Dissection of Vaginal Compartments

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Dissection of Vaginal Compartments

Faculty: Edward J. Stanford and Cheryl B. Iglesia  
Moderator: Tamer A. Seckin

Course Description

Over the past 20 years, there have been substantial changes in our understanding of the anatomy and treatment of pelvic organ prolapse (POP). This tutorial will discuss the correct terminology that is more descriptive of the surgical anatomy of the vaginal compartments; describe the interrelation of vaginal compartments; and discuss the proper dissection of the vaginal layers. Both native tissue and graft augmented surgical repairs will be briefly discussed in relation to the vaginal layers.

Learning Objectives

At the conclusion of this course, the participant will be able to: 1) Diagram the anatomy of the vaginal compartments more concisely; 2) employ correct descriptive terminology; and 3) demonstrate proper dissection of vaginal compartments.
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Asterisk (*) denotes no financial relationships to disclose.
Dissection of Vaginal Compartments

EDWARD STANFORD MD MS

DISCLOSURES

• I have no financial relationships to disclose.

PERCEPTION

LEVELS OF SUPPORT
**VAGINA**

- Embryology
- Levels I and II
  - Derive from the müllerian ducts
  - (Uterus, broad ligaments, upper vagina)
- Level III
  - Derives from the urogenital sinus
  - (Present in women with müllerian agenesis)

**Level I**

- Hangs from the pelvic walls and sacrum
- Primarily vertical (some horizontal)
- Fibers of the paracolpium originate from
  - Greater sciatic foramen over the piriformis muscles
  - Pelvic bones near the sacroiliac articulation
  - Lateral sacrum

**Level II**

- Vagina closer to the pelvic sidewall
- Histology
- Smooth muscle, collagen, elastin
- More dense than the cardinal and uterosacral ligaments

**Histology**

- Weber A, Walters M 1997
- Vagina – 3 layers
  - Epithelium, muscularis, adventitia (no "fascia")
- Support
  - levator ani muscles, lateral connective tissue attachments at the arcus tendineus

**Level II**

- Anterior vaginal wall
- Connects to the ATFP
- Forms supportive layer under the bladder
- Posterior vaginal wall
- Attached to the superior fascia of the levator ani muscles
- Forms the rectovaginal fascia
VAGINA

Level II

- Pubocervical fascia and rectovaginal fascia function as different layers
- Continuity at the lateral margins

VAGINA

Level II

- Lower region
- Connective tissue of the paracolpium extends over the anterior and posterior surfaces of the vagina in the midline
- Downward pressure on the anterior vagina toward the introitus
- Resisted by the attachments to the ATFP and pubocervical fascia

VAGINA

Level II

- Downward pressure on the anterior vagina toward the introitus
- Resisted by the attachments to the ATFP and pubocervical fascia
- Upward pressure on the posterior vagina toward the introitus is resisted by lateral attachments to the levator fascia (rectovaginal fascia)

VAGINA

Level III

- No intervening connective tissue separating the vagina from adjacent structures

VAGINA

Level III

- Anterior
  - Vagina fuses with the urethra which is embedded in the connective tissue of the perineal membrane (urogenital diaphragm)
- Lateral
  - Blends with medial margins of the levator ani muscles
- Posterior
  - Fuses with the perineal body

VAGINA

Levels I, II, and III

- Interdependent
- Level I
  - Cannot evert upper vagina if the suspensory ligaments are intact
- Level II
  - Depends on level I connections
  - Cannot easily move cephalad
- Level III
  - No mobility separate from the adjacent structures
PARAVAGINAL DEFECT

- Paravaginal defect
- Presents in the same way as a cystocele
- Lateral detachment of the EPF may be a paravaginal defect
- Paravaginal defect is a lateral tear in which the EPF has separated from the ATFP either unilaterally or bilaterally
Surgical Tutorial 7: Dissection of Vaginal Compartments—Native Tissue
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MedStar Washington Hospital Center
Associate Professor, ObGyn & Urology
Georgetown University School of Medicine

Disclosures
• I have no financial relationships to disclose.

Objectives
At the conclusion of this presentation, the participant should be able to:
1) Identify the correct steps for TVH and native tissue repairs for prolapse
2) Compare and contrast outcomes and complications

Case Presentation
CW is a 56 year old Para 2 with Stage 4 uterovaginal prolapse to 9 cm outside the hymenal ring. She has pelvic pressure and complaints of bulge. She reports no urinary or bowel symptoms.

