

# Update on Gender-Affirming Treatment for the Transgender Woman

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## Abstract

### Keywords

- male-to-female vaginoplasty
- transgender woman
- transgender surgery
- gender affirmation surgery

Transgender women often transition with cross-sex hormone therapy and some opt to further affirm themselves with breast augmentation, facial feminization procedures, and/or vaginoplasty surgery. When considering medical and surgical transition for the transgender woman, careful preoperative evaluation and individual assessment is imperative and the World Professional Association for Transgender Health (WPATH) Standards of Care provide the framework from which health care providers and surgeons may assess eligibility for affirming treatments. Vaginoplasty for the transgender woman may be performed by a variety of techniques, mainly penile inversion vaginoplasty or intestinal segment vaginoplasty. Surgical outcomes vary according to technique, and the unique risks, advantages, and disadvantages must be considered. Outcomes appear to be satisfactory following vaginoplasty surgery, but prospective, long-term data are still lacking. Providers should be aware of the peri- and postoperative management of the transgender women after genital surgery, as many women require ongoing care and management after surgery.

Gender dysphoria is a feeling of distress that is caused by a discrepancy between an individual's gender identity and the sex they were assigned at birth.<sup>1</sup> Transgender individuals feel a strong sense of incongruity between their biologic sex and their gender identity, and, as a result, may seek transition to their affirmed gender, which may include surgery.<sup>2</sup> Transgender women (individuals who are assigned male at birth but identify as female) often transition with cross-sex hormone therapy (usually exogenous estrogen and antiandrogen therapy) and some opt to further affirm themselves with breast augmentation ("top surgery"), facial feminization procedures (also known as "facial gender confirmation surgery"), and/or vaginoplasty surgery ("bottom surgery").

The purpose of this review is to provide an overview and update on gender-affirming treatment for transgender women. I will review important criteria necessary for providing gender-affirming treatments and the guidelines and recommendations for cross-sex hormone therapy. I will also

provide an overview of gender-affirming surgery, including breast and facial surgery. Finally, I will provide an in-depth discussion on vaginoplasty surgery, including techniques used to perform this surgery, important perioperative considerations, and office management of the postoperative patient.

## World Professional Association for Transgender Health

The World Professional Association for Transgender Health (WPATH) has published guidelines that serve as a framework for health professionals caring for transgender individuals.<sup>1</sup> These standards of care include criteria for hormone therapy initiation and for surgery. It is strongly encouraged that providers offering transgender-specific services follow these standards of care while caring for patients. I will make reference to the specific guidelines throughout this review.

## Cross-Sex Hormone Therapy

WPATH recommends that hormone therapy should be initiated once psychosocial assessment has been completed, the patient has been determined to be an appropriate candidate for therapy, and informed consent reviewing the risks and benefits of starting therapy has been obtained.<sup>1</sup> Per WPATH, a referral is required by a qualified mental health professional, unless the prescribing provider is qualified in this type of assessment. The criteria for therapy include (1) persistent well-documented gender dysphoria (a condition of feeling one's emotional and psychological identity as male or female to be opposite to one's biological sex) diagnosed by a mental health professional well versed in the field, (2) capacity to make a fully informed decision and to consent for treatment, (3) age of majority, and (4) good control of significant medical and/or mental comorbid conditions.

The goal of hormone therapy for transgender women is to feminize patients by changing fat distribution, inducing breast formation, and reducing male pattern hair growth.<sup>3</sup> Estrogens are the mainstay therapy for transfemale patients. Exogenous estrogens act through a negative feedback loop, suppressing gonadotropin secretion from the pituitary gland, leading to a reduction in androgen production.<sup>4</sup> Estrogen alone is often not enough to achieve desirable suppression, and adjunctive antiandrogenic therapy is often necessary.

