Vulvar Reconstruction Following Female Genital Mutilation/Cutting (FGM/C) and other Acquired Deformities

Dan mon O´Dey

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The outer female genital is a unique and likewise important anatomic region clearly justifying more than just general reconstructive insights. This region has significance for many reasons. Besides its importance for sexuality, reproduction, culture, and art, it takes a key role in feminine identity influencing psychophysical balance of the individual.

In contrast, acquired deformities of that region caused by medical or nonmedical reasons can greatly disturb the before-mentioned balance. Such deformities, therefore, are usually life-changing conditions for those being affected, as in contrast influenced positively by reconstruction.

There are different reasons resulting in vulvar deformity, such as vulvar dermatosis like lichen sclerosus et atrophicus, vulvar pemphigus, vulvar malignomas like vulvar intraepithelial neoplasias (VIN), carcinomas, congenital anomalies, or deformities deriving from ritual vulvar mutilations/cuttings known as Female Genital Mutilation/Cutting (FGM/C). Regarding those different reasons responsible for the distortion of the outer female genital, the residual anatomic correlate is frequently comparable among each other. From an anatomic point of view, therefore, it does not make a great difference if the deformity derives from ablative surgery or ritual cutting. The technical requirements for the reconstruction of form and function remain the same.

FGM/C is a worldwide problem affecting millions and millions of girls and women. It is reported to occur in nearly all parts of the world due to migration, but it is most prevalent in Africa, Asia, and the Middle East. This practice refers to all procedures involving partial or total removal of anatomic units and/or subunits of the external female genital or other injuries to that region performed for nonmedical reasons. Women, then, suffer from serious physical and psychological problems. Many of them die resulting from bleeding or infection. Communities that perform FGM/C, however, know to report a variety of social, cultural, mystical, and even religious reasons to do it. Nevertheless, FGM/C seems not to be clearly fixed officially to religious textbooks. The practice, however, clearly violates diverse human rights including the birth-given right of health, safety, self-determination, and physical integrity. According to the World Health Organization (WHO), genital cutting affects millions and millions of women around the globe, and the number is still rising [1].
Plastic surgery, as the specialty of changing physical conditions, is able to cure bodily harm deriving from different causes. It offers therapeutic options that have life-changing potential and therefore show positive effects on psychophysical balance of the patients. Recreating normal and attractive anatomic conditions, however, is demanding and needs a passionate interest in the specialty, pioneering spirit, innovative strength, in-depth understanding of the specific anatomy, advanced technical abilities including microsurgical skills, and knowledge of specialized procedures. It is critical to meet these requirements when intending to perform “anatomic reconstruction.”

This book describes specialized reconstructive techniques invented by the author all of which can effectively be used to anatomically rebuild the outer female genital following acquired deformities with a special focus on reconstruction after female genital mutilation/cutting (FGM/C). Following an introduction, giving an overview of the subject, the main chapters deal with general as well as specific material including detailed anatomic information. With the help of high-quality videos, photographs, and illustrations, the reader receives in-depth information on microsurgical reconstruction of the clitoral tip with the NMCS-procedure (neurotizing and molding of the clitoral stump), prepuce reconstruction with the OD-flap (omegadomed flap), and reconstruction of the vulva as an aesthetic unit using the aOAP-flap (anterior obturator artery perforator flap) technique. The book is completed with chapters dealing with the problem management and postoperative care after complex vulvar reconstruction.

Moreover, based on many years of experience in medically dealing with FGM/C, this book is a personal view and statement on FGM/C.

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Reference

Contents

1 Introduction ...................................................... 1
   1.1 A General View ........................................... 1
   1.2 Female Genital Mutilation/Cutting (FGM/C) ........ 1
   1.3 Personal Trip to Tanzania ............................. 8
   1.4 The European Community and FGM/C .............. 10
   1.5 The Ritual of FGM/C and Its Side Effects ....... 10
      1.5.1 Physical and Psychological Damage .......... 10
      1.5.2 Psychological Damage Without Physical Correlate .. 11
   1.6 Other Acquired Deformities ......................... 12
      1.6.1 Nonneoplastic Disorders ................... 12
      1.6.2 Neoplastic Disorders ....................... 15
      1.6.3 Inflammatory Diseases ..................... 17
      1.6.4 Functional Disorders ....................... 21
   1.7 Justifying Indication for Reconstruction in
      FGM/C Patients ..................................... 22
      1.7.1 Importance of Reconstructive Surgery .... 24
      1.7.2 Importance of Defibulation by Means
            of a Vulvar Opening Versus Vulvar
            Reconstruction in FGM/C Type III Patients .. 28
   Literature .................................................... 32

