

## Original Article

# Anatomic and Functional Outcome of Vaginal Paravaginal Repair in the Correction of Anterior Vaginal Wall Prolapse

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**Abstract:** Over a 2-year period 45 patients with bilateral paravaginal support defects underwent vaginal paravaginal repair. Postoperative evaluations were conducted and anatomic outcome was determined by vaginal examination, with grading of vaginal wall support. Functional outcome was assessed by a standardized quality of life questionnaire, voiding diary and standing stress test with a full bladder. Thirty-five patients had long-term follow-up with a mean of 1.6 years (range 1–85). The recurrence rates for displacement cystocele, enterocele and rectocele were 3% (1/35), 20% (7/35) and 14% (5/35), respectively. In no patients did vault prolapse develop or recur. Subjective or objective evidence of persistent stress urinary incontinence was found in 57% of patients (12/21). Vaginal paravaginal repair is a safe and effective technique for the surgical correction of anterior vaginal wall prolapse but has limited applicability in the surgical correction of genuine stress incontinence.

**Keywords:** Cystocele; Paravaginal defect; Prolapse surgery; Vaginal paravaginal repair

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## Introduction

A complete understanding and accurate identification of the anatomic defects contributing to pelvic organ prolapse is imperative for the success of any pelvic

reconstructive surgical procedure. Site-specific fascial defects have recently been reported in the etiology of pelvic floor relaxation [1]. The vagina is a flattened fibromuscular tube lined by mucosa, with pubocervical fascia constituting its anterior wall and rectovaginal fascia the posterior wall. In his description of the anatomy of the vaginal supports DeLancey [2] recognized three levels – suspension, lateral attachment and fusion – as important elements in maintaining the integrity of this fibromuscular tube. All bulges into the vagina, whether anterior, posterior or apical, represent a break in the continuity of this fibrous tissue and/or loss of its suspension, attachment or fusion to adjacent structures. Prolapse of the anterior vaginal wall may be due to site-specific fascial defects in the pubocervical fascia, which can be classified as midline, transverse, lateral (paravaginal) or a combination. Attenuation or weakening of the endopelvic fascia may also contribute to the degree of prolapse.

In 1909, recognizing that the high failure rate in the surgical correction of cystoceles was due to a misunderstanding of their etiology, White [3,4] described the paravaginal repair, an anatomic operation for the correction of cystoceles. Richardson [1] more recently popularized this as an abdominal operation. Shull et al. [5] have reported on the safety and efficacy of the transvaginal approach to the repair. Despite the growing popularity of the paravaginal repair for displacement cystocele, there are few data reporting its clinical outcomes. The objective of this study was to report our clinical experience with and to evaluate the anatomic and functional results of vaginal paravaginal repair for the correction of site-specific support defects in anterior vaginal wall prolapse.

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## Materials and Methods

Between March 1995 and May 1997, a total of 228 patients at our institution underwent reconstructive surgery for symptomatic pelvic organ prolapse. Each presented one or more site-specific anatomic defects. In those noted to have bilateral paravaginal defects, 45 were repaired using a vaginal paravaginal approach. Additional prolapse procedures were performed as indicated. Each patient had a complete preoperative evaluation, including site-specific analysis of pelvic support defects at various pelvic sites, including the urethra, bladder, cervix or cuff, cul-de-sac and rectum. The half-way system of Baden and Walker was used to grade these various defects [6]. Simple cystometry and/or multichannel urodynamics were performed to assess urinary incontinence. Twenty-one of the 45 were noted to have findings consistent with genuine stress incontinence.

The technique of vaginal paravaginal repair was standardized. The bladder neck and the bladder base are marked with sutures in the vaginal mucosa (Fig. 1A). Using a midline incision in the vaginal mucosa of the anterior vaginal wall, the vaginal epithelium is sharply dissected off the underlying pubocervical fascia. The dissection is extended from just below the external urinary meatus to near the vaginal apex. Laterally the epithelium is dissected to the pelvic side wall from immediately behind the pubic ramus up to the level of the ischial spine. If indicated a midline plication of the cystocele is performed at this time (Fig. 1B). Careful examination in the area of the lateral dissection confirmed bilateral paravaginal defects in all patients (Fig. 1C). These defects are characterized by partial or complete detachment of the pubocervical fascia from the arcus tendinous, revealing retropubic fat in the area of the defect. Blunt finger dissection is then used to gain complete access to the retropubic space bilaterally.

