by Tian, Liu, Wang, et al. found no differences between circumcised and uncircumcised men in sexual desire, dyspareunia, premature ejaculation, ejaculation latency time, erectile dysfunctions, and orgasm difficulties.³³

Because of the emphasis that intactivists place on the integrity of the foreskin for sexual pleasure, there are also men who attempt to “restore” the foreskin.³⁴ This can be done with nonsurgical methods using gentle traction with weights or, rarely, surgical reconstruction.

MEDICAL COMPLICATIONS ASSOCIATED WITH CIRCUMCISION

Providers performing neonatal circumcisions are familiar with the standard complications: bleeding, infection, and cosmetic injury or amputation of the glans. There are also grave complications that can develop, such as bacteremia and death from life threatening infections or profound blood loss.

Awareness of the penile anatomy, understanding of the equipment, and appropriate training can reduce many of the medical complications. An international review on neonatal and infant circumcision complications in prospective studies by WHO in 2010² noted that “the median frequency of any adverse effect was 1.5% (range of 0-16% among 16 studies) and the median frequency of

any severe adverse effect was 0% (range of 0-2%).² The circumcision approaches varied from using the Plastibell or the Gomco clamp to freehand circumcision or a combination, and were done by medical professionals (physicians, nurses, or midwives) or traditional practitioners. The most common adverse events were minor, such as swelling, bleeding, or inadequate removal of skin. There were rare serious adverse events, such as amputation of the glans penis if the glans is not protected.

The rate of complications depends on timing of the procedure and the method used to perform the circumcision (Table 2).

Other complications can develop later. These include epidermal inclusion cysts, suture sinus tracts, chordee, inadequate skin removal resulting in redundant foreskin, penile adhesions, phimosis, buried penis, urethrocutaneous fistulae, meatitis, meatal stenosis.³⁵ Many of these complications can be easily handled in the outpatient setting without a urology consultation. A later section will offer more details on when to refer to a urologist.

With the increasing age of the infant, there appears to be increased pain from circumcisions. Most literature reports that any circumcision performed before the 4th week of life is generally well tolerated. A study in 2009, 36 of 583 infants found that 6.5% infants under 1 week of life experienced pain at a rating of ≥ 2 during circumcision, using the Neonatal/Infant Pain Scale (NIPS; Table 3). However, 100% of infants at 4 weeks of life experienced this rating during circumcision.

During circumcision, pain in the newborn younger than 4 weeks of age is typically controlled by performing a dorsal nerve block with 1% lidocaine and providing the infant with dextrose water. Bleeding is generally controlled with gentle pressure and, less commonly, with chemical cautery, Surgicel®, or sutures. If bleeding cannot be controlled, surgical correction may be necessary.

Circumcision done after infancy is more likely to require sutures for hemostasis and have a higher rate of complications even for those done by medical professionals in sterile circumstances.² WHO reported 10 prospective studies of complications for circumcisions done by medical professionals on boys one year or older. For these studies, “the median frequency of any adverse event

was 6% (range 2-14%), and the median frequency of any serious adverse event was 0% (0-3%).² The authors note that adverse events were most common among boys who had the circumcision done for medical reasons, which would likely be more complicated surgical cases than if the circumcisions were for non-therapeutic reasons. Complications in circumcisions that were done by non-medically trained professionals, often in non-sterile conditions, had a higher rate of adverse events with more serious complications. One study conducted in Turkey had 407 subjects who were circumcised at two mass circumcision events.³⁷ The average age was 7 years old and the circumcisions were done by non-medical professionals in a non-sterile environment. 73% of participants had complications, including infections, subcutaneous cysts, and bleeding that needed suturing for hemostasis. Five boys required hospitalization for infections.

TABLE 3:

Neonatal/Infant Pain Scale (NIPS)³⁶
 *Maximum score of 7.

N/IPS*	0	1	2
Facial expression	Relaxed	Contracted	
Cry	Absent	Mumbling	Vigorous
Breathing	Relaxed	Different than basal	
Arms	Relaxed	Flexed/ stretched	
Legs	Relaxed	Flexed/ stretched	
Alertness	Sleeping/ Calm	Uncomfortable	

TABLE 2:

Types of complications with different methods³⁵

Type	Mogen	Gomco	Plastibell
Complication	1. insufficient or excessive skin removal 2. Asymmetric redundancy 3. Amputation of the glans *All due to incorrect placement of the clamp	1. Insufficient or excessive skin removal 2. Increased bleeding rates if not properly tightened *All due to technical factors with placement of the 4 piece clamp	1. Incomplete circumcision 2. Glans injury 3. Bleeding * Inadequate bell placement or slippage or inadequate hemostatic suture position

WHEN TO REFER FOR CIRCUMCISION BY A UROLOGIST

Most newborn or infant circumcisions under the age of 30 days can safely be performed in the hospital prior to discharge or in the outpatient setting. However, there are contraindications to this. When penile anomalies are present, it is necessary to refer to a urologist for assessment and management. The anomalies encountered more frequently include epispadias, hypospadias, congenital buried penis, hooded prepuce, penile curvature, penile torsion, and penoscrotal webbing.