2 Basic Consideration ........................................... 35
   2.1 Clinical Setting ....................................... 35
   2.2 Patient Management .................................. 37
   2.3 Clinical Management .................................. 38
   2.4 Anatomy ................................................ 39
      2.4.1 Region of the Clitoris .................... 39
      2.4.2 Region of the Minor and Major Labias ..... 43
      2.4.3 Region of the Genitofemoral Sulcus ..... 44
   2.5 Pathology ............................................... 46
   Literature .................................................... 47
3 Procedures ................................................................. 49
  3.1 General Perspective ............................................ 49
    3.1.1 Surgical Instruments ..................................... 49
    3.1.2 Planning ..................................................... 50
    3.1.3 Anesthesia and Preparation ............................ 50
    3.1.4 Positioning ............................................... 50
    3.1.5 Perforator Dissection ................................... 51
  3.2 Clitoral Reconstruction ........................................ 52
    3.2.1 General Perspective ..................................... 53
    3.2.2 Reconstruction of the Prepuce Using the
          Omega-Domed Flap (OD Flap) ............................. 53
    3.2.3 Reconstruction of the Clitoral Glans: The Neurotizing
          and Molding of the Clitoral Stump (NMCS)
          Procedure (Video 3.1) .................................... 60
  3.3 Complex Vulvar Reconstruction Following FGM
         Type III (Infibulation) ...................................... 67
    3.3.1 General Perspective ..................................... 67
    3.3.2 Vulvar Reconstruction with the Anterior Obturator
          Artery Perforator Flap (aOAP Flap) ....................... 69
  3.4 Adjunctives ..................................................... 86
  3.5 Postoperative Care ............................................. 86
    3.5.1 Clitoral and Prepuce Reconstruction .................... 87
    3.5.2 Complex Vulvar Reconstruction ......................... 87
  3.6 Management of Complications ............................... 87
    3.6.1 General Perspective ..................................... 88
    3.6.2 Primary Complication ................................... 88
    3.6.3 Secondary Complications ............................... 92
  3.7 Personal Perspective and Epilog ............................ 93
Literature ............................................................... 96
Introduction

1.1 A General View

All over the world people share different traditions and rites. The resulting behavior is almost always believed to lead into improved fertility, health, or physical comfort. Some of the behaviors are also believed to be part of religious ideologies and/or spiritual practice, even though they may not be fixed officially to religious textbooks but carried further by varying reliabilities of oral or written traditions. Even the supposed relation to religion, however, may sometimes be counterproductive in terms of humanitarian rights and moral progress. Concerning different religions there might be people who care for tradition and those who care for religion. So religion and tradition might sometimes be separated from each other, and likewise influence each other, but not depend on each other. Fortunately it should be easier to alter tradition than religion.

Worldwide an incredible number of females are made to suffer from sexual offense and discrimination. These norms are usually anchored in the respective patriarchal culture and aim to control women’s sexuality. Female genital mutilation/cutting (FGM/C), unfortunately, is such a practice being deeply rooted in traditional behavior. From a medical and/or humanitarian point of view FGM/C, therefore, is one of the biggest harms against women existing in the world today and likewise one of the most problematic culturally fixed burden that needs to be ended.

1.2 Female Genital Mutilation/Cutting (FGM/C)

FGM/C is performed entirely for nontherapeutic purposes. It comprises all procedures that cause partial or complete damage to different anatomic units and subunits of the outer female genital resulting primarily in graduated loss of form and
function. Furthermore, chronic pain, inability of clitoral sensation, urinary disorders, fistulas, cysts, and recurrent infections are secondary effects impairing women’s health.

Concerning my personal experiences with FGM/C I learned from the affected and people involved that it is more than only a ritual practice; it is a social attitude that subordinates women to men. The latter lastly results in sexual assault and oppression. This is one of the most long-lasting human errors.

The most common classification of FGM/C belongs to the World Health Organization (WHO) and was established in 2007. It comprises four basic types, which in turn are divided into different subtypes to cover a broad range of practices [1]:

Type I: Partial or total removal of the clitoris and/or clitoral prepuce (“clitoridectomy”)
   Type Ia: Removal of the clitoral prepuce (Fig. 1.1a, b)
   Type Ib: Removal of the clitoris and the clitoral prepuce (Fig. 1.2)
Type II: Partial or total removal of the clitoris and the labia minora, with or without excision of the labia majora (“excision”)

Fig. 1.1 35-Year-old woman showing a FGM/C type I (Ia) genital cutting with amputated and tightly adapted clitoral prepuce. (a) (left) Tissue at rest. (b) (right) Exposition of the covered clitoral tip through lifting up the scar in the region of the prepuce
Type IIa: Removal of the labia minora (Fig. 1.3)
Type IIb: Partial or total removal of the clitoris and the labia minora (Fig. 1.4)
Type IIc: Partial or total removal of the clitoris, the labia minora, and the labia majora (Fig. 1.5)

