Ervin Kocjancic, MD (Department of Urology, University of Illinois at Chicago, USA)
Loren S. Schechter, MD, FACS (Plastic Surgery, Chicago, USA)

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<td>Introduction</td>
<td>Ervin Kocjancic</td>
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<td>14:05</td>
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<td>Loren Schechter</td>
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<td>Voiding dysfunction after phalloplasty surgery</td>
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<td>Vaginoplasty: what are the current available options</td>
<td>Loren Schechter</td>
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<td>All</td>
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**Speaker Powerpoint Slides**
Please note that where authorised by the speaker all PowerPoint slides presented at the workshop will be made available after the meeting via the ICS website [www.ics.org/2017/programme](http://www.ics.org/2017/programme). Please do not film or photograph the slides during the workshop as this is distracting for the speakers.

**Aims of Workshop**
The surgical care of individuals suffering from gender dysphoria has undergone rapid transformation over the last several years. While not all individuals with gender dysphoria need or desire surgery, many do. With an increased recognition as to the importance of surgical therapy, coupled with improved access to care, more individuals are seeking surgery.

Congruent genitalia allow an individual to experience harmony between their body and their self identity, appear nude in social situations without violating taboos (ie health clubs, physician offices, etc...), and have legal identification concordant with their physical appearance.

The World Professional Association for Transgender Health (WPATH) developed the The Standards of Care to help provide “the highest standards” of care for individuals. The Standards of Care state that the overarching treatment goal is “...lasting personal comfort with the gendered self, in order to maximize overall health, psychological well-being and self-fulfillment.” Toward this end, gender confirmation surgery helps to provide the appropriate physical morphology and alleviate the extreme psychological discomfort of the patient.

This course will cover the state-of-the-art in gender confirmation surgery. Topics covered will include the multi-disciplinary nature of care, The Standards of Care (WPATH, SOC, version 7) as well as the various genital surgical procedures. This will entail a description of the preoperative, intraoperative, and post-operative management of individuals undergoing both transfeminine and transmasculine surgical procedures. In addition, both prevention and management of complications will be addressed.

The transfeminine genital surgery lecture will include vaginoplasty, both penile inversion and intestinal vaginoplasty approaches will be discussed. This topic covers clitoroplasty, labiaplasty (for both labia majora and minora), urethroplasty, and dissection of the vaginal space.

The transmasculine procedures include metoidioplasty (lengthening of the hormonally hypertrophied clitoris) and phalloplasty (radial forearm and anterolateral thigh flap techniques). Within these lectures, construction of the perineal and penile urethra will be described, as well as scrotoplasty, glansplasty, and the staged placement of testicular implants and penile prostheses. Strategies to minimize and prevent complications will be reviewed. In addition, secondary procedures such as mons lift/reduction will also be discussed.

**Learning Objectives**
To inform about indications, surgical possibilities and limits of confirmation surgery in gender dysphoria (transsexualism) male to female and female to male. The delegates will familiarise with the possible voiding dysfunction commonly associated with the above mention procedures as well as sexual dysfunction.

**Learning Outcomes**
- Familiarise the current definitions of the WPATH
- Learn how to properly manage individuals with gender dysphoria
- Familiarise with the common surgical techniques used for the confirmation surgery
- Recognize and treat the frequent voiding dysfunction associated with the gender confirmation surgery

**Suggested Learning before Workshop Attendance**
www.wpath.org.

**Suggested Reading**

**Other Supporting Documents, Teaching Tools, Patient Education etc**
Affiliations to disclose:

AMS/Boston Scientific
Colopast
Allergan
Medtronic
Cogentix

*All disclosures must be made to the audience and audience members with any business organization with which you might have a financial relationship.

Funding for speaker to attend:

☐ Self-funded
☐ Institution (non-industry) funded
☐ Sponsored by:

**NEW FOR 2017**

Please complete the in-app evaluation in the workshop before leaving.

Gender Dysphoria

Gender dysphoria (GD; Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) is characterized by a marked discrepancy between one’s birth-assigned sex and one’s gender identity and expression and is associated with immense bodily and emotional distress.

Gender Nonconformity

Extent to which a person’s gender identity, role, or expression differs from cultural norms

Only some gender nonconforming people experience gender dysphoria at some point in their lives.

Gender Dysphoria

Discomfort or distress caused by a discrepancy between a person’s gender identity and their sex assigned at birth.
Long transitioning process

To facilitate this change, many patients seek surgery so that their bodies resemble their chosen gender.

Gender reassignment surgery refers to all surgical procedures that a patient wishes to receive to resemble the appearance of the opposite gender.

