Surgical repair of pelvic organ prolapse

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Concepts of Pelvic Support

- **Primary support** is pelvic floor muscles
  - Injured with childbirth
  - Atrophy with age (disuse, hormonal, neurologic)
  - Cannot restore surgically

- **Secondary support** is visceral “fascia” (fibromuscular connective tissues)
  - What we use surgically to re-support
Pelvic Floor Muscle ANATOMY
Ship in the dock analogy
Ship= pelvic organs (viscera)
Water= muscle support
Tethers= connective tissue support
Concept of muscle support

- Sagittal view
- Transverse view
Concept of muscle support

effect of muscle loss

- Viscera through primary muscle support
- Loss of pelvic floor muscle
Review

• Pelvic floor damage cause is multifactorial
  – Vaginal childbirth
  – Aging
  – Repetitive increases in intra-abdominal pressure
  – Genetics

• Pelvic floor supports the pelvic viscera by
  – #1. Muscle
  – #2 Fibromuscular connective tissue
Anterior Vaginal Prolapse: Review of anatomy and techniques of surgical repair
Weber and Walters
*Obstet and Gynecol* 89:311-18 Feb 1997

Recommend that terminology describing vaginal tissue as fascia be abandoned

Term fascia should be reserved for the parietal fascia, which corresponds to established anatomic and histologic definitions (obturator fascia)

“Vaginal wall or muscularis” instead of “pubocervical fascia”

Endopelvic fascia describes the subperitoneal and perivascular connective tissue and loose areolar tissue that exist throughout the pelvis, around and between the pelvic organs
SMOOTH MUSCLE > COLLAGEN > ELASTIN

"PUBOCERVICAL FASCIA"
DeLancey Levels of Support
FIGURE 7. Integrated levels of support: illustration of the normal vaginal axis and the three levels of support of the vagina and uterus from the perspective of a standing woman. In level I, the endopelvic fascia suspends the upper vagina and cervix from the lateral pelvic wall. Flaps of level I extend both vertically and posteriorly toward the sacrum. In level II, the vagina is attached to the arcus tendineus fasciae pelvis and superior fascia of the levator ani muscles. In level III, the distal vagina is supported by the perineal membrane and muscles. The insets show transverse sections made through the vagina perpendicular to the normal vaginal axis at each level.
Summary of pelvic organ support
DeLancey Levels

• Level I – Apical (cervix and proximal vagina)
  – Uterosacral ligaments
  – Normal is at the level of the ischial spines

• Level II- Mid-vagina
  – Pubocervical fascia anterior
  – Rectovaginal fascia posterior
  – Connections are lateral to the ATFP

• Level III- Distal vagina (urethra, ano-rectal)
  – Perineal body, perineal muscles, dense fibromuscular
    connective tissue
“Stimulus, response! Stimulus, response! Don’t you ever think.”
Pelvic Organ Prolapse (POP) Surgical Repairs

- Anterior (cystocele) repair
- Posterior (rectocele) repair
- A+P Repair
- Kelly plication
- Retropubic urethropexy
- McCall
- High uterosacral ligament colposuspension (intraperitoneal colpopexy)
- Sacrospinous ligament fixation /colposuspension (extraperitoneal colpopexy)
- Iliococcygeus colposuspension
- Sacrocolpopexy
- Obliterative procedures (LeFort colpocleisis, colpectomy)
Surgical Correction of Utero-Vaginal Prolapse

- Native tissue vs. graft augmented
- Approaches
  - Trans-vaginal
  - Trans-abdominal
- Compartment
  - Anterior
  - Posterior
  - Apical
- Categorization
  - **Reconstructive** (restorative)
    - USL colposuspension, SSL fixation
  - **Compensatory**
    - Sacrocolpopexy, Sacrohysteropexy, Sacrocervicopexy
  - **Obliterative**
    - Colpectomy, Colpocleisis
Anterior Compartment

- Anterior is most common site of vaginal prolapse
- High incidence of recurrence after repair (30-70%)—depending on definition
- Subjective cure is higher than objective cure
- More than 50% of anterior support is from apical support
50% of anterior vaginal support is apical support

- **The relationship between anterior and apical compartment support.**
- **Summers A¹, Winkel LA, Hussain HK, DeLancey JO.**

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**Abstract**

**OBJECTIVE:**
The purpose of this study was to determine whether the degree of anterior compartment (bladder) and apical compartment (cervix) prolapse are correlated, and whether 2 anterior compartment elements (urethra and bladder) are related at maximal Valsalva.