Currently, oral (Estrace, Gynodiol) and transdermal (Alora, Climera, Esclim, Estraderm, Vivelle) estradiol and parenteral estradiol valerate (Delestrogen) are the preferred formulations for exogenous estrogen treatment (see ►Table 1 for dosing recommendations). No studies have examined the efficacy of the different formulations specific to transgender hormone management. After the age of 40 years, transdermal formula-

tions are recommended as they bypass first-pass metabolism and seem to be associated with better metabolic profiles.<sup>5</sup>

There are no consensus guidelines for the use of antiandrogens. Options are also listed in ►Table 1. Spironolactone is one of the most common medications used to suppress endogenous testosterone in transfemale patients. The biggest risk associated with spironolactone is hyperkalemia, and this should be closely monitored. Other options include 5 $\alpha$ -reductase inhibitors such as finasteride, but these inhibitors can be associated with liver toxicity and may not be as effective as spironolactone.<sup>6</sup> Gonadotropin-releasing hormone agonists can be very expensive, and are not always a good option for patients due to their side effect profiles. Progestins can be used as adjunctive therapy, but should be used with caution as there is a theoretical risk of breast cancer associated with long-term exogenous progesterone use.<sup>7</sup>

## Breast Augmentation Surgery

Antiandrogenic therapy and supplementation with exogenous estrogens can lead to breast development in transwomen. Breast growth typically begins 3 months after the initiation of hormone therapy with maximal growth occurring approximately 2 years after therapy is initiated.<sup>8,9</sup> As a result, WPATH recommends hormone therapy for at least 1 year prior to proceeding with breast augmentation surgery.<sup>1</sup> It is important to note, however, that response to hormone therapy varies among patients, and up to 70% of transwomen do not find their breast growth and nipple development to be completely satisfying.<sup>8</sup> We do not have a lot of data on optimal hormone regimens to maximize breast development in transwomen. Current data are observational and inconsistent, and, overall, do not point toward a recommended estrogen regimen, and there is no evidence that use of adjunctive progesterone therapy enhances growth.<sup>8,10–12</sup> Patient factors, such as age and body weight and composition, seem to be more related to breast development than the type of exogenous feminizing therapy provided.<sup>13–15</sup> Prior to initiating cross-sex hormone therapy, it is important that providers counsel their patients properly about expected breast growth and development.

Many transwomen who are not satisfied with their breast development wear external prostheses or padded bras. Many of these women also seek breast augmentation surgery. The WPATH Standards of Care recommend that individuals who request breast or chest surgery have one referral letter from a mental health provider in addition to the four criteria previously listed in section "Cross-Sex Hormone Therapy" of this review. Augmentation mammoplasty in transgender women is performed in a similar fashion to cisgender women. However, many reconstructive surgeons who routinely perform this surgery for trans-individuals disclose that there are important anatomic differences to consider to obtain optimal cosmetic outcomes. The natal male's chest is wider with a more developed pectoralis major muscle. In addition, the areola and the distance between the nipple and inframammary fold are often smaller in these patients.<sup>16</sup> These important differences can affect the type of implant selected, and the choice of incision and pocket location for implant placement.<sup>17</sup> Surgeons who

**Table 1** Estrogen and antiandrogen options for transgender women

Estrogens	
<i>Oral</i>	
Estradiol	2–4 mg daily
<i>Parenteral (subcutaneous, intramuscular)</i>	
Estradiol valerate	5–30 mg every 2 wk
<i>Transdermal</i>	
Estradiol	0.1–0.4 mg twice weekly
Antiandrogens	
Progesterone	20–60 mg PO daily
Medroxyprogesterone acetate	150 mg IM every 3 mo
GnRH agonist (leuprolide)	3.75–7.5 mg IM monthly
Histrelin implant	50 mg implanted every 12 mo
Spironolactone	100–200 mg PO daily
Finasteride	1 mg PO daily

Abbreviation: GnRH, gonadotropin-releasing hormone.

perform breast augmentation in transwomen should be familiar with these important nuances and should adapt their surgical techniques to ensure satisfying results.