Sex reassignment surgery is part of gender reassignment surgery and refers only to the reconstruction of the genital area.

Currently, the guidelines on gender reassignment are published by the World Professional Association for Transgender Health (WPATH), and the standards of care are updated regularly and available for download from the WPATH website.
Vaginal Anatomy
For Urologist

ERVIN KOCJANCIC
Director of Pelvic Health and Reconstructive Urology
Department of Urology
University of Illinois at Chicago

Why anatomy?

• Familiarize with normal pelvic anatomy
• Understand the patho-physiology of pelvic surgery
• Select the most rational procedure

Pelvic organs
Pelvic floor
Perineum with Pudendal Canal Probe, Female

The Uro-Genital diaphragm

- Deep Transverse penireal muscle
- Superficial Transverse Periennal muscle
- Ischio cavernous muscle
- Bulbo-cavernous muscle
Pelvic floor

External muscles
The ischial spines are the narrowest part of the pelvis, are typically 11 cm apart.

Relevant Structures

Pubis
Sacrum
IS
Pudendal Nerve
Stay Medial

Levator ani nerve

N. Levator ani
Located 2 finger breadth Medial to the spine
Possible role in De novo anterior POP

“White Line” & Sacrospinous Ligament

Sacrospinous Ligament
Male Pelvic anatomy
Pubis
Rectum
Bundle
Sem
Vesc
Prostate
Pelvis
Plex.
N-V Bundle  ad apex Prostate
Bladder
neck
Membranous e Urethra
Bundle
Incision of Endopelvic Fascia
Cunéo e Veau (1899)

"The fascia described by Denonvilliers originates from the fusion of two peritoneal folds that delimitates the peritoneum – rectum-vescicl pouch in embryo.


TRIANGULAR FASCIA: That separates the seminal trigone and the prostate from the rectum.

Sup. Margin: recto vesical pouch

Inf. Margin: fasciae perinealis media

Albert Einstein

“There is nothing that is a more certain sign of insanity than to do the same thing over and over and expect the results to be different.”

Know your anatomy before start dealing with Pelvic Medicine!
Urethral lengthening

Dr. Kocjancic

Urethral reconstruction

Perineal exposure:
Vestibulum and vagina will form proximal urethra

Marking of membranous urethra & vaginal flap

Vaginectomy entails removal of epithelium with preservation of muscular layer

Vestibular incisions extend on to ventral clitoris
Elevation of vaginal flap & tubularization of vestibulum

Extension of incision on to ventral clitoris

Vestibulum remains attached dorsally to corporal bodies

Incision for clitoral degloving

Clitoris degloved

Vaginal flap reflected dorsally for construction of proximal urethra

Tubularization of vestibulum

Construction of membranous urethra
Membranous urethra constructed with vaginal flap and vestibulum

Clitoris de-epithelialized

Preparation of dorsal clitoral nerve - nerve harvested on ipsilateral side of forearm flap (contralateral to vascular anastomosis)

Relationship of clitoral nerve, urethra, and glans clitoris

Dr. Schechter

Perineal Markings
Urethral Complications & voiding dysfunctions

ERVIN KOCJANCIC
Lawrence S. Ross Professor Urology
Vice Chair of Department of Urology
Director of Pelvic Health and Reconstructive Urology
University of Illinois at Chicago

58% of patients with a newly constructed urethra develops fistulae and/or stricture

Location Fistulae
- Anastomosis phallic and bulbar urethra (majority)
- Between the bulbar and the female urethra

Location Stricture
- Anastomosis phallic and bulbar urethra (majority)
- Between the bulbar and the female urethra

Urethral Fistulae
- Suprapubic abdominal flaps: 55% fistula rate
- Local Flaps: 15 – 22% fistula rate
- Pedicled flaps (ALTF): < 10%

Typical location: Junction of the neo-urethra and Native Urethra

Indian Journal of Plastic Surgery

Phalloplasty: The dream and the reality
Mamoon Rashid and Muhammad Sarmad Tanmiry

58% of patients with a newly constructed urethra develops fistulae and/or stricture
Urethral Stricture

- Suprapubic abdominal flap 64%
- RFFF 31%
- Mean stricture length 3.5cm
- Stricture location:
  - Anastomosis (most common)
  - Meatus
  - Multiple sites
  - Phallic urethra

1986 – 2002:
56 phalloplasty with Radial forearm
Tube in tube distally; tabularized vaginal urethral lengthening prox.
68% received an IPP
1 Plastic surgeon 1 Urologist

Conclusion ...

