Novel Peyronie's algorithm at the time of penile implant

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Introduction: *Peyronie's disease (PD) is a fibrous transformation of the tunica albuginea within the corpora cavernosa causing curvature of the penis while erect. This cannot only be painful but can also cause narrowing, shortening, an hourglass deformity and problems with penetrative intercourse.*
There are many means of management of Peyronie's disease at the time of penile implant. Modeling is a commonly used approach but leaves the penis without increased length. Multi-incisional techniques enhance length restoration, but risk significant vascular and neurologic compromise. Herein, we present our experience with a novel algorithm to approach Peyronie's disease with an effort to enhance and restore length without elevation of the neurovascular bundle.

Materials and methods: *A retrospective review was performed of an institutional review board approved database. Patients treated for Peyronie's disease and erectile dysfunction with penile implant from 8/16/18 to 8/20/2020 were evaluated.*
Results: *In our cohort of 33 patients there is an average of 1.9 cm average stretch difference in stretch penile length before and after management. There was a 2.15 cm difference in the cohort subset that utilized the Brock technique. We had no loss of sensation or glans ischemia. There was one patient with autoinflation. All patients had less than 10 degrees of residual curvature.*
Conclusion: *With the proposed algorithm, we are able to safely maximize length restoration without elevation of the neurovascular bundle. More patients with longer follow up is needed to ensure the safety and validity of this algorithm.*

Key Words: prosthesis, Peyronie's disease, sexual dysfunction, erectile dysfunction

Introduction

Inflatable penile prosthesis (IPP) is an effective treatment option for men suffering from erectile dysfunction and Peyronie's disease (PD). Optimal management strategies for PD at the time of IPP remain unclear. While some authors have shown device placement alone can correct almost all defects over time,[1] others report that only 4% of PD will be managed with IPP placement alone.[2] Nevertheless, a widely varied armamentarium of adjunctive surgical maneuvers is available to manage PD at the time of IPP placement. In an effort to standardize practice, the authors reviewed available techniques and created a treatment algorithm based upon curvature direction and the presence of hourglass deformity.

Treatment of PD at the time of IPP placement falls into three categories: modeling, plication and incisional. Modeling is widely used due to its relatively low morbidity, but has variable success rates.[3-5] Plication has a high success rate, but has not been widely studied.[6-8] However, neither modeling nor plication restores length. Several different incisional techniques can promote length restoration. One example is the scratch technique;[9] this internally disrupts the plaque but requires a vacuum erection device to improved curvature resolution.[10] While the scratch technique does avoid elevation of the neurovascular bundle (NVB), in our hands there is less length restoration than desired. Moreover, many of our patients do not want to use the vacuum erection device postoperatively.

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Perhaps the most aggressive incisional procedure is the tunica expansion procedure (TEP).[11] In the TEP, the NVB is fully elevated, and multiple small mesh-like incisions are made through the tunica to allow maximal girth expansion during erection. We utilized the TEP for lateral and ventral deformities. The risks of neurovascular compromise and glans ischemia have limited wide adoption of these procedures.

One technique for PD management that has not been applied at the time of IPP is a technique originally described by Dr. Gerald Brock.[12] In this Brock technique, the penis is degloved and a small, ventral, longitudinal, unilateral peri-urethral incision is made into the corpora at the point of maximum curvature, identified during an artificial erection. The cavernosum tissue within the body of the corpus cavernosum is dissected off the tunica, beginning at the initial incision and working laterally and dorsally until the spongiosum is dissected away from the dorsal plaque. Using a triangle carpal tunnel blade (Smith and Nephew, Watford, UK) the inner surface of the plaque is incised in a transverse fashion. After the internal incisions have been made, the small corporotomy is closed, and the correction is easily assessed with an artificial erection. We utilized the Brock technique for dorsal deformities.

Each of these techniques has strengths and weaknesses that can be exploited to fit individual patient needs toward a more personalized approach for each patient and his curvature. Herein, we describe our initial experience employing a novel algorithm for management of PD at the time of IPP based on severity, direction of curvature, and presence of hourglass deformity.

Materials and methods

A retrospective review was performed of an institutional review board approved prospectively collected database for a single surgeon. Patients treated for PD and erectile dysfunction with an IPP from 8/16/18 to 8/20/2020 were evaluated and treated according to our algorithm, Figure 1.

