

# Female Genital Mutilation Reconstruction for Plastic Surgeons—A Call to Arms

Takintope Akinbiyi, MD, MSc  
Emily Langston  
Ivona Percec, MD, PhD

**Summary:** The practice of female genital mutilation (FGM) is performed for historically engrained cultural beliefs with no recognized health benefits. FGM continues to be practiced secondary to motivating factors based on cultural beliefs, the majority of which aim to maintain the “purity” of the female victim. The World Health Organization has classified FGM into 4 types ranging from partial clitoral resection to complete clitoral excision along with the majority of the vulva. The list of short and long-term complications is extensive and morbid, including injury to the patient’s sexuality and feminine identity. Reconstructive surgery can be an important addition to psychotherapy for these women with the goal of correcting the appearance of the vulva to achieve a more normal appearance, and to restore clitoral function. We suggest that this represents an opportunity for plastic surgeons to use our wealth of reconstructive knowledge to provide restoration of form and function to FGM victims. (*Plast Reconstr Surg Glob Open* 2018;6:e1945; doi: 10.1097/GOX.0000000000001945; Published online 7 November 2018.)

The practice of female genital mutilation (FGM), also referred to as cutting, pricking, or female circumcision, is performed for historically ingrained traditional beliefs with no recognized health benefits.<sup>1</sup> The World Health Organization (WHO) defines FGM as comprising all procedures that involve the partial or total removal of the external female genitalia, or as any other injury to the female genital organs for nonmedical reasons.<sup>1</sup> The clitoris has been described as being essential to female sexual arousal and function and the outer appearance of the female genitalia is heavily tied to female sexuality.<sup>2,3</sup> Therefore, acts that intentionally injure, or attempt to remove the clitoris and surrounding structures, are profoundly damaging and represent a gross violation of human rights.

## CULTURAL AND HISTORICAL BACKGROUND

The primary motivation for the practice of FGM is the belief that it will decrease or eliminate sexual arousal and pleasure, thus protecting the purity of a woman for a husband.<sup>4,5</sup> Making sexual activity less enjoyable for a woman

is thought to decrease the risk of her engaging in sexual encounters before or outside of marriage. Motivating factors that contribute to the perpetuation of FGM as a “normal” practice are largely rooted in ancient tradition. Young girls may feel a greater sense of belonging among adult women who have been through the same experience. In some cultures, it is considered a necessary component of childrearing as a rite of passage that purifies a girl by removing her unclean clitoris and labia.<sup>1,6–8</sup> When viewed from within this cultural context, that is by mothers anxious to raise daughters who are socially desirable, it is possible to understand why the custom persists in modern times.<sup>4,6</sup>

FGM is currently carried out in 30 countries across Africa, the Middle East, and Asia, but is practiced predominantly in sub-Saharan Africa.<sup>1,9</sup> As of 2017, over 200 million girls and women have undergone FGM procedures. Although it can be performed at any age, the majority of girls undergo FGM by age 15, and in some cultures the procedure is performed during infancy.<sup>4</sup> In one study of over 2,000 Sudanese women, 96.9% who had undergone FGM had done so by age 6.<sup>10</sup> In Somalia, 98% of women between the ages of 15 and 49 years had undergone FGM.<sup>11</sup> In most cases, the procedure is performed by nonmedical providers such as midwives or other local women considered to have expertise in the procedure.<sup>8</sup> It is therefore typically performed without sterile surgical instruments, a sterile field, or any anesthesia.<sup>1,9,11</sup>

The practice of FGM is frequently misassociated with Islam. However, although the exact origins of female

*From the Department of Surgery, Division of Plastic Surgery, University of Pennsylvania, Philadelphia, Pa.*

*Received for publication June 25, 2018; accepted July 27, 2018.*

*Copyright © 2018 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.*

DOI: 10.1097/GOX.0000000000001945

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

circumcision are unknown, there is growing evidence that its beginnings took place in antiquity well before the birth of Islam.<sup>12</sup> Ancient Egyptian mummies have been discovered that are marked by the signs of female circumcision.<sup>9</sup> In this context, it was restricted to the daughters of priests and rulers and was thus a sign of elevated social status.<sup>13</sup> FGM is also practiced by Christians and Jews in countries where FGM is culturally accepted.<sup>4</sup>