The obturator internus fascia and the arcus tendinous fasciae pelvis (white line) are identified by palpation and then visually (Fig. 1D). The first suture (2/0 Ethibond, Somerville, NJ) is placed in the white line approximately 1 cm anterior to the ischial spine. A series of 4–6 sutures are then placed along the arcus tendineus from the ischial spine to the inner aspect of the symphysis at the level of the bladder neck (Fig. 1D). A three-point closure is then performed, incorporating the arcus tendinous, the lateral edge of the pubocervical fascia and the vaginal epithelium (Fig. 1E,F). The sutures are tied sequentially, beginning with the one near the ischial spine and ending with the periurethral stitches. Cystoscopy was performed in all patients to exclude ureteral obstruction and inadvertent stitch penetration into the bladder lumen.

A chart review of the operative information was conducted. Intraoperative data collected included the types of procedures performed, method of anesthesia, estimated blood loss, and complications. The postoperative course was reviewed for duration of hospital stay, duration of catheterization and procedure-related complications. Postoperative follow-up evaluations were

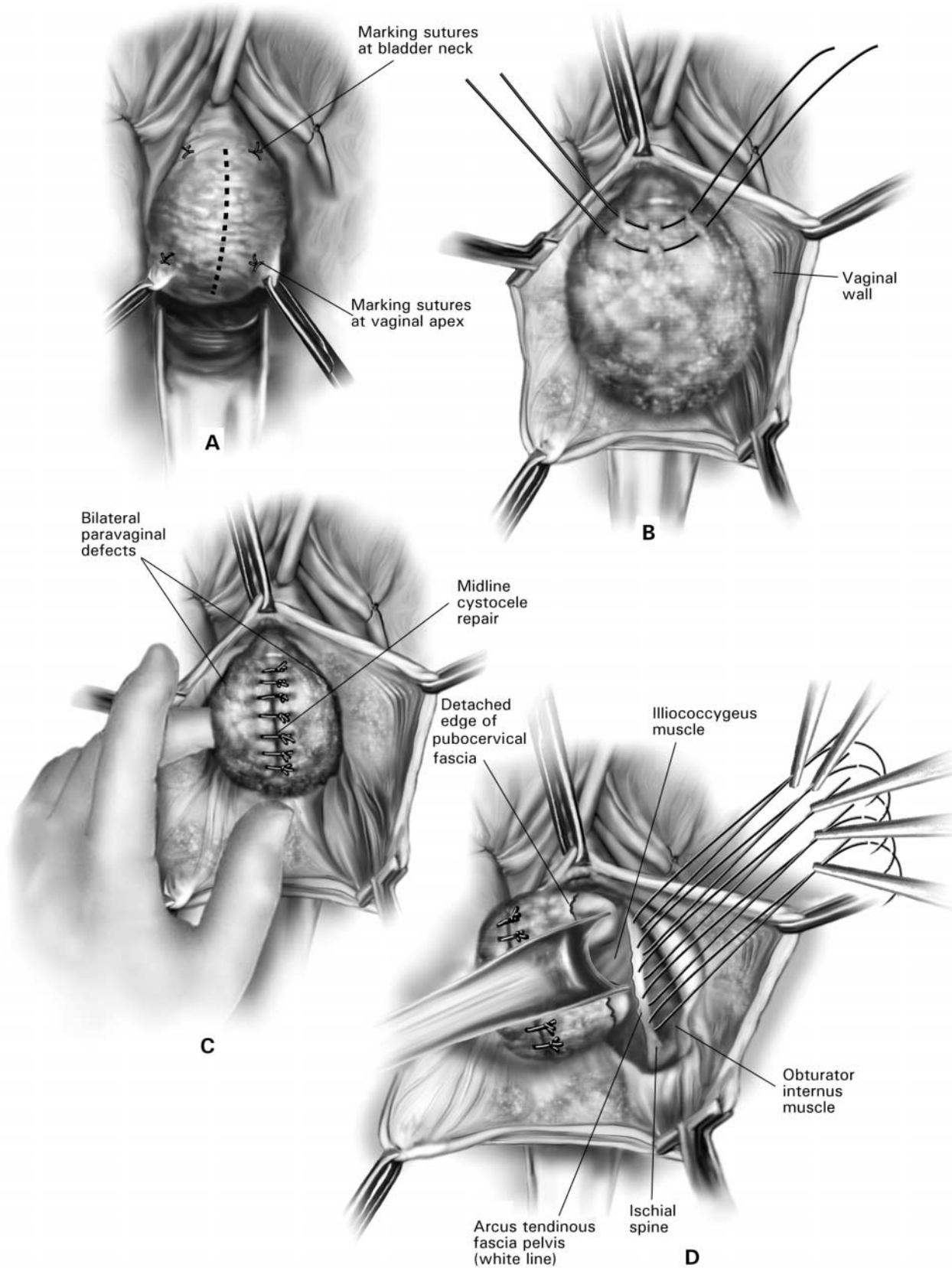
conducted at six weeks and then longitudinally to assess anatomic and functional outcome. Anatomic outcome was based on vaginal examination, with grading of vaginal wall support according to the half-way system of Baden and Walker. Functional outcome was assessed using the standing stress test with a full bladder and the incontinence Impact Questionnaire/Urogenital Distress Inventory (IIQ/UDI) short form [7]. The IIQ is a lifestyle impact assessment instrument specific to urinary incontinence and the UDI is a symptom inventory specific to symptoms associated with lower urinary tract dysfunction and genital prolapse. Answers of none, slightly, moderately or greatly are assigned a numerical value of 0, 1, 2 and 3, respectively. Follow-up urodynamics were not routinely performed but were done if indicated by urinary symptoms. Sexual function and bowel function were assessed by verbal questionnaire.

