

Laparoscopic Reconstructive Bladder Prolapse Surgery in the Female

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There are many different operations for pelvic organ prolapse. This article deals with the techniques and views currently practised by the author as inspired by world renowned surgeons in the field of female reconstructive surgery.^{1, 2, 3, 4, 5}

The basic principle of this approach is to support weak and prolapsed tissue by suturing it to bone, either directly or indirectly by interpositioning of mesh. The aim is to restore the anatomy as close to the original anatomy as possible.

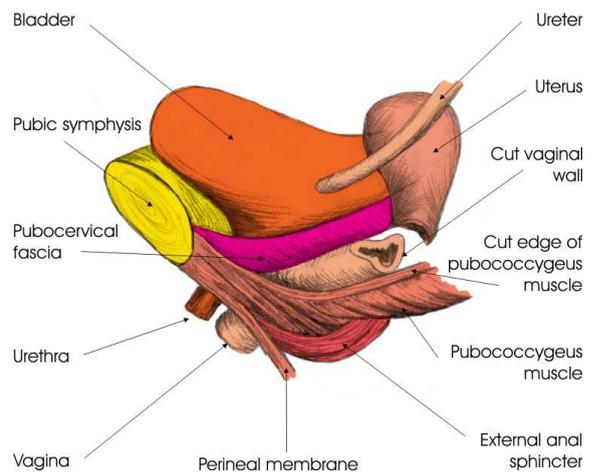
Anatomy

The bladder is supported by a specific part of the endopelvic fascia called the **pubocervical fascia**. The pubocervical fascia extends from the pubis anteriorly to the cervix of the uterus posteriorly. The pubocervical fascia acts like a hammock to support the bladder in the correct position. The anterior (front) end of the pubocervical fascia supports the bladder neck and urethra and the posterior (back) end of the pubocervical fascia supports the bladder.

Pubocervical fascia acts like a hammock



Anatomy of Female pelvis

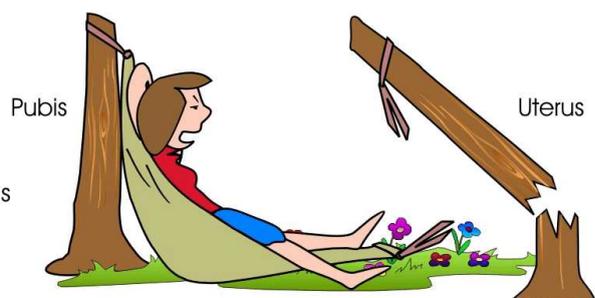


The anatomy and function of the bladder may be affected when either the support of the anterior (front) end of the hammock is damaged by a process such as pregnancy and child birth or increased collagenase activity. The same may happen if the support of the posterior (back) end of the hammock is damaged (uterine or vaginal vault prolapse) or if both are damaged.

*Bladder Neck Prolapse
Anterior (front) end of hammock is damaged*



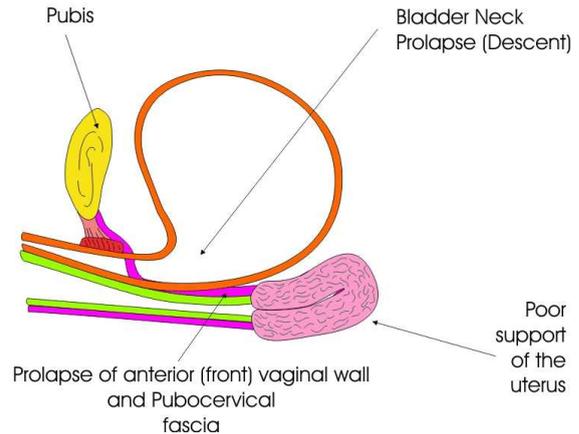
*Uterine or Vault Prolapse
Posterior (back) end of hammock is damaged*