Surgical approach and algorithm

Preoperative informed consent was obtained and patients are counseled that if unknown or severe curvature is encountered it will be addressed in a variety of approaches. If the patient is uncircumcised, we will offer circumcision versus a long ventral incision or penoscrotal invagination.

Patients were placed under anesthesia. The patient was flexed at the hips to protrude the penis as much as possible, and the table was placed in a slight Trendelenburg position. The patient was shaved, prepped and draped. A tourniquet was placed at the base of the penis. Stretched penile length was measured from the tourniquet to the coronal margin dorsally. To account for the more distal coronal edge ventrally, a line is drawn to mimic the point of the dorsal margin, Figure 2.

Next, an artificial erection was induced using a 19 gauge butterfly needle through the glans into the corpora; 10 mL of bupivacaine liposome injectable suspension mixed in 50 mL of injectable saline, plus more saline if needed, is injected to induce a rigid erection. The degree of curvature was measured using a phone-based app that uses a photograph to assess degrees of curvature (Angle Meter360, Alexy Koslov), Figure 3. In addition, the length of the convex side and the concave side of the erection was measured with a ruler. The difference in length between the convex and concave sides were noted. Any hourglass deformity was assessed and marked on the phallus. Multi-dimensional abnormalities were assessed by measuring all four sides.

Patients with hourglass deformity or < 30 degrees of deformity were managed with a scratch technique via a penoscrotal incision as previously described.[9] Patients with > 30-degree deformity who were uncircumcised would undergo a penoscrotal invagination,[13] or a long ventral incision; while those who were circumcised would undergo a circumcising incision with degloving as previously described.[14]

Left and right deviation > 30 degrees were managed with a partial elevation of Buck's fascia on the ipsilateral side of the scar; avoiding dissection above 10 and 2 o'clock dorsally, Figure 4. Once the Peyronie's plaque is exposed, microperforations were made with a 15-blade scalpel through the plaque in a mesh-like fashion. This is a slight modification to the technique described by Egydio when managing

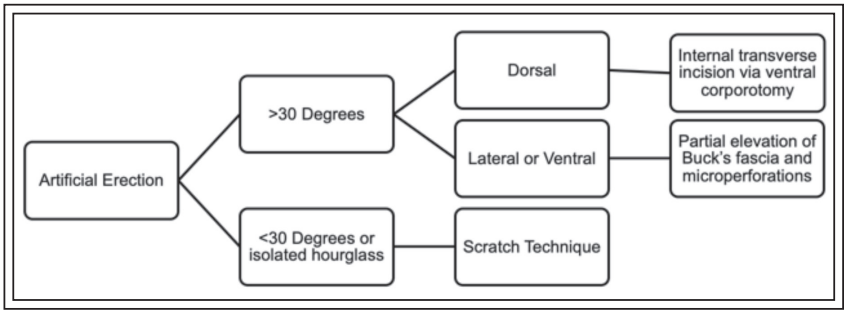

Figure 1. Algorithm.

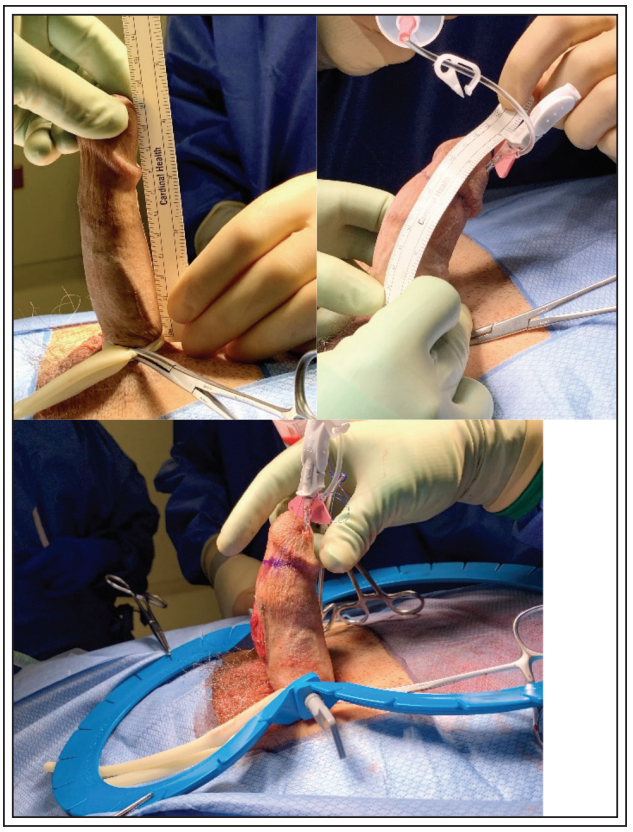

Figure 2. Measurement.