Type III: Narrowing of the vaginal orifice with creation of a covering seal by cutting and apposition of the labia minora and/or the labia majora, with or without excision of the clitoris (“infibulation”)
Type IIIa: Removal and apposition of the labia minora (Fig. 1.6)
Type IIIb: Removal and apposition of the labia majora (Fig. 1.7)

Type IV: Unclassified: All other harmful procedures to the female genital for non-medical purposes, for example, pricking, piercing, incising, tearing, scraping, and cauterizing

Anatomically the term “total removal of the clitoris” used by the WHO does not mean removal of the whole organ comprising the glans (tip), the corpora (body), the crura, and the bulbs [see 2], but removal of the clitoral glans and part of the clitoral corpora. Fortunately, partial removal of the organ is the anatomic prerequisite warranting for functional reconstruction of the clitoral glans. This is even true for very
Fig. 1.3  27-Year-old woman showing a FGM/C type II (IIa) genital cutting with amputated and adapted minor labias; the clitoral tip is partly visible.

Fig. 1.4  20-Year-old woman showing a FGM/C type II (IIb) genital cutting with amputated and adapted minor labias, as well as amputated clitoral tip and prepuce.
Fig. 1.5  40-Year-old woman showing a FGM/C type II (IIc) genital cutting with amputated clitoral tip and body, prepuce, minor and partly major labias in the adapted posterior part.

Fig. 1.6  37-Year-old woman showing a FGM/C type III (IIIa) genital cutting with amputated prepuce, clitoral tip, and minor labias, which are adapted to a minimal vaginal opening.
radical excisions performed all the way down to the pubic bone leaving behind only the clitoral crura. However, functional reconstruction of the clitoral tip then is also possible but marginal.

It is estimated that more than four million girls and women are genitally mutilated each year for nonmedical but only ritual reasons. Out of these rites, infibulation is worst and affects about 400,000 girls and women each year. The number of all affected females is that high that it can hardly be realized by one’s mind. Relying on different publications there are more than 200,000,000 [3] girls and women affected by FGM/C around the world. Out of these it is estimated that a minimum of 500,000 girls and women are living in Europe and round about 180,000 are at risk [4]. Africa is mainly concerned, but also Asia and even Europe due to migration. Genital cutting is often done due to existing myths and tradition. Religion seems to be frequently associated with FGM/C, even though no official textbook does mention it. It is remarkable that FGM/C is anyhow widely regarded as a basic element of the respective religion.

FGM/C, however, is violence against girls and women; it is child abuse; it is a bodily mutilation; it is a significant psychological and physical injury, and it is clearly a kind of sexual offense. FGM/C subordinates females and oppresses their capacities and everyday behavior. FGM/C therefore is a kind of imposed captivity.
There are different effects believed to be caused by FGM/C. It is thought, for example, that FGM/C reduces the sexual drive of women, likewise ensuring their virginity until marriage and loyalty to their forthcoming husband. It is also believed that it makes genitals cleaner, good looking, and socially more acceptable. For many reasons mothers often want their daughters to look the same as they do. In the Maasai tribe, for example, it is believed that an uncut clitoral region will lead into a poor harvest or an overall misfortune for the family and/or even the community. These existential concerns are of course relevant for the parents’ decision to hand over their daughter for genital cutting even though they know that it will be very harmful for them. It is assumed that there is a significant mortality rate after infibulation due to bleeding, infection, or both. It is remarkable, however, that in case of a serious complication or a consecutive death following the procedure nobody tends to speak about it neither in the concerned community nor to the outside world. To this concern information is limited.

It is, however, thanks to education guided by public institutions in cooperation with diverse groups and initiatives of civil and medical society, that some communities change their traditional attitude and do abandon the practice. Traditional change, though, is often a very slow process. Regarding the Maasai tribe the most important and leveraging effect to eliminate FGM/C is to convince influential community members such as community elders or other respected people. All members of the community will usually follow the attitude of these leading people without any concerns. In many countries FGM/C is performed though the law prohibits it. In those communities no one will call the procedure into question and will also never tell about it outside of the community. So, the law only does not abandon FGM and does obviously not relieve people from it. The main focus therefore remains on education by convincing people that it is a harmful and useless procedure, and that myths have nothing to do with reality.

Economy plays also an important role. Parents worry that their uncut daughter might not be accepted by the community, be socially excluded, be considered as unmarriageable, and therefore are financially unsecured. A shift of values or kind of economic alternatives must be created for those families refusing genital cutting especially in communities where grants are existentially for the bride’s family (Fig. 1.8). This will bring further motivation to abandon genital cutting. School education and professional training are important values creating economic independence. But all these efforts will not have a lasting effect if they cannot effectively be implemented into the community’s tradition. That is why progress evolves unfortunately slow.

