

## MASTER CLASS

## Treating Advanced Pelvic Prolapse



CHARLES E. MILLER, M.D.

It is estimated that 50% of parous women have evidence of loss of pelvic support.

Today, women with advanced pelvic organ prolapse have a number of surgical options. In a 1997 study by Olsen et al., the authors included 13 different procedures to treat advanced pelvic organ prolapse (Obstet. Gynecol. 1997;89:501-6). Since the date of that article, many more procedures – laparoscopic, robot-assisted, and vaginal – have been described and utilized to treat advanced organ prolapse. Even with the ability to use

minimally invasive abdominal techniques, many physicians continue to prefer a vaginal route to correct advanced pelvic organ prolapse. They cite the fact that a vaginal approach is associated with reduced hospitalization, less postoperative pain, a faster return to normal activity, and a superior cosmetic result.

Over the past 40 years, one of the most popular procedures in the vaginal surgeon's armamentarium has been the sacrospinous ligament suspension. More recently, the procedure has been described with mesh placement as well.

We have asked an expert on this surgical technique, Dr. Neeraj Kohli, to write this Gynecologic Surgery Master Class. Dr. Kohli is a leader in the field of minimally invasive pelvic surgery and the treatment of pelvic

prolapse and urinary incontinence. He is director of the division of urogynecology at Brigham and Women's Hospital and assistant professor of obstetrics and gynecology at Harvard Medical School, both in Boston. ■

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## Sacrospinous Ligament Suspension, With and Without Mesh

The sacrospinous ligament suspension technique was first described by Karl Richter in 1968 and later introduced into the United States by David H. Nichols and Clyde L. Randall in 1971. It has been and continues to be an effective technique for apical suspension via the vaginal route, and is a valuable addition to the surgical armamentarium of the gynecologic surgeon.

In the 1990s, the procedure was done less frequently because of the popularity of uterosacral ligament suspension. Recently, however, sacrospinous ligament suspension has regained popularity for various reasons. The uterosacral ligament technique, for one, requires peritoneal entry, and the ligament is often of variable strength and also can sometimes be difficult to identify.

In addition, new tools and variations in technique, such as use of the Capiro needle driver, have made sacrospinous ligament suspension easier and safer. Finally, the popularity of vaginal mesh procedures has created renewed interest in sacrospinous suspension as a direct visualization attachment technique for apical mesh, compared with trocar/needle-based techniques, which involve blind passage and possible injury to the bowel and bladder.

With proper technique, the procedure is safe, effective, and durable and has few complications related to future sexual function. Long-term success rates have been excellent in properly selected patients.

## Indications

Various techniques of apical suspension are available to the gynecologic surgeon. Sacrospinous suspension is indicated in patients with adequate vaginal length who desire a vaginal procedure. An office-based exam should be performed to assess vaginal length and location/severity of prolapse.

Oftentimes, the procedure can be performed using the traditional technique with attachment of the vaginal mucosa or with mesh augmentation using the

sacrospinous sutures as the apical mesh attachment points. In my practice, the procedure is contraindicated in patients with a short vagina, chronic pelvic pain, or any history of sciatica.

## Prior to Surgery

Vaginal exam prior to initial dissection is helpful in ensuring that the vagina is of adequate length to reach the sacrospinous ligament. Marking of the vaginal apex for placement of suspension sutures sites also is helpful. The vagina is reapproximated to either or both sacrospinous ligaments using an Allis clamp, which is then adjusted in order to maximize vaginal length and reapproximation to the corresponding ligament. The

location of the Allis clamp is then tagged with a full thickness marking suture.

## Surgical Dissection

The procedure begins with entry into the sacrospinous space. Traditionally, this dissection has been described through a posterior vaginal mucosal incision associated with rectocele repair. A midline incision is made from the perineal body to the vaginal apex. The vaginal mucosa is then dissected off the underlying rectovaginal septum distally and any enterocele proximally. In the upper third of the vagina, lateral dissection is extended in the pararectal space until areolar tissue is encountered. Blunt dissection is then performed toward the ischial spine in a back-and-forth manner.

The relevant anatomy including the ischial spine, the sacrospinous ligament, the coccygeus muscle, and the lateral side wall with White's line, is identified (Fig. A). An identical dissection is performed on the contralateral side.

An anterior approach to sacrospinous suspension was described by Peter K. Sands et al. in 2000. This is especially helpful if the patient has only anterior and apical defects without the need for rectocele dissection or is undergoing an anterior mesh augmentation procedure. The anterior vaginal wall is opened, and

the endopelvic connective tissue is separated from the pubic ramus at the level of the bladder neck to the ischial spine, exposing the paravesical and pararectal space. The sacrospinous ligament is identified and isolated through this defect.

