

Innovative surgical techniques for managing Peyronie's disease: a video presentation

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Abstract: Peyronie's disease is a disorder caused by fibrosis of the tunica albuginea, which results in penile deformity, pain, and can be associated with erectile dysfunction. Treatment options include a variety of medical and surgical approaches, with no clear consensus as to the best treatment option. Many medical therapies have been investigated, including oral, topical, injectable, and external-energy agents. Surgical management can involve plication with or without plaque resection, grafting procedures, or, in extreme cases, penile prosthesis implantation. Two of these treatment techniques are presented in a detailed technical review: the 16-dot plication and tunica-sparing plaque excision.

Keywords: Peyronie's disease; penile curvature; erectile dysfunction; penile plication; plaque excision; surgical technique



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Background

Peyronie's disease is estimated to affect at least 5% of men and underreporting is common (1,2). The disease is known to affect men as young as 18, with prevalence increasing with age and peaking at 53 years (3). Peyronie's is a disorder caused by fibrosis of the tunica albuginea, usually as a result of recurrent, often unrecognized, minor injury that accumulates over time. These fibrous plaques can also contain areas of calcification or develop into a large ossified plaque. Peyronie's presents with penile deformity, pain, and sometimes, erectile dysfunction. In some cases the penile curvature can be severe enough to prevent penetrative intercourse (4).

Management approaches

There are a variety of medical and surgical management options (3,5). Many nonsurgical options have been proposed, including conservative management ("watchful waiting"), medical therapy (6) (oral, topical, or intralesional injections), and Extracorporeal Shockwave Therapy (7,8). Surgical management includes plication with or without plaque resection, grafting procedures, or penile prosthesis

implantation (9). Here we will discuss two of these techniques: the Lue 16-dot plication (10) and Tunica-sparing excision of calcified plaque (11).

16-dot plication

Patient counseling

Prior to surgery (*Figure 1*), it is important to discuss all treatment options and their outcomes in order to ensure that patients are well informed and have appropriate expectations. Patients undergoing a plication procedure should be counseled that they may have recurrent curvature, decreased sensation, persistent pain, palpable nodules, decreased rigidity, and that indentations caused by plaques will remain after surgery. They should also be counseled that this procedure will not help them regain any penile length as the fibrotic process has already occurred and cannot be reversed. They can also be counseled on the benefits of this procedure, including little risk of causing *de novo* erectile dysfunction, which is a known complication of plaque excision. This procedure can also be performed under a local anesthetic with light sedation.



Figure 1 16-dot penile plication for Peyronie's disease (12). Available online: <http://www.asvide.com/articles/216>

Patient preparation

When the patient is in the operating room, 60 mg of papaverine is injected into the corpus cavernosum to induce a pharmacologic erection. The patient's genitalia are then shaved and prepared. After preparation, the patient's erection and the extent of curvature can be properly assessed. If the erection is not 100% rigid, intracavernous injection of saline can be used to supplement the erection. This is usually performed near the end of procedure to confirm complete correction of deformity. The patient is given one dose of peri-procedural antibiotics.

Surgical technique (13)

For dorsal curvature, the incision can be made longitudinally along the ventral midline, which is more cosmetically acceptable to patients. Prior to incision, the planned incision site is subcutaneously infiltrated with local anesthetic. A 4 to 5 cm vertical skin incision is made over the corpus spongiosum, and dissection of the subcutaneous tissues is carried out on either side of the urethra with electrocautery, taking care not to injure the corpus spongiosum medially and nerves laterally. The dots are marked on the ventral surface of the tunica, about 2 mm lateral to the corpus spongiosum and covering the entire length of the pendulous portion of the corpora cavernosa. 16 dots (2 pairs) are marked in a typical repair, but more pairs can be used as necessary. It is important to note that the most distal dots need to be at least 4 mm proximal to the glans in order to prevent injury to the glans. The dots are marked and then cauterized to prevent neuropathic pain from the needle entry sites.

Pairs of 2-0 or 3-0 braided polyester suture (such as

Ti-Cron) are placed through each set of four dots, where the suture is placed into the tunica of the first dot and the exits through the next dot (traveling about 1 cm under the tunica). This is repeated for the third and fourth dot in the same technique ("in-out, in-out") and the suture is clamped with a rubber shod. Once all the sutures have been placed, the first throw of a surgeon's knot is made in each suture, with increasing tension on the knot until the curvature appears straightened. A rubber shod is then placed just above the knot to hold it in place; this allows for adjustment of all knots until straightening has been satisfactorily achieved. A non-toothed forceps is placed just under the first throw of the knot as the suture is being tied in order to prevent over-correction, and all sutures are secured with five knots. These knots are then tucked under the suture so they will be less palpable to the patient.

A 21-gauge butterfly needle is then placed intracorporally to evacuate the blood for detumescence; diluted phenylephrine can also be used if necessary. A 5-0 Vicryl suture is used to close the needle entry site in a figure-of-eight fashion. The wound is then closed in multiple layers, using 5-0 Vicryl to close the subcutaneous tissue in two layers and then the skin with alternating vertical mattress and simple interrupted sutures.