GENERAL CARE & RECOMMENDATIONS OF THE UNCIRCUMCISED MALE

The uncircumcised infant should require no extra care. Simply washing the area during baths with gentle soaps and observing for any signs of redness or edema is sufficient. Forcible retraction in infancy is not indicated and could cause harm.³⁸ It is also not recommended to retract when the child is immersed in bathwater as the bathwater could contain *E. coli* and other enteric bacteria.

Self-exploration and nocturnal erections begin around the age of two and a parent can begin gently retracting the foreskin to clean the smegma exposed once adhesions are broken down. Gentle soap and water are used to clean the foreskin and, after retraction, the glans. Make certain to dry the area before replacing the foreskin into its anatomical position. Not replacing the foreskin properly can lead to paraphimosis, a urologic emergency (see following section). As the male child grows, it is important to teach him to perform this action as part of his daily or every other day hygiene habits. Typically once a child has undergone puberty they can be taught to perform the steps listed above as part of their own hygiene routine without adult supervision.³⁹

UNCIRCUMCISED PROBLEMS OR EMERGENCIES

Phimosis is the inability to retract the foreskin and is commonly described as physiologic or pathologic. Physiologic phimosis is most commonly seen in infants due to the normal development of congenital adhesions. If this condition continues into childhood, gentle stretches and appropriate hygiene education should be provided. Physiologic phimosis is seen in 10% of children 3 years of age.³⁸ Only 1% at the age of 16 years will be unable to retract the foreskin.³⁸

Patients with pathologic phimosis often present with a non-retractable foreskin due to scarring at the distal foreskin, which is usually caused by trauma, infection, or inflammation. The incidence rate of pathologic phimosis is 0.4 in 1000 boys per year.⁴⁰ The associated symptoms include dysuria, irritation and bleeding, painful erections, and dyspareunia.⁴⁰

With either physiologic or pathologic phimosis, application of a steroid cream can assist in breaking down adhesions. The most commonly used steroids are betamethasone cream (0.05%), triamcinolone cream (0.1%), hydrocortisone (2.5%), or fluticasone propionate (0.05%) twice daily at the prepuce opening for 4-8 weeks, along with gentle stretching techniques to assist in retracting the foreskin.^{38,40}

Balanitis is the most common inflammatory condition of the glans and balanoposthitis is the most common inflammatory condition of the combined glans and foreskin. Both can lead to pathologic phimosis and, potentially, paraphimosis. This chronic inflammation is caused by poor hygiene complicated by a secondary infection. The patient may present with a swollen and inflamed foreskin and/or glans penis with associated purulent drainage. Aerobic, anaerobic and fungal organisms can be associated with these conditions, so culture of the drainage is needed.⁴¹ Oral antibiotic and topical antifungal treatments are indicated until cultures return and more focused treatment can begin.⁴¹

Paraphimosis, on the other hand, is a urologic emergency. Paraphimosis occurs when the foreskin is left retracted and swelling develops. This swelling leads to impaired venous and lymphatic flow of the glans, which then leads to arterial compromise and potentially necrosis of the glans penis if left untreated. The cause of paraphimosis is often not replacing the foreskin over the glans into the normal anatomic position after cleaning or voiding, urethral catheter placement, or a vigorous sexual encounter during adolescence or adulthood.⁴¹ It may also occur with foreskin and penile piercings.⁴¹ There is significant pain and edema associated with this condition and patients require intravenous analgesia and potentially adjuncts to reduce edema, such as topical NSAIDs, while preparing for reduction or surgical corrective measures.⁴¹ Paraphimosis can often be reduced, if no necrosis is observed, with pressure to the glans to remove excess edema while pulling the foreskin over the glans.³⁸ If this technique is unsuccessful then a dorsal slit under anesthesia may need to be performed and a circumcision will likely follow.³⁸ If penile or foreskin necrosis is present, urgent urologic consultation is warranted.