Although the practice of FGM is primarily carried out in Africa, medical providers in Western countries are increasingly encountering FGM victims secondary to the increase in global migration. Women who underwent FGM in their native countries are increasingly seen in Western countries for routine gynecological or obstetrical visits and may require medical treatment for FGM sequelae. In addition, girls and women may remain at risk for undergoing the FGM procedure even after they leave their native countries. In the United States, a 2012 Centers for Disease Control and Prevention (CDC) report cited that over 500,000 girls and women were at risk for undergoing FGM here in the United States based on their country of origin.<sup>14</sup> The practice has been formally banned since 1996 in the United States. However, as of the writing of this article, 26 states still do not currently have legislation in place criminalizing FGM.<sup>15</sup> Tracking its practice here is challenging because the procedure may be carried out in private, nonmedical settings, thereby escaping detection. In addition, girls may be taken back to their home country by family members to have the procedure performed, a practice termed “vacation cutting.” As a result, the CDC stated “No reliable sources of data exist on the number of U.S. resident women and girls who have undergone FGM either in the United States or in their country of origin, or on the number of women and girls who undergo the procedure in a given year.”<sup>14</sup>

In 2017, Dr. Jumana Nagarwala, an Emergency Medicine physician, and Dr. Fakhruddin Attar, an internal medicine physician, were indicted before a Grand Jury in Detroit for performing FGM on girls in the state of Michigan. The 2 physicians, along with Dr. Attar’s wife and practice manager, are alleged to have conspired to perform FGM on two 7-year-old girls. The indictment stated that they may have been performing the procedure at Dr. Attar’s clinic since 2005.<sup>16</sup> This represents the first indictment brought under the 1996 Federal anti-FGM law.<sup>17</sup> The 2 girls in question were brought from Minnesota to Michigan to facilitate the procedure suggesting that the motivation to perform FGM is high among some immigrant communities.

Multiple other Western countries are similarly dealing with FGM, both in caring for former victims and by protecting those still at risk. The United Kingdom is now home to an estimated 137,000 victims of FGM. A striking 2.5% of women living in London were victims of FGM. The United Kingdom also has legislation in place making the practice of FGM illegal. However, as of 2016, they also had zero prosecutions under the law, which is startling considering that, on average, a case of FGM is reported every 109 minutes. Many prominent figures, like Lord Smith of Hindhead, have championed the cause.<sup>18,19</sup> However, the frequent involvement of nonmedical prac-

tioners outside of clinical environments means the true numbers at those who have been victimized while in the United Kingdom are unknown, and protecting those at risk is also very challenging.

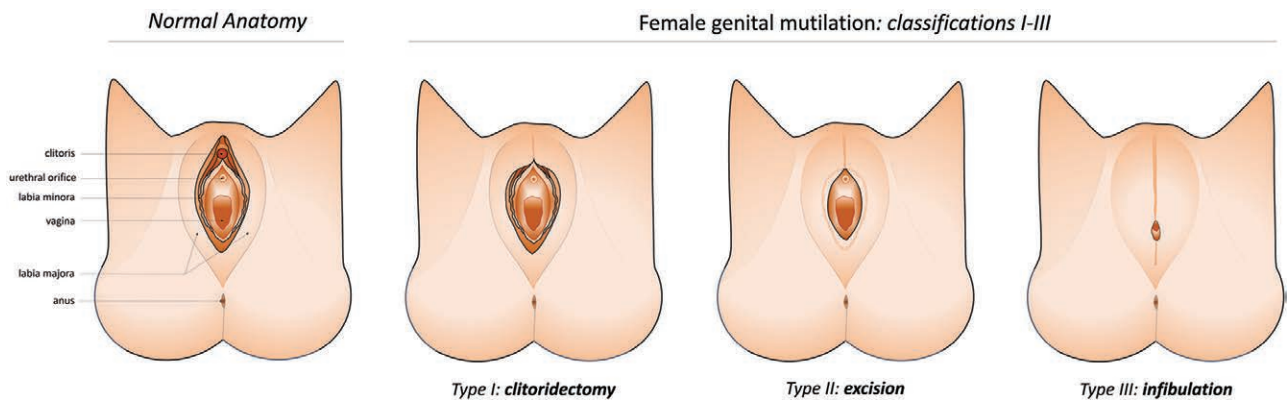
Despite international recognition of FGM as a violation of human rights and several initiatives promoting education and awareness and implementing improved legal protection, it remains a common practice. Although there is evidence that the incidence is decreasing, globally an estimated 3 million girls and women are still at risk every year.<sup>1,11</sup> In 2013, approximately 89.6% of women aged 15–49 years in Sierra Leone had undergone FGM, down from 91.3% in 2008. A temporary ban on the practice implemented during the Ebola crisis helped drive down the incidence. However, while no recent figures exist, many believe the incidence is rising again due to how deeply ingrained the practice is in the local culture.<sup>20</sup>

