

# What Surgeons Need to Know About Gender Confirmation Surgery When Providing Care for Transgender Individuals

## A Review

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**IMPORTANCE** In 2014, the US Department of Health and Human Services decided that its 1981 exclusion of transsexual surgical treatments from Medicare coverage was based on outdated, incomplete, and biased science and did not reflect current evidence or standards of care, and the exclusion was therefore lifted. As a direct result of this decision, surgeons nationwide are seeing an increase in consultations for surgical therapy to help transgender and gender-nonconforming individuals. Although some clinicians may have the technical training for such surgical procedures, in many cases, they may not have a full understanding of the complex and comprehensive care required to provide optimal health care for transgender individuals.

**OBSERVATIONS** Gender confirmation surgery is a developing field in the United States and other areas of the world. The World Professional Association for Transgender Health started a global education initiative intended to provide surgeons and other health care professionals with the necessary background knowledge to understand and treat this patient population. This article provides an overview of best practices as set forth in the seventh edition of the *Standards of Care for the Health of Transsexual, Transgender, and Gender Nonconforming People* by the World Professional Association for Transgender Health, including mental health, endocrinology, and surgery for trans women and trans men.

**CONCLUSIONS AND RELEVANCE** Experts in each aspect of transgender health have summarized the content of the global education initiative in this article. It provides valuable information to surgeons of all disciplines and other health care professionals to help guide the treatment and management of transgender individuals.

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In 2014, following a lawsuit filed by retired army veteran Denee Malone, the US Department of Health and Human Services determined that its 1981 exclusion of transsexual surgical treatments from Medicare coverage was based on outdated and biased science that did not reflect current evidence or standards of care.<sup>1</sup> Accordingly, the Medicare policy of categorically excluding coverage of gender confirmation surgery (GCS) was invalidated. Instead, coverage for care associated with gender transition was now to be made on an individual basis.

In addition to improved Medicare coverage, other third-party payers have expanded benefits for care associated with gender transition. As a result, more individuals are seeking GCS to treat their gender dysphoria (GD). It is estimated that 0.4% to 1.3% of the population worldwide experiences GD.<sup>2-4</sup> Although not all individuals with GD desire or are candidates for GCS, the number of individuals seeking such surgery exceeds the number of trained physicians available to provide the necessary surgical care. Furthermore, the increased demand for care requires an increase in centers designed to provide multidisciplinary care.

With the increase in demand for GCS, surgeons are likely to encounter patients seeking our expertise. To provide optimal care, the surgeon needs to be more than a mere technician; instead, the surgeon needs to be part of the health care team and, as such, must be familiar with the comprehensive needs of transgender individuals. This article, based on the global education initiative of the World Professional Association for Transgender Health, is intended to give surgeons a framework on which to evaluate patients with GD. We review the current standards of care, key terminology, and the importance of multidisciplinary collaboration in providing complete health care to transgender individuals.<sup>5</sup>

### History of Health Care for Transgender and Gender-Nonconforming Individuals in the United States

Although notable advances have been made, the field of transgender health care has also faced significant obstacles. Several health care

Table 1. Standards of Care, Seventh Edition<sup>a</sup>

Type of Surgery	Referral Letter	Social Transition	Hormonal Treatment
Mastectomy	1	No	No
Breast augmentation	1	No	1 y
Hysterectomy and oophorectomy or orchiectomy	2	No	1 y
Metoidioplasty	2	1 y	1 y
Phalloplasty or vaginoplasty	2	1 y	1 y <sup>b</sup>
Other surgical procedures	No	No	No

<sup>a</sup> Adapted from the World Professional Association for Transgender Health<sup>14</sup> and Ettner et al.<sup>15</sup>

<sup>b</sup> Recommended if no other condition precludes hormonal treatment.

professionals and patients had important roles in the development of the field of health care for transgender individuals. Harry Benjamin, MD, was a German endocrinologist who immigrated to the United States during World War I. When Benjamin was practicing in San Francisco, California, in 1941, an adolescent patient with the then-unknown condition of GD was referred to him. Hormonal treatment was initiated, with results described as good success.<sup>6,7</sup> The patient was subsequently referred to surgeons in Germany, as there were no surgeons performing GCS procedures in the United States. Benjamin's most famous patient, Christine Jorgenson, underwent GCS in Denmark. Jorgenson was the first individual to gain notoriety in the American media for having undergone a "sex change," and, as a result, raised public awareness about GD and the need for medical care for transgender and gender-nonconforming individuals.