Facial Gender Confirmation Surgery

Gonadal hormones play an important role in the development of male and female phenotype. Prenatal and adolescent levels of androgens are mainly responsible for the appearance of facial features related to gender.<sup>18</sup> The development of the frontonasoorbital complex, the nose, the malar region, the upper lip, the jaw and chin complex, and the thyroid cartilage are under hormonal influence.<sup>19</sup> Development is predetermined by genetic sex, and is mostly irreversible once puberty has occurred. If patients are treated with puberty blockers at an early age, some of this development is thwarted and administration of exogenous hormones can lead to the development of gender-affirming features. While we are seeing a shift in earlier treatment of transgender individuals, most patients today seeking transition-related care have not benefited from puberty suppression therapy. As a result, some patients desire facial feminizing procedures.

Reconstructive surgeons trained in craniofacial surgery perform facial gender confirmation procedures. The goal is to achieve cosmetic outcomes that allow patients to integrate into society appearing as their self-affirmed gender. WPATH does not provide specific guidelines for criteria for patients seeking facial gender confirmation surgery, but many surgeons apply the same guidelines recommended for breast augmentation surgery. Many procedures exist and can be performed in combination with each other, and not all patients seek the same outcomes. The surgical consultation is an integral part of the patient’s transition process, as the patient is able to discuss with her surgeon what her goals are for feminization, while the surgeon is able to outline realistic expectations for that patient. ►Table 2 lists the facial surgeries that are currently available to patients.

Genital Affirmation Surgery: Vaginoplasty

Vaginoplasty surgery may be performed for transgender women who desire surgical transition. This type of surgery is now more commonly referred to as *gender confirmation* or *affirmation* surgery and it is considered irreversible. Therefore, careful patient selection is crucial for favorable outcomes. The

Table 2 Facial feminization procedures

Forehead reconstruction
Hairline treatment
Forehead reconstruction and simultaneous hair transplant
Cheek augmentation
Rhinoplasty
Lip-lift
Lower jaw and chin recontouring
Thyroid cartilage recontouring

WPATH Standards of Care are a bit more involved for this surgery than the earlier-mentioned affirmation treatments. The Society recommends that in addition to the four previously mentioned criteria, two mental health professional letters of referral be provided by the patient before surgery, and patients should be living full-time as their self-affirmed gender for at least 12 months before pursuing surgery.

Two main techniques exist for male-to-female vaginoplasty; penile inversion vaginoplasty and intestinal segment vaginoplasty.<sup>20</sup> Other less common techniques may involve the use of skin grafts from various donor sites.<sup>21–23</sup> The goal of all techniques is to construct a functional and aesthetic vagina, clitoris, and vulva, capable of intercourse and orgasm. The most researched and most commonly performed technique is the penile inversion vaginoplasty, which involves deconstruction of the penile structures and use of the scrotal skin to line the neovagina.<sup>20</sup> Alternatively, intestinal segment vaginoplasty can be performed when penile inversion vaginoplasty fails, or when there is insufficient penoscrotal skin, which can occur in transgender women who transition early in life, and are treated with puberty-suppressing therapy.<sup>20,24</sup> In these patients, the penile inversion technique is still often performed with additional skin grafting techniques. To perform an intestinal vaginoplasty procedure, a segment of sigmoid colon or ileum is used to create a neovagina. In general, this procedure has fallen out of favor as a primary gender confirmation surgery, and is more commonly performed in transgender women who require revision surgery for neovaginal stenosis or contracture.

The technique of penile inversion vaginoplasty has been widely described and various modifications have been made over time.<sup>25–27</sup> In brief, the technique includes deconstruction of the penis, formation of a neoclitoris from a portion of the glans with an intact dorsal neurovascular pedicle, creation of a neourethral meatus, dissection of the neovagina, lining of the neovagina with penoscrotal skin, and labiaplasty/vulvoplasty with use of various penoscrotal skin flaps.<sup>28</sup> The advantages of the penile inversion vaginoplasty procedure include the use of local flaps that maintain their neurovascular supply and avoidance of an abdominal procedure which could confer higher morbidity. Disadvantages of the procedure include the need for compliance with postoperative dilation, the possibility of insufficient skin to achieve adequate neovaginal dimensions, and hair growth in the neovagina if a scrotal flap is used and permanent depilatory procedures (e.g., electrolysis, laser) are not performed preoperatively.