- Urethroplasty plays a major role in overall morbidity ...
- Half of late complications were urethral strictures and urinary fistulae
- Most common area of urethral complications at the distal anastomosis
- Perineal urethrostomy recommended
Urethral Stricture

- Suprapubic abdominal flap: 64%
- RFFF: 31%
- Mean stricture length: 3.5 cm
- Stricture location:
  - Anastomosis (most common)
  - Meatus
  - Multiple sites
  - Phallic urethra

Stricture recurrence rate after various treatment is up to 61.9%


Fasciocutaneous flap reinforcement of ventral onlay buccal mucosa grafts enables neophallus revision urethroplasty

Stelios C. Wilson*, John T. Stranix*, Kiranpreet Khurana, Shane D. Morrison, Jamie P. Levine and Lee C. Zhao

Urethral Reconstruction

Single or staged approach

I. Pendulous urethra
   Prelamination
   Prefabrication
   Tube – in Tube
   Separate flaps

II. Fixed urethra:
   Local Vagina
   Labial flap

100% success rate in 3 patients at 13 months follow up

therapeutic advances in urology
conclusions ...

- Urethral reconstruction remains a great challenge...
- Buccal mucosa graft and labia minora flap appears to provide advantages
- Permanent follow-up is necessary as urethral complications can occur many months or years post.op

The role of colpocleisis with urethral lengthening in transsexual phalloplasty

Ralph R. Chesser, MD, David A. Gilbert, MD, Gerald H. Jesdansky, MD, Steven M. Schlesinger, MD, Gerald T. Ramsey, PhD, and Deborah M. Gilbert, RN

- Extension of the urethra to the clitoris using vaginal mucosa reduces greatly the risk of Urethral Fistula formation
- Colpocleisis offers a great vascular support for the anastomosis site
- Performed as a stage procedure
Vestibular neo-urethra

Perineal exposure:
Vestibulum and vagina will form proximal urethra

Vestibular neo-urethra

Marking of membranous urethra & vaginal flap

Vestibular neo-urethra

Vaginectomy entails removal of epithelium with preservation of muscular layer

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Tubularization of vestibulum

Vestibular neo-urethra

Construction of membranous urethra

Vestibular neo-urethra

Relationship of clitoral nerve, urethra, and glans clitoris

Vaginal flap
Vaginal flap

Construction of membranous urethra & clitoral fixation

Scrotum Closure

Surgery for Urethral Stricture Disease after Radial Forearm Flap Phalloplasty – Management Options in Gender Confirmation Surgery

Neha R. Malhotra, Nikita Abhyankar, Valerio Iacovelli, Loren Schechter, Ervin Kocjancic

Introduction
- Increasing requests for phalloplasty
- Urethral complications are not uncommon, including stricture or fistula
- Ongoing need for assessment of techniques and outcomes

Study design: Retrospective cohort study of urethral complications following radial forearm flap phalloplasty
- Two institutions
- January 2015 to July 2016
- Multidisciplinary team: Plastic Surgeon and Reconstructive Urologist

Methods

Results
- Urethral reconstruction may require additional procedures
- Results suggest traditional techniques are viable treatment options
- Single versus two stage urethroplasty with buccal mucosa may be helpful in the management of urethral strictures and fistulas after phalloplasty

Figure 1. Native urethral stricture identified

Figure 2. Buccal mucosa on-lay graft

Figure 3. Distribution of urethroplasties by type
- Options for urethroplasty
- One or two staged
- With or without buccal mucosa
- Three month follow-up
- Three recurrent strictures (37.5%)
  - 2 treated with laser incision
  - 1 repeat urethroplasty
Table 1. Location of Urethral Stricture

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Native Urethra-Neourethral Anastomosis</td>
<td>6 (75%)</td>
</tr>
<tr>
<td>Neourethra only</td>
<td>2 (25%)</td>
</tr>
<tr>
<td>Inflammatory Polyp</td>
<td>1 (12.5%)</td>
</tr>
<tr>
<td>Hair bearing</td>
<td>1 (12.5%)</td>
</tr>
</tbody>
</table>

- Dorsal Buccal mucosa graft

- Ventral buccal mucosa graft, & layered closure

- Fistula repair

- Repair of
Harvest & placement of buccal mucosa

Insert of buccal mucosa

Repair of urethral stricture/fistula with buccal mucosa

Urethral fistula/meatal stenosis

Buccal mucosa graft
Conclusion

• Urethral reconstruction may require additional procedures

• Results suggest traditional techniques are viable treatment options

• Single and two stage urethroplasty with buccal mucosa are both viable options in the management of urethral strictures and fistulas after phalloplasty
The Multi-Disciplinary Nature of Care & The Standards of Care

**WPATH Vision Statement**

Respect, dignity, and equality for transgender, transsexual, and gender variant people in all cultural settings.