hourglass deformities.[15] The incisions are kept under 3 mm, about the width of a 15-blade. Tension is placed on the penis during the incisions. We continue making incisions until the stretch penile length has increased to make up the difference in the measurements taken earlier. For example, if the concave measurement and stretched length was 10 cm, and the convex side

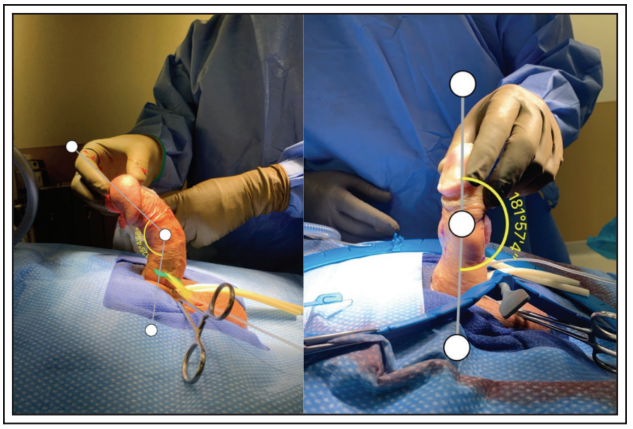

Figure 3. Measuring the angle.

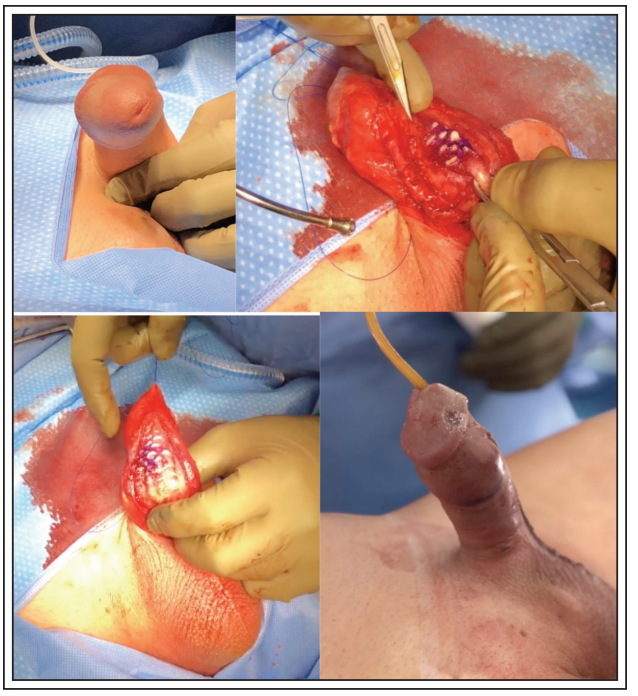

Figure 4. Lateral microperforation technique via penoscrotal invagination.

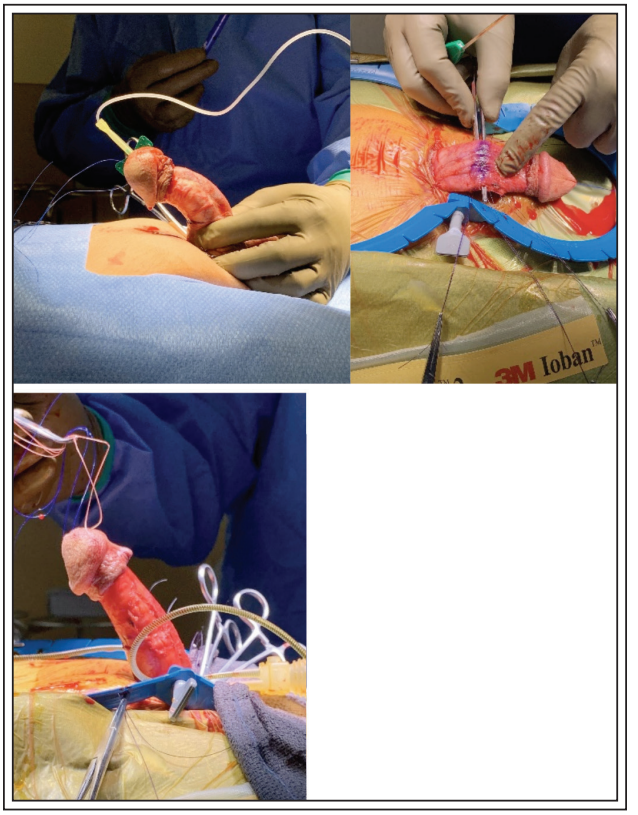

Figure 5. Brock procedure example 1.