There is a debate if the practice of female genital cutting should generally be regarded as mutilation or if less severe forms, such as rubbing genitals with herbs or pricks, might be tolerated especially when physicians perform it. Well, every form of genital cutting, if neither medically indicated, nor of the personal intention, is harm. FGM/C is therefore unethical. It is a non-willing procedure and does clearly result in physical and psychological injury. Moreover, it is physical and psychological violence and should never ever be regarded as culturally given. In contrast, it
must be definitively antagonized. Neither medicalization nor toleration of FGM/C is an option but eradication. Female genital mutilation/cutting has no benefits, causes only harm, and might be regarded as one of the most problematic attitudes of which females are made to suffer today.

1.3 **Personal Trip to Tanzania**

When I traveled to Tanzania in 2013, joining a group of courageous women active in the fight against FGM/C, the intention was to get an idea about cultural backgrounds of FGM/C, and medical care following complications. On-site we joined activists of NAFGEM (Network Against Female Genital Mutilation) and visited different villages of the Maasai tribe, women’s refuges, schools, physicians, and the biggest medical facility in Moshi. It was an incredibly intensive journey with lots of impressions and important insights. We met and talked to elders, parents, youth, families including husbands, brothers, sisters, uncles, aunts, grandmas, grandfathers, as well as circumcisers, teachers, doctors, activists against FGM/C, and of course affected girls and women. It was an amazing and likewise an important experience. Very soon it became obvious that FGM/C is deeply rooted and interwoven in a complex network of cultural, social, sexual, economic, and also religious backgrounds and last but not least firmly linked to tradition (Fig. 1.9).

Tradition itself reflects beliefs, values, and attitudes that can only be changed by conviction. Change, therefore, is very hard to establish in this context. Unfortunately, it is believed for example that FGM/C prepares girls for adulthood and/or marriage, protect them for losing their virginity un- or willingly, ensure their loyalty to their future husbands, make them bodily “clean,” maintain the family’s honor, as well as ensure social integrity and economic security.

Parent’s belief to protect their daughters and to prepare them best possible for their future life by handing them over to the procedure of FGM/C. FGM/C, therefore, is a dilemma.
In the Maasai tribe circumcisers are frequently older women who keep up with the tradition, and are additionally entrusted with other important duties like being midwives, and healers. Surprisingly, one very old woman (Fig. 1.10) that I got to know working as a circumciser though suffering from blindness and age states that she would never ever attend nor do any circumcisions again because she cannot stand screaming of the traumatized children any more (Fig. 1.11). Her point of view once more reflects that also circumcisers cannot be uncritically regarded as vicious or inhuman, but as people being both captured and driven by something called “Tradition.”

In general it is not right to intend control of girl’s and women’s sexual and reproductive capacity by any means. So, a “Tradition like FGM/C” is not covered by immunity. It clearly offers room for a change. Tradition sometimes must be changed.

Fig. 1.9 “Masks.” Typical Tanzanian masks reflecting mysteries and myths

Fig. 1.10 “Hands.” The hands of an old and retired Maasaian circumciser
1.4 The European Community and FGM/C

Concerning Europe, FGM/C is increasingly present due to the rising number of affected immigrants arriving from countries where FGM/C is commonly performed. In addition, it is believed that also unaffected girls living in Europe are taken back to their families’ country of origin just for holidays to expose them to the rite of genital cutting. It shall be assumed that even sometimes circumcisers are flown into Europe for the procedure. Due to these diverse possibilities to be cut, protecting every girl and woman from the procedure is not easily done and likewise actually not possible regarding the current situation.

Dignity is a natural right of every human being and should be regarded as inviolable. It should be respected and saved by all human beings, especially by adults taking responsibility for younger people. Why should children, that do not even have an idea about sexuality, be bodily and mentally harmed by adults for sexual purposes and without any consent? This is fundamentally wrong and clearly violates dignity and self-determination of the affected.

1.5 The Ritual of FGM/C and Its Side Effects

Due to the raw experience most of the affected are exposed to, FGM/C shows some significant side effects on them, all of which may be physical or psychological in origin.

1.5.1 Physical and Psychological Damage

Concerning FGM/C, usually female adults forcibly hold children while the mutilation/cutting is performed with diverse cutting devices (Fig. 1.11). Beforehand
children are usually made to believe that the procedure is a kind of celebration they can look forward to. Typically anesthetics are not used and that’s why defense mechanisms of the children frequently lead into aggravation of the genital trauma. The legs are then usually bound together to promote healing of the cut edges and the children are forced to lie down for several days or weeks.

There are, of course, immediate and long-term complications resulting from the procedure that are serious to and frequently life changing for the affected girls and women. Victims usually feel deeply stigmatized even though physical damage caused by the procedure is usually not visible due to clothing. The simple awareness of being mutilated/cut does already cause enormous stress to the affected. That’s why an unsuccessful procedure will also show long-term harm on the affected (see Sect. 1.5.2).