**STUDY DESIGN:**
Women with a complete spectrum of pelvic support were recruited for a pelvic support study. Dynamic magnetic resonance scans were taken during Valsalva. A convenience sample of 153 women with a mean age of 53.3 +/- 12.5 (SD) years with a uterus in situ was studied. Anterior compartment status was assessed by the most caudal bladder point and the internal urinary meatus. The external cervical os was used to assess the apical compartment. The position of the bladder, urethra, and uterus were determined in 20 nulliparous women to determine their reference locations. The distances of each structure below the reference positions were calculated at maximum Valsalva.

**RESULTS:**
Average distances of the bladder base, urethra, and uterus from the reference positions at maximal Valsalva were 4.1 +/- 2.4 cm, 3.1 +/- 1.3 cm, and 4.3 +/- 2.4 cm, respectively. The Pearson correlation coefficient of the relationship between the bladder base and uterine distances was r = 0.73 (r² = 0.53). The Pearson correlation coefficient of the bladder distance and urethral distance was r = 0.82 (r² = 0.67).

**CONCLUSION:**
Half of the observed variation in anterior compartment support may be explained by apical support.
Association of anterior vaginal wall prolapse and apical prolapse


- Recurrent vaginal prolapse- cause remains controversial
- Difficult to differentiate persistence from recurrence
- 325 women cohort
  - Anterior prolapse occurred more frequently than apical or posterior
  - Strong linear correlation between Points C and Ba
  - Not affected by history of hysterectomy
  - Higher stage anterior prolapse more likely to have had hysterectomy
- Conclusion: Anterior vaginal wall prolapse is associated strongly with apical prolapse. Anterior vaginal wall defects that are surgically repaired usually require a concomitant repair of the apex.

Outcomes of Vaginal Prolapse Surgery Among Female Medicare Beneficiaries- The Role of Apical Support
Obstet and Gynecol Vol 122, NO. 5, November 2013

- 10 yr f/u of 2756 women ant colporrhaphy, post colporrhaphy, or both w/ or w/o apical suspension
- Reoperation rate twice as high for women who had isolated anterior colporrhaphy vs women who had anterior colporrhaphy with apical suspension procedure (20.2% vs 11.6%).
Anterior prolapse (cystocele)

- Anterior vaginal prolapse is:
  1. most common
  2. highest recurrence
  3. nearly always associated with apical defect
Full thickness

Split thickness

Split and imbricate
Transverse Cystocele

Most common or least common type?

- **Transverse Cystocele (5% or 95% ?)**
  - Occurs from anterior disruption of pericervical ring during childbirth (where is narrowest pelvic diameter and at what level does this lie?)
  - Usually associated with superior paravaginal defect
  - “These are the only real causes of cystocele”- Kovac & Stubbs *Advances in Reconstructive Vaginal Surgery* 2007
  - “Site specific” defect repair
Figure 3–10. Fascial “framework” of vaginal supports. Structures: B, bladder; C, cervix; IPL, iliopsoas line; IS, ischial spine; OF, obturator foramen; OIM, obturator internus muscle; R, rectum; S, sacrum; SP, symphysis pubis; U, urethra. Fascial “sheath” defects (solid lines): MLD, midline defects; SVVD, superior vesicovaginal defects. Supports: 1, posterior pubourethral ligament; 2, anterior levator arch (ALA); 3, arcus tendineus fascia pelvis (paravaginal levator arch); 4, arcus tendineus levator ani (lateral levator arch); 5, superficial fascia levator ani; 6, paracervical ligament; 7, uterosacral ligament; 8, cul-de-sac. “Sheath support” defects (broken lines): LVD, lateral vesicovaginal defects; PVD, paravaginal defects. The fascial “framework” shows endopelvic fascial supports from above. Pararectal and perineal supports are not visible in this view.
URETHRA

TRANSVERSE DEFECT

PB

ANUS
Figure 3–10. Fascial “framework” of vaginal supports. Structures: B, bladder; C, cervix; IPL, ilipectineal line; IS, ischial spine; OF, obturator foramen; OIM, obturator internus muscle; R, rectum; S, sacrum; SP, symphysis pubis; U, urethra. Fascial “sheath” defects (solid lines): MLD, midline defects; SVVD, superior vesicovaginal defects. Supports: 1, posterior pubourethral ligament; 2, anterior levator arch (ALA); 3, arcus tendineus fascia pelvis (paravaginal levator arch); 4, arcus tendineus levator ani (lateral levator arch); 5, superficial fascia levator ani; 6, paracervical ligament; 7, uterosacral ligament; 8, cul-de-sac. “Sheath support” defects (broken lines): LVD, lateral vesicovaginal defects; PVD, paravaginal defects. The fascial "framework" shows endopelvic fascial supports from above. Pararectal and perineal supports are not visible in this view.
Cystocele (anterior vaginal prolapse)