POP-Q
Stage 3
Aa +3 Ba +9 C +9
GH 5 PB 3 TVL 10
Ap +3 Bp +9 D -1
Options for treatment include all of the following except:

A. Robotic hysterectomy and sacrocolpopexy  
B. Pessary  
C. Vaginal mesh kit  
D. Anterior colporrhaphy alone  
E. Vaginal hysterectomy with sacrospinous ligament fixation

Native Tissue Repairs

STEPS

① Transvaginal Hysterectomy  
② Placement of Uterosacral Sutures  
③ Anterior Colporrhaphy  
④ Tie Down Uterosacral Sutures to support apex  
⑤ Cystoscopy  
⑥ Close Cuff  
⑦ Posterior Repair +/- perineorrhaphy

USLS- cuff after hyst

USLS: Goals

- Reestablish continuity of pubocervical and rectovaginal fascia (muscularis)  
- Elevate vault toward uterosacral ligaments
**Delancey’s levels: Apex is Key**

![Image of Delancey’s levels]

**Operations for Prolapse**

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Vaginal Procedures</th>
<th>Abdominal Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>Anterior repair, Vaginal PV repair, mesh kit</td>
<td>Paravaginal repair</td>
</tr>
<tr>
<td>Middle or Apical</td>
<td>Vag hyst with culdeplasty, or Uterosacral ligament suspension (USLS), or Sacrospinous ligament suspension (SSLS), mesh kit, Colpocleisis, Colpectomy</td>
<td>TAH w/ Uterosacral colpopexy, ASC, Sacrocervicopexy, Sacrohysteropexy</td>
</tr>
<tr>
<td>Posterior</td>
<td>Post. repair (site specific, levator plication), mesh kit</td>
<td>ASC with post. mesh into RV septum</td>
</tr>
</tbody>
</table>

**USLS: Helpful tips**

- Enter enterocele
- Palpate ischial spine
- Use long Allis clamp to place stitch on intermediate portion of ligament
- 2-3 permanent sutures each side
- Highest stitch most medial
- Cystoscopy (DUAL)

![Image of McCall Uterosacral Clamp by Karam and Walters]

**McCall Uterosacral Clamp**

**USLS Outcomes**

- Anterior 81.2%
- Apical 98.3%
- Posterior 87.4%

Better outcome with Stage 2 than Stage 3 prolapse (92.4% vs 66.8%; P = .06)

Margulies RU AJOG 2010

![Image of USLS outcomes by Dr. Tristi Muir, Cleveland Clinic]
Complications: USLS

- Ureteral obstruction rate:
  - 1 - 11% intraoperatively
  - ~90% of these resolved intraoperatively
  - 0.9% ureteral injury rate requiring further intervention
- Neural entrapment
- Suture erosion

Management of Complications

- Ureteral Obstruction
  - Deligate: caudad to cephalad
  - Replacement
  - Consider ureteral stent placement for:
    - Bloody efflux
    - Retroperitoneal leakage
    - No efflux

Sacrospinous Ligament Suspension

Steps for Sacrospinous Suspension

- Enter pararectal space
- Palpate ischial spine
- Visualize coccygeus muscle/SSL complex
- 2 passes
  - 2 cm medial to spine
  - Capio device
  - Deschamps
  - Miya Hook

Capio Device (Boston Scientific)

Helpful Instruments

- Breisky-Navratil retractors
- Light Source
  - Vital Vue/Lumitex
  - Lighted retractor
Sacrospinous ligament fixation

- Approaches: anterior, apical, posterior, abdominal
- 4 Corner
- Unilateral vs Bilateral
- Permanent vs Delayed absorbable suture
- Unilateral, posterior or apical approach most common in 70% of studies

Systematic Review of SSLF

- Failure rates vary depending on how outcomes evaluated
- Anterior Compartment fails most often (outcome defined as Grade 2)
  - Anterior failure 21.3%
  - Apical 7.2%
  - Posterior 6.3%
- ? Posterior deviation of vagina

SSLF: Complications

- Complications:
  - Buttock pain
  - Nerve injury
  - Rectal injury
  - Vaginal stenosis
  - Stress incontinence
  - Hemorrhage

References

Surgical Tutorial 7: Vaginal Dissection Videos Part 2

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Disclosures

• I have no financial relationships to disclose.