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**WPATH GEI Programs**

Increase access to competent and compassionate care for transsexual, transgender, and gender nonconforming people worldwide.

*World Professional Association for Transgender Health (WPATH) Global Education Initiative (GEI) certified course*

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**Gender Dysphoria:** Varying degrees of dissatisfaction with anatomic gender & desire to possess secondary sexual characteristics of opposite sex.

**Goal of Therapy:** Lasting personal comfort with gendered self in order to maximize psychological well-being & self-fulfillment.

*Radial forearm phalloplasty*

The Standards of Care for Gender Identity Disorders, Seventh Version, WPATH
Gender confirmation surgery provides appropriate physical morphology & alleviates extreme psychological discomfort

"adjusting the mind to the body" is not an effective treatment
(Meyer, et. al 2001)

"adjusting the body to the mind" is the best way to assist severely gender dysphoric persons
(Cohen-Kettenis 1984)

Congruent Genitalia

- Experience harmony between body & self-identity
- Allow individual to appear nude without violating social taboos (health club, physician office, etc…)
- Legal identification (passport)

Transgender is not a diagnosis

The distress of gender dysphoria might be diagnosable and for which treatments are available

Gender dysphoria can be alleviated through treatment (hormonal, psychotherapy, & surgery): many individuals find a gender role & expression comfortable for them (even if different from sex assigned at birth or prevailing norms & may or may not require body modification)

The Endocrine Society Clinical Guidelines: 2009
Transsexual persons seeking to develop the physical characteristics of the desired gender require a safe, effective hormone regimen

American Psychiatric Association: 2012
The manual will diagnose transgender people with "Gender Dysphoria" which communicates the emotional distress that can result from "a marked incongruence between one's experienced/expressed gender and assigned gender." This will allow for affirmative treatment and transition care without the stigma of disorder

World Health Organization: 2014
Eliminating forced, coercive, and other involuntary sterilization across the globe. This specifically includes any requirement that transgender people undergo any surgeries that might impact their reproductive ability in order to have their gender identity recognized

American Medical Association: 2014
Transgender people shouldn't have to have surgery to change their birth certificates

Standards of Care for the Health of Transsexual, Transgender, and Gender Nonconforming People, Version 7

- Intended to provide flexible direction for the treatment of transgender individuals
- Individual centers may vary (hormonal therapy & realistic test)
- Not intended as barrier to surgery...identify patients who would benefit from surgery

First version published in 1979
Beginning version 8

SOC v Informed Consent Model

Emphasis on role of mental health professionals in alleviating dysphoria and facilitating change in gender role

Versus
Focus on obtaining informed consent as the threshold
Language (EPATH)

- Avoid language which has the intention (or likely effect) of stigmatizing or pathologizing gender and bodily diversity
  - Stigmatizing and pathologizing language (i.e., “disordered” or “abnormal”) should be avoided
  - Use affirmative language (i.e., “gender and bodily diversity”)
  - Use “cisgender”

Referral for Surgery

- Patient’s personal and treatment history
- Progress
- Eligibility
  - Legal age of majority
  - Ability to make informed decision & provide informed consent
- Two referrals who provide independent assessment
  - One referral for chest/breast surgery
  - No letter for other surgical procedures (i.e., face)

Spectrum of Care

- SRS: Sex reassignment surgery
- GCS: Gender confirmation/affirmation surgery

MtF (transfeminine)
- Vaginoplasty
- FFS (facial feminization)
  - Brow lift (hair advancement), frontal bone reduction (burring v. osteoplastic +/- onlay graft), mandible reduction (angle and/or chin), rhinoplasty, malar implant, lip shortening and/or augmentation, hair transplantation
- Tracheal shave (thyroid chondroplasty)
- Breast augmentation
- Body contouring
  - Liposuction, lipofilling

FtM (transmasculine)
- Phalloplasty: with or without urethral lengthening, includes scrotoplasty, staged placement of testicular implants & penile prosthetics
  - Radial forearm, ALT, MLD
- Metoidioplasty: with or without urethral lengthening, includes scrotoplasty, staged placement of testicular implants
- Chest Surgery: subcutaneous mastectomy with chest contouring
  - Double incision v. short scar
  - Body Contouring
    - Pectoral implants
    - Facial Masculinization
      - Thyroid cartilage, forehead, nose, chin
Surgical Goals

- Successful cosmetic & functional result with minimal complications
- A technically proficient surgical procedure is only one determinant in the overall therapeutic process

Single-stage vaginoplasty: penile disassembly & inversion with limited scrotoperineal flap, urethral flap, & clitoroplasty

