Urological focus on gender affirmation surgery

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Background
Gender affirmation surgery plays an important role in the treatment of gender dysphoria. These procedures play a vital role in aligning individuals' physical characteristics with their gender identity, resulting in improved mental health and overall wellbeing.

Objective
This article provides an overview of genital gender affirmation surgeries, focusing on the available options and appropriate referral criteria for general practitioners and surgeons.

Discussion
Gender affirmation surgery necessitates a multidisciplinary approach, emphasising patient readiness, clear surgical preferences, hormonal transition and modifiable risk factors. The two primary methods for assessing patient appropriateness, the World Professional Association for Transgender Health (WPATH) guidelines and the informed consent model, are discussed. This article summarises surgical options for both trans-male and trans-female individuals, outlining procedures, benefits and potential complications. Gender affirmation surgery is set to play an increasingly important role in the management of gender dysphoria. By understanding the available options and referral processes, primary care physicians will be able to optimise care for these patients.

GENDER AFFIRMATION surgery has an important role in the treatment of gender dysphoria.[1] Gender dysphoria is defined as a marked incongruence between one's experienced or expressed gender and gender assigned at birth.[2] This state can be understood as a misalignment between 'biological sex' (typically understood as sexual organ and genetic characteristics) and 'gender identity'. Gender dysphoria might occur at various developmental stages, but commonly escalates with development of secondary sexual characteristics (Figure 1).[3]

Multidisciplinary input can improve outcomes when treating patients with gender dysphoria.[4] In this context, a multidisciplinary team commonly includes mental healthcare providers, sexual healthcare physicians, general practitioners (GPs), endocrinologists and surgeons.

These treatments are effective in managing gender dysphoria, and patients rarely regret gender affirmation therapy later in life.[5,6] Various surgical options are available to transgender and non-binary individuals, which include facial reconstructive surgery, vocal surgery, chest or 'top' surgery, and genital or 'bottom' surgery (Table 1).[7] This article will focus predominantly on available options for genital surgery.

Aim

To provide GPs and surgeons with a brief summary on gender affirmation surgeries and guide for appropriate referral criteria.

Referral considerations

Gender affirmation surgery requires considered multidisciplinary input over a minimum of six months.[8] An ideal candidate for referral to a reconstructive surgeon would:

- be psychologically stable; absence of psychosis, depression, alcoholism and intellectual disability[8]
- have a strong support network
- have a clear idea of their desired type of surgery

- have begun or planned hormonal transition. Current recommendation is a minimum of six months prior to 'bottom' surgery
- have undergone optimisation of modifiable surgical risk factors, including smoking cessation (recommended six months minimum), weight management (optimal body mass index [BMI] 21–29) and diabetes stabilisation.[9] Elevated BMI is not an absolute contraindication to surgery, but would require a careful discussion of risks and benefits with the patient.

The two predominant methods used to assess patient appropriateness for surgery are the World Professional Association for Transgender Health (WPATH) guidelines and the informed consent model.[4,8,10,11]

World Professional Association for Transgender Health

The World Professional Association for Transgender Health standards of care (SOC) are a detailed set of mental health-orientated criteria.[8] Initially developed in 1979, these guidelines have evolved over eight iterations.[8]

Table 1. Options for gender affirmation surgeries

Female-to-male surgeries	Male-to-female surgeries
Facial masculinisation surgery	Facial feminisation surgery
Vocal surgery (uncommon)	Vocal surgery and chondrolaryngoplasty
Chest or 'top' surgery • Bilateral mastectomy	Chest or 'top' surgery • Breast augmentation
Genital or 'bottom' surgery • Scrotoplasty • Testicular prosthesis • Metoidioplasty (with or without urethral lengthening) • Phalloplasty (with or with urethra) – Flap type - Radial artery forearm flap - Anterolateral thigh flap - Abdominal flap - Myocutaneous latissimus dorsi flap - Other flap – Penile prosthesis • Hysterectomy + bilateral salpingo-oophorectomy • Vaginectomy	Genital or 'bottom' surgery • Bilateral orchidectomy • Scrotectomy • Vaginoplasty – Penile inversion – Peritoneal pull through • Penectomy