## Results

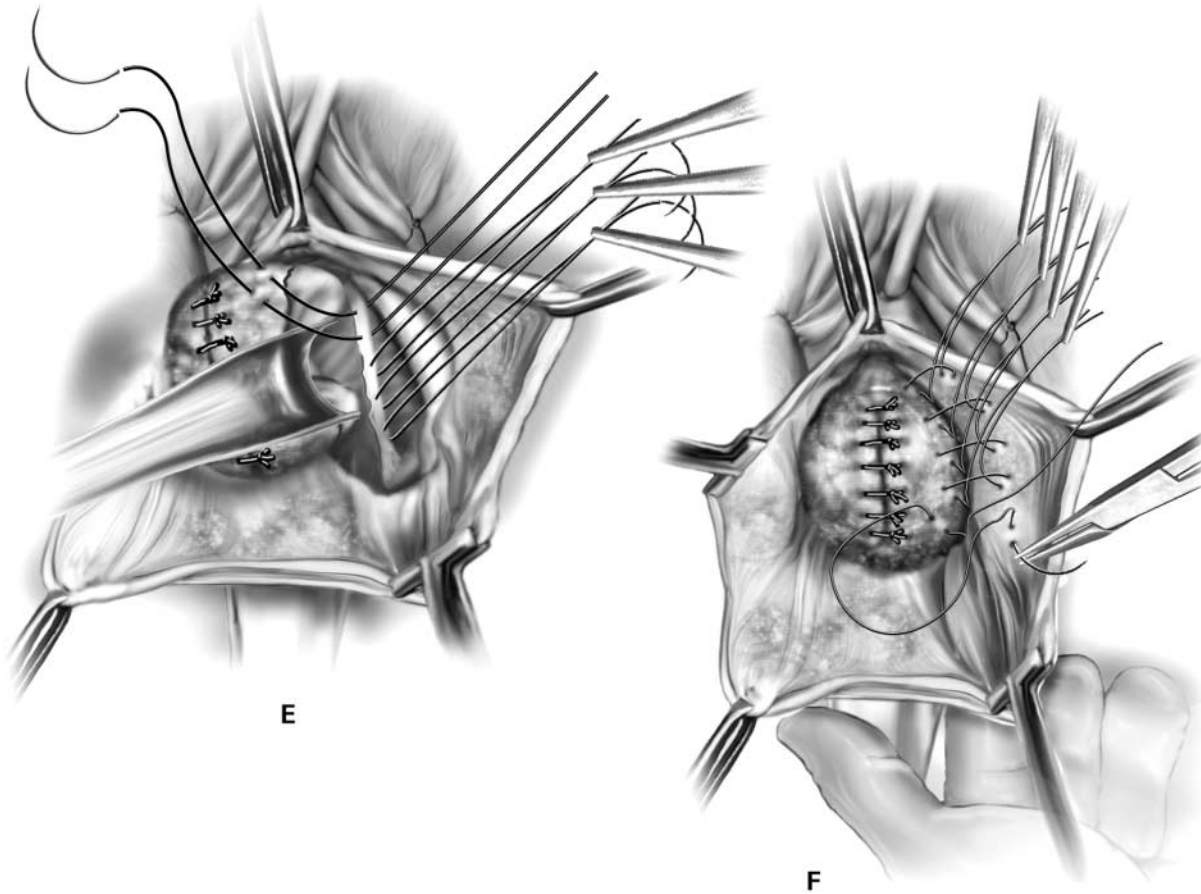
The mean age of the patients was  $65.9 \pm 2$  years (range 35–76). The various support defects in the study group and their gradings are shown in Table 1. Twenty-one patients (47%) had coexisting stress urinary incontinence. The most common concurrent surgical procedures performed were anterior and posterior colpoproctorrhaphy (100%), vaginal hysterectomy (40%), enterocele repair (40%), McCall's culdoplasty (27%) and sacrospinous fixation (27%).

