

SEXUAL MEDICINE REVIEWS

Surgical Planning and Strategies for Peyronie's Disease

João L. Almeida, MD, João Felício, MD, and Francisco E. Martins, MD

ABSTRACT

Introduction: Peyronie's disease results in penile curvature, shortening, instability, or pain upon erection—hindering sexual performance and leading to psychological distress. Despite extensive research, surgery is still the mainstay of treatment.

Objective: To present an organized description of the most common surgical techniques used in the correction of Peyronie's disease and to propose a surgical algorithm to guide management.

Methods: Using PubMed, we reviewed the published literature regarding surgical treatment of Peyronie's disease and its outcomes. We identified original articles, review articles, and editorials addressing the subject, with a focus on surgical techniques, their indications, and outcomes.

Results: Peyronie's disease can be treated by corporoplasty or penile prosthesis implantation. Corporoplasty includes convex side-shortening procedures and concave side lengthening procedures. It is indicated when the erectile function is adequate. Shortening procedures include excisional, incisional, and plication-only techniques, and lengthening procedures include partial excision or incision followed by grafting. When refractory erectile dysfunction is present, placement of a penile prosthesis with or without further straightening maneuvers is recommended. We reviewed the indications, advantages, disadvantages, and outcomes of the available techniques and proposed a surgical algorithm to guide management.

Conclusion: Penile shortening procedures are usually indicated in curvatures $<60^\circ$, in penises with adequate length. Partial excision/incision and grafting are indicated for curvatures $>60^\circ$, hourglass or hinge deformities, and short penises, if the patient's erectile function is adequate. The presence of "borderline" erectile function and/or ventral curvature tilts the choice toward shortening procedures, and refractory erectile dysfunction is an indication for penile prosthesis placement. Peyronie's disease management remains challenging with many options available, making an accurate risk/benefit assessment of each case and meticulous patient counseling critically important. **Almeida JL, Felício J, Martins FE. Surgical Planning and Strategies for Peyronie's Disease. Sex Med Rev 2020;XX:XXX–XXX.**

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Key Words: Peyronie's Disease; Penile Curvature; Plication; Plaque Incision; Grafting; Penile Prosthesis

INTRODUCTION

Peyronie's disease (PD) is a wound-healing disorder of the albuginea of the corpora cavernosa, leading to a scar. This results in acquired penile curvature, shortening, instability, or pain upon erection, thus hindering sexual performance. It has a prevalence of up to 7.1% in the male general population and is likely underreported because of embarrassment and misconceptions about the available treatment options.¹ The impact on the psychological well-being of those affected can be severe, with approximately 50% of patients reporting depressive symptoms and 80% reporting distress related to the disease.² PD is

associated with erectile dysfunction (ED) in up to 58% of cases and is often a concomitant diagnosis during investigations for ED.³ The disease has an inflammatory phase followed by a chronic phase. The inflammatory or active phase is characterized by penile pain, frequently during erection, and progressive curvature of the penis. A plaque may be felt more commonly on the concave side of the curvature, that is, sometimes tender. The duration of this phase is variable but can last up to 12 to 18 months. The chronic, or stable phase, then starts, during which the curvature and plaque are stable, and the pain typically disappears.⁴ "Torque" pain may, however, still be felt on the plaque upon rigid erections.⁵ Plaque calcification is frequently used as a surrogate for disease stability, but it can happen very early in the course of the illness and should be interpreted with caution.⁶ It was previously thought that the natural history of PD was one of gradual resolution.⁷ However, only 12% of the men presenting with PD show some degree of spontaneous improvement in curvature during the course of the disease.⁴

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Despite extensive research and accumulated knowledge, the precise pathophysiology still eludes the scientific community, and effective nonsurgical management options are lacking, making surgery the mainstay of treatment.⁸