## CLASSIFICATION AND SEQUELAE

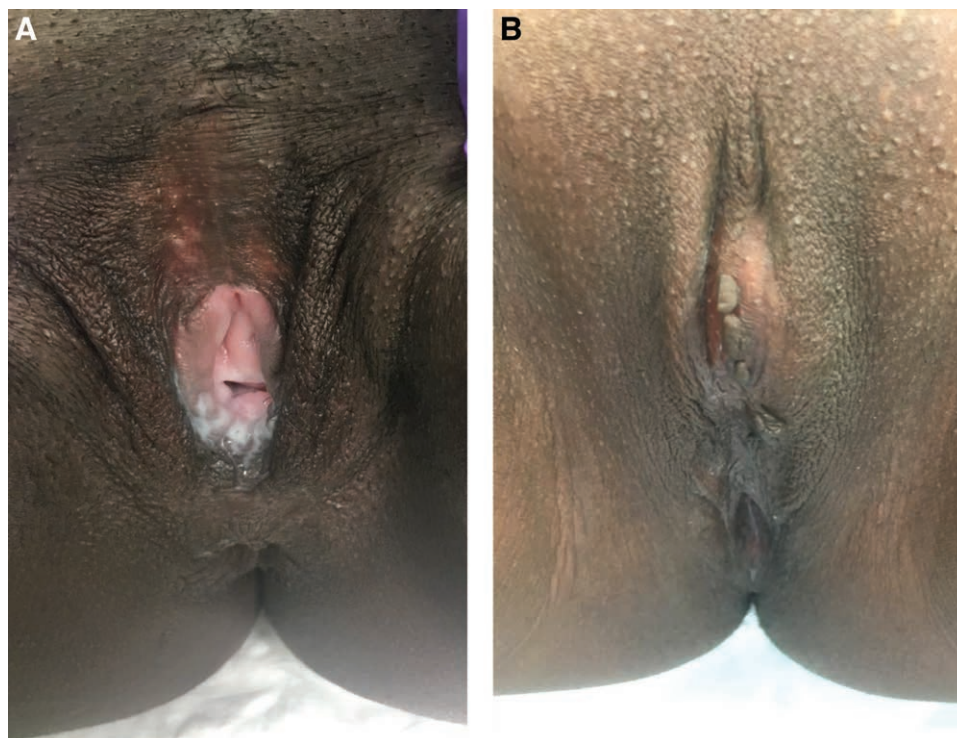
Many systems have been described to characterize FGM. One of the more popular historic systems was described by Shandall,<sup>13</sup> which was further modified by Verzin<sup>21</sup> in 1975. Currently the most universally recognized and utilized system was developed by the WHO and is illustrated in Figures 1 and 2 and described in Table 1. In brief, type 1 is defined as a partial or total removal of the clitoris, type 2 as the additional removal of labia minora and possibly majora, type 3 as the narrowing of vaginal opening by surgically closing the external portion of the vulva, while type 4 is defined as any other harmful procedure to the female genitalia for nonmedical reasons.

There are a myriad of short- and long-term complications caused by FGM. Most are likely related to the fact that so many procedures are performed: (1) by nonmedical practitioners; (2) with crude and unsharpened instruments that are often not sterilized; (3) under no anesthetic control; and (4) with no follow-up care. Some of the more notable complications include hemorrhage, death, acute or chronic infections, transmission of HIV or hepatitis, dyspareunia, dysmenorrhea, recurrent urinary tract infections (UTIs), psychological disturbances, and higher risk pregnancies.<sup>4,10,22</sup> It is important to note that the full complication profile is unknown because patients with complications may not seek care from the medical establishment secondary to fears of repercussions, shame, or lack of knowledge.