Meanwhile, at the Johns Hopkins Hospital, Milton Edgerton, MD, was seeing patients with complications from GCS performed abroad. Together with medical psychologist John Money, PhD, psychiatrist Norman Knorr, MD, and other colleagues, Edgerton founded the first academic gender identity clinic in the 1960s.<sup>8</sup> The gender identity clinic developed rigorous screening criteria to identify patients for surgical therapy. Initially, patients were not required to have lived in cross-sex roles prior to surgery; however, this condition later became a prerequisite for GCS. In its decade-long existence, only 32 patients underwent surgical therapy at the gender identity clinic. However, it became a model for other institutions across the country.

Initial outcome studies from patients treated at the gender identity clinic were overwhelmingly positive and reported improvement in subjective well-being.<sup>8,9</sup> However, a long-term follow-up study of the Johns Hopkins Hospital cohort included 15 patients who were compared with a control group of 35 transgender individuals who were not deemed to be candidates for GCS.<sup>10</sup> The study concluded that, "Sex reassignment surgery confers no objective advantage in terms of social rehabilitation, although it remains subjectively satisfying to those who have rigorously pursued a trial period and who have undergone it."<sup>10(p1015)</sup> This finding laid the groundwork for the 1981 Medicare ban, and the ensuing cessation of GCS programs nationwide.<sup>11</sup> However, critics of the study, including Edgerton, noted that the study omits important outcomes such as improvement of subjective well-being and psychiatric comorbidities.<sup>8,12</sup> Although surgical care and research waned in the United States, other countries, notably Belgium, the Netherlands, and Thailand, continued to advance the field. Subsequently, many transgender individuals from the United States went abroad to seek surgical therapy.

In 1969, one of Benjamin's patients, philanthropist Reed Erickson, funded the first international symposium on gender identity, out of which the Harry Benjamin International Gender Dysphoria Association was created in 1979.<sup>13</sup> In 2007, the organization

underwent a name change and is now known as the World Professional Association for Transgender Health.

The World Professional Association for Transgender Health has been instrumental in developing a framework for the appropriate evaluation and care of transgender individuals. The World Professional Association for Transgender Health's Standards of Care (SOC) are perhaps the most cited and recognized guidelines for the management of transgender individuals. Since the first guidelines were published in 1979, seven editions have been printed,<sup>13</sup> illustrating the evolving field of health care for transgender individuals. The SOC are designed to provide flexible guidelines for surgical management; when care is consistent with the SOC, outcomes are found to be reliably good (Table 1).<sup>5,16-18</sup>

## Definitions of Terms Related to Transgender and Gender-Nonconforming Individuals

Table 2 provides an overview of definitions of terms related to transgender individuals. *Gender dysphoria* is defined as distress caused by a discrepancy between a person's gender identity and that person's external sexual characteristics at birth (sex).<sup>19,20</sup> *Gender nonconforming* refers to a person's gender identity, role, or expression that differs from cultural norms. *Transgender* describes a diverse group of individuals whose cross-culturally defined gender identity differs from the sex they were assigned at birth.<sup>14</sup> Although there is overlap between groups, individuals who identify as gender nonconforming may feel comfortable within their biological sex without conforming to perceived societal roles.<sup>21</sup> More important, GD is not a pathological state, but instead is a condition of distress.<sup>14,22,23</sup> Furthermore, individuals who identify as gender nonconforming, transgender, or transsexual do not necessarily have GD. *Trans man* refers to a transgender individual who was assigned female sex at birth, while *trans woman* refers to a transgender individual who was assigned male sex at birth.

Understanding these concepts aids with providing an individualized, multidisciplinary treatment plan involving 3 treatment modalities: psychotherapy or counseling, hormonal treatment, and surgery. Ancillary treatment modalities may include speech therapy, electrolysis or laser hair removal, and assistance with legal, social, and reproductive issues.