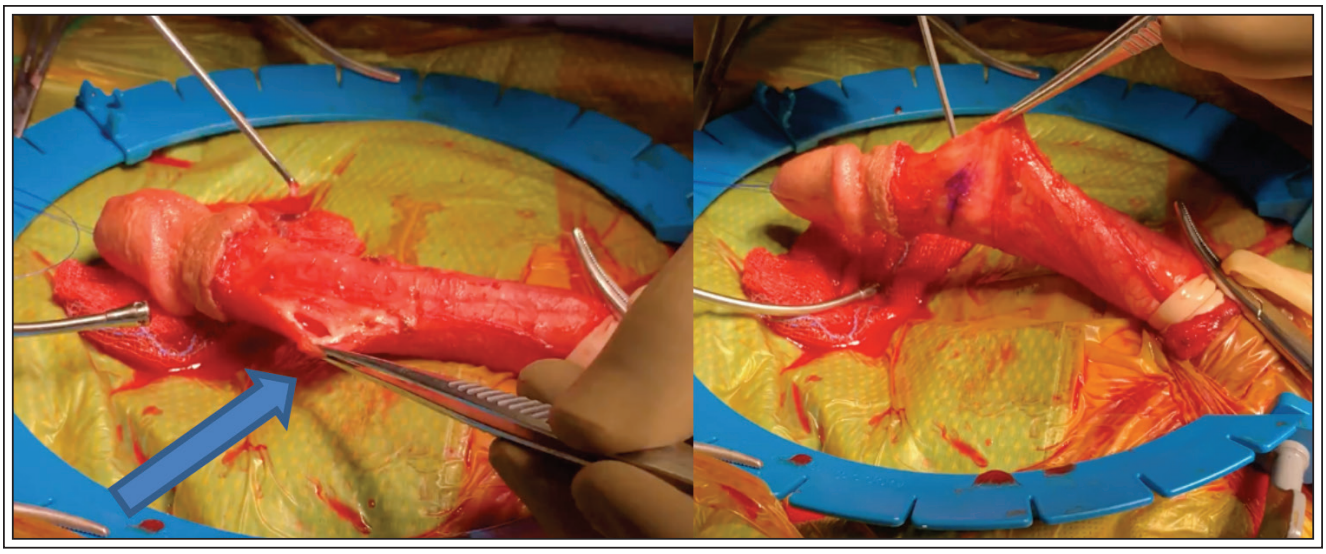

Figure 6. Brock 1 cm ventral incision to access dorsal plaque.

was 12 cm, we would increase the stretch length by 2 cm to make up the difference. The incisions are kept very small in order to prevent herniation of the implantation, allowing us to use any type of implant. Tachosil (Baxter, Deerfield, IL, USA) is applied over the microperforations with the penis on stretch, and the Buck's fascia is reapproximated over the Tachosil. Similarly, ventral curves were managed with a partial elevation of the urethra off the corpora. Then, a similar microperforation was made as in the lateral case.

For dorsal or dorsolateral plaques, we employed a modification of the Brock technique.[12] In the region of a dorsal plaque, a 1 cm longitudinal ventral incision is made on either side of the urethra, Figures 5 and 6. The internal surface of the tunica is freed from the spongiosum toward the dorsal plaque with a Metzenbaum scissor. This is carried to the dorsal plaque and beyond to the opposite ventral incision. The internal plaque is incised transversely in a fan like fashion using a triangle blade. Tension is placed

