

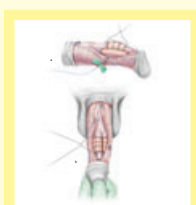
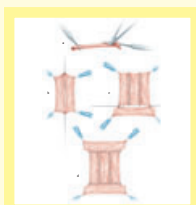
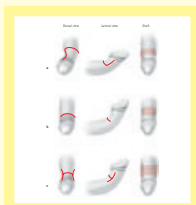
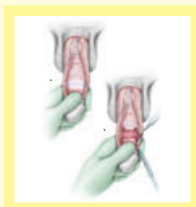
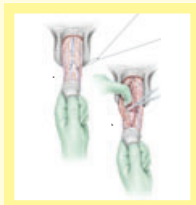
Surgery Illustrated

Surgical Atlas

Correction of Peyronie's disease: plaque incision and grafting

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INTRODUCTION

Severe penile curvature due to Peyronie's disease (PD) can lead to severe functional limitations and psychological trauma. Often the plaque can cause penile shortening and/or configurations (hourglass deformity, indentations) that cannot be addressed with simpler plication procedures. In these complex cases, plaque incision and thinning, combined with placing a graft onto the thinned tunica, allows some of the lost penile length to be reclaimed. In addition, this procedure can be tailored to correct a variety of plaque-induced configurations of the penis.

PLANNING AND PREPARATION

Indications: Patients with good erectile function with penile curvature inhibiting sexual intercourse.