Intestinal vaginoplasty may be performed through an open abdominal incision, by hand-assisted laparoscopy or by total laparoscopy.<sup>29</sup> Reported advantages of the procedure include achievement of adequate vaginal depth and a vaginal tube that has natural lubrication. Disadvantages of this technique include excessive mucus production that may be bothersome to patients, introital stenosis, malodor, and the potential morbidity associated with an abdominal procedure and creation of a bowel anastomosis.<sup>30</sup> The abdominal portion of the surgery includes harvest of an intestinal segment (usually sigmoid or ileum) on its vascular pedicle, creation of a neovaginal tube, and anastomosis for

restoration of bowel continuity. The perineal portion of the surgery includes partial penectomy, orchiectomy, dissection of the neovaginal cavity, bowel-perineal anastomosis, clitoroplasty, labiaplasty/vulvoplasty, and, in some cases, a suspension procedure for prevention of prolapse.<sup>30</sup>

### Outcomes and Complications

Intraoperative complications of vaginoplasty surgery include excessive bleeding and need for transfusion, and injury to the bladder, urethra, and/or rectum. Immediate postoperative complications include bleeding, hematoma or seroma formation, infection or abscess, wound dehiscence, flap necrosis, and venous thromboembolism. Delayed postoperative complications of vaginoplasty include neovaginal stenosis or shortening of the neovagina, rectovaginal or genitourinary fistula formation, urethral meatal stenosis or abnormal urine stream, neuropathy, and sexual dysfunction including dyspareunia and anorgasmia. In a recently published systematic review of postoperative outcomes following male-to-female vaginoplasty using the modified penile inversion technique, Horbach et al reported the following rates of complications: stricture of the neovaginal introits in 12% (4.2–15%) of patients, partial necrosis of the neovagina in 2.7 to 4.2%, clitoral necrosis in 1 to 3%, rectal injury in 2 to 4.2%, rectovaginal fistula in 1% (0.8–17%), urethral meatal stenosis in 5% (1–6%), wound dehiscence in 12 to 33%, abscess in 5%, hematoma in 4 to 6%, and surgical bleeding in 3.2 to 10%.<sup>20</sup>

A survey using standardized questionnaires of transgender women who underwent penile inversion vaginoplasty showed that the majority were satisfied with their functional and aesthetic outcomes; however, female sexual function index scores fell into the sexual dysfunction range in 56% of respondents, mainly due to sexual inactivity, or issues related to lubrication or discomfort.<sup>31</sup> This high rate of sexual dysfunction should alert professionals caring for transgender patients to the need for improvement in both surgical technique and postoperative education and management of sexual function. We also suspect that these results could reflect the lack of validated questionnaires specific to the transgender population, and work is currently underway to address this and to help assist us in studying these important postoperative outcomes. At an average follow-up of 37 months, 86% of transgender women who underwent vaginoplasty reported having had an orgasm, and 86% reported no pain. The majority of these patients were satisfied with their surgery.<sup>32</sup>

There are fewer studies evaluating outcomes in patients who have undergone intestinal vaginoplasty surgery. In a systematic review of intestinal vaginoplasty performed for multiple indications (including gynecologic), an overall complication rate of 6.4% was reported for sigmoid vaginoplasty ( $N = 686$ ) with a 0.6% severe complication rate, and 8.3% for ileal segment vaginoplasty ( $N = 169$ ) with no severe complications reported.<sup>30</sup> Both introital and diffuse vaginal stenosis were reported in 8.6 and 3.5%, respectively, in the sigmoid vaginoplasty group, and 1.2 and 3.0%, respectively, in the ileal segment vaginoplasty group. In both groups, discharge was noted to be acceptable by 6 months, with

excessive discharge continuing in 0.7% of sigmoid patients. Sexual activity was resumed 2 months postoperatively and was satisfactory in more than 85% of patients.<sup>30</sup>