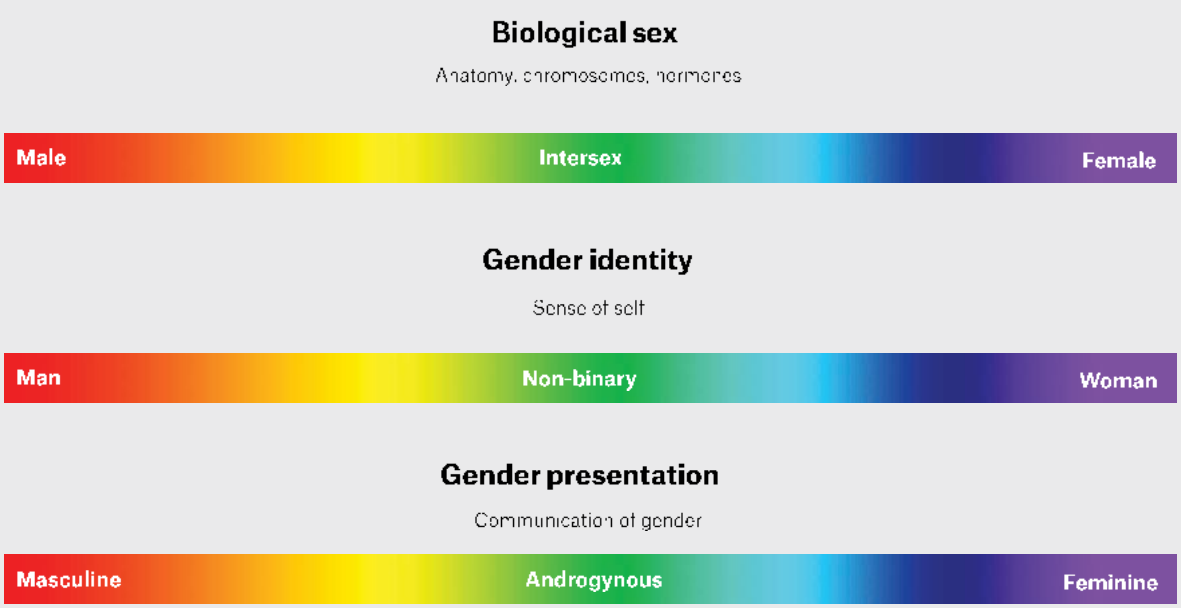


Figure 1. Graphical representation of the distinction between biological sex, gender identity and gender presentation displayed on a visible light spectrum. Used with permission from author, DH, from a personal figure library.

Within its framework, mental health providers facilitate formal mental health evaluations and provide obligatory letters of readiness (Table 2). Initially, these guidelines highlighted the significance of psychiatric assessment to ascertain the persistence of gender dysphoria, often doubting the reliability of patient self-reporting. Historically, WPATH SOC mandated a period of psychotherapy and real-life experience living as one's identified gender with referral letters from mental health professionals to validate eligibility for treatments, such as hormone therapy and surgery.[8] Critics argue that these standards, although born from the principle of non-maleficence, have perpetuated a form of gatekeeping and paternalism that limits access to gender-affirming care.[10,11] Despite the accumulating clinical experience and research supporting the safety and efficacy of gender-affirming treatments, some argue that the WPATH SOC continue to place a burden on transgender individuals to validate their identities to healthcare providers.[10]

Informed consent model

The guiding principle underpinning the informed consent model is that patients experiencing gender dysphoria have capacity to make informed decisions and consent to medical or surgical management.[10,12]

In contrast to the WPATH SOC, the informed consent model does not require referral letters from mental health professionals and, instead, places trust in the treating clinician and patient to collaboratively determine the most suitable management course. This model acknowledges that patients, as experts in their own experiences, are best positioned to assess the benefits and risks of treatment. Given low rates of regret post intervention, some authors argue that the informed consent model should be used more commonly in contemporary practice.[13]

Perioperative considerations

The timing of gender affirmation surgeries is an important consideration in transgender healthcare. The timing is driven by where each individual is in their own journey of transition, the particular details of their dysphoria, their awareness and experience regarding sexual activity, as well as their overall preferences for managing their gender dysphoria.