Radial forearm phalloplasty, scrotoplasty, glansplasty, vaginectomy, urethral lengthening, & Mons resection & vaginectomy

Metadoplasty with testicular implants and vaginectomy

History

December 1, 1952 New York Daily News
"Ex-GI Becomes Blonde Beauty"
In Denmark, Christine Jorgensen had become the recipient of the first sex change

Harry Benjamin, MD
The Transsexual Phenomenon. 1966

Dr. Renee Richards
1975: "SRS"

1976: Denied entry into US Open by USTA

1977: New York Supreme Court ruled in her favor

1977 US Open: Lost in doubles finals to Martina Navratilova
Gold medal: Decathlon 1976 Olympic Games, Montreal, Canada

Chicago, November 12, 2015

History of Phalloplasty:
1936: Bogoraz (Russia): tubed abdominal flap & rib cartilage (no urethra)
1946: Sir Harold Gilles
Father of modern plastic surgery
Laurence Michael Dillon
13 surgeries: tubed abdominal flap
1980's: Chang/Hwang: radial forearm tube-within-a-tube
Single stage reconstruction with vascularized urethra

Male
Masculinization: androgens produced by fetal testes

Female
Feminization: absence of androgens

Indifferent stage: 4th week
Distinguishing characteristics: 9th week
Differentiation complete: 12th week

Abnormally small phallus: 2 std deviations below mean
< 6 cm flaccid
< 9.5 cm on stretch

Microphallus: 2.5 std deviations below mean
< 5.2 cm flaccid
< 8.5 cm on stretch

Maximum growth of penis between 12-16 yrs

Perineal hypospadias and cryptorchidism

Radial forearm phalloplasty
Metoidioplasty

Staging Approaches
- **Single stage**: mastectomy, hysterectomy/oophorectomy, vaginectomy, phalloplasty
- **Two-Stage**:
  a) Mastectomy & hysterectomy/oophorectomy
  b) Vaginectomy & phalloplasty
  Or
  a) Mastectomy
  b) Hysterectomy/oophorectomy + vaginectomy & phalloplasty
- **Three-stage**:
  - Mastectomy
  - Hysterectomy/oophorectomy
  - Vaginectomy & phalloplasty

*most common approach
-nature of referrals
-scheduling/coordination

Non-Genital Surgery
- **Hysterectomy & oophorectomy**
  - Fertility preservation (egg or embryo preservation)
  - Discomfort associated with gynecologic care
  - Eliminate risk of female reproductive tract disease
  - Minimally invasive
    - Laparoscopic or robotic
    - Removal of cervix
- **Genital surgery 3 months following hysterectomy**

Metoidioplasty v. Phalloplasty
- **Lengthen clitoris**
- **Urination while standing**
- **Minimize donor site**
- **No penetrative intercourse**
- **Urination while standing**
- **Penetrative intercourse**
- **Donor site & surgical risks**

Conversion of metoidioplasty to phalloplasty

*Conversion to metoidioplasty to phalloplasty

*Metoidioplasty: clitoral virilization

*Non-Genital Surgery:
- Hysterectomy & oophorectomy
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- No penetrative intercourse
- Urination while standing
- Penetrative intercourse
- Donor site & surgical risks

*Conversion of metoidioplasty to phalloplasty

*Metoidioplasty: clitoral virilization
Release suspensory ligament of clitoris
Release ventral chordae (urethral plate)
Urethral tubularization
Skin closure
Scrotoplasty

Metoidioplasty: Outcomes/Techniques

Long-term outcome of metoidioplasty in 70 female-to-male transsexuals
Hage, et. al.
Ann Plast Surge 2006; 57 312-316

<table>
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<tr>
<th>Complications</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Immediate Fistula</td>
<td>33%</td>
</tr>
<tr>
<td>Stricture Prosthesis</td>
<td>37%</td>
</tr>
<tr>
<td>Stricture Prosthesis</td>
<td>36%</td>
</tr>
<tr>
<td>Prosthesis Loss</td>
<td>31%</td>
</tr>
<tr>
<td>Prosthesis Dislocation</td>
<td>49%</td>
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TABLE 1. Distribution of the Number of Events per Patient

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<th>No. Events per Patient</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
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<tr>
<td>Primary scrotoplasty</td>
<td>6</td>
<td>17</td>
<td>10</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>Secondary scrotoplasty</td>
<td>1</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>No scrotoplasty</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>All</td>
<td>8</td>
<td>22</td>
<td>19</td>
<td>15</td>
<td>5</td>
<td>1</td>
<td>70</td>
</tr>
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Length of stay: 10 days