Both front and back ends of the hammock support are damaged

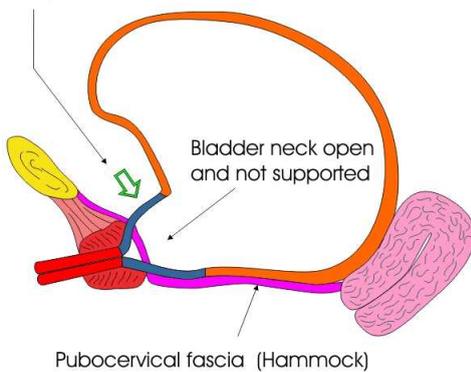


Prolapse (Descent) of the Bladder Neck and Uterus



Bladderneck Prolapse (Descent)

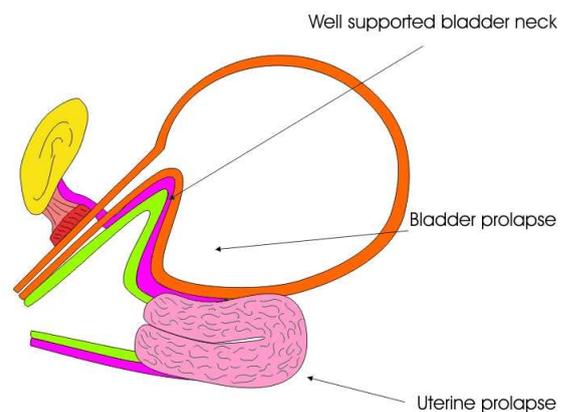
Transmitted intra-abdominal pressure cannot close off the proximal urethra



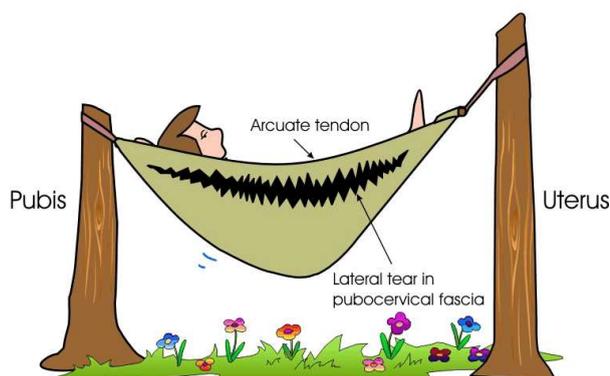
When the bladder neck support is deficient, the bladder neck drops down and the most common symptom is urinary stress incontinence. Patients may also develop urge incontinence, frequency and nocturia. (DeLancey Level III defect) ⁶

Bladder and Uterine Prolapse (deficient posterior support)

When the posterior support is deficient, the bladder drops down with the uterus or vaginal vault. The most common urinary symptoms are urgency and frequency. Patients may also have nocturia, a poor urinary flow and feeling of incomplete bladder emptying. They often do not have incontinence due to kinking of the urethra or due to the prolapsed uterus supporting the bladder. (DeLancey Level I defect) ⁶



Cystocele, (anterior vaginal wall prolapse) due to lateral defects in the pubocervical fascia



The pubocervical fascia may get dislodged from its lateral attachments to the arcuate tendons (Arcus tendineus fasciae pelvis) on the pelvic side walls. This causes anterior vaginal wall and bladder prolapse with the clinical picture of a cystocele. (DeLancey Level II defect) ⁶

Surgical correction of insufficient bladder neck support:

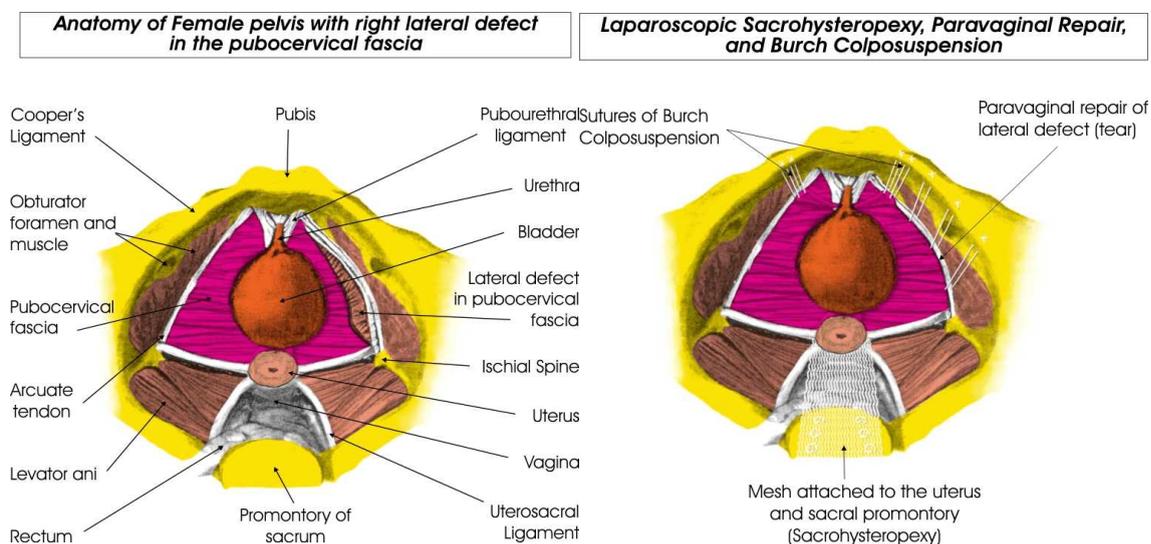
A. Significant prolapse (descent) of the bladder neck and urethra. ^{4, 5, 7} (Hypermobility of the urethra)

1. Laparoscopic Burch colposuspension:

The operation of choice is the laparoscopic Burch colposuspension, where the pubocervical fascia lateral to the bladder neck is elevated and fixed to the pelvic wall. This restores the normal posterior urethrovesical angle.

2. Laparoscopic paravaginal repair:

If there is associated anterior vaginal wall and bladder prolapse, then a paravaginal repair is also performed. With this procedure lateral defects in the pubocervical fascia are repaired with nonabsorbable sutures. This procedure supports the bladder and vaginal wall proximal to the urethrovesical junction.



3. ? Suburethral slings:

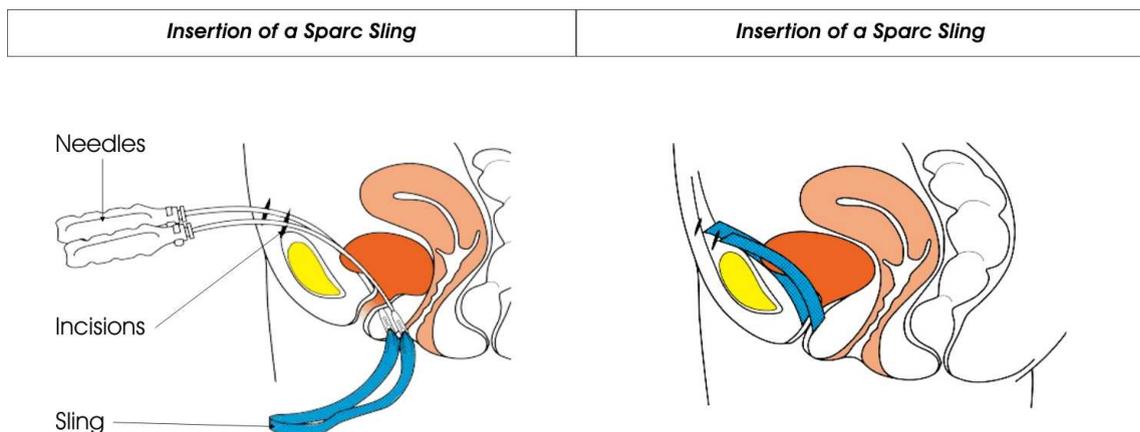
Treating significant bladder prolapse with a suburethral sling, without correcting the prolapse, does often not give good results in my opinion, because if the sling is only loosely around the urethra, the patients may still be incontinent. If the sling is pulled tighter, the patients may have difficulty passing urine due to kinking of the urethra, and may develop urgency and frequency with incomplete bladder emptying. Fortunately this complication can be corrected by a laparoscopic paravaginal repair and Burch colposuspension, as these procedures address both the concurrent anterior vaginal wall and bladder prolapse and associated urinary stress incontinence secondary to urethral hypermobility.