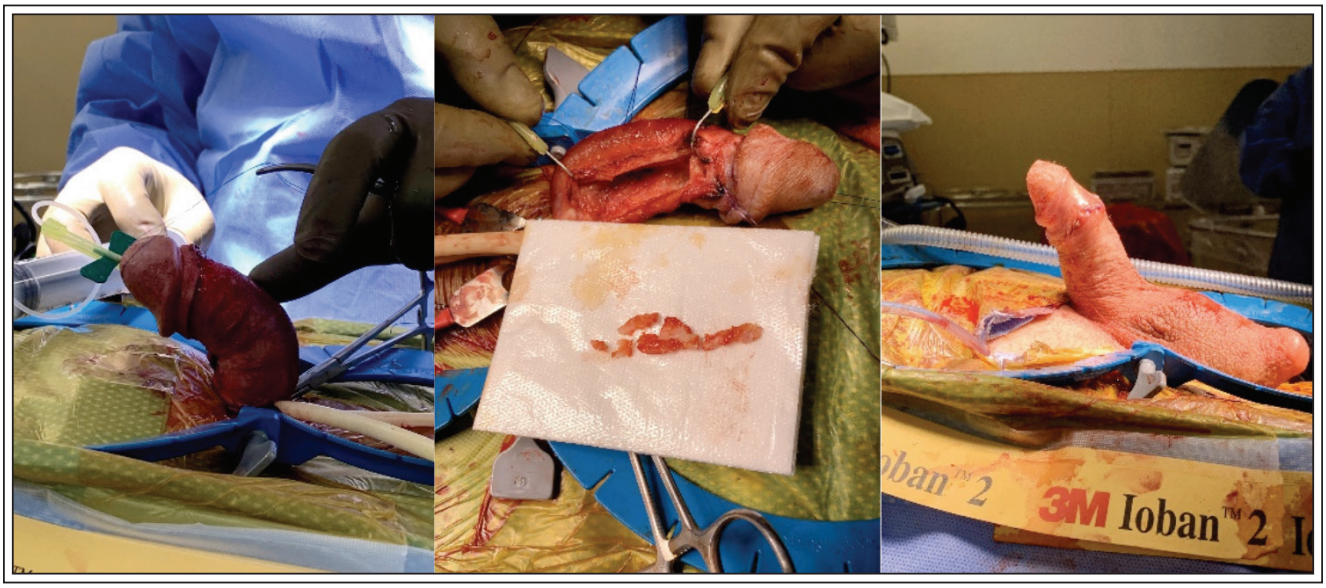

Figure 7. Internal ossified plaque excision.

on the penis as the incisions are made until the stretch length has increased to match the difference in the earlier measurements. This approach is advantageous because the ventral incision can be closed and the artificial erection can be re-induced intraoperatively to ensure complete correction of the curvature. The final advantage is that if there is a simultaneous hourglass deformity, the triangle blade can be directed longitudinally, and the hourglass can be incised similar to that of the scratch technique. If there was an ossified plaque, or significant fibrosis, the paraurethral longitudinal incision was extended, and the ossified plaque or fibrosis was directly excised, Figure 7.

Once correction of the Peyronie's is completed, the penile prosthesis device is inserted through a penoscrotal fashion at the proximal ventral corpora.

Results

From August 2018 to August 2020 we utilized our novel algorithm on 32 patients. The median follow up was 12 months (4-30). The median age was 66 years old. Overall, there was average of 1.9 cm penile stretch length difference before and after management. Table 1 summarizes the difference of the three approaches.

No patients experienced loss of sensation, penile skin complications, or glans ischemia. One patient experienced auto-inflation requiring revision of his reservoir. One patient had less than 10 degrees at completion of the surgery but was found to be at 20 degrees at last follow up. Otherwise, all patients were less than 10 degrees at last follow up (96%). There were 19 patients who had some degree of hourglass deformity. Of those with hourglass, it was isolated in 9, and associated with curvature in 10 patients. One patient required excision of an ossified plaque, performed in addition to the Brock technique.

Discussion

We describe the early outcomes of a novel algorithm in the management of PD at the time of IPP placement. The algorithm attempts to maximize elongation without elevation of the NVB. Our patient cohort has no loss of sensation, skin complications, or glans ischemia. 96% of patients had less than 10 degrees of residual curvature at last follow up.

While modeling and plication are safe and effective with reported success rates between 35%-100%,[3-5,16,17] they do not address the need for length restoration. Plication was first described by Rahman et al[6] and later by the group at University of Texas Southwestern.[7,8] In this last series, it is noted that the stretched penile length is the same before and after plication, resulting in no length restoration. Hudak et al reported a 78% perceived loss of length when plication maneuvers were employed for PD.[7] While modeling straightens the penis, it is performed over a penile implant that was placed before correction of the curvature. Our algorithm aims to address this shortcoming with length restoration.