In children basic trust may be fundamentally disturbed and there can be many psychological consequences affecting mental balance including fear of sexual contact, stress disorders, anxiety, and depression. Further immediate complications comprise pain, shock, bleeding, wound infections, infections resulting from shared and unsterilized instruments, and death. Long-term complications include chronic pain resulting from neuromas and scars, recurrent infections resulting from epithelial inclusion cysts [5], abscesses, instable scars, urinary tract infections, discomfort resulting from sexual dysfunction, vulvovaginal trauma resulting from sexual intercourse and/or delivery, need for surgery to enable sexual intercourse (“defibulation”), delivery, vaginal and urinary outflow, or gynecological procedures requiring vaginal access.

FGM/C patients that I have seen in my office able to have sexual intercourse usually complain of sexual dysfunction due to tissue loss, reduced elasticity aggravated by scarring, cysts, and neuromas of the clitoral organ. Concerning the literature, however, “psychosexual dysfunction” in FGM/C patients seems to be debatable [6, 7]. Some confirm [6] and some deny [7] that most women suffering from FGM/C show sexual dysfunctions. The debate might be justified on both sides due to the fact that the clitoral organ is in general partly intact; there are multiple variants within the respective design of a FGM/C type I, type II, or type III procedure depending on the land or tribe of origin, and the sample sizes are usually imbalanced and/or small [7].

All in all, FGM/C is and remains a degrading, disabling, and disrespectful procedure to human beings that hopefully can be abandoned one time once and for all.

1.5.2 Psychological Damage Without Physical Correlate

Sometimes the mutilating/cutting procedure does not succeed due to many reasons including defense mechanisms of the affected, protective behavior of relatives, or fake practice by the circumcisers. Concerning my clinical experience, I occasionally see victims of FGM/C who do not show physical damage caused by the procedure, but do really belief that they were cut. These patients might remember that the FGM/C procedure was forcibly intended in their early childhood or that they might be deeply traumatized by just having attended the procedure. Remarks on their
physical complaints are understandably mostly somewhat unclear, but they usually report on an unfulfilled sexual life and moreover show significant psychological burden. Of course reconstructive surgery is no answer for those patients, but particularly psychological support.

1.6 Other Acquired Deformities

Acquired vulvar deformities frequently result from ablative surgery. There are different pathologic changes in the squamous skin of the outer female genital or pathologies of adjacent structures of the vulva such as inflammation of the Bartholin glands that require medically indicated tissue removal leading to similar or even aggravated defects as those resulting from FGM/C. Changes of the skin include exemplarily nonneoplastic diseases, neoplastic diseases, inflammatory diseases, traumas, burns, scarring, soft-tissue contractures, and even non-rational alterations like vulvodynia. Reconstructive needs following ablative surgery therefore are frequently comparable with those necessary for FGM/C patients and are oriented on the respective deformity. From an anatomic point of view the main problem resulting from ablative surgery is significant tissue loss showing complex reconstructive needs. The anticipated defect, the possible reconstructive options, and the expected reconstructive result considering form and function should be carefully reflected beforehand and also explained to the patient. Besides reconstruction, an interdisciplinary approach is sometimes required primarily or secondarily.

Due to defect similarity some important acquired deformities other than those resulting from FGM/C are described in the following.

1.6.1 Nonneoplastic Disorders

Pathologic skin alterations may necessitate partial or total resection of the vulva. Reconstruction of the vulva can be surgically best performed at the time of resection due to elasticity of the remaining tissue.

Lichen sclerosus et atrophicus is a frequent, inflammatory, and noninfectious dermatosis that in the long run might change into squamous cell carcinoma [8, 9]. However, till date there is no knowledge about the etiology of lichen, but it is assumed that it is based on an autoimmune disorder. It is one of those diseases which need further pioneer work concerning both basic research and therapeutic options [9]. The clinical problem with lichen sclerosis et atrophicus is complex. It leads into loss of the normal anatomy of the inner and outer vulva by fading and merging of its anatomic units and subunits. The minor and the inner part of the major labias may disappear in the long run, opening of the prepuce and thereby
passing of the clitoral tip do coalesce (phimosis), and last but not least the vaginal entrance consecutively narrows accompanied by fissuring of the vulvar epithelium especially at the posterior commissure. The remaining vaginal opening is comparable with the condition following FGM/C type III. Tissue quality, however, is worse because of pathologic shrinkage, fibrosis, and consecutive loss of elasticity.