CONCLUSION

There are cogent arguments for and against circumcision. On the medical side, there are decreased risks for severe UTI in the first year of life, as well as lowered risks of foreskin related diseases, such as balanitis. There is evidence for the physiology of the foreskin leading towards a higher rate of sexually transmitted illnesses. On the ethical side, doing circumcisions in the first month of life leads to a simpler, better tolerated procedure with fewer complications, and can help prevent foreskin related problems during a male's lifetime.

From the opposing viewpoint, 70% of the men in the world are uncircumcised. The high prevalence in the United States appears to be from cultural, rather than medical or religious, reasons. Many of the medical problems that are foreskin related are relatively rare (UTI) or extremely rare (penile cancer). For other diseases, such as HPV, while circumcision is helpful to prevent transmission and contracting the disease, appropriate use of condoms and immunization against high-risk types of HPV are likely more effective. Ethically, doing a procedure for non-religious and non-medical reasons that permanently alters the appearance of genitalia could be considered problematic.

Importantly, there is not much research that demonstrates a decrease in sexual effects after circumcision. Based on systematic reviews and meta-analyses as well as studies of physiology, the evidence seems to lean towards no change after circumcision or even slightly improved sexual experiences.

The authors take a similar stand as the AAP 2012 guidelines and advocate discussion of these issues with concerned parents and helping them to make a decision based on medical, ethical, religious, and cultural beliefs.

ACKNOWLEDGEMENTS

The authors would like to thank the Oklahoma State University-Center for Health Sciences Library for its help with the literature search.