Patient selection: Patients with good erectile function have a 10–15% risk of erectile dysfunction (ED) within 6 months after surgery, and a greater risk at 5 years. If erectile function is compromised before surgery the risk of further decline can be much higher. Patients with a history of coronary artery disease who are at high risk of future coronary artery bypass grafting procedures should not have a saphenous vein graft (SVG); other graft material, e.g. porcine dermis, intestinal submucosa or bovine or human pericardium, might be more appropriate in this setting. In addition to

ED, patients must be aware of the risks of temporary or permanent penile anaesthesia, and of future plaque formation and recurrent curvature.

SPECIAL EQUIPMENT

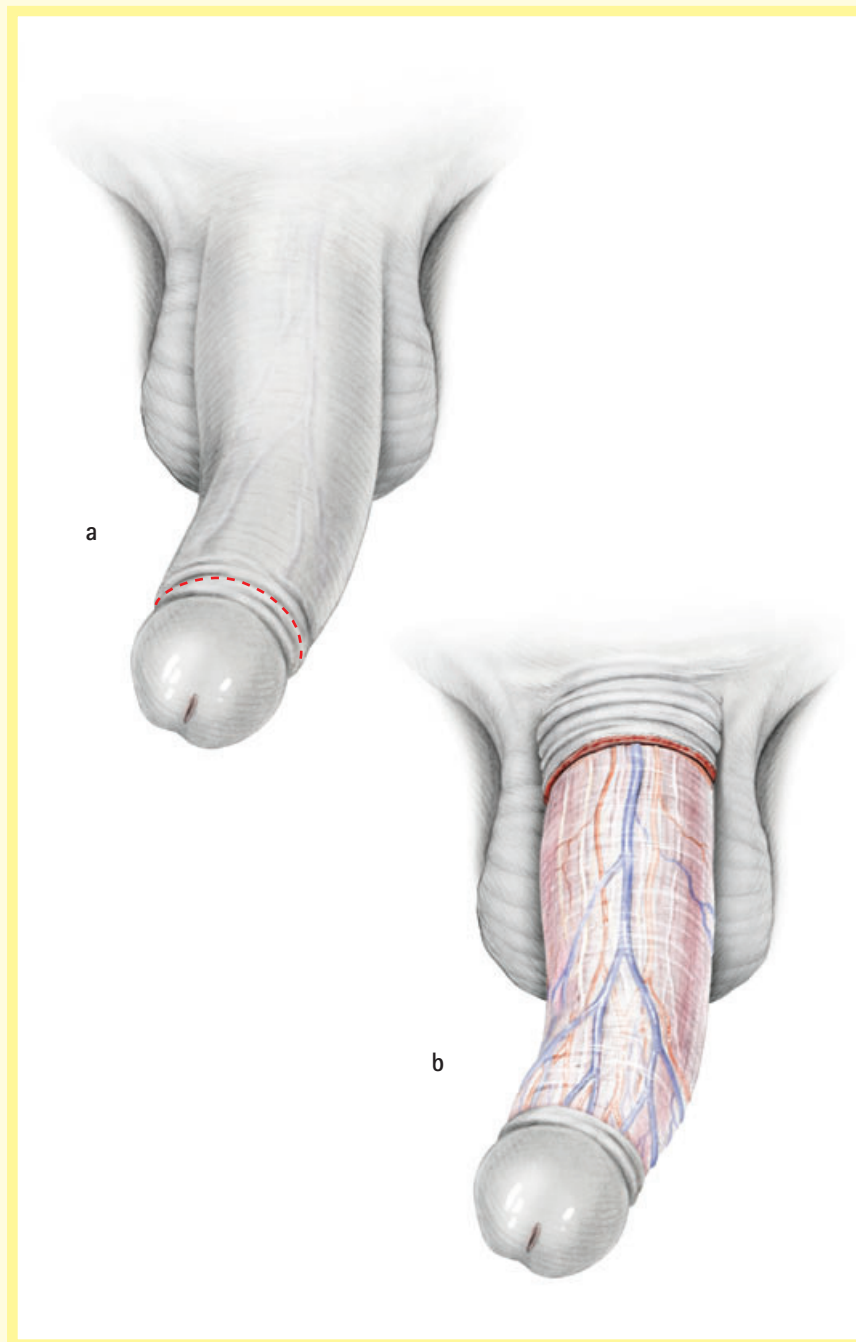
- Injectable saline for artificial erection.
- Silastic block for graft preparation.
- Vascular closure stapler (VCS), with titanium staples (for fashioning the graft, 5–0 and 4–0 polyglyconate for suturing the graft in place).
- A pair of blepharoplasty scissors for dissecting the neurovascular bundles.

