Gender Affirming Surgery

Phalloplasty

A summary for health care providers

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This summary provides information to facilitate the discussion of gender affirming surgery between Ontario health care providers and patients. It is not exhaustive and does not replace the informed consent process between surgeon and patient.

DESCRIPTION

Phalloplasty refers to the creation of a phallus (aka penis) using tissue, such as skin, fat, nerves, veins and arteries, sourced from elsewhere on the body and attaching it to the pubic area.

In addition to the phallus formation, this surgery may comprise multiple procedures depending on one's goals and surgeon requirements including:

- **Total hysterectomy +/- bilateral salpingo-oophorectomy (BSO)**
- **Vaginectomy**: removal of the vagina (colpectomy) and closing of the vaginal opening (colpocleisis)
- **Urethral lengthening**: creation of a urethra that travels through the phallus that connects with the natal urethra
- **Burying the clitoris**: the clitoris is moved into the base of the phallus
- **Glansplasty**: creation of the glans penis by sculpting head of phallus
- **Monsplasty**: removal of prominent prepubic tissue
- **Scrotoplasty/perineal reconstruction**: creation of a scrotum
- **Implants**:
  - **Testicular implants**: inserted into the new scrotal tissue as testicular prosthesis
  - **Erectile device**: insertion of a device into the phallus for erectile function

INTENDED RESULTS

- Align anatomy with gender identity
- Reduction in gender dysphoria and/or gender incongruence
- Improve mental health and well being
- To have a penis and scrotum
- Maintain erogenous sensation and the ability to have an orgasm

Depending on the type of procedures:

- A phallus with sexual sensation
- Ability to have insertive sex
- To allow standing urination

ALTERNATIVE TREATMENT OPTIONS

- "Packing" (use of padding or phallic object in pants/ underwear)
- Devices that aid voiding while standing
- Devices that allow for insertive sex with a partner
- Use of testosterone to develop clitoromegaly (enlargement of the clitoris)
- Metoidioplasty and the various options of the different procedures involved

SIDE EFFECTS

- **Irreversible**
- **Impacts on fertility:** if hysterectomy is done, one will be unable to carry embryo; if BSO is done, one will no longer have eggs for fertility

SURGICAL TECHNIQUES AND OPTIONS

Surgical techniques vary by surgeon.

The two main factors that differentiate between the surgical techniques are where the tissue for the phallus is obtained and how the shaft of the phallus is created.

Construction of the shaft options

- Shaft only
  Only an outer tube is created, and the urethra remains in the original position. This option does not allow one to void standing up. Vaginectomy and scrotoplasty are possible.
- Shaft with urethra
  One piece of tissue forms two tubes, or a 'tube within a tube'. One has skin on the outside for the shaft of the phallus and one has skin on the inside for the urethra.

Donor site options

There are two common donor sites because of their reliable blood supply and increased chance for sensation:

- Radial Forearm Free (RFF) Flap:
  Skin, blood vessels and nerves from the forearm are used to make the phallus.
- Anterior Lateral Thigh (ALT) Flap:
  Skin, blood vessels and nerves from the side of the thigh are used to make the phallus. When possible, the blood supply is left attached (pedicled flap) and only the nerves are cut and reconnected.

Alternative donor sites

- Abdominal flap lower abdominal skin is used for a shaft-only phalloplasty. This technique doesn't involve nerve connections and sensation can be limited. It does not allow one to urinate while standing.
- Musculocutaneous latissimus dorsi (MCL) Free Flap: tissue including skin, fat, muscle, veins and arteries are taken from the side of the torso (under the armpit).

There are three general steps to phalloplasty:

1. **Preparation:** Hysterectomy and hair removal
2. **Phallus creation** +/- urethral lengthening
3. Erectile and testicular **implants**

It is important to note that this does not mean only three surgeries. There may be more surgeries involved depending on how the procedure is staged and if there are complications. This can take two to three years or more from start to completion.

The first step involves procedures that need completing prior to the second step. Most surgeons will ask that **a total hysterectomy** be performed prior to initial phalloplasty surgery. This is an important consideration if vaginectomy and/or urethral lengthening are desired. If creating a urethra from hair bearing skin, one requires **permanent hair removal** which can take up to a year.

The second step involves the primary construction of the phallus. In this step the phallus is created from the removal of a flap of tissue from elsewhere on the body, including skin, fat, nerve, vein and artery, and attaching it to the pubic area. A skin graft, or the use of artificial skin, will be used to cover the phallus donor site. Microsurgery is performed to attach the blood vessels and nerves from the neophallus to the genital blood vessels and nerves. If undergoing urethral lengthening, a urethra is created within the phallus in a 'tube within a tube' approach. Additionally, vaginectomy, glansplasty, scrotoplasty, perineum reconstruction and burying of the clitoris may take place. If undergoing phalloplasty with urethral lengthening (where urethra is extended to the end of the phallus), vaginectomy is usually required due to the increased risk for urethral vaginal fistula (requiring additional surgical procedures with uncertain results). If undergoing phalloplasty without urethral lengthening, vaginectomy is not a requirement.