## Mental Health

The mental health professional has a pivotal role in the evaluation of individuals with GD. The mental health professional must also

**Table 2. Definitions of Terms Related to Transgender and Gender-Nonconforming Individuals**

Term	Meaning
Sex	Assigned at birth based on external genitalia (ie, male or female)
Gender identity	Intrinsic sense of gender; can be congruent or incongruent with biological sex
Transgender	Diverse group of individuals who cross or transcend culturally defined categories of gender; the gender identity or expression differs in varying degrees from the sex they were assigned at birth
Transsexual	Transgender person who has taken medical steps to transition from 1 gender to the other
Gender nonconforming	Gender identity, role, or expression that differs from cultural norms; does not fit the binary understanding of gender identity; examples would be "gender queer," masculine women, or feminine men
Cis-male, cis-female	Persons whose gender identity is congruent with their assigned sex
Trans man	Transsexual person who was born female and is transitioning (or has transitioned) to male phenotype; also known as female-to-male or FtM
Trans woman	Transsexual person who was born male and is transitioning (or has transitioned) to female phenotype; also known as male-to-female or MtF
Internalized transphobia	Discomfort or shame concerning one's own transgender feelings, identity, or history, leading one to treat other transgender people negatively
Gender dysphoria	Distress caused by discrepancy between a person's gender identity and that person's sex assigned at birth
Transvestite	Cross dresser; can be cis-male, cis-female, trans man, or trans woman; this term is no longer preferred and can be seen as derogatory
Transition	Period of social and possibly medical transition between sex assigned at birth and true gender identity
Sexual orientation	A person's preference for others of a specific gender for sexual intimacy; transgender individuals can be homosexual, heterosexual, or bisexual
Intersex	Congenital conditions in which chromosomal, gonadal, or anatomical sex is atypical; also called <i>disorders of sex development</i>

assess for associated mental health diagnoses and consider the individual's support system, as these components can affect response to therapy. If there are no associated mental health issues and/or existing mental health conditions are well controlled, GCS may be considered if the mental health professional and patient agree that surgery is medically necessary to help alleviate GD. An assessment by a mental health professional is not synonymous with psychotherapy. Although it is highly recommended, psychotherapy is not a prerequisite for GCS. The treating mental health professional should emphasize the importance of regional and online peer support to help in the transition process.<sup>22</sup>

The SOC recommends that mental health professionals provide referral letters to surgeons for individuals who are candidates for GCS. One referral letter is recommended for chest reconstruction and 2 letters are recommended for genital surgery. Other procedures, such as facial surgery, do not require referral letters. The SOC suggest criteria that should be included in the referral letters (Box 1). The surgeon should be familiar with what constitutes a sufficient assessment.<sup>14</sup> Furthermore, the surgeon should have an ongoing working relationship with the treating physician and mental health professional. Preoperative preparation is of the utmost importance, and it is directly correlated with surgical outcomes.<sup>18</sup>

### Box 1. Standards of Care Recommendation Referral Letter From Mental Health Professional

#### Content of Referral Letter

- General identifying characteristics
- Result of psychosocial assessment, including diagnosis
- Duration of relationship between mental health professional and client, including overview of previous evaluations and therapies or counseling
- Explanation that criteria for surgery have been met, including clinical rationale in support of surgery
- Statement that informed consent has been obtained from the patient
- Statement that mental health professional is available for coordination of care and welcomes a telephone call to establish this availability

## Endocrinology

Feminizing or masculinizing hormone therapy can have a profound effect on secondary sex characteristics and psychological well-being. In 2009, the Endocrine Society published a clinical practice guideline based on expert opinion and current evidence.<sup>23</sup> It states that a patient seeking GCS, notably genital surgery, should be cleared by the treating endocrinologist or health care professional prescribing the hormones prior to surgery and followed up in the perioperative period. Owing to lack of access to gender confirming care in certain areas, some patients may obtain hormones from dubious sources and/or self-medicate. The physiological effects of hormones as well as their adverse effects influence surgery; therefore, it is important for surgeons to understand hormonal therapies and their sequelae. Typically a minimum of 1 year of cross-sex hormonal treatment is recommended before genital surgery and breast augmentation.<sup>14,15</sup> Patients who do not adhere to hormonal treatment may not be ideal candidates for surgery.<sup>15</sup>

### Hormone Therapy for Trans Men

Testosterone therapy has dramatic effects, with increases in facial and body hair, male pattern baldness, increased muscle mass, male fat distribution, acne, cessation of menses, clitoral enlargement, and deepening of the voice.<sup>23</sup> Intramuscular or transdermal formulations of testosterone are most commonly prescribed. Choice of formulation depends on efficacy, cost, adverse effects, and patient preference. Testosterone therapy should be titrated to the physiological adult male reference range. Potential serious adverse reactions include polycythemia vera and a worsened lipid profile. Gonadotropin-releasing hormone analogues or progestins can be used to stop menstrual bleeding in the short term as the dose of testosterone is titrated up into the physiological range for males.