PATIENT PREPARATION

We ask the patient to take photographs of the erect penis from several angles; if they cannot or will not do this, we induce a pharmacological erection in the clinic to document the length and degree of curvature. In addition, we use colour duplex ultrasonography to document the lesion characteristics (calcifications, etc.) and assess penile vascular function. Before surgery the patient is given one dose of a first-generation cephalosporin and the operative area is depilated using a clipper.

PATIENT POSITIONING

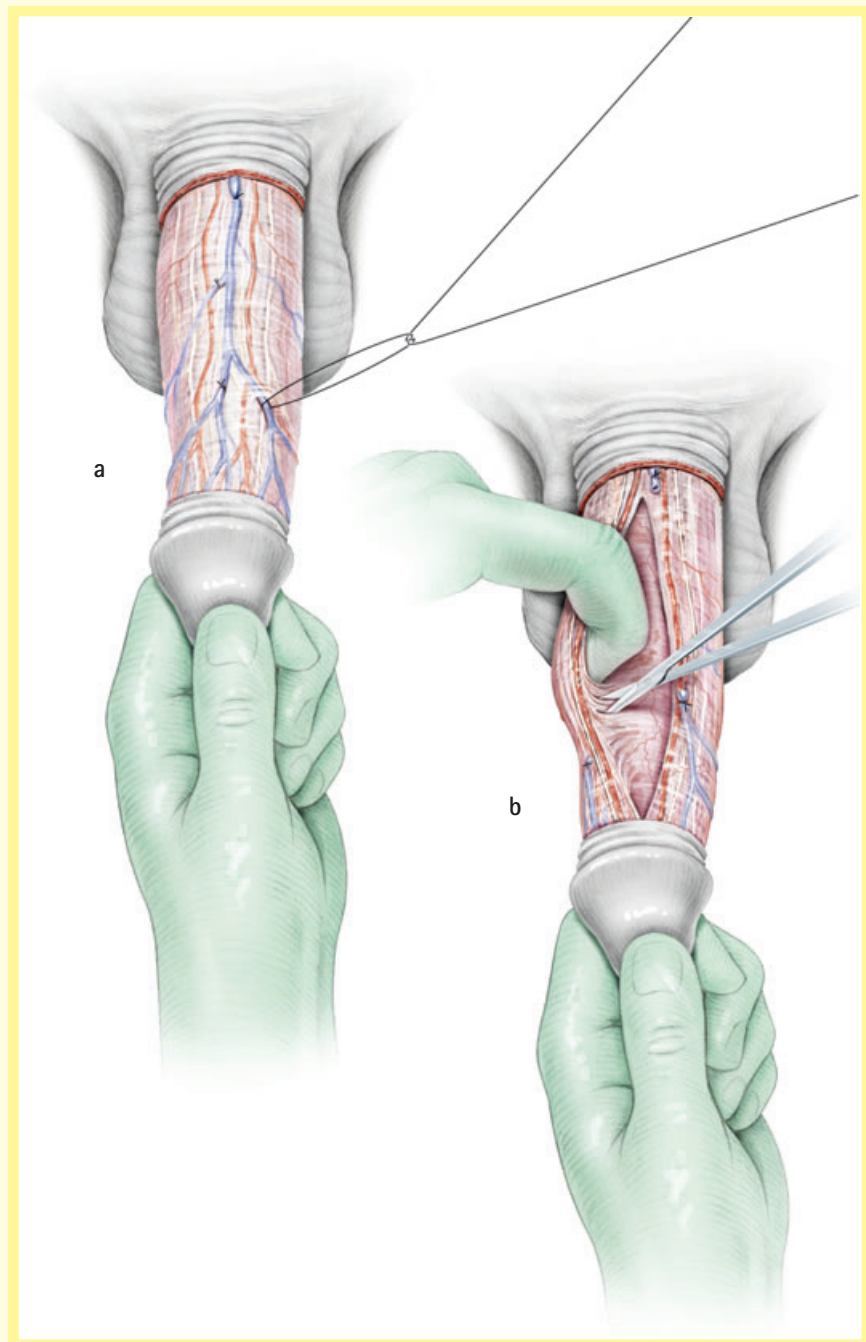
The patient is placed supine; if a SVG is to be used, the subordinate leg is placed in a slightly flexed and abducted position (frog-leg).