PATIENT EVALUATION

Diagnosis of PD is usually straightforward, based on the clinical history and physical examination. It is critical to establish the patient's pathological phase at the time of diagnosis. PD must be present for at least 12 months, or the disease must remain stable for at least 3 months before the patient is considered a surgical candidate, otherwise the disease might progress resulting in curvature recurrence.⁹ Once a patient is considered for surgical treatment, it is fundamental to carefully assess his erectile function, penile length, and the degree, location, and characteristics of the curvature to select the most appropriate technique and to provide accurate patient counseling. The use of the International Index of Erectile Function questionnaire is recommended before and after treatment. The patient should be questioned about the quality of his penile rigidity, namely if it is adequate for penetrative sexual intercourse or if he believes it would be if his penis were straight.¹⁰ The penile length should be measured objectively, and it is useful to ask the patient to estimate the length lost since the onset of the disease. Techniques resulting in significant length loss may be inadequate for short penises, leading to patient dissatisfaction or difficult coitus. A good way to assess length is to measure the penis dorsally under stretch, at a right angle, from the pubic symphysis (pressing down the pubic fat), to the corona (measuring to the meatus might result in further variation between measurements).¹⁰ This is also a good opportunity to evaluate the plaque characteristics, specifically its location, size, rigidity/calcification, and eventual tenderness to palpation. Objective evaluation of the degree of curvature is also essential. Patients are known to overestimate their curvature with estimates differing by an average of 20° from objective measurements.¹¹ Given the ubiquity of smartphones with cameras, photographic documentation of the deformity on erection at home is a comfortable option for the patients but requires correct acquisition of images. 3 angles are suggested (dorsal, lateral, and frontal views).¹² Measurement of the curvature based on photographs might, however, be inaccurate.¹⁰ Office-based objective assessment with a goniometer or protractor by the physician under vasoactive induced erection is recommended. The presence of hourglass deformity, hinge effect, or complex deformities should be noted. The routine use of penile duplex Doppler ultrasound is useful in the hemodynamic evaluation of penile erection, allowing measurement of flow parameters, better characterization of the plaque, and assessment of collaterals between the deep dorsal and cavernosal arteries in dorsal curvatures.^{9,10}

SURGICAL TECHNIQUES

Corporoplasty techniques for PD include techniques that “compensate” for the curvature by shortening the convex side

and techniques that address the plaque directly and lengthen the concave side. Implantation of a penile prosthesis, with or without adjunctive straightening maneuvers, is the ideal treatment option for patients with ED who do not respond to conservative treatment (Table 1). The outcomes of the different techniques, reported in distinct, noncomparable studies, can be found in Table 2.

CONVEX SIDE SHORTENING TECHNIQUES

Convex side shortening techniques can be divided into 3 groups: excisional corporoplasty, incisional corporoplasty, and plication-only procedures. The main advantages of these techniques consist of being surgically easier and faster and in causing minimal interference with the cavernosal erectile tissue and neurovascular bundle (NVB), making postoperative ED less likely.^{13,14} As they often result in further shortening of the penis, they are generally not recommended for curvatures greater than 60° and very short penises. They also do not adequately address the instability caused by hourglass deformities and those demonstrating hinge effect.

Excisional Corporoplasty

Described by Nesbit (1965) for correcting congenital curvature, this procedure consists in the removal of transverse elliptical wedges of tissue on the convex side of the penis, followed by transverse closure.¹⁵ Later, Pryor and Fitzpatrick (1979) reported a series of 23 PD patients treated with this technique with a successful outcome in 20/23 (86.9%) patients, suggesting that Nesbit's operation was the procedure of choice in patients who did not respond to conservative treatment.¹⁶ In 1997, Rehman et al described a modification to the technique consisting in shaving the albuginea instead of excising it, leaving a thin layer of tunica protecting the erectile tissue, which they postulated would decrease complications.¹⁷ When removing tissue, the ellipses width should be kept under 1 cm to avoid dog-ear deformities, and the total length of removed edges should match the difference in length between the convex and concave side to achieve a straight penis. Allis clamps may be used to grasp the tunica and determine the size and number of wedges needed before excision.

Table 1. Surgical management of Peyronie's disease

Corporoplasty
• Convex side shortening
◦ Excisional (Nesbit)
◦ Incisional (Yachia)
◦ Plication-only (Essed)
• Concave side lengthening
◦ Partial excision and grafting (PEG)
◦ Plaque incision and grafting (PIG)
Penile prosthesis implantation
• No further maneuvers
• Modeling
• Plication
• Incision with or without grafting