### Hormone Therapy for Trans Women

One goal of hormone therapy in trans women is to decrease the serum testosterone level from a range appropriate for a male to that for a female. For a trans woman who has not undergone orchiectomy, this decrease can be achieved medically with an

antiandrogen; spironolactone is most commonly used in the United States. Following orchiectomy, the spironolactone therapy can be discontinued.

In addition to an antiandrogen, estrogen therapy should be prescribed for feminization. Oral, intramuscular, and cutaneous forms of estrogen are available. Oral estradiol is often prescribed because it allows for easy measurement of serum estradiol concentrations to titrate the dosage. However, oral estrogen, especially ethinyl estradiol, is associated with an increased risk of venous thromboembolism; therefore, it is common practice for the use of estrogens to be discontinued 2 to 4 weeks before GCS.<sup>23,24</sup> In addition, proper prophylaxis may further reduce the risk of deep vein thrombosis.<sup>25</sup>

Feminizing therapy leads to female fat redistribution, decreased muscle mass, skin softening, decreased libido, decreased erections, breast growth, decrease in testicular volume, thinning of body and facial hair, and cessation of male pattern baldness.<sup>23,26</sup> In addition, direct androgen receptor blockers such as finasteride have been used to improve male pattern hair loss but may not be necessary if serum testosterone levels are lowered into the range appropriate for females.

Because hormone therapy results in breast growth, it is recommended that breast augmentation surgery be delayed for 1 to 2 years following initiation of hormone therapy to assess whether breast growth is satisfactory.<sup>14,23</sup> Patients should be instructed to follow surveillance guidelines for female breast cancer while not omitting screening for prostate cancer. Osteoporosis is also a concern in trans women, and a screening for bone mineral density by dual-energy x-ray absorptiometry may be considered before and after initiation of estrogen therapy.

### Progestins

There is insufficient evidence that progestins aid in breast development. Furthermore, progestins may be associated with increased cardiac and cancer risk. Therefore, at this time, routine treatment with progestins is not recommended.<sup>27,28</sup>

## Endocrine and Surgical Care of the Adolescent Patient

Gender identity can fluctuate during childhood. Some children who express transgender tendencies as children later identify with their natal gender as adults.<sup>29</sup> In contrast, adolescents who identify as transgender overwhelmingly describe themselves as transgender as adults.<sup>30</sup> The overarching goal of treating adolescents with GD is to prevent formation of secondary sex characteristics of their natal gender and to help them live a life consistent with their true gender identity. Pubertal suppression therapy using gonadotropin-releasing hormone analogues is largely reversible and gives adolescents time to explore the nature of their GD and gender identity. The recommendation is to start treatment with gonadotropin-releasing hormone analogues no earlier or later than Tanner stage II (puberty staging system).<sup>14</sup> It is important to educate the patient on the effects of suppression on penile development and potential challenges of penile inversion vaginoplasty owing to inadequate penile tissue.

Generally, genital surgery is delayed until the patient has reached the full legal age of maturity, although individual exceptions may oc-

cur. Many individuals do undergo chest surgery before the age of 18 years. Ideally, the patient should have socially transitioned from their natal gender to their true gender identity for at least 1 year prior to surgery.<sup>14</sup>

## Reproductive Aspects

Hormonal therapy and surgery will affect reproductive capacity. Options such as cryopreservation of oocytes or spermatozoa are available. However, these options may not be possible if patients have undergone pubertal suppression.