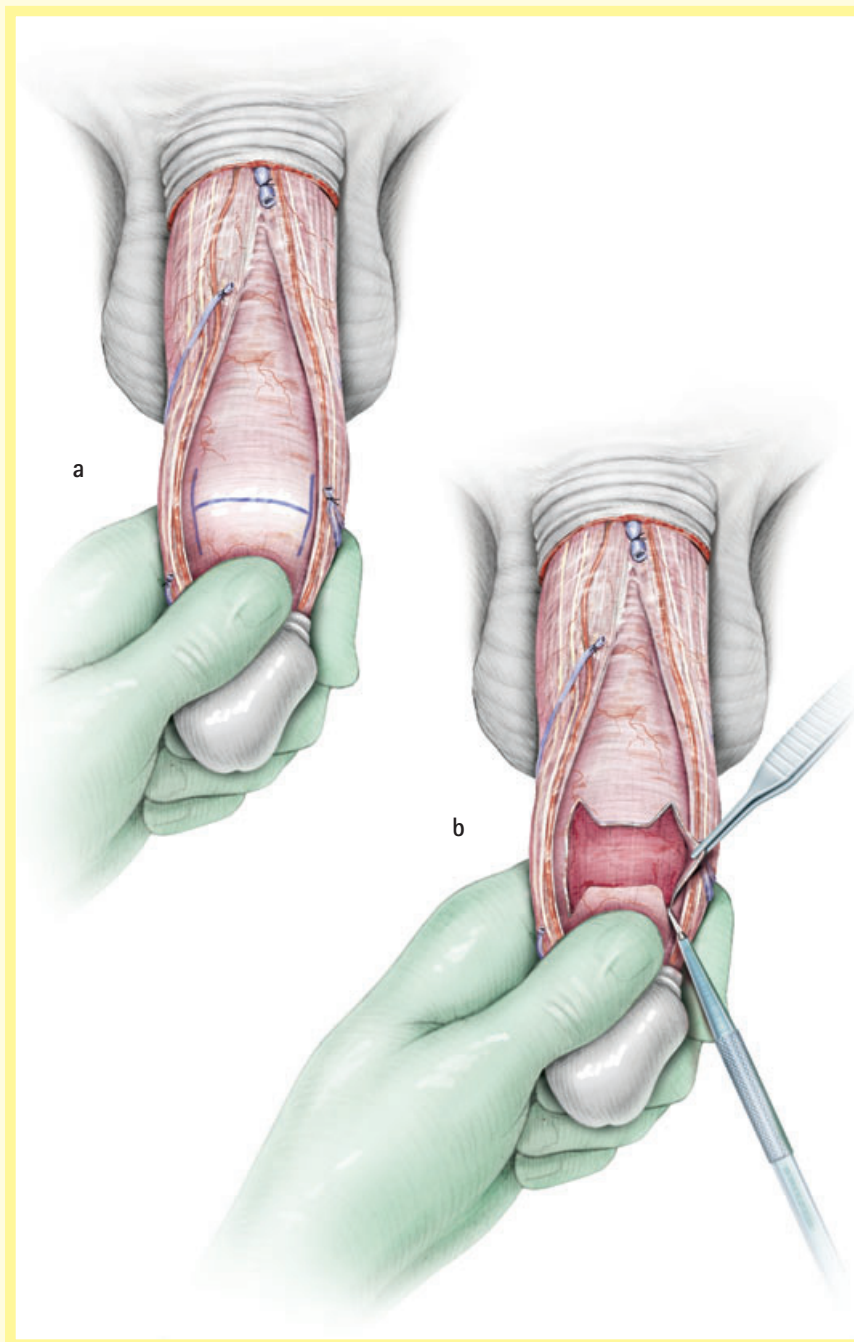
**Figure 1**

Make a circumcision incision and deglove the penis.

Figure 2

Dissect out the deep dorsal vein and tie it off proximally and dorsally. This will allow mobilization of the neurovascular bundles bilaterally to the corpora cavernosa. Using a Jake or other fine-tipped clamp and a pair of blepharoplasty scissors, begin to elevate the tissue containing the neurovascular bundle. We generally work from medial to lateral, although it is possible to work in the other direction. A potential pitfall is that this tissue should mobilize easily in the setting of a normal tunica. However, the tissue overlying the Peyronie's plaque is often very adherent and care must be taken to not injure the artery or nerve. To minimize the potential for crush injuries to the nerve, we retract tissue using gentle finger retraction.