Apart from so-called porcelain white changes of the vulvar skin, sensory loss of the clitoral tip, and functional loss of the vaginal introitus, patients suffer from several complaints such as vulvar pruritus, burning sensations, recurrent fissuring of the vulvar skin resulting from mechanic irritations, or even spontaneous and disabling dyspareunia. Lichen sclerosus et atrophicus, therefore, has a lasting and impairing effect on the quality of life. It usually, however, does not affect other tissues apart from the vulva as it is observed in lichen ruber planus disease. The latter also affects other regions such as the vagina, other mucosas, and squamous epithelias.

Conservative treatment of lichen sclerosus et atrophicus is usually symptomatic and especially accomplished with local applications of highly potent corticosteroids; besides estrogens, and moisturizing substances. Especially long-lasting therapies with local corticosteroids can produce unintended secondary effects to the skin, like atrophy and vulnerability, leading to a vicious circle. Nevertheless, conservative treatment effects noticeable relief of symptoms from episode to episode. Healing, however, usually does not occur [10].

Operative treatment includes surgical separation followed by application of corticosteroid [11], local excision, or more extensive procedures like vulvectomy [8] followed by direct closure, mucosal advancement flaps, vulvar skin advancement, and mucosal or non-mucosal skin grafts [9]. Regarding anatomic reconstruction results are different. Grafts frequently tend to shrink and show loss of elasticity. Maintenance therapy with topical corticosteroids is recommended to prevent scarring, recurrence, and malignant alteration [12].

Concerning my clinical experience with the surgical treatment of lichen sclerosus et atrophicus in supposed advanced cases, complete excision accomplished by skinning vulvectomy and surface reconstruction with all-layered non-vulvar fasciocutaneous tissue, especially with the aOAP flap, is key to cure the disease, to control local recurrence, and to provide normal anatomic conditions for the patient. In case of lichen sclerosus et atrophicus it seems that “steel can heal.” The challenge, however, remains then achieving normal anatomic conditions through the reconstructive procedure. With the aOAP flap technique normalized anatomic conditions can be achieved especially in extensive vulvectomy cases (Fig. 1.12a–f). Long-term personal follow-up reevaluations of more than 10 years show neither clinical recurrence of the disease nor return of any symptoms associated with it. Moreover, aOAP-flap vulvar reconstruction is able to normalize vulvar anatomy with regard to vaginal delivery. The latter is a very important perspective for patients in the fertile age.
Fig. 1.12 28-Year-old woman with a late lichen sclerosus et atrophicus showing faded minor labias coalesced with the major labias, covered clitoral tip, and narrowed vaginal introitus. (a) (top left) Preoperative view of the outer genital. (b) (top right) Preoperative view of the outer genital with the major labias tightened up; note the faded clitoral region, minor labias, and narrowed vaginal introitus. (c) (middle left) Intraoperative view after partial vulvectomy of the diseased tissue. (d) (middle right) Intraoperative view following resection presenting with an extensive vulvar defect and marking of the both sided aOAP flaps on the genitofemoral sulcus. (e) (bottom left) 1-Year follow-up examination after aOAP vulvar reconstruction; note the natural aspect of the vulvar and inconspicuous scarring of both the harvest side and the vulva; form and function have turned to normal without recurrence of the disease. (f) (bottom right) 1-Year follow-up examination after aOAP-flap vulvar reconstruction showing the vulva in the upright position; note the normal contour of the vulva and inconspicuous scarring of the harvest side.
1.6.2 Neoplastic Disorders

Ablative surgery of vulvar neoplasias often leaves extensive defects that are difficult to reconstruct [13].

Neoplastic disorders include intraepithelial neoplasias also known as VIN I–III (vulvar intraepithelial neoplasias) lesions. The International Society of Vulvovaginal Disease (ISSVD) classified the severity of intraepithelial neoplasias according to the biology of the underlying neoplastic changes. As a result the known precancerous condition called VIN I skin lesion was ranked as a reactive and self-limiting epithelial irritation. VIN II and VIN III were changed into “usual type” and “differentiated type.” The usual type especially includes diseases associated with HPV-16 (human papilloma virus) infections. The differentiated type comprises those lesions that were either not associated with HPV or associated with lichen sclerosus et atrophicus [14].

Nevertheless resection leaves complex defects and reconstruction is demanding. If the harvest side by means of the genitofemoral sulcus is not impaired by resection, aOAP-flap reconstruction is an effective option to reestablish form and function of the outer female genital in cancer patients (Figs. 1.13, 1.14, and 1.15). Especially in younger patients but also in older patients with sexual activity reestablishing normal sexual function and body image is crucial for life balance.

Reconstruction following resection can be performed at the same time or delayed depending on both the oncologic needs and the therapy concept. Adjuvant therapy like chemotherapy or radiation also impairs non-tumor healthy tissue important for reconstruction.