## Primary Care

Primary care physicians serve an important role in the care of transgender individuals. In many settings, primary care professionals prescribe and titrate hormone therapy and monitor for adverse effects. Primary care professionals also help the surgeon determine if an individual is medically fit for GCS. In addition, preventive screening for breast, prostate, and cervical cancer is important and often neglected, as patients may have remnants of gonadal and glandular tissue.<sup>31</sup> Compared with the general population, transgender individuals have a higher rate of human immunodeficiency virus and other sexually transmissible diseases; a primary care professional can help ensure appropriate medical management of these diseases.<sup>32</sup>

## Gender Confirming Surgical Care

Box 2 provides an overview of the available surgical procedures. The surgical plan is tailored to the individual patient, as not every patient necessarily wants, requires, or qualifies for all procedures. This section highlights certain aspects of GCS; comprehensive reviews of techniques are referenced in the specialized literature.<sup>33,34</sup>

### Surgical Aspects in Trans Men

#### Timing

Certain procedures may be combined so as to reduce recovery times, expedite transition, and reduce costs. In trans men, surgical transition may consist of the following 3 surgical procedures<sup>35</sup>: (1) chest reconstruction, hysterectomy, and salpingo-oophorectomy; (2) vaginectomy, scrotoplasty (with or without testicular implants), metoidioplasty or phalloplasty, and urethroplasty; and (3) insertion of penile prosthesis (9-12 months after phalloplasty).

Individual procedures and timing may vary based on the patient's goals, comorbid medical conditions, and previous surgical history. Newer approaches such as osteointegrated penile epithesis are being explored and may extend the surgical options beyond traditional phalloplasty.<sup>36</sup>

#### Chest Reconstruction

Often referred to as "top surgery," chest reconstruction consists of subcutaneous mastectomies, reduction and repositioning of the nipple-areola complex, and chest contouring with liposuction when needed. Some patients "bind" their breasts (wrapping the chest with fabric to flatten the breasts), leading to increased skin laxity.<sup>37</sup>

**Box 2. Gender Confirming Surgical Care****Trans Woman**

Facial feminization surgery  
 Forehead feminization  
 Frontal bossing shave  
 Frontal sinus set back  
 Hairline advancement  
 Hair transplantation  
 Forehead shortening  
 Brow-lift  
 Rhinoplasty  
 Periorbital rejuvenation  
 Rhytidectomy  
 Cheek augmentation  
 Rhinoplasty  
 Lip feminization  
 Lip augmentation  
 Upper lip shortening  
 Gonial angle shave  
 Genioplasty  
 Thyroid cartilage shave  
 Breast augmentation  
 Body contouring  
 Genital surgery  
 Orchiectomy  
 Vaginoplasty  
 Penile inversion (with or without skin graft)  
 Intestinal conduit  
 Clitoroplasty  
 Labiaplasty

**Trans Man**

Facial masculinization surgery  
 Rhinoplasty  
 Gonial implants  
 Genioplasty  
 Chest reconstruction  
 Subcutaneous mastectomy  
 Liposuction  
 Pectoral implants  
 Genital surgery  
 Hysterectomy and oophorectomy  
 Colpectomy  
 Metoidioplasty  
 Phalloplasty  
 Phallus  
 Glansplasty  
 Urethroplasty  
 Erectile prosthesis  
 Scrotoplasty  
 Testicular implants  
 Penile epithesis  
 Pubic lift or mini-abdominoplasty

**Gender-Nonconforming Individuals**

Any masculine or feminine spectrum surgical procedures, notably:  
 Chest surgery  
 Body contouring  
 Orchiectomy

Depending on the volume of parenchyma, position of the nipple-areola complex, and degree of skin elasticity, either a periareolar or an inframammary approach with free nipple grafts may be performed.<sup>37</sup>

**Genital Surgery**

Often referred to as "bottom surgery," genital surgery on trans men consists of removal of female organs and either metoidioplasty or phalloplasty. A metoidioplasty refers to lengthening of the hormonally hypertrophied clitoris and can be performed with or without urethral lengthening. Ideally, the metoidioplasty allows for micturition while standing; however, it does not allow placement of an erectile device. Therefore, the ability to engage in penetrative intercourse after surgery is limited. The most complete genital transformation is a phalloplasty, and the most well-described procedure is the radial forearm free flap.<sup>38</sup> This procedure allows for single-stage construction of a phallus and neourethra. Table 3 gives an overview of the most common methods of phalloplasty. Both metoidioplasty and phalloplasty procedures may involve a scrotoplasty with staged placement of testicular implants.