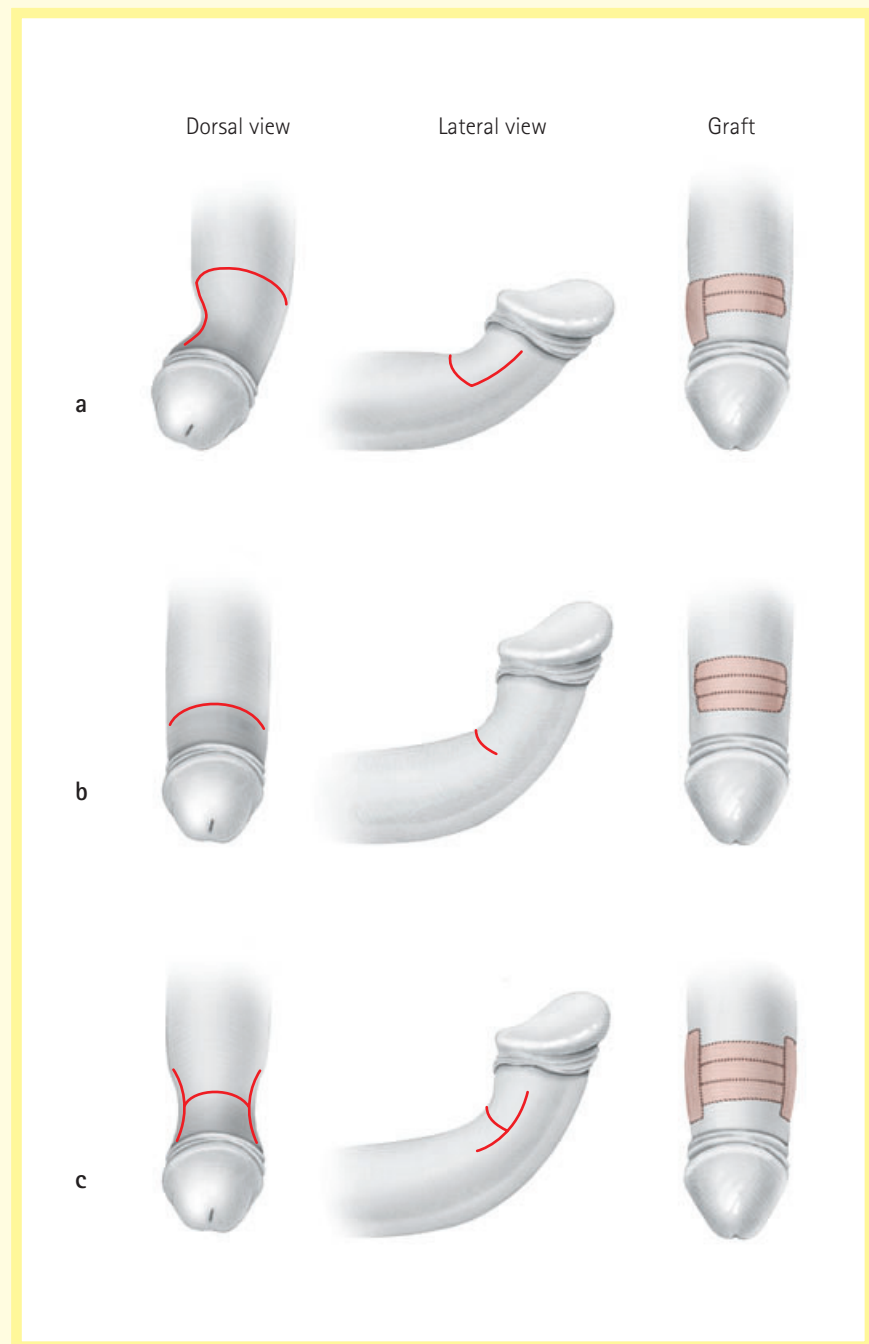


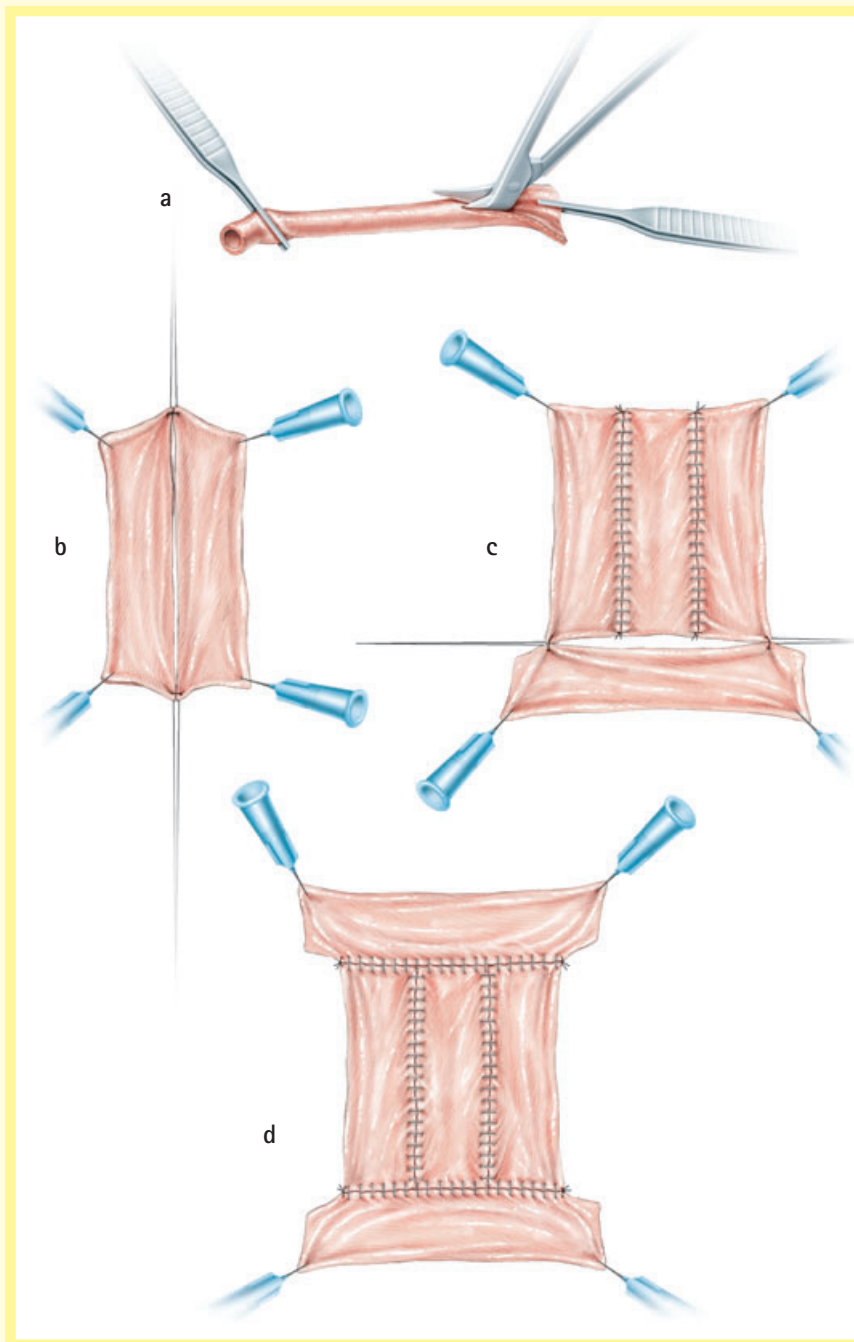
**Figures 3 and 4**

Create an artificial erection by an injection with normal saline into the corpus cavernosum via a 21 G scalp vein needle. Mark the site of greatest curvature and area(s) of narrowing; an 'H' is then drawn. The middle bar marks the centre of the curvature and the side bars extend along the axis of the penis; these markings can also be used to address areas of narrowing, so their length and direction will depend on the characteristics of the curvature. The penile site is then opened along the markings and spread open so that the size of the defect both longitudinally and transversely can be measured.

For a SVG, the impulse of the femoral artery is palpated in the inguinal region and an incision made to expose the greater saphenous vein. Care should be taken to control more superficial vessels and lymphatics.

Tip: The vein usually has an approximate inner circumference of 0.5 cm, so each segment will be ≈ 1 cm wide once opened. This guideline helps to determine how much vein to harvest. To avoid a long incision, we typically make several smaller incisions and tunnel the vein out, taking care to ligate tributaries with polyglycolic acid ligatures. Haemostasis must be excellent. The wounds are then irrigated and packed with moistened pads while the graft is prepared. The wounds are closed in two layers using absorbable sutures for Scarpa's fascia and a subcuticular layer.



**Figure 5**

To determine vein length, e.g. if the H incision measures 5 cm wide by 3 cm high, choose a vein length of ≈ 17 cm, to yield 5×3 cm segments with a small surplus of material. Vein has the least contraction of any of the biological graft materials; it is easier to tailor other graft choices to size and this will be discussed below.

Vein preparation: Using a Silastic block, the vein's adventitia is removed and the vein is divided into segments. Tributary sites are opened during the division to minimize postoperative leakage. Using short 25 G needles is helpful in fixing the vein to the block while working. 5-0 polyglyconate is used to anchor segments together and the sides are joined using VCS titanium staples. The graft is kept moist until it is used. Many other graft materials are available; as these contract after placement, we recommend tailoring a graft that gives a final size of $\approx 25\%$ larger than the defect.