This second step can occur in a single or two stage approach (one or two surgeries) and will depend on the construction of the urethra, if undergoing urethral lengthening. The lengthened urethra contains three discrete regions: the native urethra (the urethra that was already there and stays in place), the penile urethra that extends throughout the phallus, and then there is a region that connects these two regions called the 'fixed urethra.'

In a single stage approach, all of the urethra is constructed and connected so that at the end of the surgery one can stand to void.

A two-stage approach involves three common methods:

1. Everything that is done in a single stage is completed but the penile urethra and the fixed urethra are not connected. This will be done in a second surgery, usually several months later.
2. The first surgery will only be to create the phallus and penile urethra. A second surgery will include vaginectomy, glansplasty, scrotoplasty, perineum reconstruction, burying of the clitoris and the urethra is connected.
3. The first surgery is essentially a metoidioplasty (see metoidioplasty sheet) including vaginectomy, scrotoplasty, perineum reconstruction, and urethral lengthening. The second surgery will create the phallus with the penile urethra, connecting it to the previously elongated urethra of the metoidioplasty and burying the clitoris at the base of the phallus.

The third step includes the insertion of testicular implants in the scrotum and erectile implants in the phallus that will allow for insertive sex. There are different types of implants including ridged, malleable and inflatable.

SURGICAL RISKS AND COMPLICATIONS OF PHALLOPLASTY

URINARY/URETHRAL COMPLICATIONS

Urethral complications are very common if urethral lengthening to the end of phallus is undertaken. Surgical revision may be required, and one should prepare for this possibility.

- **Urethral fistulas**: these result in an unwanted leak between the urethra and the skin (urethra-cutaneous) or vagina (urethra-vaginal)
- **Urethral strictures**: a narrowing of the urethra at any site within the phallus making it difficult or impossible to urinate
- **Bladder spasms** may occur if a catheter is placed to empty the bladder to manage a complication (i.e. Stricture)
- **Urethral meatal stenosis**: narrowing of the end of the urethra (urethral opening)
- **Urethral diverticula**: a pocket or pouch that forms along the urethra and can cause urine to pool leading to incontinence
- **Lower urinary tract symptoms**: post-void dribble, urinary spray, UTIs, poor flow, incomplete emptying
- **Hair growth in urethra**: may cause UTI, stenosis, stricture, obstructive symptoms, intra-urethral stones
- Urine may need to be manually expressed after voiding to completely empty the urethra of urine. This is done by applying pressure along the phallus, or at the bottom of the scrotum and this can be permanent.

OTHER COMPLICATIONS

- **Donor site**: large permanent scar, numbness, stiffness, swelling, weakness, decreased flexibility, pain and general morbidity to the donor site, possibly extending to other parts of the limb (i.e. hand)
- **Scarring**: to donor site, genital region. Location of scars vary by surgical technique (i.e. large scar on forearm from forearm flap phalloplasty). Scarring may be extensive, hypertrophic, hyper/hypopigmented or other non-desirable aesthetic
- **Skin graft loss**: when all or part of skin used to cover the flap donor site (forearm or thigh) dies
- **Flap loss/graft failure**: when all or part of the flap (phallus) dies, typically because of poor blood flow or infection.
- **Nerve damage** and loss of sensation of neophallus
- **Decreased sexual satisfaction**, erogenous sensation and inability to orgasm
- **Dissatisfaction with appearance** and/or function of genitals (size, shape, function of penis, scrotum)
- **Injury to bladder or rectum** (recto-perineal fistulas: rectum to skin)
- **Wound breakdown**, delayed healing, hypergranulation and other complications of skin healing. Commonly affected areas include the base of phallus and perineal-scrotal junction.
- **Testicular implant complications:** infection, extrusion, poor positioning, pain, limitations in function that can be chronic without surgical removal
- **Erectile device complications**: infection, skin erosion, technical failure, leakage, poor positioning, pain
- **Perineal pit:** the area above the anus can form a small pit that can have hygiene implications
- **Vaginal remnant or mucocele**: vaginal tissue may be left behind after vaginectomy and a collection of fluid and cells in your pelvis may result. If it is connected to the urethra, it may cause substantial post-void dribbling/incontinence. This may require surgical revision to remove the tissue.
- **Negative mental health impacts of surgery**: Despite positive impacts to quality of life and mental health in the long term, it is not surprising that some patients may have challenges in the shorter term.