Type 3 “infibulation” involves the surgical narrowing of vaginal opening by closing variable amounts of the external vulva. Urine and menses often flow through a single hole, labeled “watering-can dispersal”<sup>10</sup> (Fig. 2B). In many cases, women often have to undergo deinfibulation to reopen the vaginal opening to allow for sexual intercourse and/or childbirth. Even after deinfibulation, some women still experience severe perineal tearing during sexual intercourse and childbirth leading to further scarring. Frustrations with delayed or difficult sexual intercourse can lead to anal intercourse or even using the urethral meatus.<sup>7</sup> Prolonged obstructed labor, secondary to narrowed vulva, and scar tissue can lead to fetal death and vesicovaginal fistulas with ischemia of the septum. Some women



**Fig. 1.** Schematic representation of The WHO's FGM classification system types 1–3.



**Fig. 2.** Clinical pictures of WHO female genital mutilation classification type 2 (A) and type 3 with a clitoral remnant cyst (B).

will elect to undergo reinfibulation after childbirth, demonstrating how ingrained FGM is in many cultures. Each additional birth then requires another deinfibulation, resulting in multiple procedures and an increased risk of complications.<sup>4</sup> A comprehensive look at both the short- and long-term sequelae is displayed in Table 2.

### ANATOMY AND THERAPEUTIC OPTIONS

It is important to first understand normal female genital anatomy to fully appreciate the extent of the anatomical and corresponding physiologic changes in the context of FGM (Fig. 3). The clitoris comprises several components that work with other anatomical elements to facilitate aspects of sexual stimulation. The glans is the external portion and is covered by the prepuce or hood. The body

connects the glans to the pubic symphysis via the suspensory ligament of the clitoris and to the crura. The crura then attach to the ischiopubic rami.<sup>5</sup> The bulbs engorge during arousal and are situated beneath the labia and are covered by the bulbocavernosus muscle and are innervated by branches of the pudendal nerve. The bulbs provide additional sensory stimulation, aiding in sexual arousal, and engorge with arousal providing vaginal wall rigidity.<sup>23</sup> Sensory tissue under the labia minora and around the urethra are also thought to convey sexual stimuli.<sup>3,5,24</sup>

In the early to mid 20th century, clitoromegaly was treated with clitoral reduction surgery. Early techniques primarily involved debulking the body of the clitoris. Unfortunately, the now devascularized glans would subsequently necrose. This then led to the practice of

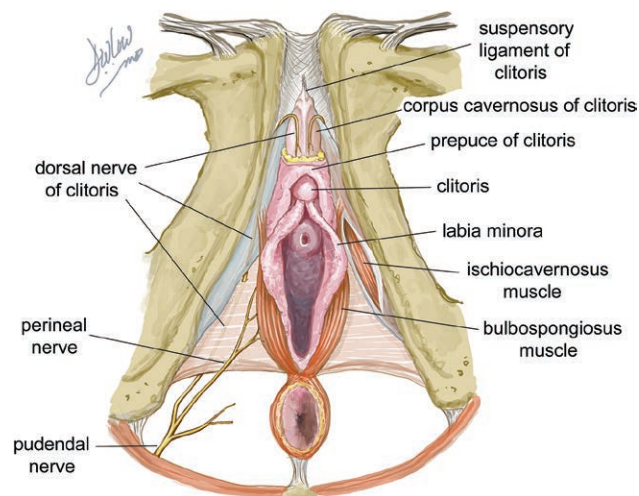


**Table 1. WHO Female Genital Mutilation Classifications**

Type 1 "Clitoridectomy"	Partial or total removal of clitoris. Possibly only removal of prepuce (clitoral hood).
Type 2 "Excision"	Partial or total removal of the clitoris and labia minora +/- removal of labia majora.
Type 3 "Infibulation"	Narrowing of vaginal opening by surgically closing the external portion of the vulva. This can involve sealing [word choice] the minor or major lips together with or without removal of clitoral tissue.
Type 4	All other harmful procedures of the female genitalia for nonmedical purposes such as pricking, piercing, or cauterizing.