Most often, genital procedures for trans men are performed by a surgical team involving plastic, gynecologic, and urologic sur-

geons. Most late complications are associated with urethral reconstruction, including a rate of stricture and fistula of at least 40%.<sup>39</sup> Many of these patients will require subsequent urethroplasties.

The combined hysterectomy and salpingo-oophorectomy is performed either laparoscopically or transvaginally. The subsequent vaginectomy and colpocleisis is typically performed at the time of phalloplasty. In some cases, an anterior wall vaginal flap is used to lengthen the proximal urethra at the time of phalloplasty or metoidioplasty.

**Surgical Aspects in Trans Women****Breast Augmentation**

In trans women, the vaginoplasty and breast augmentation can be safely combined. Following 12 to 24 months of hormonal treatment, breast augmentation may be performed. The principles are similar to those of breast augmentation in natal females. However, anatomical differences, such as chest width and nipple position, are relevant.

**Genital Surgery**

Depending on the patient's goals (ie, vaginal intercourse) and the length of the phallus, a penile disassembly and inversion vaginoplasty or an intestinal vaginoplasty may be performed. Trans women undergoing penile inversion vaginoplasty are required to dilate their

**Table 3. Phalloplasty Overview**

Characteristic	RFFFP	ALT	Fibula	MLD	SCIP	Peroneal Art Perf
Shaft	Yes	Yes	Yes	Yes	No	Yes
Sensation	Good	Some	Some	None	None	Some
Sensory nerves, No.	2	1	1	0	0	1
Bulk	Moderate	Bulky	Moderate	Bulky	Moderate	Moderate
Pedicled option	No	Yes	No	No	Yes	No
Reliability	Good	Acceptable	Good	Good	Acceptable	NA
Urethra stages, No.	1	2-3 <sup>a</sup>	1	2-3	1 <sup>a</sup>	1

Abbreviations: ALT, anterolateral thigh flap; Art Perf, arterial perforator; MLD, muscle sparing latissimus dorsi; NA, not applicable; RFFFP, radial forearm free flap phalloplasty; SCIP, superficial circumflex iliac perforator.

<sup>a</sup> Unless ALT is performed concomitantly with SCIP flap for urethral reconstruction.

neovagina indefinitely. If an intestinal vaginoplasty is performed, dilation requirements are less rigorous. Stenosis, dyspareunia, recurrent cystitis, incontinence, urinary spray, vaginal prolapse, and aesthetic deformities are among the issues that can occur following vaginoplasty. Pelvic physical therapy is a useful adjunct in the perioperative period.<sup>40,41</sup>

**Laryngeal Surgery**

Speech therapy, alone or in conjunction with vocal cord surgery, has been reported to help transition a patient’s voice to match the higher pitch of the female voice.<sup>42,43</sup> Female vocal cords are thinner and shorter, so vocal feminization surgery relies on a shortening of the vocal cords. During reduction thyroid chondroplasty, the male thyroid cartilage prominence can be reduced through removal of excess cartilage.

**Facial Feminization Surgery**

Many surgical procedures can be performed to feminize facial features. At this time, most insurance companies consider facial feminization surgery to be cosmetic. However, research suggests that facial feminization surgery can alleviate GD in transgender individuals.<sup>44-47</sup>

**Surgical Aspects in Gender-Nonconforming Patients**

Many individuals who identify as gender nonconforming do not identify with binary gender identities. Still, they may request surgical therapy to alleviate their GD. There is a paucity of literature on indications and outcomes for individuals who identify as gender nonconforming. Surgical care must be tailored to the needs of the individual.

**Conclusions**

The field of GCS is experiencing a renaissance in the United States. To provide optimal care to transgender individuals and those who identify as gender nonconforming, it is critical that the surgical community collaborate closely with the health care team and understand the World Professional Association for Transgender Health SOC guidelines. These guidelines are designed to be flexible; they should not serve as a barrier to care, but instead, they should help surgeons provide appropriate care. With expansion of third-party coverage, more transgender individuals are now able to receive the care they need. As surgical volumes increase, more outcome data will be available, and prospective studies will help to refine our indications and surgical techniques.

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