Fig. 12 (continued)
Fig. 1.13 76-Year-old woman with an extensive vulvar cancer of vulvar vestibule including region of the clitoral tip. (a) (top left) Intraoperative view after tumor excision including the region of the clitoral tip and the clitoral body showing extension of the defect. (b) (top right) Intraoperative view after partial vulvectomy showing the defect at rest. (c) (middle left) Intraoperative view after medially tunneled transposition of the both sided aOAP flaps and closure of the harvest side by means of a medial thigh lift. (d) (middle right) Intraoperative view after complete aOAP-flap inset demonstrating flexibility of the reconstructed vaginal introitus. (e) (bottom left) 1-Year follow-up examination after aOAP-flap vulvar reconstruction; note the natural aspect of the vulva and inconspicuous scarring of both the harvest side and the vulva; form and function have turned to normal without recurrence of the disease. (f) (bottom right) 1-Year follow-up examination after aOAP-flap vulvar reconstruction showing conditions in the upright position; note the normal contour of the vulva and inconspicuous scarring of the harvest side.
That’s why immediate reconstruction often provides better tissue qualities concerning both the harvest and the recipient sides frequently showing better results. In addition scarring and the resulting contracture of soft tissue make the reconstruction more complex and somewhat less effective.

### 1.6.3 Inflammatory Diseases

Usually intact skin is a perfect barrier preventing microbiological invasion. Finest injuries to the skin, however, allow microbes to get through this barrier. Some of them are highly virulent and can cause serious systemic infections such as necrotizing fasciitis. Due to the loose subcutaneous tissue of the vulva, facilitating progressive microbial invasion, all inflammation even if superficial or abscesses should be considered as potentially serious. Any fluid from an abscess, of course, should be taken to a microbiological institute for Gram staining and processing for the identification of facultative and obligated anaerobic bacteria. For empiric treatment of vulvar infection the use of metronidazole and cefuroxime or clindamycin can be recommended [15].

Vulvar folliculitis, showing resistance to conservative therapies, can lead to partial or full vulvectomy making reconstructive surgery finally necessary. Procedures used for reconstruction depend on the involvement of surrounding tissue. If the genitofemoral sulcus is free of inflammation, it is one of the best options available for vulvar reconstruction. Depilation of the flaps before or after the procedure may be crucial for stable and recurrence-free long-lasting results.
Fig. 1.14  60-Year-old woman with an extensive vulvar cancer of the anterior commissure including region of the clitoral tip. (a) (top left) Preoperative view showing extension of the tumor; medial border of the aOAP-flap incision line and placement of the inguinal incision are marked on the left side to realize topographic relations. (b) (top right) Intraoperative view after tumor excision including the region of the clitoral tip; tumor excision comprises inguinal lymph nodes of the left side not shown in this picture. (c) (middle left) Intraoperative view after excision of the tumor including excision of the clitoral tip showing extension of the defect; the clitoral stump located at the middle of the clitoral bodies is visible in the upper part of the defect. (d) (middle right) Intraoperative view after excision of the tumor and both sided planning of the aOAP flaps on the genitofemoral sulcus. (e) (bottom left) Intraoperative view after medially tunneled transposition of the both sided aOAP flaps and closure of the harvest side by means of a medial thigh lift. (f) (bottom right) Intraoperative view after complete aOAP-flap inset demonstrating flexibility of the reconstructed vaginal introitus and simultaneously reconstructed clitoral tip with NMCS procedure positioned 1.5 cm anterior to the urethral orifice
Fig. 1.15 77-Year-old woman with an extensive cancer of the vaginal introitus and the anterior commissure including region of the clitoris. (a) (left) Intraoperative view following wide excision including region of the clitoris and both sided inguinal lymph nodes. (b) (right) Immediate reconstructive result with both sided tunneled aOAP flaps for vulvar reconstruction, both sided medial thigh lift for closure of the harvest side, and an advancement-transposition flap of the mons; flexibility of the vaginal introitus is shown
Inflammation of the Bartholin glands is of particular importance involving almost 2% of all women [16]. The Bartholin glands are located at the 4 and 8 o’clock positions in the vestibule and drain both sides into it. Unfortunately they sometimes develop abscesses or cysts. Bartholin gland abscess in turn can be associated with phlegmonous cellulitis of the surrounding tissues. As with other abscesses, patients tend to apply pressure to the lesion in an attempt to initiate drainage and relief but potentially aggravate the inflammatory process.

Concerning surgical intervention, healing usually occurs after surgical relief, permanent draining by suturing the wall of the gland to the epidermis of the vestibule (marsupialization). Marsupialization usually cures the disease but may also result in symptomatic scarring, tissue depression with an open introitus, and dyspareunia. In addition, secondary sclerosis of the surrounding tissue and painful scarring may also occur leading to revisional operative interventions. Operative revision should be consequently more sustainable by means of radical excision and immediate reconstruction. The aOAP flap procedure shows many benefits for reconstruction of the perineal and bordering region. Due to flap mobility and tissue thickness of the aOAP flap molding of the posterior commissure and the perineum works very well (Fig. 1.16).