Many authors have described incisional maneuvers to lengthen the concave side of the penis.[15,18-23] However, these often result in added complexity and increased risk of neurovascular complications which make many implanters shy away from these approaches. Therefore, others have described techniques to incise the plaque internally, without elevation of the neurovascular bundle. In 2011, Shaeer described using a cystoscope passed through the corporotomies to transversely incise the Peyronie's plaque.[24] Later, Perito and colleagues described the scratch technique using a nasal speculum passed down the corpora with a #12 blade or Metzenbaum scissors.[9] In the multi-institutional follow up, the immediate postoperative

TABLE 1. **Summary of three approaches**

	Brock	**Scratch alone**	**Microperforation**
Number of patients	10	19	3
Change in stretched penile length (avg cm)	2.2 (1-3.5)	.7 (0-2)	2.8 (2-4.5)
Average degree initial curvature (degrees)	70.5 (30-100)	17.8 (0-25)	76.7 (45-95)
Average operative time (min)	113	77	147
Estimated blood loss (avg mL)	45	38	100

curvature was often > 10 degrees, and they therefore employed a 12 week postoperative vacuum therapy protocol.[10] The immediate postoperative curve difference was 35-54 degrees based on location along the phallus. The authors report that deep longitudinal cuts result in longitudinal and transverse fracture of the plaque, but the above findings may reflect the lack of adequate transverse incisional effect. In our experience, if we measure the internal corporal length, then perform the scratch technique, and then perform the measurement again, we were never able to gain more than 1 cm of length. This was true despite curvature correction. The difference in measurement, despite severity of curve, indicated that the length gained was minimal with this approach. Therefore, we sought alternative means of length restoration.

The Brock technique was initially described in 2006 to manage dorsal PD via a small ventral peri-urethral incision preventing the need to elevate the NVB.[12] Performing the Brock technique at the time of IPP placement, we have identified several advantages. First, there is no elevation of the NVB needed. The transverse disruption of the plaque allows us to easily measure the increase in stretched penile length. The ventral incision can be closed, and the artificial erection reassessed to ensure resolution. The ventral incision can be extended to allow excision of ossified plaque internally as needed. The final advantage is the ventral phallus can be exposed via a long ventral incision,[25] circumcising incision,[26] or penile invagination via the penoscrotal junction[13] therefore giving the surgeon many options to access the plaque.

For lateral and ventral curvature, we have adopted the microperforation approach. This is a limited form of the more aggressive TEP) as described by Egydio.[11] We prefer this approach as the multiple tunical incisions do not need to be grafted like they do with one large tunical incision. We have also found we can use any brand of IPP as the integrity of the tunica is preserved. Unlike the Egydio's original technique, we only expose and elevated Buck's fascia over the region of scarred corpora, in addition we limit the elevation of the NVB to the 10 and 2 o'clock position in order to minimize any sensation changes. Similar to Egydio, we found that full elevation of the urethra is not necessary to allow maximal expansion of ventral scarring. Outcomes from our limited series demonstrated an average length gain of 2.8 cm, compared to 3.3 cm in the more aggressive TEP.[11] While lengthening procedures are known to increase risk of neurovascular complications,[27] in the TEP population 3.8% had temporary glans numbness, 6.9% had temporary anorgasmia, and 19.9% had a postop hematoma.[11] Comparatively, no patients in our series had significant hematoma nor sensation changes.

There are several limitations to the present study. It is a retrospective study. We have few numbers of patients in each subset, especially utilizing the microperforation technique. Long term follow up is lacking. Despite these limitations, we are encouraged by our early outcomes of this algorithm. We demonstrate that without elevating the NVB we can still offer length restoration when treating PD at the time of IPP placement.

Conclusion

Herein we present our novel algorithm for the management of PD at the time of IPP placement. By utilizing a combination of the scratch technique for subtle curvature and hourglass deformity we can easily correct minimal curvature. By using the Brock technique for severe dorsal curvature, and a limited TEP for severe ventral and lateral curvature we have been able to safely maximize the length without elevating the NVB. By limiting NVB elevation, we decrease the risk of neurovascular complications. This novel algorithm is safe and effective for the treatment of PD at the time of IPP placement. □