Table 2. Results of PD surgery from distinct noncomparable studies

Technique	Curvature correction (%)	Satisfaction (%)	Postoperative ED (%)	Shortening (%)	Decreased sensation (%)
Nesbit	86–100% ¹⁸	76.2–83.5% ¹⁸	0–13% ¹⁸	17.4–100% ¹⁸	2–21% ¹⁸
Yachia	73–100% ⁵	63–83% ⁵	7–8% ⁵	67% ⁵	3–8% ⁵
Plication-only	85–99% ¹⁸	62–96% ¹⁸	3–12% ¹⁸	9–90% ¹⁸	2–36% ¹⁸
Grafting	80.0–96.4% ⁴⁴	88.0–92.0% ⁴⁴	4.6–24.1% ⁴⁴	No significant change ^{*,44}	2–22.5% ⁴⁴
Prosthesis	65–100% ⁹	48–100% ⁹	N/A	0†–73% ^{55,76}	0–9% ⁷⁶

ED = erectile dysfunction; N/A = not applicable; PD = Peyronie's disease.

*Most studies reported either no change or an increase in postoperative penile length. Those that measured length objectively found no significant change in stretched penile length.

†Shortening is reported to occur in 73% of patients when adjuvant plication is used, while those offered lengthening techniques might have an increase in size.

In some patients, it might be necessary to mobilize the NVB or the corpus spongiosum for ventral or dorsal curvatures, respectively. The Nesbit procedure is reported to have a success rate of 86–100% for correcting the curvature, a postoperative ED rate of up to 13%, and a decrease in penile sensitivity in 2–21% of patients.¹⁸

Incisional Corporoplasty

Saalfeld (1973), Lemberger (1984), and Yachia (1990) described the use of the Heineke-Mikulicz principle to perform the corporoplasty instead of removing tissue.^{19–21} Longitudinal incisions made on the tunica albuginea are closed transversely, effectively shortening the convex side in a simpler manner. Again, the use of Allis clamps is useful to outline the incision. Lemberger reported a series of 19 patients treated by this approach: 15 of 19 patients were able to resume penetrative intercourse and 4 of 6 (patients with preoperative ED) referred improvement in erectile function.²⁰

Plication-Only Corporoplasty

Essed-Schroeder (1985) and Ebbelhøj-Metz (1985) described techniques in which no incision is made on the albuginea.^{22,23} Double crossover stitches (Ebbelhøj) or “reeving” longitudinally placed looping sutures (Essed) are placed to plicate the albuginea. Interestingly, Nesbit had already described a similar technique in

one patient with congenital curvature on his original report in 1965, in which the curvature recurred after 6 months.²⁰ Although easier to perform, these techniques often result in bothersome palpable knots. To address this, Knispel (1991) modified the Essed technique by inverting the suture. Levine reported a modification of the technique described by Duckett and Baskin (1994), called modified tunica albuginea plication. Two 1- to 1.5-cm transverse incisions, separated by 0.7–1.5 cm, are made for each knot, through the longitudinal layer only, to aid in knot burying. The albuginea is shaved between the incisions if deemed too thick, which is frequently the case when the stitches are placed dorsally.^{24,25} Other modifications include the technique described by Lue (1992) that evolved to the procedure known as the “16-dot technique.”^{26,27} 8 transversal pairs of dots, 0.5-cm apart, are marked along the convex side of the corpora. 4 longitudinal Lembert stitches are then passed through the dots and their tension adjusted before tying, to achieve a straight penis. The number of dots and stitches may need to be doubled in longer curvatures to correct them with minimal tension (24-dot technique). In the case of ventral curvatures, NVB dissection can be avoided by placing the sutures in a space between the deep dorsal vein and the deep dorsal arteries (Figure 1).^{26,28} These techniques have shown to be successful in straightening the penis in 85–99% of patients, resulting in de novo ED in 3–12% and reduced sensation in 2–36%, in series with a mean follow-up of 19.5–49 months.¹⁸



Figure 1. Plication-only in a ventral curvature. Panel A shows the penis with a ventral curvature under artificial erection with saline. Panel B shows markings for plication after dorsal exposure of the albuginea. Neurovascular bundle mobilization was avoided by dissecting laterally the deep dorsal vein. Panel C shows the penis straightened after plication. Figure 1 is available in color online at www.jsm.jsexmed.org.



Figure 2. Partial plaque excision and grafting with collagen fleece. Panel A shows the defect after an ellipsoid partial excision of the plaque with lateral extensions. Panel B shows the defect covered by Tachosil. Panel C shows the final result after approximation of Buck's fascia. Figure 2 is available in color online at www.jsm.jsexmed.org.