**Table 2. Short and Long-term Sequelae of Female Genital Mutilation**

Short-term	Long-term
<ul style="list-style-type: none"> <li>• Severe pain;</li> <li>• Excessive bleeding;</li> <li>• Fever;</li> <li>• Soft-tissue infections;</li> <li>• Urinary tract issues;</li> <li>• Wound breakdown;</li> <li>• Shock;</li> <li>• Death;</li> <li>• Genital tissue swelling</li> </ul>	<ul style="list-style-type: none"> <li>• Chronic urinary problems (dysuria, UTIs);</li> <li>• High-risk pregnancies;</li> <li>• Vaginal problems (discharge, pruritus, recurrent bacterial vaginosis and other infections);</li> <li>• Menstrual problems (dysmenorrhea, difficulty in passing menstrual blood);</li> <li>• Painful scar tissue and keloid formation;</li> <li>• Dyspareunia;</li> <li>• Decreased libido or sexual satisfaction;</li> <li>• Increased childbirth complications;</li> <li>• Need for additional procedures (deinfibulation in type III patients);</li> <li>• Psychological problems (depression, anxiety, posttraumatic stress disorder, low self-esteem)</li> </ul>



**Fig. 3.** Illustration of the female perineum. *Used with permission from Chang CS, Low DW, Percec I. Aesthet Surg J. 2017 37(8): 942–46.*

clitorectomy for clitoromegaly. Those patients who underwent clitorectomy were subsequently found to have issues with sexual arousal and satisfaction. Thus, a historic parallel exists between patients who underwent FGM and clitorectomy.<sup>23</sup> However, despite Western medicine’s historic experience with clitorectomy and its resulting morphology, little is known about the correlation between each

type of FGM and the resulting impact on sexual function/satisfaction.

One possible explanation for this is that many procedures are performed by nonmedical practitioners without a universally accepted technique. Although each practitioner may often perform the same type of FGM in a similar way, their technique may vary considerably from a neighboring practitioner. The high rate of infection, scarring, and trauma (eg, from sexual intercourse) may further add variation to the resultant morphology. Therefore, trying to find patterns across geographic regions and different populations can prove challenging as there can be a high degree of variation within the same type.

Whether secondary to the loss of clitoral tissue, the altered appearance of the female genitalia, or the psychological trauma incurred during the procedure, many women subject to FGM report a deleterious effect on their sexuality. Although some investigators have studied how FGM impacts sexuality and sexual function, there is still a general lack of understanding of the mechanisms by which and the extent to which the changes occur. Alsibiani and Rouzi<sup>12</sup> studied the impact of FGM on sexuality and sexual function by comparing 136 women who had undergone FGM to 130 women who had not using the female sexual function index, a validated tool for assessment of sexual function. They found statistically significant differences in arousal, lubrication, orgasm, and satisfaction. However, their results did not stratify the different types of FGM.<sup>12</sup>

One of the many unanswered questions that have been investigated is whether or not more aggressive types of FGM confer worsening sexual outcomes. Abdulcadir et al.<sup>5</sup> conducted a cross-sectional study to identify the anatomical changes after FGM and attempted to correlate magnetic resonance imaging to changes in sexual function and satisfaction using validated questionnaires.<sup>5</sup> They compared 15 women who had undergone FGM in their home countries, now living in Switzerland, with 15 non-FGM patients, native to Switzerland. They were able to show that FGM patients had smaller volumes of clitoral tissue but were unable to correlate the amount of remaining tissue, and therefore the extent of resection, to sexual function.

Even though the WHO’s classification describes type 3 as the total removal of clitoral tissue, typically not all sexually responsive tissue is removed during FGM. Therefore, the possibility exists to restore some or possible all of the function by removing scar tissue and reconstructing the external portion of the organ. Thabet and Thabet<sup>25</sup> and Foldès et al.<sup>26</sup> were among the first to publish on the subject of vulvar/clitoral reconstruction.<sup>27</sup> Many groups have also described their experiences with vulvar reconstruction.<sup>26,28–31</sup> Foldès et al.<sup>26</sup> have subsequently published their results on almost 3,000 FGM reconstructions with a complication rate of 5%. They observed no serious complications or mortality suggesting reconstruction is a safe procedure.<sup>26</sup> Although there is a paucity of high-level literature documenting a causal relationship between vulvar reconstruction and improved sexual function, there is a large body of anecdotal evidence. In addition, the morbidity is acceptably low, thereby providing justification to further pursue vulvar reconstruction.