• A. Is highly correlated with apical (cervix or vaginal cuff) prolapse
• B. Surgical success is doubled with an apical suspension procedure in addition to traditional anterior colporrhaphy
• C. Is the most common observed vaginal compartment prolapse
• D. After a repair, has a higher risk of recurrent prolapse compared to rectocele
Posterior Compartment repair
Similar to anterior

- Higher success than anterior
- Recurrence risk up to 18%
- De novo dyspareunia up to 18%
- Site specific vs muscle splitting vs levatorplasty
- MESH (synthetic or biograft) DO NOT improve outcomes.
- Improves abnormal defecation in 2/3
APICAL SUSPENSION PROCEDURES

• UTEROSACRAL LIGAMENT COLPOSUSPENSION = INTRAPERITONEAL COLPOPEXY
• SACROSPINOUS LIGAMENT COLPOSUSPENSION = EXTRAPERITONEAL COLPOPEXY
• SACROCOLPOPEXY
Use of uterosacral ligaments for vaginal apical reattachment

INTRA-PERITONEAL COLPOPEXY
High USL colposuspension / McCall cul de plasty

• Advantages
  • Less dissection
  • Restores natural upper vaginal axis
  • Less risk/morbidity than other vaginal procedures?
  • Just as efficacious as SSLF

• Disadvantages
  • May not be able to identify adequate “ligaments”
  • Cystoscopy required- ureteral obstruct /injury 2%
Sacrospinous Ligament Suspension (fixation)
EXTRA-PERITONEAL COLPOPEXY

• Attaches vaginal apex to sacrospinous ligament / coccygeus muscle complex
• Unilateral (traditional) or bilateral
• Permanent suture (delayed absorbable?)
• Access usually via posterior dissection-pararectal space, can be done via anterior dissection (blind application)
• Risks—bleeding, nerve injury, gluteal pain
The abdominal sacral colpopexy:

Uses synthetic graft material
Dissection avoids opening of the vaginal wall
Requires precise dissection of the presacral space to avoid serious complications
Mesh to cover large surface area of vagina with multiple attachment points (dissection in vesico-vaginal space, rectovaginal space, presacral space)
Sacrocolopopexy - INDICATIONS

- Preserve vagina
- Preserve sexual function (shortened vagina)
- Previous vaginal repair failure
- Vagina scarred / retracted
- Need Retropubic urethropexy (MMK-Burch)
- Neurogenic / Genetic basis for POP
Which of the following are true concerning surgery for a POPQ Stage II uterine prolapse?

• A. Hysterectomy is always required to eliminate the weight (force) of the uterus on the vagina
• B. If hysterectomy is performed, the preferred route is trans-vaginal
• C. Hysterectomy is current standard of care uterine prolapse POP-Q Stage II or greater
• D. May be corrected by intra or extra peritoneal colpopexy
• E. B + D
Deviation of vaginal axis due to surgical repair
SCP, RPU, USLS, SSLS
OBLITERATIVE PROCEDURES

LeFort colpocleisis
Colpectomy
Vaginal Obliterative Procedures

• Indications
  – No future desire for vaginal intercourse
  – Poor surgical risk for major operation / anesthesia
  – Unable to retain pessary

• Advantages
  – Quick
  – Less bleeding
  – Highly effective (if done properly)

• Disadvantages
  – Unable to assess AUB w/ LeFort
  – May require bladder neck support or MUS
Which of the following are true?

- A. Sacrocolpopexy has approximately a 6% risk of mesh erosion / exposure into the vagina
- B. LeFort colpocleisis is contraindicated in a woman desiring to preserve vaginal function
- C. Sacrocolpopexy deviates the vaginal axis more anterior to it’s normal position
- D. Sacrocolpopexy carries risk of serious hemorrhage from the left common iliac vein, presacral/hypogastic veins, and presacral vessels.
- E. All above are true.
Dang! Tied again! Ready...one, two, three!

Before paper and scissors
The pelvic surgeon ideally is.....

• “... trained and prepared to perform a variety of operative techniques and to tailor the operation to the needs of the patient, rather than making all patients conform to his or her own specific skills.”