CONCAVE SIDE LENGTHENING TECHNIQUES

Concave side lengthening techniques address the plaque by either removing it completely (no longer recommended because of high rates of postoperative ED²⁹), partially excising it, or incising it, followed by covering the defect with a graft. These procedures are known as plaque excision and grafting and plaque incision and grafting. They are indicated in more severe cases such as curvatures $>60^\circ$, hourglass deformities, or presence of the hinge effect. Their aim is to preserve length, making them an option for men with less severe curvatures and very short penises but adequate erectile function. They have the disadvantages of being more complex and invasive, requiring longer operative time, and resulting in higher rates of postoperative ED.³⁰

Excision/Incision Techniques

Several techniques have been described to perform the incision/partial excision of the plaque. These include an ellipsoid partial excision with lateral extensions (Figure 2),³¹ an I incision,³² an H incision,³³ and the Egidio technique (double Y, almost completely circumferential).³⁴ These techniques were developed to straighten the penis with the least possible impact on erectile tissue and to leave the simplest possible defect for graft placement. A modern solution uses an app that calculates the necessary incisions, using measures taken during surgery, and

draws out the outlines of the grafts to be used.³⁵ One technique, based on a nongrafting procedure first described by Hegarty,³⁶ involves multiple transverse incisions across the plaque. Unlike Hegarty's technique of incising only the outer longitudinal layer of the albuginea, full thickness incisions and Tachosil (Takeda, Japan) grafting were required to achieve straightening because of residual curvature in a small series. However, the defects are smaller than those in single incisions (Figure 3).³⁷ Another study described a new minimally invasive technique in which the plaque is incised from the inside by insertion of a 5-mm triangular blade through a 1-cm corporotomy lateral to the plaque. The superficial longitudinal layer is preserved avoiding the need for grafting.³⁸ There are no quality data comparing the different types of incisions. One study found an association between the Egidio technique and decreased postoperative erectile function.³⁹

Graft Choice

The ideal graft should be resistant and flexible but without allowing aneurysmatic dilation or interfering with the veno-occlusive mechanism. It should also be nonsusceptible to infection and contraction and, if autologous, should involve minimal harvest-related morbidity. Grafts can be categorized into 4 groups: autografts, allografts, xenografts, and synthetic



Figure 3. Multiple transverse incisions patched with Tachosil. Panel A shows the penis with a dorsal curvature under artificial erection with saline. Panel B shows the curvature after dissection of the neurovascular bundle. Panel C shows the penis straightened after multiple transverse dorsal incisions patched with Tachosil strips. Figure 3 is available in color online at www.jsm.jsexmed.org.

Table 3. Grafts used for corporoplasty

Autografts
• Dermis
• Vein
• Temporalis fascia
• Fascia lata
• Tunica vaginalis
• Crural albuginea
• Buccal/lingual mucosa
Allografts (cadaveric)
• Pericardium
• Fascia lata
• Dura mater
• Dermal
Xenografts
• Porcine dermis
• Porcine small intestinal submucosa
• Bovine pericardium
• Tachosil
Synthetic (no longer used)
• Dacron
• Gore-Tex

(Table 3).^{3,40} Autografts have the disadvantage of adding additional harvest-related morbidity and increasing operative time. Allografts and xenografts have the advantage of off-the-shelf availability and of avoiding the need for harvesting, with similar results to autografts. Synthetic grafts fell out of favor because of concerns related to infection and fibrosis, leading to contraction.³ Other drawbacks include possible allergic reactions and the lack of graft elasticity.⁴¹ Tachosil (a matrix of equine collagen coated with human fibrinogen and human thrombin) has been used in several studies since the first description by Lahme et al (2002) using TachoComb (Takeda, Japan) (a previous iteration).⁴² Tachosil has the advantage of watertight self-adhesion requiring no suturing, decreasing therefore the complexity and operative time. Checking intraoperatively for curvature correction should, however, be made with caution because the graft does not acquire its full resistance immediately and might fail upon forced erection. It is important to ensure an albuginea overlap of at least 5 mm over the margin of the defect. It has been advised to use an artificial erection of “80% of maximum erection” to avoid failure during intraoperative evaluation.⁴³ Currently, there are no quality data comparing different grafts. Despite this, buccal mucosa, pericardium, porcine small intestine submucosa, and Tachosil are being used increasingly.⁴⁰