In both the WPATH SOC and informed consent models of care, preparing for gender affirmation surgeries involves several key components.

Preoperative assessment is undertaken with evaluation of the patient's physical health prior to surgery and focuses on optimisation of modifiable surgical risk factors including smoking cessation, BMI and diabetes.[1]

Other important considerations for the multidisciplinary team (Table 3) include:

- **Hair removal:** It is an important component in both phalloplasty and vaginoplasty surgeries to ensure minimal hair exists within a formed urethra or vagina, as well as cosmesis to align with desired genital appearance. This is commonly organised by gender surgeons.
- **Fertility planning:** Discussions around sperm or ovarian cryopreservation prior to surgery or hormone therapy should be undertaken by GPs or physicians organising these interventions.
- **Family planning:** Some patients might prefer to have a family prior to surgery, particularly surgery involving reproductive organs. Some patients might interrupt their hormone treatment to achieve a pregnancy.
- **Preoperative hormonal levels** should be assessed, particularly for individuals who have undergone hormone therapy as part of their gender affirmation. This is ideally organised via referral to a gender surgeon.

Surgical plans are tailored to each patient's unique needs and preferences. Gender affirmation surgeries are highly individualised, and the specific procedures chosen should align with the patient's gender identity and desired physical changes.[11]

Table 2. Comparison of World Professional Association for Transgender Health (WPATH) guidelines and informed consent models of care for assessing suitability for gender affirmation surgery

	Requirements	Pros	Cons
WPATH	Mental health provider: • Master's-level degree • International Classification of Diseases (ICD) competence • Able to undertake capacity assessments • Experience in treating patients with gender dysphoria	• Careful evaluation of gender dysphoria and mental health status • Structured process for determining eligibility and readiness for treatment • Historically rooted in established clinical practice	• Time-consuming and potentially stigmatising • Requires involvement of mental health professionals, which might lead to delays in treatment • Might be viewed as gatekeeping and paternalistic due to limiting access to care
Informed consent	• Informed decision making • Capacity for consent • Detailed discussion regarding risks, benefits and alternative treatments	• Reduces reliance on external evaluations and referral letters • Fosters a strong clinician–patient relationship • Aligns with evolving transgender healthcare practices and diverse identities	• Challenges related to insurance coverage criteria and access to care • Potential concerns about lack of psychological evaluation for some patients

Surgeons work closely with patients to create surgical plans that reflect their goals and might involve chest surgery, genital surgery, facial feminisation or masculinisation, among many other procedures.

Patient education is undertaken as a critical aspect of the surgical process. Patients should be well-informed before and after surgery regarding their expectations. Preoperative education includes information about the surgical procedure, potential risks, the recovery process and expected outcomes.[9] Patients should have a clear understanding of the surgical process and its implications. Postoperative care instructions are important. Patients are educated on wound care, pain management and recognition of complications postoperatively.

Options for gender affirmation surgeries

Gender affirmation surgeries can be divided into female-to-male and male-to-female operations (Table 3).

Female-to-male surgeries

There are many female-to-male gender affirmation surgeries available (Table 1). Collaboratively choosing the appropriate operation requires detailed patient understanding of surgical options and limitations of outcomes.

Hysterectomy and vaginectomy

Managing gender dysphoria surgically often involves removal of female reproductive organs (Table 1). This can include removal of the uterus, cervix, ovaries, Fallopian tubes and vagina.[9,14,15] Removal of the vagina is often paired with reconstructive surgery such as metoidioplasty or phalloplasty.[9,14,16,17]

Metoidioplasty

Metoidioplasty involves releasing the clitoral ligament and constructing a neophallus (new penis) from the enlarged clitoris.[16] The procedure might include urethral lengthening, scrotoplasty or glansplasty.[16] Importantly, the appearance of metoidioplasty resembles a pre-pubertal penis, rather than that of an adult male and it is rarely able to be utilised for penetrative intercourse. With urethral lengthening, people might be able to void in the standing position.