Objectives

At the conclusion of this presentation, the participant should be able to:

1) Identify the correct depth of dissection for vaginal and sacrocolpopexy mesh placement
2) Compare and contrast layers of dissection between vaginal mesh and colporrhaphy

Anterior Colporrhaphy

Anterior Vaginal Wall Prolapse

– Paravaginal defects to the ATFP
– Apical/transverse defects to uterosacral ligaments
– Central/midline defects
– Distal defects
Anterior Repair Steps

1) Starting at apex held with Allis clamps
2) Hydrodissect (will see blanching); incise
3) Metzenbaums used to dissect vaginal muscularis
4) Dissect from apex to UVJ (?sling)
5) Dissect to ischiopubic rami
6) Sutures: 2-0 PDS plication of vaginal muscularis and 0-Vicryl imbricating over especially for larger defects
7) Trim and close with 2-0 Vicryl or 3-0 Monocryl

Anterior Repair Notes

- I do not do a Kelly bladder neck plication
- I leave room for a sling, via a separate 2 cm incision starting 0.5 cm from the external urethral meatus at the midurethra
Posterior Colporrhaphy

Vaginal Anatomy

- 3 Layers:
  - Epithelium
  - Muscularis
  - Adventitia

Vaginal Wall Anatomy
Surgical Placement of Mesh

- Vaginal Fibromuscular wall
  - non-keratinized stratified squamous epithelium
  - concentrically arranged smooth muscle

Fascial "capsule"
- formed from condensation of irregular loose areolar endopelvic connective tissue

Potential graft placement sites

Reiffenstuhl et al. Vaginal Operations: Surgical Anatomy and Technique 1994
Histology of Vaginal “Fascia”

- Non-Keratinized Stratified Squamous Epithelium
- Directly fused on Thin Lamina Propria
- Concentric Layers of Smooth Muscle
- Derived from Dense Irregular Connective Tissue

Traditionally used in:
- Pubocervical or Rectovaginal “Fascia” repairs
- Vaginal Mesh

Full-Thickness Vaginal Incision

- Colporrhaphy splits the vaginal muscularis
- Mesh kits should be placed beneath muscularis into true vesicovaginal space

Vaginal Mesh

- Full-Thickness Vaginal Incision
- Mesh kits should be placed beneath muscularis into true vesicovaginal space

Source: Bailey’s Textbook of Histology

Williams & Wilkins 1971
References

CULTURAL AND LINGUISTIC COMPETENCY

Governor Arnold Schwarzenegger signed into law **AB 1195** (eff. 7/1/06) requiring local CME providers, such as the AAGL, to assist in enhancing the cultural and linguistic competency of California's physicians (researchers and doctors without patient contact are exempt). This mandate follows the federal Civil Rights Act of 1964, Executive Order 13166 (2000) and the Dymally-Alatorre Bilingual Services Act (1973), all of which recognize, as confirmed by the US Census Bureau, that substantial numbers of patients possess limited English proficiency (LEP).

California Business & Professions Code §2190.1(c)(3) requires a review and explanation of the laws identified above so as to fulfill AAGL's obligations pursuant to California law. Additional guidance is provided by the Institute for Medical Quality at [http://www.imq.org](http://www.imq.org).

**Title VI of the Civil Rights Act of 1964** prohibits recipients of federal financial assistance from discriminating against or otherwise excluding individuals on the basis of race, color, or national origin in any of their activities. In 1974, the US Supreme Court recognized LEP individuals as potential victims of national origin discrimination. In all situations, federal agencies are required to assess the number or proportion of LEP individuals in the eligible service population, the frequency with which they come into contact with the program, the importance of the services, and the resources available to the recipient, including the mix of oral and written language services. Additional details may be found in the Department of Justice Policy Guidance Document: Enforcement of Title VI of the Civil Rights Act of 1964 [http://www.usdoj.gov/crt/cor/pubs.htm](http://www.usdoj.gov/crt/cor/pubs.htm).

**Executive Order 13166,”Improving Access to Services for Persons with Limited English Proficiency”**, signed by the President on August 11, 2000 [http://www.usdoj.gov/crt/cor/13166.htm](http://www.usdoj.gov/crt/cor/13166.htm) was the genesis of the Guidance Document mentioned above. The Executive Order requires all federal agencies, including those which provide federal financial assistance, to examine the services they provide, identify any need for services to LEP individuals, and develop and implement a system to provide those services so LEP persons can have meaningful access.

**Dymally-Alatorre Bilingual Services Act** (California Government Code §7290 et seq.) requires every California state agency which either provides information to, or has contact with, the public to provide bilingual interpreters as well as translated materials explaining those services whenever the local agency serves LEP members of a group whose numbers exceed 5% of the general population.

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If you add staff to assist with LEP patients, confirm their translation skills, not just their language skills. A 2007 Northern California study from Sutter Health confirmed that being bilingual does not guarantee competence as a medical interpreter. [http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538](http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538).