Of note, for ventral curvature, either a dorsal midline incision or a circumcising incision can be utilized for cosmesis. It is important to identify the neurovascular bundle dorsally and a small clamp, such as a hemostat, can be used to create a small window of space between the deep dorsal vein and the dorsal arteries on either side for suture placement.

A petroleum gauze strip is placed over the incision and a 4×4 gauze sponge is wrapped gently around the shaft of the penis. A Coban™ dressing is then wrapped snugly around the penis from just under the glans to the base; this should not be too tight to avoid strangulation and ischemia. If a patient is uncircumcised, his foreskin must be retracted and included in the compression dressing to avoid paraphimosis.

Postoperative care

Patients should be instructed to use ice packs to help with pain and swelling. They need no further antibiotics and are discharged with a prescription for pain medication. The patient is seen by the physician the following day to change the compression dressing. The patient can be taught how to change the dressing and should do so daily for a total of five days postoperatively.

Patients should be instructed not to engage sexual



Figure 2 Peyronie's plaque excision and penile plication (15). Available online: <http://www.asvide.com/articles/217>

intercourse for 6-8 weeks after surgery. They may notice that they can feel the knots or suture and can be reassured that this will improve over time. They may also have some pain with erections post-operatively, which is usually self-limited.

Technical advantages

This technique has several advantages, including the ability to be performed under local anesthesia, minimal risk of causing *de novo* erectile dysfunction, and the ability to adjust sutures until adequate straightening is achieved (14). In a review of 132 patients who underwent the 16-dot plication, outcomes were excellent, with 93% of patients reporting a straight erection at six months and a 15% recurrence rate with a mean of 2.6 years of follow-up (10). Only 3% of patients noted worsening erectile function.

Tunica-sparing plaque excision

Patient counseling

Prior to the procedure (*Figure 2*), high-resolution penile ultrasonography is performed to measure the thickness of the tunica albuginea overlying the calcified portion of the plaque. In several hundred patients with calcified dorsal plaque, more than 95% have at least 2 mm of tunical thickness, which allows for adequate tunical preservation at the time of surgery.

Patients are counseled similarly to those who are undergoing routine 16-dot plication, as above.

Surgical technique

Pharmacologic erection and preparation is carried out as in

the plication. Again, a vertical ventral incision is used for dorsal curvature. We have not performed this procedure in men with ventral curvature because the calcification is usually smaller and the ventral tunica albuginea is thinner and difficult to preserve. A similar 16-dot penile plication is then performed for penile straightening; this is done prior to plaque excision to allow for an easier and more accurate straightening procedure.

Attention is now turned to the plaque. A lateral approach is used to avoid dissecting the dorsal neurovascular bundle and prevent penile numbness. The smaller lateral neurovascular bundles are dissected off the tunica and the calcified plaque is palpated, a longitudinal incision is then made over the edge of the plaque. The corporal incision should be approximately 1 cm longer than the plaque itself to allow for easy mobilization and manipulation of the plaque. A #15 blade is used to meticulously scrape the underlying erectile tissue from the ossified plaque. Microdissection under a surgical loupe (2.5× magnification) is recommended for dissecting the tunica albuginea off the underlying ossification. The plaque can be grasped with toothed forceps or a toothed clamp (such as an Allis clamp) to help facilitate dissection. This dissection is performed with a brushing motion of the blade. Of note, the blades must be replaced very often as they dull quickly against the ossified plaque.

Once the entire plaque has been separated, it is removed and several 5-0 Vicryl sutures were used to close the space occupied by the ossification. The tunica albuginea is closed primarily using an interrupted 3-0 PDS suture. This is done with the penis on stretch in order to prevent shortening of the suture line and thus preserve penile length. The subcutaneous and skin were closed as in the plication procedure described above. A similar dressing is applied.

Postoperative care

Postoperative care and instructions should be the same as for patients who undergo the 16-dot plication. In addition, these patients are started on pentoxifylline for six months in order to prevent formation of new plaques and calcification. Due to the large incision in the tunica, the patient is instructed to abstain from sexual intercourse for ten weeks.

Technical advantages

This technique offers several advantages over the standard non-tunica sparing techniques. Incision and excision of

plaques requires dissection of the neurovascular bundles or corpus spongiosum, depending on plaque location, and this may result in alteration in penile sensation. In extreme cases, this can include complete loss of penile sensation. Studies have shown that these techniques carry a 10-21% risk of altering penile sensation (16-18), whereas with the tunica-sparing technique all patients reported maintaining penile sensation (11). In addition, with plaque excision and grafting techniques there is a significant risk of *de novo* erectile dysfunction, with studies showing erectile dysfunction in 20-100% of patients in follow up (17,19). In the tunica-sparing procedure, all patients had erections sufficient for penetration after follow up (11).

In conclusion, the combination of Lue 16-dot plication and tunica-sparing plication with excision of ossified plaque provides an excellent surgical option for treatment of Peyronie's disease that is not amenable to medical management.

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Footnote

Conflict of Interest: The authors have no conflicts of interest to declare.

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