The most common method of anesthesia was general endotracheal (40/45) and 5 patients had epidural anesthesia. The median estimated blood loss was 400 ml (range 100–1000 ml). Postoperatively the mean length of stay was  $2.6 \pm 1.1$  days (range 1–6) and urethral catheterization was required for a median of 7 days (range 1–42). Intraoperative complications included one case of bilateral ureteral obstruction requiring takedown of the repair and suture replacement. This patient had total proctocentesis and required extensive pelvic reconstruction. She is now doing well 28 months from surgery with no evidence of recurrent prolapse. Postoperative morbidity included one retropubic hematoma requiring re-exploration and two vaginal abscesses. One of the vaginal abscesses, which presented 3 weeks after the operation, occurred in a patient who preoperatively had had a total vaginal prolapse and had undergone a sacrospinous vaginal suspension and anterior and posterior colporrhaphies in addition to her vaginal paravaginal repair. After drainage there was some scarring and moderate shortening of the vagina.

The mean duration of follow-up was  $20.18 \pm 8.5$  months (range 0.8–34.63): 35 patients were followed for a minimum of 1 year to a maximum of 2.85 years. The rate of recurrent displacement cystocele following vaginal paravaginal repair was 3% (1/35). This patient developed recurrent anterior vaginal wall prolapse (grade 2) 6 months postoperatively and was treated



**Fig. 1A.** Unopened anterior vaginal wall with marking sutures placed at anatomic level of bladder neck and vaginal apex. **B** Anterior vaginal wall opened via a midline incision. Sutures placed for midline cystocele repair. **C** Midline cystocele repair completed. Bilateral paravaginal defects identified. **D** Bladder retracted medially to expose lateral pelvic side wall. Permanent sutures have been passed through the white line.



**Fig. 1E.** Top two sutures have been passed through detached edge of pubocervical fascia. **F** Three-point closure is completed with all sutures passed through the pubocervical fascia and inside wall of the vagina.

**Table 1.** Preoperative site-specific support defects and grading (Baden and Walker)

Grade of the defect	Cystocele	Rectocele	Enterocele	Vaginal vault/uterus
1	0	31	17	10
2	7	2	4	5
3	24	5	6	8
4	14	7	6	13

Total number of patients = 45.

successfully with partial colpoclectomy/colpocleisis. Two other patients developed mild (grade 1) midline anterior defects that are asymptomatic at 12 months and 31 months postoperatively. Both of these patients had grade 3 prolapse of the anterior vaginal segment preoperatively. Recurrent enterocele was noted in 7 patients (20%) and recurrent rectocele in 5 (14%). Five of the enteroceles were grade 1 and two were grade 2. Four of the rectoceles were grade 1 and one was grade 2. The 2 patients with grade 2 posterior vaginal wall defects (one

with a grade 2 enterocele and grade 2 rectocele and the other with grade 2 enterocele) have chosen to be observed. In no patient did vault prolapse develop or recur.