- Bilateral labia minora flaps, rectangular vestibular lining flap, & vaginal flap
- Placement of buccal mucosa
- Clitoral degloving incision
Release of ventral chordae and elevation of bilateral labia minora flaps

Clitoral degloving

Buccal mucosa harvest

Placement of buccal mucosa, tubularization of urethra (creation of perineal urethra)
Skin closure

Medium testicular implant: 15 cc saline (2.7 x 4 cm)

Remote fill expander

Secondary Scrotoplasty

Retrodisplacement of labia majora for secondary scrotoplasty

Metoidioplasty with second stage scrotoplasty, mons lift, and placement of testicular implants

Mons Resection

Staged procedure performed 3 months following metoidioplasty

Removal of skin and fatty tissue overlying pubis

Mons: fatty tissue overlying pubic bone which forms the vulva and divides into the labia majora
Mons resection with fixation of Scarpa’s fascia to anterior abdominal wall

Metoidioplasty, Mons reduction, scrotoplasty, testicular implants

Conversion of Metoidioplasty to Phalloplasty

Isolation of Urethra & Clitoral Nerve
Phalloplasty

Multi-Stage: ALT
- Phalloplasty
- Scrotoplasty
- Vaginectomy
- Staged debulking
- Urethral lengthening & glansplasty

Multi-Stage: MLD
- Phalloplasty
- Scrotoplasty
- Vaginectomy
- Staged debulking
- Urethral lengthening & glansplasty

Single Stage: RFAFF
- Phalloplasty
- Scrotoplasty
- Glansplasty
- Vaginectomy
- Urethral lengthening

Phalloplasty: Outcomes/Techniques

- 79 patients (52%) requested phalloplasty
  - Voiding (99%)
  - Scrotum (96%)
  - Glans (92%)
  - Rigidity (86%)
  - Appealing look (wearing tight swim suit (91%) or nude (81%))
- Mean length of desired phallus: 13 cm (range 5 cm – 25 cm)

Alternative Flap Choice
- Combined flaps (ALT + SCIP or RFAFF), Prelamination of urethra, Osseocutaneous flaps (Fibula, Forearm), groin flaps, Gracilis flap, Abdominal flaps

Regardless of technique, phalloplasty surgery requires a commitment to managing complications

Phalloplasty Goals
- Aesthetic phallus
- Tactile & erogenous sensation
- Void while standing
- Minimal morbidity (including donor site)
- Aesthetic scrotum
- Ability to experience sexual satisfaction

RFF Phalloplasty

Phalloplasty: Goals
- Aesthetic phallus
- Tactile & erogenous sensation
- Void while standing
- Minimal morbidity (including donor site)
- Aesthetic scrotum
- Ability to experience sexual satisfaction

Radial forearm phalloplasty: placement of 3 piece, 2 cylinder hydraulic penile prosthesis

Penile reconstruction: is the radial forearm flap really the standard technique, Monstrey, PRS 124: 510, 2009
RFF Phalloplasty: Outcomes/Techniques

Urologic
- Urologic complications 41%
  - Other series up to 80%
  - All patients ultimately able to void
- Most complications at “neo-urethra and native urethra,” not along flap urethra.

Flap
- Anastomotic revision 11.3%
- Partial flap necrosis 7.2%
  - Larger flaps
- No longer operate on smokers

56 patients who had radial forearm phalloplasty
Mean number of surgical procedures: 6

3 flap failures (5%) - 1 flap failure at 7 weeks post-op
19 (34%) patients had urethroplasty - 7 patients (37%) required perineal urethrostomy a mean of 72 months after surgery

Radial Forearm Phalloplasty

Single stage reconstruction of urethra ("tube-within-tube")
- May require preop electrolysis
- Urethra 4 cm in width
- Volar positioning of urethra

Medial & lateral antebrachial cutaneous nerves, cephalic & median cubital/median antebrachial cutaneous vein, radial artery
- Lateral antebrachial cut, n. ilioinguinal n.
- Medial antebrachial cut, n. dorsal clitoral n.
- Venous anastomoses: cephalic vein, great saphenous vein, median antebrachial cutaneous vein, superficial epigastric vein, superficial circumflex vein
- Radial artery, femoral artery

Flap Dimensions:
- Approximately (distal wrist crease to elbow flexion crease) 21-23 cm
- Flap length: 13-17 cm

Average Male Dimensions:
- Flaccid: 8.6-9.3 cm (3.4-3.7 in)
- Erect: 12.9-14.5 cm (5.1-5.7 in)
- Circumference: 8.6-10 cm (3.5-3.9 in)