## CONCLUSIONS

The clitoris has been described as being essential to female sexual arousal and function and the outer appearance of the female genitalia is heavily tied to female sexuality.<sup>2,3</sup> The practice of FGM, defined as the mutilation of the clitoris and vulva to varying degrees for completely nonmedical reasons, has been divided into 4 overlapping classifications by the WHO. There is a long list of short- and long-term complications including infertility, recurrent infections, and infant and maternal mortality in the extreme case. Many of the victims are too young to be able to fully understand the procedure, let alone give their consent. Finally, the conditions under which the procedures occur are inhumane. As such, there is a growing global outcry at the practice and many initiatives are underway to reduce and eventually eliminate its occurrence. In short, the act of FGM is a gross violation of human rights.

Even with the most aggressive forms of FGM, only the superficial aspect of the clitoris, the glans, is usually damaged.<sup>5</sup> Therefore, the possibility exists to restore some, or possibly all, of the clitoral function. Many authors have described techniques and their initial results with vulva reconstruction. However, additional work on how best to treat victims of FGM and the optimal method of reconstruction is still required. It is essential to increase education of both the public and medical professionals, especially those practicing in primary care, pediatrics, and obstetrics and gynecology fields who will often be the first to encounter FGM victims and potentially intervene on those at risk of becoming future victims.

Although plastic and reconstructive surgeons are traditionally at the forefront of innovating reconstructive therapies and techniques, most of the early work and advancements in vulvar reconstruction after FGM has been by urologists and obstetrician-gynecologists. Plastic and reconstructive surgeons have been markedly absent from the discussion, as evidenced by only one article on the subject published in *Plastic and Reconstructive Surgery* over 10 years ago.<sup>32</sup> Although some information can be extrapolated from the labiaplasty and transgender transformation publications, which are both discussed more frequently in the plastics literature, the paucity of FGM data represent a tremendous opportunity for plastic surgeons to engage this population suffering from anatomical disfigurement and to use our wealth of reconstructive knowledge to provide restoration of form and function to FGM victims. As such, it behooves us to begin to develop multidisciplinary treatment programs for women suffering the repercussions of FGM procedures, much like we have developed for other complicated conditions.

Before we begin to seek out the victims of the FGM and try to heal them, however, we must educate ourselves about the cultural beliefs that perpetuate this practice, and understand the broad physical and psychological repercussions. Only then can plastic surgeons fully engage with FGM victims and provide them with comprehensive therapeutic options. The victims of FGM represent a very vulnerable and potentially isolated population of women.

However, those appropriate for vulvar reconstruction may experience tremendous increases in their quality of life and should be offered the opportunity for reconstruction.

**Ivona Percec, MD, PhD**

Division of Plastic Surgery  
University of Pennsylvania  
Perelman Center South 14<sup>th</sup> Fl.  
3400 Civic Center Boulevard  
Philadelphia, PA 19104  
Email: ivona.percec@uphs.upenn.edu