**Fig. 1.16** 50-Year-old woman with recurrent inflammation of the Bartholin glands; multiple operative interventions elsewhere were done; she presented with fibrous induration of the perineum, symptomatic scarring, and painful masses of the region of the Bartholin glands. (a) (left) Intraoperative view after both sided wide excision including the region of the perineum; the remaining three-dimensional defect requires an all-layered reconstruction. (b) (right) Immediate reconstruction with both sided tunneled aOAP flaps, and bilateral medial thigh lift for closure of the harvest side; flexibility of the posterior vaginal introitus is shown.
1.6.4 Functional Disorders

The term “vulvodynia” represents a genital condition of chronic or acute pain and discomfort without evidence of inflammatory, infectious, neoplastic, nonneoplastic, or any other origin. As a result it is difficult to identify and even more difficult to handle. Symptoms can be triggered by mechanical stress like sexual intercourse or spontaneously. However, complaints should be taken seriously.

The symptomatic region can range from clearly defined areas to the entire vulva. Sometimes, in young patients a tight web at the posterior commissure, that does not tend to widen but tenses up through sexual intercourse, may cause the symptoms. A fine double-opposed Z-plasty, known as a dancing-man plasty, can solve the problem (Fig. 1.17a, b). Suturing of the flaps, however, must be performed meticulously in a multilayered fashion. I prefer resorbable suture material like monofilament 5.0 and 6.0 for subcutaneous sutures and braided 6.0 for skin closure in a single-knot fashion.

The therapeutic approach must be decided in the individual case and comprises treatment with ointments, symptomatic medications, nerve blocks, pain management, and psychosomatic or psychiatric approaches. In cases in which those conservative treatments are in the long run unsuccessful, surgery might be an option. In my experience partial vulvectomy and immediate anatomic reconstruction can lead to complete pain release (see Fig. 1.16). However, even though in selected cases a partial vulvectomy and anatomic reconstruction with the aOAP flap is a very effective procedure, it must be carefully considered because it is a complex

Fig. 1.17 26-year-old woman showing a symptomatious tight web at the posterior commissure; (a) (left) Preoperative view demonstrating the web while tighten up the posterior commissure. (b) (right) Postoperative view showing the faded web while tighten up the posterior commissure following a local dancing man plasty (opposed Zplasty)
intervention. Nevertheless, what cures cannot be wrong. Surgery, therefore, is an option especially in complex cases.

The term “dyspareunia” can be associated with “vulvodynia” but can in contrast also result from scarring based on diverse vulvar deformities. Women usually suffer from pain and discomfort triggered by sexual intercourse. Etiology is widespread including scarring resulting from FGM/C, diseases, traumas, or any operative intervention. Perineal lacerations and/or episiotomies do frequently induce chronic pain and may also be present with an open introitus leading into dryness and further problems. Relief can be achieved with local scar therapies using massages combined with ultrasonic technology and softening ointments. In conservative unsuccessful cases and in those in which a more complex deformity exists, scar excision and perineal reconstruction with the aOAP flap is an effective option (Fig. 1.18). The aOAP flaps can be used single sided just to fill in the preexisting tissue gap, or sided in an interlocking manner in the region of the perineum.

1.7 Justifying Indication for Reconstruction in FGM/C Patients

FGM/C is closely linked to tradition. Tradition is something very important for those people living with it, and that’s why people need to carefully handle other people’s traditions just to keep the intercultural communication and integrity of the respective culture. Respectful cultural interaction, however, does not mean unreflected acceptance of evident violation of human rights. Acceptance in that context means respectful interaction with those people being involved in certain traditions. From an intercultural point of view it might be beneficial and likewise advisable to call the practice of culturally motivated genital alterations “female genital cutting (FGC)” instead of “female genital mutilation (FGM),” just to respectfully reflect the cultural background of it. This is of course only a small differentiation but might have a major impact on the dignity and the cultural background of the patients. When at some point this context is understood, it will get clearer what great significance it has, that women search for reconstructive surgery, and what responsibility thereby is shouldered by the plastic or reconstructive surgeon. The term “mutilation” within the acronym “FGM,” however, is a clear message outlining harm and injustice. It is a “must,” therefore, to use both acronyms “FGM” and “FGC” individually in certain circumstances.

Regarding the cultural impact of FGM/C, who does justify reconstruction of the female genital in those patients? Should a woman be informed about her condition of being cut even though she might not be aware of it? Of course these are more philosophical than medical questions, but nevertheless important. When I was traveling through Tanzania in 2013, learning more about the roots of FGM/C, I quite rapidly came to the understanding that besides medical indication it must be of course the right of self-determination of both genders. Unfortunately,