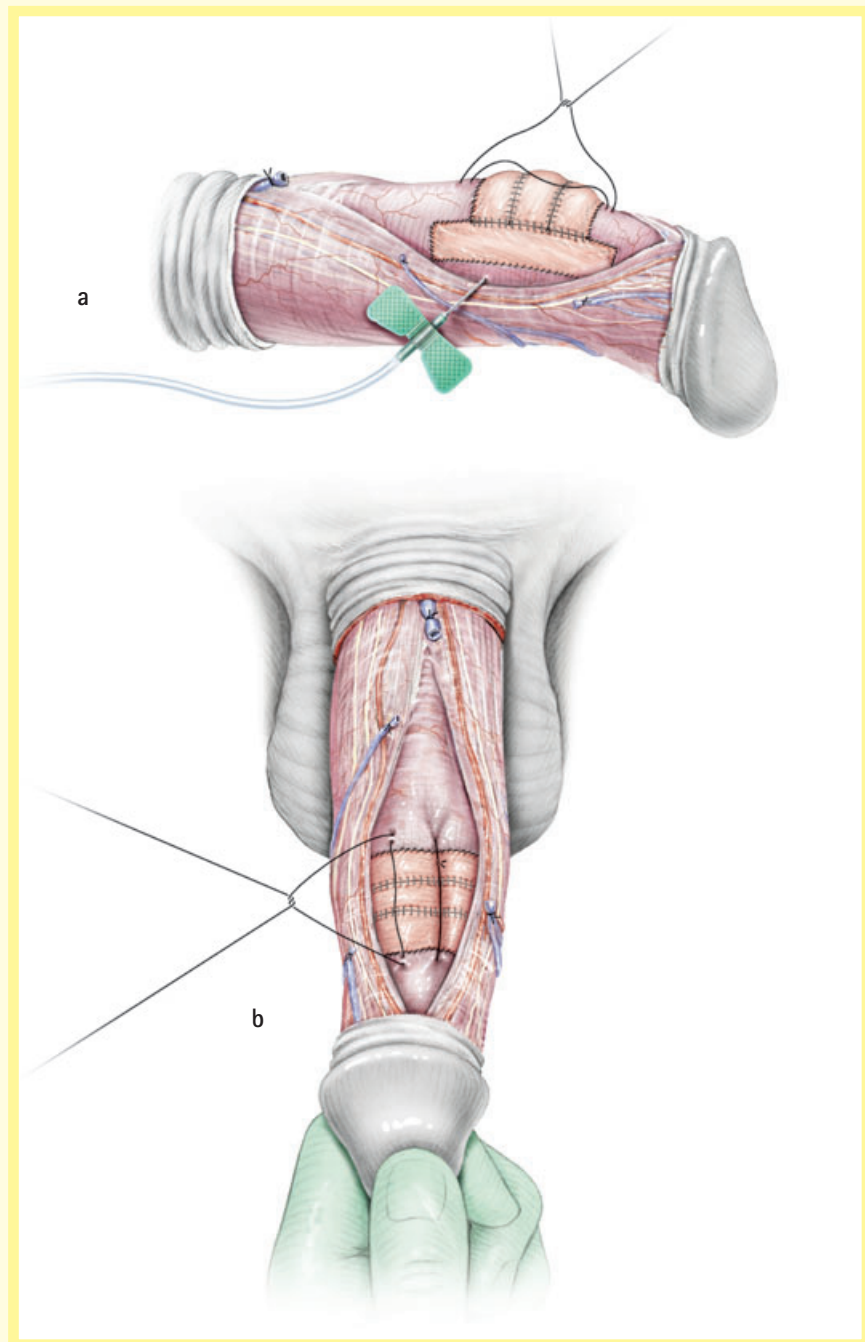
Figure 6

The corners are sutured into place first, using 4-0 polyglyconate. The remainder of the graft is sutured into place in a running, locking fashion.

Tip: Leaks tend to occur at the corners where the running suture goes around the previously placed corner knots. This can be avoided by not locking the suture at these sites and by advancing the suture very little in these areas.

An artificial erection should confirm an appropriate shape and will identify any leaks in the graft; 5-0 polyglyconate is used to close the leaks. Once the graft is watertight, a few sutures are placed to return the neurovascular bundles to their original site.

An artificial erection is created again by injection with normal saline. If the penis is not straight, plication sutures (2-0 polyethylene terephthalate, Ticron™, Tyco Healthcare, Mansfield, MA) are placed to straighten the penis and protect the graft from bulging. Several interrupted subcutaneous sutures are placed using 5-0 polyglyconate, then the skin is closed using two running, locking 5-0 polyglycolic acid sutures.



POINT OF NO RETURN

The most crucial step is the site of incision along the centre of the curvature(s).

EXCISION OR INCISION

Excision of a large plaque is associated with a greater incidence of ED. Most patients fare well with incision and grafting. The only time we use excision is when the patient has an extensive calcified plaque.