Perhaps the easiest method of entering the sacrospinous space is through a midcompartment approach just lateral to the enterocele. This is often described with isolated apical/enterocele defects. The vaginal mucosa over the apex/enterocele is incised in the midline. The edges of the incision are grasped using Allis clamps, and lateral dissection is performed between the vaginal mucosa and enterocele sac until loose areolar tissue is noted. Blunt finger dissection in a back-and-forth motion is performed to the ischial spine.

An identical procedure is then performed on the contralateral side. Such midcompartment dissection is associated with very little bleeding and quick access to the sacrospinous space.

## Suture Placement

A variety of tools and techniques have been described to place the sacrospinous suspension sutures. Traditionally, suture placement has been described using a standard needle holder, Miya hook, DesChamps ligature, Shutt punch, or Nichols-Veronikis ligature carrier. Each device is loaded with the suture/needle.

Vaginal retractors (I prefer the Breisky-Navratil retractors) are

used to gain exposure to the sacrospinous space until the ligament is visualized. The suture is placed around the sacrospinous ligament approximately two fingerbreadths medial to the ischial spine, with care given to avoid injury to the pudendal neurovascular bundle (Fig. B).

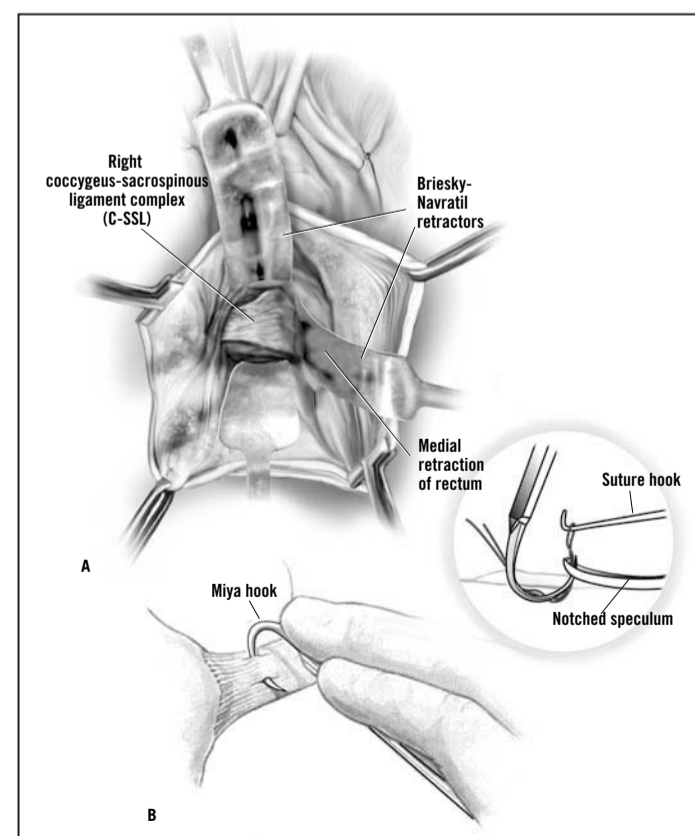
A permanent suture (Ethibond or Gore-Tex) is used for a pulley stitch attachment, while a delayed absorbable suture such as polydioxanone (PDS) is used for a full thickness vaginal attachment. A second suture may be placed just slightly medial to the first at the surgeon's discretion. Bilateral sacrospinous sutures also could be placed. Bilateral suspension sutures are especially useful when considering mesh augmentation of the anterior and/or posterior segment.

More recently, traditional devices have

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A. Here Briesky-Navratil retractors are used to retract the rectum medially and the bladder superiorly. B. Here is the technique of passage of a Miya hook through the ligament. Inset is the technique of retrieval of the suture.

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been replaced with the Capiro needle driver. This is a disposable multiuse suture retrieval device which makes sacrospinous ligament suspension significantly easier, faster, and safer. The device has a medium caliber shaft with a plunger for suture application. The end has a hook which allows push-catch retrieval of a small needle-based suture. Various permanent and delayed absorbable sutures are available. Under direct finger guidance, the device is used to hook the sacrospinous ligament at the appropriate location. Depression of the plunger passes the needle through the ligament, and the needle is then retrieved by fins on the other side. Removal of the device completes placement of the suture.

One of the true benefits of the Capiro needle driver is the ability to perform suture placement under direct finger guidance without the need for visualization using retractors – a benefit that minimizes the extent of dissection and the time involved. In my opinion, this device has revolutionized sacrospinous suspension by allowing more physicians to perform the procedure safely and effectively.