Twenty-one patients had genuine stress urinary incontinence demonstrated by office cystometry and/or multichannel urodynamics, although none had severe or total incontinence. In all patients urinary incontinence was either mild or was demonstrable only with reduction of the prolapse with a single blade of a bivalved speculum (potential incontinence). Of the 21 patients, 9 were dry and 12 had subjective or objective evidence of persistent stress urinary incontinence at follow-up. Eight of the latter 12 had subjective symptoms of persistent urinary incontinence. They declined further testing, as they had only noted minimal urine loss and did not regard it as a problem. Four had genuine stress urinary incontinence on urodynamics. Three of these elected for conservative management with Kegel exercises and bladder retraining. One patient felt it was sufficiently a problem to pursue further treatment: her findings were consistent with ISD and she was cured with periurethral collagen injections.

Thirty five per cent of the patients were sexually active preoperatively. All but 2 of these have either maintained their sexual function postoperatively without diminished satisfaction, or have noted an improvement. Two patients reported mild dyspareunia on follow-up that has not precluded them from having intercourse. Three patients who could not have intercourse preoperatively are now sexually active. The mean score on the IIQ/UDI short form was 0.40 (0 = none, 1 = slightly). The mean score for UDI was 0.26. The mean score for urgency/frequency symptoms was 0.88, that for stress incontinence was 0.44, and that for voiding dysfunction was 0.33.

## Discussion

Anterior vaginal wall prolapse is one of the most challenging aspects of surgical gynecology. The traditional midline anterior colporrhaphy was designed on the assumption that anterior vaginal wall prolapse was caused by attenuation and weakening of the fascial supports of the bladder and the vaginal wall. White [3,4] first described the paravaginal repair in 1909 as an alternative to anterior colporrhaphy for the correction of cystoceles. The concept of site-specific fascial defects popularized by Richardson et al. [1] form the basis for the current paravaginal defect repair, which can be performed abdominally, vaginally or laparoscopically. The transvaginal approach is particularly attractive because the coexisting anterior support defects, as well as defects in all other sites, can be repaired vaginally, thereby providing the patient with the advantages of vaginal surgery: minimal hospitalization, reduced recovery time and decreased morbidity and mortality.

The paravaginal repair restores the lateral attachment of the vagina to the pelvic side wall and seems to be a more effective approach to the correction of anterior vaginal wall prolapse caused by loss of lateral support [6]. Shull et al. [5] reported on their experience with 62 patients with bilateral paravaginal defects and found it to be a safe and effective method of correcting anterior vaginal wall prolapse. Cross et al. utilizing the technique of paravaginal repair for suspension of the vaginal cuff to the arcus tendineus, report a 14% recurrent cystocele rate in their series of 29 patients [8]. Although the vaginal paravaginal repair is being performed routinely at several centers, there have been no further studies on its safety and efficacy. Vaginal paravaginal repair is technically a more difficult procedure, with the potential for serious complications compared to midline anterior colporrhaphy, and it is imperative that its safety and efficacy be established. We have analyzed 45 consecutive patients who underwent vaginal paravaginal repair by a single primary surgeon at our institution. This ensured uniformity in the technique and eliminated operator bias, so that a meaningful analysis of efficacy could be performed.

The incidence of the two major complications (retropubic hematoma requiring re-exploration and one

bilateral ureteral obstruction) in our series is relatively low, given the fact that 38 of the 45 patients had advanced anterior vaginal wall prolapse (grades 3 or 4) with multiple coexisting support defects at various vaginal sites. The patient with bilateral ureteral obstruction had procidentia and underwent major reconstructive vaginal surgery that puts her at risk for ureteral obstruction even without a paravaginal repair.