In a review of the literature, 14 cases of regret have been reported in male-to-female transgender patients undergoing vaginoplasty surgery.<sup>33</sup> In these cases, three factors were identified as potential risk factors for this unfavorable outcome: inappropriate diagnostic indication for surgery, not enough time spent living in the desired gender role, and perception of a poor outcome following the surgical procedure. In a more recent survey of 232 postoperative male-to-female vaginoplasty patients, no participants reported consistent regret, but 6% ( $n = 15$ ) did report that they were sometimes regretful, and 2 participants (1%) reported reversion to living in a male gender role following surgery.<sup>34</sup> In this study, surgical outcome was identified as an important predictor of satisfaction. Most providers offering surgical services to patients adhere to the WPATH Standards of Care. The criteria for surgical transition set forth by the society have been carefully chosen by experts in the field to mitigate potential risk factors for postoperative regret and to assist providers in choosing appropriate candidates for surgery.

### Office Management of the Postoperative Vaginoplasty

In the postoperative period, vaginal spotting and bleeding with dilation may be due to the presence of granulation tissue, which may be treated with silver nitrate or local excision.<sup>35</sup> A trial of vaginal estrogen may be considered if the spotting becomes bothersome and chronic, although there is no evidence to support this intervention. Vaginal discharge and/or malodor should alert the medical care provider to a possible yeast vaginitis. Skin sloughing from the epithelial neovaginal lining and the warm, moist environment may contribute to this. Regular douching with a vinegar or povidone/iodine solution, or with a mixture of baby soap and warm water, may help maintain hygiene.<sup>35</sup>

In a survey of postsurgical transgender patients, change in voiding was reported in 32% ( $n = 10$ ) of male-to-female respondents.<sup>36</sup> Of those surveyed, 19.3% ( $n = 6$ ) reported worse voiding and 19.3% ( $n = 6$ ) reported some degree of incontinence. In other studies, neourethral meatal stenosis has been reported to occur in approximately 5% of postoperative patients.<sup>20</sup> Postsurgical changes in the urethra may also result in an upward or splayed urinary stream which can sometimes be bothersome to patients. These urinary changes are often temporary and resolve as postoperative swelling improves, but persistent urinary stream issues should be addressed by the primary surgeon and may involve a minor surgical revision. Other cosmetic concerns that may require surgical revision include perineal scarring, inadequate clitoral exposure or hooding, and poor cosmesis of the labial structures.

Vaginal stenosis and contracture may occur if proper neovaginal dilation is not performed. In our practice, dilation is taught on postoperative day 7, initially three times daily for 12 weeks, using progressively larger dilators. After the initial



12 weeks, twice daily or daily dilation is encouraged. If vaginal caliber is not satisfactory, soft silicone dilators may be used initially with later transition to rigid dilators as the patient becomes more comfortable with dilation. If there are signs of graft contracture and/or patients are having trouble dilating, one helpful tip is to have the patient soak a tampon in mineral oil or baby oil then place it in the vagina for 30 minutes prior to dilation, allowing for softening of the skin and greater stretching with dilation. Patients are encouraged to maintain their dilation regimens, as revision surgeries for neovaginal stenosis can sometimes be challenging and associated morbidity is higher than in the primary surgery.

## Conclusion

Transgender women often transition with cross-sex hormone therapy and some opt to further affirm themselves with breast augmentation, facial feminization procedures, and/or vaginoplasty surgery. When considering medical and surgical transition for the transgender woman, careful preoperative evaluation and individual assessment is imperative and the WPATH Standards of Care provide the framework from which health care providers and surgeons may assess eligibility for affirming treatments. Providers should be aware of the peri- and postoperative management of the transgender women after vaginoplasty surgery, as many women require ongoing care and management after surgery.

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