'HIDDEN SECRET'

Additional longitudinal grafts are needed to correct the hourglass deformity; the pitfalls are as described above. It is important with an SVG to determine how much vein to harvest, as harvesting additional vein once it has been ligated distally is tedious and inefficient.

TROUBLESHOOTING

- If difficulty is encountered mobilizing the neurovascular bundle(s), then starting lateral to the plaque, begin mobilizing lateral (over normal tissue) towards medial.
- If the plaque has an hourglass, circumferential distribution, the incision must also be made circumferentially with a resulting wider graft.
- If the patient has pain after surgery, with nocturnal erections although daytime discomfort is minimal, we make the patient aware of this discomfort and have him take analgesics before sleep; this is usually sufficient.
- If the patient notices a new bulge at the site of the graft 2–3 months after surgery, after he has had a strong erection, this might represent a haematoma, with graft materials other than venous graft. We use ultrasonography and, if a haematoma is identified, we aspirate it under ultrasonographic guidance.

SPECIFIC MATERIALS

The materials are fairly standard and should be readily available in any operating suite. There are various biomaterials commercially available for the graft. If SVG is to be used, we

use a VCS with titanium staples. Suture can be used in its place but this adds ≈ 0.5 h to the surgery. We do not drain the operative site. A urethral catheter is placed at the end of the operation and is removed the following morning.

POSTOPERATIVE CARE

- The dressing used is Xeroform™ gauze (Invacare, Ilyria, OH) around the incision, followed by wrapping loosely with a gauze pad. A Koban adhesive compression dressing is placed without constricting the penis, wrapped from distal to proximal. The dressing is then 'squeezed' around the penis to make it snug but not constrictive. We mark the end of the Koban dressing with a marking pen to aid the patient when we teach him to change the dressing the next day. An ice-pack is routinely applied for the first 24 h to minimize pain and swelling.
- The patient is admitted to the hospital overnight.
- On the first day after surgery the patient attends the clinic, where we show him how to change the dressing, which he does daily for 10 days. We have developed a handout on restrictions, recommendations and expectations over the 6 weeks after surgery, and we review these with the patient. He is allowed to shower on the second day after surgery but must endeavour to keep the incision dry by applying a condom. He is not allowed to immerse himself in water for 5 weeks, nor engage in sexual intercourse or masturbation for 6 weeks. If he had a SVG he must avoid vigorous exercise (more than walking) for 4 weeks.

SURGEON TO SURGEON

The single most important aspect, as with most surgery, is patient selection. A grafting procedure can help the patient to regain the penile length lost from the underlying fibrosis, but there is an attendant risk of *de novo* ED. Patients, especially those with baseline dysfunction, must be aware of this, and they should always be informed of the option of a penile prosthesis. We counsel patients that a prosthesis can be placed at a later date. It might even be preferable to use a two-stage procedure, as the substantial increase in operative time if both grafting and prosthesis

are done at the same setting can carry a greater risk of perioperative prosthetic infection.

An additional important factor in counselling before surgery is to address patient expectations about penile length afterward. Many patients are understandably distraught about the penile shortening that often accompanies PD, but they often overestimate how much length has actually been lost, and we can rarely show this objectively, as we seldom have pre-morbid penile measurements available. We routinely document the patient's stretched penile length in the chart, and he is made aware that grafting will only add 1–2.5 cm to the stretched flaccid length after surgery. Patients need to be educated that simple plication surgery can result in a straight erection but will not restore length; a grafting procedure might restore some length but will not exceed the baseline length of the penis.

THINGS TO MAKE LIFE EASIER

- A self-retaining retractor such as a Gelpi or Weitlaner aids exposure of the saphenous vein.
- A Silastic block and four short 25 G needles help with graft preparation.

'LOWS AND HIGHS'

A patient made numerous complaints to various institutions and authorities after developing ED and plaque recurrence after a SVG for PD. The importance of patient selection, especially the patient's frame of mind about expectations and possible risks, cannot be overemphasised.

'Highs' are when patients report a straight penis and are happy to be able to resume sexual intercourse after surgery. When a patient's expectations are realistic and can be met, this is a satisfying procedure that addresses a significant functional and psychological disability.

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