Outcomes

Outcomes are difficult to evaluate given the lack of good-quality prospective trials and the high heterogeneity in the available reports. The patient selection, techniques used, definitions of success, and methods of assessment vary. In a review by Rice (2019), successful straightening is reported to be achieved in 80.0–96.4% of patients.⁴⁴ In 4.6–24.1% of patients, worse erectile function was reported postoperatively, resulting in a

complete loss in 0.0–11.8%. However, 65.5–95.5% are reported to be able to achieve spontaneous erection postoperatively. Length does not appear to change significantly. Patient satisfaction ranged between 88.0% and 92.0% in studies that evaluated this parameter. Decreased penile sensitivity occurred in 2–22.5% of patients but was usually transient.⁴⁴ One study found curvatures >60°, Egydio technique, age >55 years, and baseline venous leak as predictors of decreased postoperative erectile function (>5 point decrease in the International Index of Erectile Function).³⁹

PENILE PROSTHESIS

For patients with refractory ED (unresponsive to conservative treatment), penile prosthesis implantation is recommended. Although the placement of the penile prosthesis alone may be enough to correct the curvature, many patients require additional maneuvers.⁴⁵ Since the initial description by Wilson (1994), the modeling maneuver has been widely adopted and is recommended by some authors as the first intervention if additional curvature correction is needed.^{3,46–48} It requires inflating the prosthesis fully, clamping the tubing to the pump, and manually forcing the correction of the curvature, holding the forced position for 90 seconds. This maneuver can be repeated. The increased corporal capacity caused by breaking the plaque may allow additional inflation of the cylinders between maneuvers. The main risk is urethral injury, initially reported by Wilson and Simhan to happen in 4% of cases.⁴⁷ This risk can be mitigated by compressing the urethra with the forefinger at the fossa navicularis protecting it.^{47,49} Modeling accomplishes functional straightening of the penis in virtually all cases.⁵⁰ It frequently does not leave an “arrow straight” penis and does not address length loss. Residual curvatures of <30° do not require further intervention because they allow penetrative sex and might tend to self-correct over time as the prosthesis acts as a “tissue expander.”⁴⁸ This notion of progressive straightening has, however, been disputed.⁵¹ To further correct the curvature and make modeling easier, Perito and Wilson described the “scratch technique.”⁴⁹ The plaque’s location is marked with a pen after inducing an artificial erection and then, after dilation of the corpora, the plaque is placed under stretch by opening a nasal speculum inserted through the cavernotomy. A 12 blade is used to “scratch” the plaque longitudinally from the inside, disrupting it. Besides making subsequent modeling easier, it may also correct hourglass deformities, increasing the width at plaque level.⁴⁹ Curvature may also be corrected by plication before prosthesis placement through a single penoscrotal incision,⁵² or by placing sutures using the 16-dot technique that are later adjusted and tied after prosthesis placement. Although simple and effective, these techniques exacerbate the length loss which is already a common complaint of penile prosthesis patients. Another option, if modeling fails, involves plaque incision with or without grafting. Multiple transverse incisions can be used resulting in multiple small defects, straightening, and possible lengthening



Figure 4. Nongrafted multiple transverse incisions for the correction of residual curvature after penile prosthesis placement. Figure 4 is available in color online at www.jsm.jsexmed.org.

the penis without the need for grafting (Figure 4).⁵³ It is suggested that defects greater than 2 cm should be grafted, although there is no solid evidence supporting this.⁵¹ Autografts or xenografts can be used, although dermis and vein might be less suitable.⁹ Tachosil remains an attractive option.⁵⁴

A technique aiming at increasing length, the “sliding technique”, was initially described by Rolle et al (2012) on a series of 3 patients.⁵⁵ It involves complete mobilization of the NVB and urethra followed by longitudinal bilateral incisions on the corpora at 3 and 9 o’clock positions, extending for about 4 cm. The proximal ends of the incisions are then connected through a transverse dorsal semicircular incision and the distal ends through a ventral one. After freeing the albuginea from the cavernous tissue and septum, traction is applied on the glans allowing the distal penis to slide until the NVB is stretched, limiting further sliding. The albuginea is then sutured in the new position, the corpora are dilated through the proximal defect, the penile prosthesis is placed, and the 2 created defects are grafted with porcine small intestinal submucosa. The procedure resulted in 3.2 cm of average increase in length. It was later modified by Egydio (2015) by precluding the use of grafts and using a subcoronal incision only, calling it modified sliding technique.⁵⁶ Although initially described as safe, later reports of severe complications such as complete glans necrosis led to concerns. Using a ventral longitudinal incision, thus avoiding a subcoronal incision and degloving,⁵⁷ one could potentially lower the risk of this devastating complication.⁵⁸ In an attempt to further improve the technique, Egydio (2018) described another modification he called multiple-slit technique.⁵⁹ Instead of 2 semicircular