RFF Phalloplasty: Outcomes/Techniques
Design of urethra and shaft

Marking of membranous urethra & vaginal flap

Proximal urethra constructed with vaginal flap and vestibulum

Elevation of vaginal flap & tubularization of vestibulum

Extension of incision on to ventral clitoris

Vestibulum remains attached dorsally to corporal bodies

Construction of perineal urethra
Clitoris de-epithelialized

Preparation of dorsal clitoral nerve nerve harvested on ipsilateral side of forearm flap (contralateral to vascular anastomosis)

Clitoral-urethral construct transferred subcutaneously into position at pubic symphysis

Layered closure of superficial muscles over urethra

Excision of labia minora & colpocleisis

Fixation of de-epithelialized clitoris to pubic symphysis

Scrotoplasty with medial transposition of labia majora

Closure of scrotum
Urethral inset, vascular anastomoses, neuroraphies.

Construction of AV loop between great saphenous vein and femoral artery.

Path of flow following urethral reconstruction.

Flap Monitoring.

Distal urethral anastomosis.

Proximal urethral anastomosis.
Preop ALT phalloplasty: extrophy & microphallus

ALT phalloplasty: retention of sensate glans & corpora cavernosa with nerve coaptation to ilioinguinal nerve

Insertion of testicular implants

Penile Prostheses

- 129 patients (185 prostheses)
  - 41.1% underwent removal or revision
  - Infection: 11.9%
  - Protrusion: 8.1%
  - Leak: 9.2%
  - Dysfunction rate: 13%
  - Malposition rate: 14.6%

Erectile implants in female-to-male transsexuals: our experience in 129 patients, Hoebeke, European Urology, 57 (2010) 334-341

Malieable prosthesis with 2 rods

3 piece hydraulic prosthesis with 2 cylinders
Placement of 3 piece, hydraulic penile prosthesis, 2 cylinder (with ADM wrap) in conjunction with mons lift

Testicular implants and revision glansplasty

Activating penile prosthesis

Sexual and Physical Health After Sex Reassignment Surgery

107 Dutch transsexuals contacted by questionnaire: 55 responded

- 23 participated
- 15 declined

- 75% improvement in sex life
- 10% worsened sex life
  - Pain, lack of sensation, difficulty relaxing
- Masturbate more after surgery
  - 95% ‘always’ orgasm
  - More powerful & shorter orgasm
- Pre-surgery: clitoral stimulation (with sexual intercourse)
- Post-surgery: intercourse

DeCuypere, Archives of Sexual Behavior, Vol. 34, No 6, December 2005 pp 679-690
Vaginoplasty
Feminization Through Hormonal Therapy

- Suppression of androgen effects
  - Suppress GnRH or GnRH antagonists
  - Suppress production of luteinizing hormone
  - Interfere with testosterone production, metabolism, or receptor binding
- Induction of female physical characteristics
  - Estrogen acts through direct stimulation of receptors in target tissue

Hormonal Therapy

- Redistribution of body fat
- Decreased muscle mass
- Softening of skin
- Decreased libido
- Hair: slow progression of male pattern baldness & facial hair becomes finer

Single Stage Vaginoplasty: Functional & Aesthetic Requirements

- Natural appearance
- Sensate clitoris with clitoral hooding
- Adequate depth & introital width for intercourse
- Smooth, graded, & contiguous appearance to labia majora
- Moist appearance to labia minora/vestibulum
- Lubrication for intercourse

Measurement and aesthetics of the mons pubis in normal weight females

Evidence Based Medicine:
- Study anatomy
- Incorporate findings into gender confirmation surgery

28 female measurements:
- Normal weight female volunteers n=15
- Cadavers n=13
- Age range:
  - Volunteers: 26-53 yrs (mean 35 +/- 8.4)
  - Cadavers 60-95 yrs (mean 82 +/- 9.5)
- BMI:
  - 18-26 (mean 21 +/- 2.4)


Aesthetics of the mons pubis

Fatty tissue over the pubic bone which forms the vulva and divides into the labia majora
Surgical Application

Creating the mons aesthetic subunit in gender confirmation surgery

Surgical Decision-Making

- **Penile disassembly with inversion & scrotoperineal flap**
  - Full-length scroto-perineal flap
  - Limited scrotoperineal flap
- **Penile disassembly with inversion & FTSG**
  - Scrotal FTSG
  - Abdominal and/or inguinal FTSG
- **Intestinal transposition**
  - Large intestine
    - Sigmoid v. right colon
  - Small intestine

Considerations

- Patient goal (i.e. vaginal intercourse)
- Penile length
- +/- Circumcision
- Primary v. revision