The next evolution in sacrospinous suspension will include anchor-based single-point attachment – an approach that has recently become available and may supplant traditional suture placement, which can potentially strangulate tissue and result in postoperative pain. Additional clinical experience is required before this technique can be supported, but initial results are encouraging, especially with respect to postoperative sacrospinous pain.

### Completion of Procedure

Once the suture(s) are in place, a rectal exam is recommended to exclude unintentional rectal injury or suture placement. Once confirmed, tie-down of the sutures can be completed. In cases of simple sacrospinous suspension, the suture is taken through the vagina at the apex marked prior to initial incision. Two techniques are available for this.

The traditional pulley technique with permanent suture is taken through full thickness vagina excluding the epithelium, and then tied down prior to closure of the mucosal incision, thereby burying the knot under the mucosa. This sometimes can be technically confusing and difficult, and may reduce the strength of vaginal attachment. The benefit of this technique is use of a permanent suspension suture.

An alternative technique utilizes delayed absorbable suture and involves both arms of the suture being taken through the full thickness vaginal mucosa at the apex (Fig. C, D). The mucosal incision is then closed followed by suture(s) tie-down (Fig. E, F). I prefer this technique as it is technically easier and allows full thickness attachment of the vagina. More importantly, it gives the surgeon easy access to the suspension sutures if the sutures need to be removed in the postoperative period in cases of persistent postoperative pain.

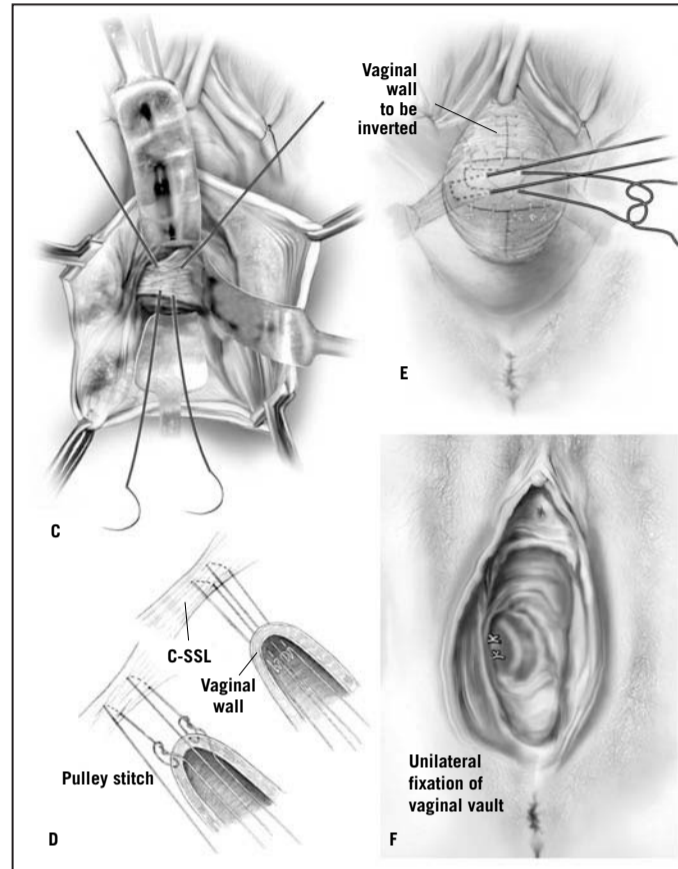
Regardless of technique, it is impor-

tant to tie down the suture securely, but not tightly, as strangulation of the sacrospinous tissue may increase the chances of postoperative pain.

I prefer bilateral sacrospinous suspension sutures with only one attachment on each side in order to minimize deviation of the vagina to one side as well as to maximize support. A single suture on each side also removes any confusion over which suture may be involved in uncommon intraoperative complica-

In addition, it's important to assess the tissue bridge spanning the sacrospinous ligaments to make sure this is not too tight. A tight bridge may cause significant postoperative pain as well as defecatory dysfunction by partially obstructing the rectosigmoid. When using a mesh, this bridge can be minimized by cutting the apical transverse distance to at least 10 cm.

Cystoscopy with IV indigo carmine is performed at the end of the procedure to



**C.** Here two sutures have been passed through the complex. **D.** Technique of fixing the vaginal apex to the coccygeus-sacrospinous ligament complex (C-SSL). If a pulley stitch is performed, then permanent sutures should be used. If the sutures are passed through the vaginal epithelium and tied in the vaginal lumen, then delayed absorbable sutures should be used. **E.** The vagina is closed prior to tying the suspension sutures. **F.** Tied sacrospinous sutures.

tions such as rectal penetration or ureteral kinking.