incisions, further incisions are made in the concave side, increasing the number of defects but decreasing their size, thereby avoiding the need for grafting. The urethral dissection is also carried out in the minimal extent necessary to allow sliding mobility. In the case of indentation or narrowing, multiple small longitudinal slits are placed in a rhomb-like configuration to restore girth. In any case, these procedures, given their complexity and risk, should only be performed by experienced surgeons and proposed to patients with short penises, who are willing to risk potentially mutilating complications for an additional 2-3 cm of length.⁶⁰

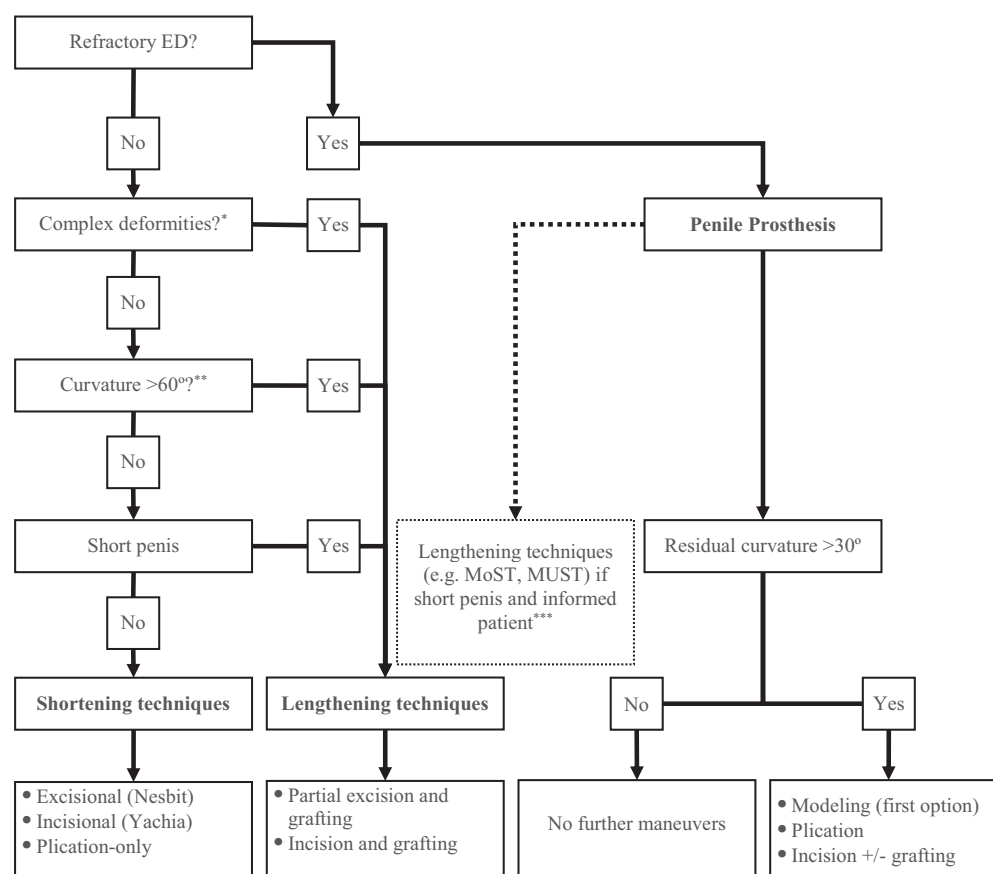
POSTOPERATIVE CARE

Sexual activity is usually advised to be resumed 4-6 weeks postoperatively,^{32,61–66} although it has also been suggested to start as soon as 2 weeks after surgery.²³ Stretching and massage of the penis have been advocated, beginning 2-3 weeks after surgery for periods ranging from 2 weeks to 3 months, to minimize length contraction.^{5,43,67} The patient is encouraged to gently stretch the penis by the glans and massage the shaft with the other hand for 5 minutes twice per day. This is also an opportunity to involve the partner and improve intimacy.⁵ Some authors recommend daily bedtime phosphodiesterase inhibitors beginning 1-4 weeks after surgery for periods of 4 weeks⁴³ to 3 months⁶⁸ to increase blood flow to improve nocturnal erections, stretch the tissue, enhance graft take, and possibly reduce the risk of postoperative ED.^{3,68,69} Postoperative penile traction therapy (PTT) has also been recommended.^{3,5,29,30} A retrospective study showed that PTT, initiated 3-4 weeks postoperatively for >2 hours a day for 3 months, resulted in length preservation or even in length gain after correction of the curvature by both tunica albuginea plication and plaque excision and grafting procedures.⁷⁰ Other authors have suggested the use of postoperative vacuum therapy (VT) to the same end.^{63,68,71}

In penile prosthesis patients, postoperative device cycling by daily inflation has been encouraged to reduce residual curvature and peri-device fibrosis and also help familiarize the patient with device operation.^{50,51} Even gentle manual modeling by the patient has been suggested to further address the curvature.⁵¹ Postoperative inflation protocols have already been shown to improve length and girth in men after aggressive cylinder sizing in a multicenter, 40-patient study that notably excluded men with PD.⁷² Despite this limitation, it seems reasonable to carefully extrapolate these data to patients with PD. The use of an adjuvant postoperative VT protocol in this setting has also been described in which patients used the vacuum pump twice daily, for 3 min, starting 2 weeks after surgery and continuing for 12 weeks, resulting in further curvature improvement.⁷³ The data on the use of PTT or VT before prosthesis implantation are scarce. Daily PTT for 2-3 months preoperatively has been reported to be used routinely to improve postoperative length.⁵¹ The implementation of a preoperative VT protocol has been described in patients with extensive corporal fibrosis due to