POTENTIAL RISKS/COMPLICATIONS COMMON TO MOST SURGERIES

Risks are increased with smoking, immunosuppressant drugs, clotting disorders, conditions that impair healing, BMI <18.5 or >30

General Surgical Risks

- Bleeding, if excessive may require blood transfusion
- Deep Vein Thrombosis, Pulmonary Embolism (blood clots in legs, lungs)
- Injury to surrounding anatomical structures (organs, nerves, blood vessels)
- Hematoma (collection of blood)/seroma (collection of fluid)
- Infection/abscess (collection of pus)
- Wound dehiscence (wound opening), delayed healing
- Nerve damage, loss of sensation, hypersensitivity, neuropathic (nerve) pain
- Chronic pain
- Scarring (can be prominent especially if history of keloid)
- Dissatisfaction with appearance/function
- Need for revision(s)
- Post-operative regret

General Anesthetic Risks

- Respiratory failure
- Cardiac failure/arrest
- Death
- Damaged teeth
- Aspiration pneumonia
- Nausea/vomiting

REVISION SURGERY

Phalloplasty is a complex, multi-staged, demanding set of surgeries and there is a high risk of complications. Additional surgeries, or 'revisions' are fairly common. This can include any aspect of the surgery including the phallus, scrotum, urethra, donor site or implants. Common complications for revision surgery include:

Strictures after urethral lengthening. Fixing a stricture may include:

- A suprapubic catheter, a catheter (tube) inserted from the lower abdomen into your bladder
- A urethral catheter, a catheter (tube) inserted from the urethra to the bladder
- Cutting out a short segment of the urethra and closing it directly
- Urethral dilations

If the stricture is long, a two-stage repair may be required:

- First stage: Donor tissue (i.e. tissue from inside your mouth) is used to create a new section of the urethra, which is left open, and you will urinate sitting down.
- Second stage: The area is then closed over a catheter. A suprapubic catheter will drain the bladder until the catheter is removed and urinating out of the phallus is once again possible.

Fistulas: if requiring surgical management, may involve a small outpatient procedure or a more involved procedure depending on the cause. Fistulas caused by strictures will need a stricture repair for the fistula not to reoccur. Generally, surgical repair involves removing the unwanted tract and applying new tissue over the area. A catheter, suprapubic or urethral, will likely be placed.

Implant infection usually requires implant removal and replacement at another time.

PRE-OPERATIVE CARE

PRE-SURGICAL CONSIDERATIONS

Ensure careful exploration of one's goals including the importance of the following:

- The appearance of the phallus
- Tactile or erogenous sensation
- Being able to stand to void
- The ability to have insertive sex
- Acceptability of donor site
- Removing the vaginal canal
- Fertility preservation
- Acceptability of risk and complications

- Consider working through pre-surgical journey pages available on Provincial Health Service Authority Trans Care BC website
- Consider referral to the Sherbourne Health's Acute Respite Care (ARC) Program for post-operative care if socially isolated, under-housed or homeless
- Phalloplasty can be a very demanding surgery with a long recovery and several possible complications.
- If undergoing vaginectomy, totally hysterectomy (with or without BSO) is required prior to phalloplasty
- Surgical sites that use hair-bearing skin for the urethra formation requires meticulous permanent hair removal (electrolysis or possibly laser) from the donor site to be completed at least 3 months prior to phalloplasty
- Perineal electrolysis may also be requested between stages, if perineal tissue is used in the urethral extension
- Preparing for surgery should include optimizing one's health. This includes all aspects of health including physical, mental, spiritual and social
- **Smoking cessation** is particularly important in phalloplasty (due to blood vessel grafts and risk of graft failure). Typical recommended time frame for smoking cessation (including cannabis) is six months pre-op and six months post-op
- Follow surgeon's advice on time periods to avoid smoking, alcohol & other substances
- Phalloplasty takes multiple surgeries over a period of one-two years or longer, depending on the recovery time between surgeries
- Weight, at the higher or lower ends of the spectrum, can significantly influence surgical options and contribute to both surgical and post-surgical complications. Concurrently, weight stigma is a prevalent issue. Discussions about the repercussions of weight are essential. While BMI is an imperfect index for measuring fat and tissue perfusion, it can be correlated with skin thickness, affect phallus size and overall surgical outcomes. Prior to surgery, a thorough physical examination is crucial for assessing the surgical options.
- Presurgical imaging such as ultrasound or CT of the donor site may be advised
- Allen testing may be required for radial forearm flap phalloplasty to evaluate blood perfusion