If mesh/graft augmentation is being performed, the bilateral sacrospinous suspension sutures are taken through the apical lateral extensions of the trapezoid-shaped mesh and tied down. Although permanent suture can be used for this technique, I would recommend the use of delayed absorbable suture; permanent suture can sometimes strangulate the sacrospinous ligament with contraction of the mesh/graft over time.

After initial tie-down, these suspension sutures then can be taken through the vaginal apex as described above for further apical support. The distal ends of the mesh are then attached to the pubocervical fascia lateral to the bladder neck or the perineal body, depending on whether the procedure involves anterior or posterior mesh placement, respectively.

If mesh is used, hemostasis should be ensured when the vagina is closed using interrupted suture with little or no mucosal excision, thereby minimizing tension at the suture line and hopefully reducing the risk of postoperative mesh exposure.

A rectal exam should be done to exclude rectal injury/stitch penetration.

exclude unintentional urethral extraction/kinking. The vagina is packed at the surgeon's discretion.

### Preventing, Managing Complications

With proper technique, complications associated with the sacrospinous suspension are relatively uncommon.

They can be broadly categorized as occurring intraoperatively and postoperatively, and can be largely avoided by minimizing wide dissection, by placing sutures at least 2 cm medial to the ischial spine to avoid injury to the pudendal neurovascular bundle, and by always performing a rectal exam as well as cystoscopy with

IV indigo carmine following the surgical procedure.

### Intraoperative Complications

Intraoperative complications can be associated with dissection into the sacrospinous space and placement of the suspension suture. Dissection-related complications include injury to the rectosigmoid as well as bleeding during dissection. It is important to make sure that dissection of the endopelvic fascia is performed sharply until a relatively avascular and areolar space is created; at this time, blunt dissection with the surgeon's finger can be easily accomplished.

Hugging the lateral side wall on each side should minimize risk of injury to the bowel. Rectal exam after placement of the suture is essential to the diagnosis of any unintentional bowel injury or suture penetration. Any confirmed rectal injury would need repair at the time of surgery.

Use of finger dissection in a back-and-forth motion rather than a sweeping up-down or side-side motion will minimize injury to the surrounding vasculature while still creating a tract large enough to place the suture. Placement of the suture can occasionally be associated

with bleeding if there is any injury to the pudendal neurovascular bundle or its associated branches.

Oftentimes, tie-down of the suspension suture will control the bleeder. If there is persistent and uncontrollable bleeding, it is best not to be overly aggressive with hemostatic sutures or surgical clips, as these may result in increasing injury to the pudendal neurovascular bundle. Adequate exposure and suction are essential. Initial control of the hemostasis with pressure and tape-nade for several minutes is usually successful. Placement of hemostatic agents such as Surgicel or Flo-Seal is often effective, followed by suture/clip placement if needed. Postoperative embolization for persistent bleeders has also been reported.

Placement of the suture also can sometimes be associated with ureteral kinking/obstruction. Following tie-down of the suspension sutures, cystoscopy with IV indigo carmine is recommended. If the ureter fails to spill on either side, repeat IV indigo carmine followed by ureteral stent placement is suggested. Stent placement will allow one to determine the relative site of obstruction based on how far the stent can be inserted. Typically, obstruction associated with sacrospinous sutures allows the stent to be passed 5-9 cm.

Removal of the suspension suture almost always results in resolution of the obstruction with resulting ureteral spill. A repeat suspension suture could then be placed slightly more medial at the surgeon's discretion. Repeat cystoscopy should be performed to confirm continued ureteral patency.

### Postoperative Complications

Postoperative complications include hematoma/bleeding and complaints of buttock pain secondary to the involvement of the pudendal nerve branches. Bleeding should be banished accordingly. If bleeding is significant, reoperation or embolization is generally the best option. Small self-limited hematomas can be expectantly managed or drained via vaginal access as needed. It may be best to drain hematomas in cases in which mesh was placed at the time of sacrospinous suspension so as to prevent significant abscess and postoperative infection.

Mild buttock discomfort following sacrospinous suspension is not uncommon, and it is usually managed conservatively with observation, nonsteroidals, and muscle relaxants such as baclofen. The patient should be monitored on a weekly basis to ensure continued improvement.

For severe or persistent pain, removal of the suture should be considered; this is easiest if the suture was tied transvaginally rather than with the traditional pulley stitch technique. (In the latter case, suture removal involves opening the vagina.) Transvaginal excision of the suspension sutures can often be performed in the office or at the bedside with a lighted speculum and long scissors. Most patients report almost immediate relief after removal of the suture. ■

DR. KOHLI said he had no relevant conflicts of interest to disclose.