**B. Minimal prolapse (descent) of the bladder neck and urethra. ⁷
(Minor degree of hypermobility or intrinsic sphincter deficiency)**

This is often seen after a previous anterior repair or other bladder neck surgery where the posterior urethrovesical angle looks quite normal but the intrinsic urethral sphincter mechanism is deficient.

1. Suburethral Sparc sling ⁸:

Suburethral slings such as the Sparc sling, give excellent support and cure of incontinence in this situation. The Sparc sling is similar to other tensionless vaginal tapes, but the needles are thinner and are inserted from the suprapubic area in a posterior direction and guided with a finger inserted through a small suburethral incision. The tape is made of polypropylene.



2. Periurethral injections:

Periurethral injections such as Macroplastique could be used as a last resort, but are rarely used due to the excellent results of the Sparc sling.

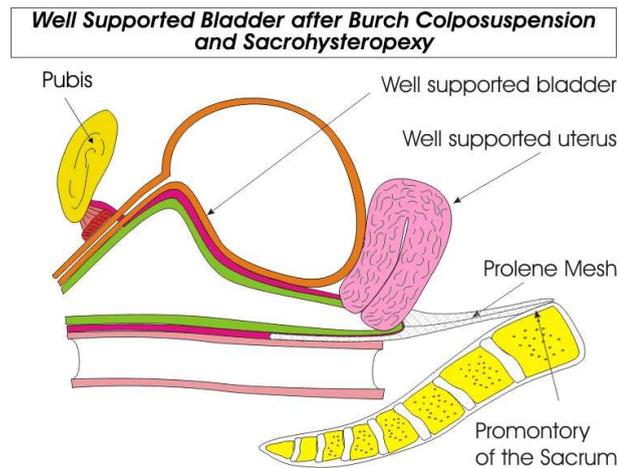
Surgery to support the posterior end of the prolapsed pubocervical fascia hammock.

A. Uterine prolapse

1. Uterine preservation

a. Laparoscopic sacrohysteropexy.^{1,2}

Retaining the cervix at prolapse surgery may be advantageous in offering a physiologic cornerstone for attachment of the pubocervical fascia, rectovaginal fascia and uterosacral-cardinal ligament complex.⁹



With this procedure Prolene mesh is attached to the uterosacral ligaments and isthmus of the uterus or taken around the uterus and fixed to the pubocervical fascia. The other end of the mesh is stapled onto the ligament covering the promontory of the sacrum and then covered with peritoneum.

This procedure is indicated in young patients with uterine prolapse who do not have children, or who want more children, or patients who refuse a hysterectomy and wish to retain their uterus². Uterine preservation is only considered in women if they have normal cervical cytological findings, acceptable uterine ultrasound and no abnormal uterine bleeding.⁹

b. Laparoscopic suture hysteropexy.⁹

The cranial portion of the uterosacral ligament is plicated and shortened. This technique is used for minor degree uterine prolapse where there is sufficient uterosacral ligament present.

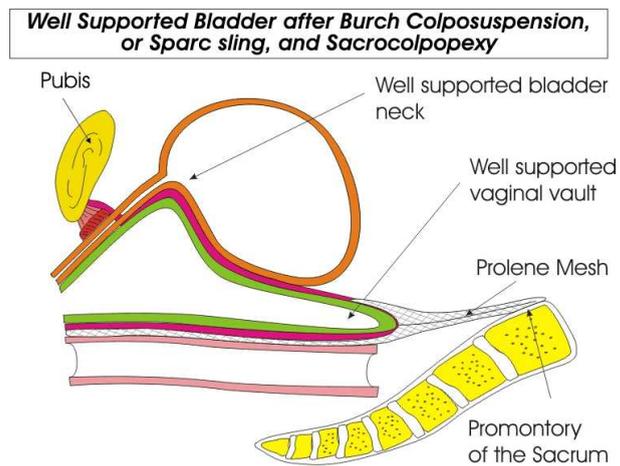
2. Hysterectomy

With any abnormalities in the uterus, a hysterectomy with proper fixation of the vaginal vault structures, performed by a Gynaecologist, is the treatment of choice. This is a popular treatment option even in the absence of abnormalities.