Benefits of metoidioplasty include alleviating gender dysphoria with a less invasive and less costly procedure, minimal scarring and the preservation of clitoral sensation.

Phalloplasty

Phalloplasty is another operative option for transgender men and non-binary individuals seeking gender affirmation surgeries. A variety of phalloplasty techniques are available, including radial artery forearm, thigh and abdominal flap phalloplasty.[1,9,17–19]

Radial artery forearm flap

This approach uses forearm tissue to create the neophallus. It offers excellent cosmesis and better sensation rates, but is accompanied by significant forearm scarring. A urethra is usually included.

Anterolateral thigh flap

A thigh flap has the benefit of being able to hide scarring under clothing. Sensation might be less than when a forearm flap is used, and some skin/body types might not be suitable for this option. Sometimes a urethra can be included.

Abdominal flap phalloplasty

This local flap is used for people with a suitable amount of abdominal tissue. Cosmesis and poor sensation are disadvantages of this approach. A urethra can be created, but requires a separate procedure that often involves a forearm free flap.

Complications and postoperative care

Postoperative care for phalloplasty and metoidioplasty patients involves regular follow-up appointments and wound care. Additional surgeries might be required to address complications. A variety of short- and long-term complications exist for phalloplasty (Table 4).

Male-to-female surgeries

Gender affirmation surgery for trans-women generally involves orchidectomy, with or without scrotectomy, or some form of vaginoplasty.[3,4]

Orchidectomy involves the removal of both testicles and is suitable for those patients with significant testicular or scrotal dysphoria, as well as patients wishing to cease testosterone-blocking medications or to facilitate genital tucking.[20]

Vaginoplasty is a gender affirmation surgery designed for transgender women and non-binary individuals, aiming to create a neovagina. The surgical process includes two primary techniques: penile inversion or non-penile inversion. In the penile inversion approach, the penile skin is inverted to form the neovagina, whereas the non-penile inversion technique uses grafts or tissue from other areas of the body, such as the peritoneum, scrotum or sigmoid colon, to construct the neovagina. Vaginoplasty variants include zero depth, which focuses on external appearance without the vaginal canal, or full depth, which includes the creation of a functional vaginal canal (Table 5). Occasionally, a patient might prefer to have a penectomy, rather than a full reconstruction.

Preoperative care involves thorough patient assessment, psychological evaluation and extensive discussions to clarify readiness and informed consent. Postoperative care includes

Table 3. World Professional Association for Transgender Health (WPATH) guideline criteria for referring patients to experienced gender-affirming surgical centres

Team member	Requirements
Mental health team	Mental health assessment and diagnosis of gender dysphoria by a qualified mental health professional
	Psychological stability
Hormone prescriber (commonly endocrinologist or general practitioner)	Hormone therapy for a minimum of 6 months
Surgeon	Assessment of the patient's understanding of the surgical process, risks and realistic expectations

Table 4. Female-to-male: Operations and techniques available, and the benefits and risks