Preoperative Process

- Patient expectations (appearance & function)
- Informed consent
- Hair removal
  - Electrolysis v. laser
- Management of hormones
  - Cessation 2 weeks prior to surgery
- Bowel preparation

*Obesity and smoking
Neovagina dissected anterior to Denovillier’s fascia

Corpus spongiosum: glans penis

Dissection of glans: dorsal neurovascular pedicle (incorporation of Bucks’ fascia)

Construction of clitoris placed on corporal bodies to provide engorgement in addition to sensation

*Erection of clitoris: parasympathetic innervation of paraurethral glands (prostate), greater vestibular glands (bulbourethral glands), & enlargement of bulb

4 Goals for the clitoris and vestibulum:
- Clitoral hooding
- Sensate neo-clitoris
- Moist appearance to labia minora/vestibulum
- Engorgement

Penesile inversion vaginoplasty
6 weeks status-post vaginoplasty

Penile inversion vaginoplasty

Penile inversion vaginoplasty

Penile inversion vaginoplasty

Penile inversion vaginoplasty

Penile inversion vaginoplasty
Post-operative Instructions

- **Dilation**
  - Post-op day # 10
  - 3 times daily for 2 weeks (then 4x/day for 3 weeks, then 2x/day for 10-12 weeks, then daily for 6-8 weeks, then 3-4x/week)
  - Relaxation (pelvic physical therapy)

- **Intravaginal washing**
  - 1-2x/week

- **Vaginal intercourse**
  - 8 weeks after surgery
  - Lubrication

- **Follow-up**
  - Annual speculum and prostate exam

Complications

- **Rectal injury/fistula**
- Creation of vaginal cavity
- **Urethral stream abnormalities**
  - Meatal stenosis, position of meatus
- **Stenosis**
  - Dilation, incomplete dissection, flap or graft loss
- **Pain/bulging**
  - Retained erectile tissue
- **Prolapse**
- **Scarring & loss of sensation**
- **Other** (compartment syndrome, blood transfusion, delayed healing, intravaginal hair growth, drainage)
- **Regret**
  - Preoperative assessment
What Options Remain After Failed Penile Inversion Vaginoplasty?

Underwent vaginoplasty 30 years ago, unable to have vaginal intercourse

Stenotic vaginal cavity with multiple attempted revisions involving skin grafts—inadequate vaginal depth & dissatisfaction

Intestinal Vaginoplasty Sigmoid & Right Colon

- Revision procedure for inadequate vaginal length
  - Creation of 12-15 cm vaginal cavity
- Moist vaginal lining
  - Non-secretory (mucus-producing goblet cells)
- Combined intra-abdominal & perineal procedure
  *Attempted revision with perineal approach and skin grafts limited by visibility and potential for rectal/urethral injury

Plane of dissection between rectum & bladder

Hybrid approach: laparoscopic mobilization and robotic dissection

Vascularized intestinal transplant with sigmoid colon (12-15 cm length)
Results

- Vaginal depth 12-15 cm
- Adequate vaginal lubrication for intercourse (without need for lubrication)
- Intermittent drainage
- Intermittent bleeding
- Diversion colitis (steroid enema)
- GI diseases (malignancy)

Review of 1563 Vaginoplasty Patients

26 studies (1461 penile inversion, 102 intestinal vaginoplasty)

<table>
<thead>
<tr>
<th>Results</th>
<th>Satisfaction</th>
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</thead>
<tbody>
<tr>
<td>Mean vaginal depth: 10 cm – 13.5 cm</td>
<td>Depth: 76% - 100%</td>
</tr>
<tr>
<td>Complications:</td>
<td>Appearance: 90% - 100%</td>
</tr>
<tr>
<td>Introtial stricture: 12% (4.2% – 15%)</td>
<td>Improvement in quality of life: 7.9 (scale 10 – 10)</td>
</tr>
<tr>
<td>Vaginal stricture: 7 % (1% - 12%)</td>
<td>Happiness: 8.7 (scale 0 – 10)</td>
</tr>
<tr>
<td>Partial necrosis: 2.7% - 4.2%</td>
<td>Life is easier: 83.1%</td>
</tr>
<tr>
<td>Wound dehiscence: 12% - 33 %</td>
<td>Regret: 0 (6% &quot;some regret&quot;)</td>
</tr>
<tr>
<td>Genital pain: 3% - 9%</td>
<td></td>
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<tr>
<td>Rectovaginal fistula: .8%-17%</td>
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Conclusions

• Surgery is a proven therapy for patients with gender dysphoria
• Optimal outcomes occur in multidisciplinary clinics
• Additional outcomes research to identify potential risk factors and objective grading method for post-operative results