B. Vaginal vault prolapse (Following previous hysterectomy) (DeLancey Level I defect)⁶

1. Laparoscopic Sacrocolpopexy

If a patient had a previous hysterectomy for uterine prolapse then there is an 11.6% incidence of vaginal vault prolapse and if the hysterectomy was done for other benign causes then the incidence of vault prolapse is only 1.8%.³ This significant difference clearly indicates that if the ligaments were too weak to support the uterus, they are often also too weak to support the vaginal vault.



Sacrocolpopexy is performed by fixation of an anterior and posterior layer of Prolene mesh to the anterior and posterior vaginal walls. Mesh supporting the anterior vaginal wall will correct the high cystocele. The posterior mesh extension is taken down as low as possible (Levator ani muscles) to cover the posterior vaginal wall after plication of the rectovaginal fascia. The mesh is fixed to the uterosacral and cardinal ligaments on both sides. This step treats a rectocele and enterocele at the same time.

This approach yields a durable and satisfactory anatomical and functional result. Sacrocolpopexy gave the best long-term outcome for vault prolapse in a 20-year study.³

All patients undergoing a sacrohysteropexy should have a laparoscopic Burch colposuspension, with or without paravaginal repair (for significant bladder neck descent) or Sparc sling (for minimal bladder neck mobility) at the same time, as pulling on the pubocervical fascia may cause incontinence postoperatively.

If a sacrocolpopexy is performed, the best option may be a paravaginal repair and Sparc sling as the Burch colposuspension fails to prevent incontinence in a significant number of patients in this situation.¹¹

In a patient who has had a previous Burch colposuspension, who develops uterine or vaginal vault prolapse at a later date, a Sparc sling should be inserted at the same time as the sacrohysteropexy or sacrocolpopexy as people may develop incontinence again despite the previous Burch colposuspension, as the urethrovesical angle is altered due to traction on the pubocervical fascia.

2. Laparoscopic Apical Vault Repair. (Posterior Culdoplasty)

With this procedure the uterosacral ligaments are shortened and fixed to the vaginal vault. This is used in minor degree vaginal vault prolapse where there is sufficient uterosacral ligament present.

3. Sacrospinous vaginal vault fixation.

In elderly people or in people with severe intra-abdominal adhesions, it is often impossible to do a laparoscopic sacrocolpopexy and in these patients a sacrospinous fixation of the vaginal vault transvaginally is a better option.

The disadvantage of this procedure is the proximity of the sacrospinous ligament to the sciatic nerve and inferior gluteal and pudendal vessels and nerves, which may cause significant buttock and leg pain and haemorrhage.² There is also a higher incidence of recurrent anterior vaginal wall prolapse reported.¹⁰

4. Posterior Intravaginal slingplasty (IVS)

This is the latest addition to transvaginal vault repair surgery, but will not be done by the author until more clinical data on long term postoperative bladder function and recurrence of anterior and posterior vaginal vault prolapse is available.

Summary:

Repair of pelvic organ prolapse must have a triple goal: ¹

1. The uterus or vaginal vault must be suspended, returning it to a physiologically normal position with restoration of a firm subvesical floor. This eliminates a high cystocele.
2. Evident or latent stress urinary incontinence must be treated. Treatment of the uterine prolapse (hysterocele) alone is not sufficient because once the prolapse has been corrected, the effect of a subvesical mass will disappear and in many cases reveal urinary incontinence.
3. Steps must be taken in the posterior compartment to reconstitute the rectovaginal support structure and to reinforce the posterior vaginal wall with synthetic mesh ^{1,3}.

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