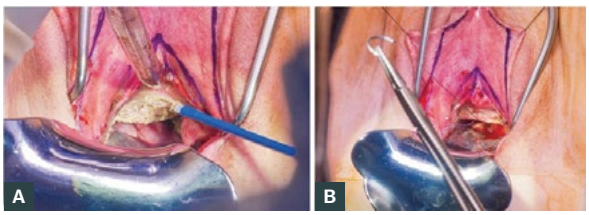
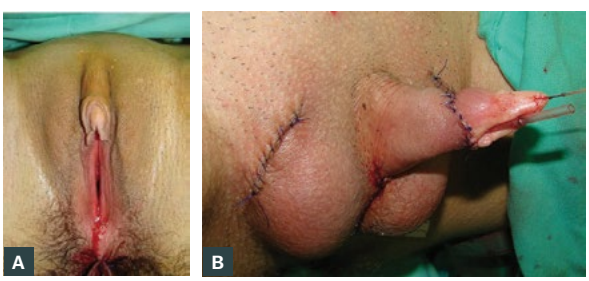
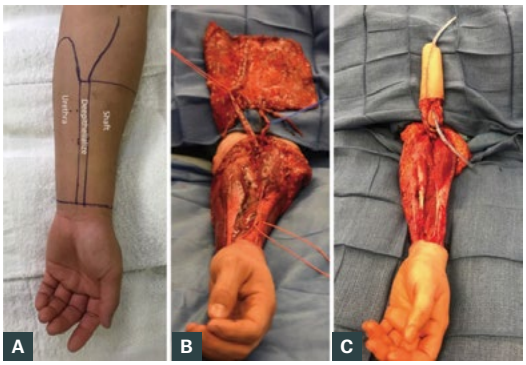
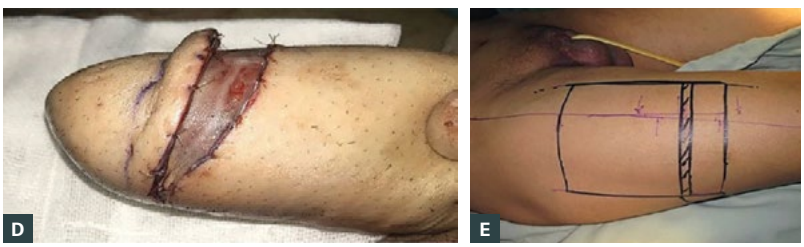
Operation	Surgical technique	Benefits	Risks
Hysterectomy +/– salpingo-oophorectomy	Hysterectomy +/– salpingo-oophorectomy involves the removal of the uterus +/– fallopian tubes and ovaries. It can be performed trans-vaginally, trans-abdominally, laparoscopically, and robotically	• Gender affirmation/ reduction of dysphoria • Lowered uterine and cervical cancer risk If oophorectomy: • Cessation of menstruation • Decreased need for hormones • Lowered ovarian cancer risk	• Surgical complications (infection, bleeding, vault dehiscence, adhesions) • Urinary and bowel issues • Infertility regret If oophorectomy: • Hormonal changes (early menopause) • Osteoporosis or osteopaenia • Cardiovascular risks
Vaginectomy	This procedure involves the surgical removal or closure of the vaginal canal. Vaginectomy is often performed in conjunction with other gender affirmation procedures, such as phalloplasty or metoidioplasty, depending on the patient's surgical plan  (**A**) After distal sharp mucosal excision, the remainder of the vaginal mucosa is fulgurated; (**B**) Colpocleisis is carried out with a thick polydioxanone suture[A]  Vascular de-epithelialised flaps from the labia minora tissue not used for urethroplasty are preserved for coverage of the pars fixa urethral suture line[A]	• Gender affirmation/ reduction of dysphoria	• Surgical complications (infection, bleeding, sinus formation, rectal injury, bladder injury, small bowel injury)
Metoidioplasty[16]	 (**A**) Preoperative appearance with a hormonally enlarged clitoris[B] (**B**) Appearance after metoidioplasty. Two testicle implants are inserted into the scrotum created from the joined labia majora[B]	• Gender affirmation / reduction of dysphoria • Reduced scarring compared to phalloplasty • Preservation of clitoral sensation • Personalised approach to gender affirmation	• Relatively smaller neophallus size compared to phalloplasty • Infection • Nerve damage • Inability to perform penetrative intercourse

Table continued on the next page

Table 4. Female-to-male: Operations and techniques available, and the benefits and risks (cont'd)