Thirty-five of the 45 patients have been followed for a minimum of 1 year to a maximum of 2.85 years. The procedure-specific failure rate of 3% (1/35) speaks for the durability of this procedure performed vaginally. The two cases of midline recurrence were asymptomatic at last follow-up of 12 and 31 months respectively, and none is as large as the preoperative defect. The etiology of the high failure rate in the posterior compartment is unclear. It could possibly be related to an inadequate repair of the initial defects, or might be the result of an over correction of the lateral defects in the anterior vaginal wall. In addition, the size of the levator hiatus and the strength of the pelvic floor muscle in each individual patient may affect their risk of recurrent prolapse.

It is well known that genital prolapse and urinary incontinence frequently coexist in the same patient. On the other hand, severe prolapse may mask potential stress urinary incontinence because of urethral kinking or external urethral compression. The management of coexisting prolapse and clinical or potential genuine stress urinary incontinence remains controversial. The success rate of the paravaginal repair in the correction of genuine stress urinary incontinence due to urethral hypermobility is variable. Richardson et al. and Shull et al. have reported success rates as high as 93% and 97%, respectively [9,10]. In a randomized comparison of Burch colposuspension and abdominal paravaginal repair for stress urinary incontinence, Colombo et al. [1] found the success rate to be 61% in the paravaginal group, compared to a 100% success rate in the Burch group. We used the vaginal paravaginal repair and Kelly plication for bladder neck stabilization and did not perform any other bladder suspension procedures. All our patients were carefully chosen and had mild or potential urinary incontinence at presentation. On follow-up, 12 patients (57%) had subjective or objective evidence of stress urinary incontinence, but only 1 patient considered her condition severe enough to warrant further therapy, and underwent two periurethral collagen injections. Based on our data the usefulness of vaginal paravaginal repair for the correction of stress urinary incontinence is limited to a selected group of patients. For patients with overt incontinence a traditional anti-incontinence procedure, such as a suburethral sling or a retropubic urethropexy, is preferable.

The vaginal paravaginal repair is an anatomic operation designed to correct anatomic defects. However, as with any other pelvic reconstructive surgery, restoration of function is just as important an issue in evaluating the efficacy of this surgical procedure. Our

study indicates good functional results, with improvements in quality of life and sexual function.

## Conclusion

The vaginal paravaginal repair is a safe and effective technique for the surgical correction of anterior vaginal wall prolapse and provides excellent anatomic results based on intermediate follow-up. Further long-term follow-up studies would be helpful and are currently in progress. The vaginal paravaginal repair provides adequate exposure to the relevant anatomy and is a helpful adjunctive procedure when anatomic correction of pelvic support defects is being performed through an exclusive transvaginal approach.

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**EDITORIAL COMMENT: The vaginal approach to retropubic space surgery is technically challenging, but experienced pelvic surgeons may find a role for it in selected patients. The authors have provided a clear description of the approach and of the surgical repair. There are, however, inherent risks to the operation. A clear message from the authors is that vaginal paravaginal repair is NOT an operation for urinary incontinence.**

## Review of Current Literature

### The Effect of Estrogen Supplementation on Postmenopausal Urinary Stress Incontinence: A Double-Blind Placebo-Controlled Trial

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Hormone replacement may have a therapeutic role in postmenopausal urinary incontinence. The study objective was to evaluate 6 months of unopposed estradiol valerate 2 mg once daily in the treatment of urinary stress incontinence in postmenopausal patients. Urodynamic parameters, general health scores, urinary tract symptoms questionnaire, urinary diary, and 1-hour pad test were used in the comparison. Serum estradiol levels were measured to assure compliance. Sixty-seven women were

selected and those taking estrogen had good compliance. No significant effect was observed for estrogen therapy in general health status, urinary symptoms, objective assessment of incontinence, diary data or urodynamic parameters.

#### Comment

It seems unlikely that estrogen has a role in the treatment of postmenopausal stress incontinence. It is unfortunate that the study had so few patients; however, although estrogen is useful in treating urinary irritative symptoms, its usefulness in treating stress incontinence is not apparent. It would not be appropriate to prescribe estrogen in the absence of other therapies for managing stress incontinence.