procedures should be considered first. These techniques might also be an option for patients with less than 60° of curvature, who are concerned with penile shortening, if the erectile function is adequate. Hourglass deformities and curvatures with a hinge effect result in instability that is not properly addressed by shortening procedures. In these cases, grafting procedures are the first option. As these complex procedures carry a significant risk of postoperative ED, the patient's erectile function status is particularly important in these situations. Ventral curvatures in PD are less common and represent a particular challenge when severe because these patients seem to have a higher incidence of postoperative ED and do poorly with grafting.^{71,75} These patients should be treated with shortening procedures whenever possible. As previously mentioned, a patient with refractory ED should be offered penile prosthesis implantation. This by itself may be enough to correct the curvature, and if not, modeling, plication, or incision (with or without grafting) can be used to address it. In patients with shorter penises, lengthening procedures should be considered intraoperatively before insertion of the prosthesis, independently of the magnitude of curvature, since

When considering a patient for surgical treatment, it should first be established if the patient has adequate erectile function for corporoplasty. Merely correcting the curvature in a patient with refractory ED will not restore sexual function. Moreover, both shortening and grafting procedures carry a risk of postoperative ED—the risk being higher in the latter. As shortening procedures are simpler and safer, they should be the first choice for patients with adequate penile length, curvatures $<60^\circ$, and absence of complex deformities. They could also be a good option in patients with more pronounced curvatures but “borderline” erectile function in which extensive grafting carries a higher risk of postoperative ED, if the predicted length loss is deemed acceptable.¹⁴ For curvatures $>60^\circ$ and short penises, shortening techniques often lead to considerable further loss, and grafting



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modeling and plication are merely straightening procedures. In patients with “borderline” erectile function, in which a complex grafting surgery with high risk of ED is required, primary penile prosthesis implantation should also be considered, avoiding the need for multiple procedures. Figure 5 presents a suggested step-by-step algorithm for selecting the appropriate surgical technique. Whatever the technique chosen, obtaining signed informed consent after a meticulous discussion with the patient over the objectives, expected outcomes, and possible complications is essential. It must be made clear to the patient that his penis will not be returned to its state before the onset of disease because PD causes irreversible changes. The aim of the surgery is to restore function. Addressing expectations is critical in the management of PD to achieve patient satisfaction.

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STATEMENT OF AUTHORSHIP

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