Operation	Surgical technique	Benefits	Risks
Phalloplasty	**Abdominal flap phalloplasty**[17] In this approach, tissue from the lower abdomen, often including the musculocutaneous rectus abdominis flap, is used to build the neophallus **Radial forearm**[17] In this technique, a segment of the patient's forearm, including the radial artery and the skin from the underside (**A**), is used to create the neophallus. The radial forearm flap provides excellent vascularisation, allowing for good blood supply (**B**). Nerves and blood vessels are microsurgically connected to maintain sensation and vascularisation  Example of a tube within a tube flap design in the radial free flap with (**A**) arm markings; (**B**) dissected flap; and (**C**) a tube within a tube around the catheter[C]  (**D**) Postoperative result after second stage – 'glans sculpting'[D] **Anterolateral thigh**[17] This method uses tissue from the thigh, particularly the anterolateral thigh, to construct the neophallus (**E**) Leg markings for the anterolateral thigh flap without urethra creation[E]	• Gender affirmation with improved mental health, enhanced body confidence • Aesthetic outcome • Functional benefits • Increased freedom of gender presentation through clothing choices • Improved confidence in intimate relationships • Ability to engage in penetrative intercourse	**Infection:** surgical site infections can occur, necessitating proper wound care, antibiotics and monitoring **Urethral complications:** issues with urethral fistulas or strictures might arise, requiring surgical correction **Vascular complications:** blood flow problems can lead to partial or total flap failure, emphasising the importance of maintaining optimal circulation **Sensation issues:** changes in sensation, particularly around the neophallus, are possible due to nerve manipulation **Penile prosthesis complications:** higher incidence of implant infections or erosion compared to cis-population; higher incidence of 'visible' changes in the phallus related to cylinder position **Scrotal and perineal issues:** skin loss, scarring with reduced size and capacity for implant.

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[D]Reproduced from Akhoondinasab MR, Saboury M, Shafaeei Y, Forghani S, Fatemi MJ. The comparison of a new durable coronaplasty technique with Norfolk method for glans reconstruction after phalloplasty. World J Plast Surg 2020;9(1), with permission from the Iran Society of Plastic, Reconstructive and Aesthetic Surgeons.

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pain management, dilation exercises and maintaining surgical site hygiene. Potential complications include infection, bleeding, rectal or bladder injury, loss of sensation and neovaginal stenosis or loss of depth. Vaginoplasty can be an important step in the gender affirmation process, aligning physical appearance with a patient's gender identity. Pre- and postoperative care is essential to minimise complications and ensure successful outcomes.

Conclusion

Gender affirmation surgery is likely to have an increasingly important role in the management of gender dysphoria. It is important for primary care physicians and surgeons to understand available options for gender affirmation surgeries in Australia, as well as referral processes in order to optimise timely patient care.

Key points

- Gender affirmation surgeries are important for improving quality of life of transgender and non-binary individuals.
- General practitioners have an important role in transgender medicine, including capacity assessment, initiating hormone treatments and understanding optimal timing for referral to gender surgeons.
- Multidisciplinary, collaborative care between surgeons, general practitioners and other healthcare providers is vital for timely patient care.
- Continued research and education are necessary to provide optimal care to this often, under-serviced patient population.

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Table 5. Male-to-female: Operations and techniques available, and the benefits and risks

Operation	Surgical technique	Benefits	Risks
Orchidectomy (bilateral)	Bilateral orchidectomy involves the removal of both testicles	• Surgical castration, which reduces oestrogen requirements and eliminates need for hormone-blocking medication • Gender affirmation and reduction of dysphoria	• Non-reversible • Osteoporosis
Vaginoplasty	Vaginoplasty[1,21] aims to create a functional neovagina through penile inversion or non-penile inversion techniques Penile inversion vaginoplasty uses a superiorly placed penile skin flap with a scrotal skin graft to line the neovagina. The urethra might also be included in the formation of the neovagina Skin is marked with penile and scrotal skin graft used for the penile inversion vaginoplasty. A posteriorly based perineal flap is created. A midline incision is made on the posterior aspect of the inverted penile skin flap with the perineal flap subsequently advanced into the posterior fourchette. The glans is rearranged to construct the neoclitoris. The neurovascular pedicle of the neoclitoris is folded gently on itself with the clitoral hood formed by folding the prepuce skin  Photographic demonstration of the simplified steps involved in vaginoplasty.[A] (**A**) Pre-first stage vaginoplasty. (**B**) Post second stage vaginoplasty	• Gender affirmation with improved mental health and enhanced body confidence • Improved sexual function • Stress-free clothing choices • A wider range of intimate experiences	• Infection • Bleeding • Loss of sensation • Neovaginal stenosis or loss of depth • Rectal or bladder injury

[A]Reproduced from Pariser JJ, Kim N. Transgender vaginoplasty: Techniques and outcomes. Transl Androl Urol 2019;8(3), with permission from AME Publishing Company.

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