REFERENCES

1. WHO. Male circumcision: global trends and determinants of prevalence, safety and acceptability. 2007; http://apps.who.int/iris/bitstream/10665/43749/1/9789241596169_eng.pdf. Accessed May 31, 2016.
2. WHO. Neonatal and child male circumcision: a global review. 2010; http://www.who.int/hiv/pub/malecircumcision/neonatal_child_MC_UNAIDS.pdf. Accessed May 31, 2016.
3. Introcaso C, Xu F, Kilmarx P. Prevalence of circumcision among men and boys aged 14 to 59 years in the United States, national health and nutrition examination surveys 2005-2010. *Sex Transm Dis*. 2013;40:521-525.
4. Lao O, Raynor S. Circumcision. In: Holcomb G, Murphy P, Ostlie D, eds. *Ashcraft's Pediatric Surgery*. 6th ed; Elsevier; 2014:810-815.
5. CDC. Male Circumcision Benefits Outweigh Risks, CDC Says. <https://www.scientificamerican.com/article/male-circumcision-benefits-outweigh-risks-cdc-says/>. Accessed April 20, 2017
6. Circumcision Policy Statement. *Pediatrics*. 2012;103(3):686.
7. WHO. Male circumcision for HIV prevention. <http://www.who.int/hiv/topics/malecircumcision/en/>. Accessed July 6, 2016.
8. Morris B, Bailis S, Wiswell T. Circumcision rates in the United States: rising or falling? What effect might the new affirmative pediatric policy statement have? *Mayo Clin Proc*. 2014;89(5):677-686.
9. Siegfried N, Muller M, Deeks J, Volmink J. Male circumcision for the prevention of heterosexual acquisition of HIV in men. *Cochrane Database of Systematic Reviews*. 2009(2). Accessed July 6, 2016.
10. Wiysonge C, Kongnyuy E, Shey M, et al. Male circumcision for the prevention of homosexual acquisition of HIV in men. *Cochrane Database of Systematic Reviews*. 2011(6). Accessed July 6, 2016.
11. Morris B, Wiswell T. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. *J Urol*. 2013;189:2118-2124.
12. Svoboda J, Adler P, Van Howe R. Circumcision in unethical and unlawful. *J Law Med Ethics*. 2016;44(2):263-282.
13. Collier R. Ugly, messy and nasty debate surrounds circumcision. *Can Med Assoc J*. 2012;184(1):E25-26.
14. Doctors Opposing Circumcision: Physicians for Genital Integrity. <http://www.doctorsopposingcircumcision.org>. Accessed August 2, 2016.
15. Malone P, Steinbrecher H. Medical aspects of male circumcision. *Brit Med J*. 2007;335:1206-1209.
16. Chang S, Shortliffe L. Pediatric urinary tract infections. *Pediatr Clin N Am*. 2006;53:379-400.
17. Singh-Grewal D, Macdessi J, Craig J. Circumcision for the prevention of urinary tract infection in boys: a systematic review of randomised trials and observational studies. *Arch Dis Child*. 2005;90(8):853-858.
18. Centers for Disease Control and Prevention. HIV among men in the United States. 2013; http://www.cdc.gov/hiv/pdf/risk_gender_hiv_among_men.pdf. Accessed June 8, 2016.
19. Han JJ, Beltran TH, Song JW, et al. Human papillomavirus vaccination rates among US adult men: National Health and Nutrition Examination Survey. *JAMA Oncol*. 2017; e-publish ahead of print. doi:10.1001/jamaoncol.2016.6192
20. Patton M, Su J, Nelson R, Weinstock H. Primary and secondary syphilis--United States, 2005-2013. *Morbidity and Mortality Weekly Report*. 2014;63(18):402-406.
21. Sardi, Lauren M. The Male Neonatal Circumcision Debate: Social Movements, Sexual Citizenship, and Human Rights. Volume 6. Issue 3. Article 4. <http://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=1101&context=swb>. Accessed April 20, 2017
22. Zak, Dan. 'Intactivists' Cut to the Chase About Circumcision Issue. Tuesday, March 31, 2009. <http://www.washingtonpost.com/wp-dyn/content/article/2009/03/30/AR2009033003312.html>. Accessed April 17, 2017.
23. Evangelista B. Circumcision law blocks local bans. *San Francisco Chronicle* 2011.
24. Cutting controversy: German court sets new circumcision rules. 2013; <http://www.spiegel.de/international/germany/new-circumcision-ruling-requires-doctors-to-discuss-procedure-a-924984.html>. Accessed July 6, 2016.
25. Benatar M, Benatar D. Between prophylaxis and child abuse: the ethics of neonatal male circumcision. *Am J Bioeth*. 2003;3(2):35-48.
26. Brady M. Newborn male circumcision with parental consent, as stated in the AAP circumcision policy statement, is both legal and ethical. *J Law Med Ethics*. 2016;44(2):256-262.
27. Sansom S, Prabhu V, Hutchinson A, et al. Cost-effectiveness of newborn circumcision in reducing lifetime HIV risk among US males. *PLoS ONE*. 2010;5(1).
28. British Medical Association. The law and ethics of male circumcision: guidance for doctors. *J Med Ethics*. 2004;30:259-263.
29. Morris B, Krieger J. Does male circumcision affect sexual function, sensitivity, or satisfaction?--a systematic review. *J Sex Med*. 2013;10(11):2644-2657.
30. Krieger J, Mehta S, Bailey R, Agot K, et al. Adult male circumcision: effects on sexual function and sexual satisfaction in Kisumu, Kenya. *J Sex Med*. 2008;5:2610-2622.
31. Laumann E, Masi C, Zuckerman E. Circumcision in the United States: prevalence, prophylactic effects, and sexual practice. *J Am Med Assoc*. 1997;277:1052-1057.
32. Richters J, Smith A, deVisser R, et al. Circumcision in Australia: prevalence and effects on sexual health. *Int J STD AIDS*. 2006;17:547-554.
33. Tian Y, Liu W, Wang J-Z, et al. Effects of circumcision on male sexual functions: a systematic review and meta-analysis. *Asian J Androl*. 2013;15:662-666.
34. Collier R. Whole again: the practice of foreskin restoration. *Can Med Assoc J*. 2011;183(18):2092-2093.
35. Krill A, Palmer L, Palmer J. Complications of circumcision. *Scientific World Journal*. 2011;11:2458-2468.
36. Banieghbal B. Optimal Time for Neonatal Circumcision: An Observation-Based Study. *J Pediatr Urol*. 2009;5(5):359-362.
37. Atikeler M, Gecit I, Yuzgec V, Yalcin O. Complications of circumcision performed within and outside the hospital. *Int Urol Nephrol*. 2005;37(1):97-99.

38. McGregor T, Pike J, Leonard M. Pathologic and physiologic phimosis: approach to the phimotic foreskin. *Can Fam Physician*. 2007;53(3):445-448.
39. American Academy of Pediatrics. Care for an uncircumcised penis. 2007; <https://www.healthychildren.org/English/ages-stages/baby/bathing-skin-care/Pages/Care-for-an-Uncircumcised-Penis.aspx>. Accessed September 4, 2016.
40. Shahid S. Phimosis in children. *ISRN Urol*. 2012.
41. Palmer L, Palmer J. Management of abnormalities of the external genitalia in boys. In: Wein A, Kavoussi L, Partin A, Peters C, eds. *Campbell-Walsh Urology*. 11th ed. Philadelphia, PA: Elsevier; 2016:3368-3398.
42. Barnholtz-Sloan JS, Maldonado JL, Pow-sang J, Giuliano AR. Incidence Trends in Primary Malignant Penile Cancer. *Urol Oncol*. 2007;25(5):361-7.