PRE-SURGICAL CONSIDERATIONS, CONTINUED

TRAVEL

Expect three to five trips to the surgical centre and consider travel costs (not covered by OHIP) and travel burden. Each surgical centre will have their own specific advice on hospital length of stay and returning home. Note: hysterectomy and hair removal can be completed in Ontario

1. **Pre-operative consultation (outpatient)**. Most surgical centers will require an in-person consultation prior to booking phalloplasty to ensure adequacy of donor site.
2. **The primary phalloplasty surgery**. This typically requires 5-7 days in hospital +/- 5 days in a recovery center. Surgical centres may ask you to stay close by for the first 3-6 weeks. If this step is a two staged procedure, there will be another surgery scheduled to complete the urethral surgery. This is typically one night in hospital and another week close by.
3. **Insertion of penile and testicular implants**. This step requires one night hospital stay. One can usually return home soon after.

ANESTHESIA WILL DISCUSS:

- Which medications to stop and when
- Anesthetic approach and risks
- Pain control measures

Hospitals tend to have standard pre-operative processes which may include:

- Pre-admission visit to review health history and provide teaching (pre/post-op care)
- Anesthesia and/or medicine consult may be required, depending on health history

IMMEDIATE POST-OPERATIVE CARE

- A period of bedrest frequently accompanies immediate post-operative recovery
- A small amount of urine leakage from the end of the phallus urethra can occur at this stage
- If there is a catheter in place, symptoms associated with this can occur (i.e. bladder spasms and hematuria).
- Follow surgeon's instructions for
  - positioning of the neophallus
  - suture removal/ dressings
  - physiotherapy instructions for leg and arm exercises

Some general guidelines and timeframes include:

- Avoid driving for two weeks or longer, until safely able to move arms to drive
- Avoid any water submersion (i.e. bath, pools, hot tubs) until wounds are fully healed
- Caution should be used around application of ice as it can compromise blood flow. Follow the surgeon's advice.
- Avoid straining and heavy lifting for six weeks
- Avoid strenuous activity for 12 weeks
- Reduce activities and book time off work for 8-12 weeks (or longer depending on type of work)
- Timelines for recovery vary by surgical stage and procedure. Creation of the phallus, urethra and healing of donor site tend to require the longest recovery period. Testicular implants and erectile device insertion will have shorter recovery times

INTERMEDIATE POST-OPERATIVE CARE

- Follow surgeon's recommendations on restrictions to activities
- Some general guidelines include:
  - Have a support person during the post-op period to assist with ADLs, IADLs (cleaning, laundry, groceries)
  - Avoid driving for one week or longer, until safely able to move arms to drive
  - Avoid straining, lifting heavy objects (max 10 lbs), and exercise for four weeks
  - Reduce activities and take time off work for one week or longer (depending on type of work)
  - Gradual return to daily activities over 4-6 weeks

LONG-TERM MEDICAL CARE

- Once forearm wound is completely healed, a compression sleeve can be worn to reduce scarring
- Swelling is normal for at least four to six months, and will slowly resolve over time
- Avoid exposing scars to sunlight for one year post-op, this will minimize colour changes in the scar
- No tattooing the donor arm for minimum one year post-operatively
- Smoking cessation and limiting caffeine are important to promote blood flow and support good long-term health of the anatomy

Ongoing Care Instructions For The Provider

- Complications following phalloplasty can occur at any time after surgery. For example, strictures typically present later in the post-operative course (6-36 months).
- Preparing for complications is an important part of pre-surgical planning. Integrate a local urology team into the patient's care early if possible.
- Obstructive voiding symptoms should trigger a high suspicion for urethral stricture. Symptoms can include: decreased force of stream, dribbling, urinary retention, dysuria, frequency and urgency. Initial evaluation should include a comprehensive history and a clinical examination
- Urinary tract infections (UTI) should be treated as complicated UTI and with culture specific antibiotics
- With recurrent UTIs, consider upper tract ultrasound, post-void residual and/or cystoscopy
- Post-void residuals (i.e. Bladder ultrasounds) should be ordered if there is concern about urinary retention
- Retrograde urethrography or voiding cystourethrography can provide important information on the characteristics of a stricture or fistula. These are accessible through referral to urology.
- Arranging investigations locally, with collaboration and communication with the surgical team, can be highly valuable and supportive.

In Ontario, funding for revisions can be applied for through the Ministry of Health by completing the Prior Approval for Funding of Sex Reassignment Surgery form.

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DISCLAIMER

The information provided here is generalized and is not medical advice. It is recommended that all patients have a pre-operative consultation with their surgeon to receive individualized information including the specific surgeon's technique, complication rates and recommendations. This is a dynamic document that is subject to change, as the knowledge of gender affirming surgeries changes.

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