## REFERENCES

1. Female genital mutilation. Available at <http://www.who.int/mediacentre/factsheets/fs241/en/>. Accessed September 2, 2017.
2. Pauls RN. Anatomy of the clitoris and the female sexual response. *Clin Anat*. 2015;28:376–384.
3. Puppo V, Puppo G. Anatomy of sex: revision of the new anatomical terms used for the clitoris and the female orgasm by sexologists. *Clin Anat*. 2015;28:293–304.
4. Toubia N. Female circumcision as a public health issue. *N Engl J Med*. 1994;331:712–716.
5. Abdulcadir J, Botsikas D, Bolmont M, et al. Sexual anatomy and function in women with and without genital mutilation: a cross-sectional study. *J Sex Med*. 2016;13:226–237.
6. *Female Genital Mutilation: An Overview*. Geneva, Switzerland: World Health Organization; 1998.
7. Abdel-Azim S. Psychosocial and sexual aspects of female circumcision. *African J Urol*. 2013;19:141–142.
8. Ladjali M, Rattray TW, Walder RJ. Female genital mutilation. *BMJ*. 1993;307:460.
9. Kouba LJ, Muasher J. Female circumcision in Africa: an overview. *African Stud Rev*. 1985;28:95–110.
10. Sharfi AR, Elmegboul MA, Abdella AA. The continuing challenge of female genital mutilation in Sudan. *African J Urol*. 2013;19:136–140.
11. Female genital mutilation/cutting: a global concern. 2016. Available at [https://data.unicef.org/wp-content/uploads/2016/04/FGMC-2016-brochure\\_250.pdf](https://data.unicef.org/wp-content/uploads/2016/04/FGMC-2016-brochure_250.pdf). Accessed September 2, 2017.
12. Alsibiani SA, Rouzi AA. Sexual function in women with female genital mutilation. *Fertil Steril*. 2010;93:722–724.
13. Shandall AA. Circumcision and infibulation of females: a general consideration of the problem and a clinical study of the complications in Sudanese women. *Sudan Med J*. 1967;5:178–212.
14. Goldberg H, Stupp P, Okoroh E, et al. Female genital mutilation/cutting in the United States: updated estimates of women and girls at risk, 2012. *Public Health Rep*. 2016;131:340–347.
15. Now E. FGM in the United States. 2017. Available at [https://www.equalitynow.org/infographic\\_fgm\\_in\\_us](https://www.equalitynow.org/infographic_fgm_in_us). Accessed September 9, 2017.
16. Cuevas M, Moghe S. Prosecutor: ‘Brutal’ genital mutilation won’t be tolerated in US. 2017. Available at <http://www.cnn.com/2017/04/26/health/fgm-indictment-michigan/index.html>. Accessed September 9, 2017.
17. Krupa M. The alarming rise of female genital mutilation in America. 2017. Available at <http://www.cnn.com/2017/05/11/health/female-genital-mutilation-fgm-explainer-trnd/index.html>. Accessed September 3, 2017.
18. United Kingdom, House of Lords. Female genital mutilation. Vol 773 June 2017.
19. United Kingdom, House of Lords. Women: domestic and sexual violence services. Vol 779 March 2017.
20. Devi S. FGM in Sierra Leone. *Lancet*. 2018;391:415.
21. Verzin J. Tropical doctor. *Tropical Doctor*. 1975;5:163–169.

22. Biglu MH, Farnam A, Abotalebi P, et al. Effect of female genital mutilation/cutting on sexual functions. *Sex Reprod Healthc.* 2016;10:3–8.
23. Lean WL, Hutson JM, Deshpande AV, et al. Clitoroplasty: past, present and future. *Pediatr Surg Int.* 2007;23:289–293.
24. Yang CC, Cold CJ, Yilmaz U, et al. Sexually responsive vascular tissue of the vulva. *BJU Int.* 2006;97:766–772.
25. Thabet SM, Thabet AS. Defective sexuality and female circumcision: the cause and the possible management. *J Obstet Gynaecol Res.* 2003;29:12–19.
26. Foldès P, Cuzin B, Andro A. Reconstructive surgery after female genital mutilation: a prospective cohort study. *Lancet.* 2012;380:134–141.
27. Foldes P, Louis-Sylvestre C. [Results of surgical clitoral repair after ritual excision: 453 cases]. *Gynecol Obstet Fertil.* 2006;34:1137–1141.
28. Ezebialu I, Okafo O, Oringanje C, et al. Surgical and nonsurgical interventions for vulvar and clitoral pain in girls and women living with female genital mutilation: a systematic review. *Int J Gynaecol Obstet.* 2017;136:34–37.
29. Abdulcadir J, Rodriguez MI, Say L. A systematic review of the evidence on clitoral reconstruction after female genital mutilation/cutting. *Int J Gynaecol Obstet.* 2015;129:93–97.
30. Abdulcadir J, Rodriguez MI, Petignat P, et al. Clitoral reconstruction after female genital mutilation/cutting: case studies. *J Sex Med.* 2015;12:274–281.
31. Berg RC, Taraldsen S, Said MA, et al. The effectiveness of surgical interventions for women with FGM/C: a systematic review. *BJOG.* 2018;125:278–287.
32. Cantor JD. When an adult female seeks ritual genital alteration: ethics, law, and the parameters of participation. *Plast Reconstr Surg.* 2006;117:1158–1164; discussion 1165–1156.