References

1. Mulhall J, Ahmed A, Anderson M. Penile prosthetic surgery for Peyronie's disease: defining the need for intraoperative adjuvant maneuvers. *J Sex Med* 2004;1(3):318-321.
2. Levine LA, Benson J, Hoover C. Inflatable penile prosthesis placement in men with Peyronie's disease and drug-resistant erectile dysfunction: a single-center study. *J Sex Med* 2010;7(11):3775-3783.
3. Wilson SK, Cleves MA, Delk JR. Long-term follow up of treatment for Peyronie's disease: modeling the penis over an inflatable penile prosthesis. *J Urol* 2001;165(3):825-829.
4. Levine LA, Dimitriou RJ. A surgical algorithm for penile prosthesis placement in men with erectile failure and Peyronie's disease. *Int J Impot Res* 2000;12(3):147-151.
5. Montague DK, Angermeier KW, Lakin MM et al. AMS 3-piece inflatable penile prosthesis implantation in men with Peyronie's disease: comparison of CX and Ultrex cylinders. *J Urol* 1996;156(5):1633-1635.
6. Rahman NU, Carrion RE, Bochinski D et al. Combined penile plication surgery and insertion of penile prosthesis for severe penile curvature and erectile dysfunction. *J Urol* 2004;171 (6 Pt 1):2346-2349.
7. Hudak SJ, Morey AF, Adibi M et al. Favorable patient reported outcomes after penile plication for wide array of peyronie disease abnormalities. *J Urol* 2013;189(3):1019-1024.

8. Chung PH, Scott JF, Morey AF. High patient satisfaction of inflatable penile prosthesis insertion with synchronous penile plication for erectile dysfunction and Peyronie's disease. *J Sex Med* 2014;11(6):1593-1598.
9. Perito P, Wilson S. The Peyronie's plaque "scratch": an adjunct to modeling. *J Sex Med* 2013;10(5):1194-1197.
10. Antonini G, De Berardinis E, Del Giudice F et al. Inflatable penile prosthesis placement, scratch technique and postoperative vacuum therapy as a combined approach to definitive treatment of Peyronie's disease. *J Urol* 2018;200(3):642-647.
11. Egydio PH. An innovative strategy for non-grafting penile enlargement: a novel paradigm for tunica expansion procedures. *J Sex Med* 2020;17(10):2093-2103.
12. Bella AJ, Beasley KA, Obied A et al. Minimally invasive intracorporeal incision of Peyronie's plaque: initial experiences with a new technique. *Urology* 2006;68(4):852-857.
13. Austoni E, Altieri VM, Tenaglia R. [Trans-scrotal penile degloving, a new procedure for corporoplasties]. *Urologia* 2012;79(3):200-210.
14. Smith AD. Circumcision incision for insertion of semirigid penile prosthesis. *Urology* 1981;18(6):609.
15. Egydio PH, Kuehhas FE. The multiple-slit technique (MUST) for penile length and girth restoration. *J Sex Med* 2018;15(2):261-269.
16. Carson CC. Penile prosthesis implantation in the treatment of Peyronie's disease and erectile dysfunction. *Int J Impot Res* 2000;12(Suppl 4):S122-S126.
17. Kadioglu A, Sanli O, Akman T et al. Surgical treatment of Peyronie's disease: a single center experience with 145 patients. *Eur Urol* 2008;53(2):432-439.
18. Garaffa G, Minervini A, Christopher NA et al. The management of residual curvature after penile prosthesis implantation in men with Peyronie's disease. *BJU Int* 2011;108(7):1152-1156.
19. Raz S, Dekernion JB, Kaufman JJ. Surgical treatment of Peyronie's disease: a new approach. *J Urol* 1977;117(5):598-601.
20. Hatzichristodoulou G. The PICS technique: a novel approach for residual curvature correction during penile prosthesis implantation in patients with severe Peyronie's disease using the collagen fleece TachoSil. *J Sex Med* 2018;15(3):416-421.
21. Sansalone S, Garaffa G, Djinovic R et al. Simultaneous penile lengthening and penile prosthesis implantation in patients with Peyronie's disease, refractory erectile dysfunction, and severe penile shortening. *J Sex Med* 2012;9(1):316-321.
22. Rolle L, Ceruti C, Timpano M et al. A new, innovative, lengthening surgical procedure for Peyronie's disease by penile prosthesis implantation with double dorsal-ventral patch graft: the "sliding technique". *J Sex Med* 2012;9(9):2389-2395.
23. Egydio PH, Kuehhas FE. Penile lengthening and widening without grafting according to a modified 'sliding' technique. *BJU Int* 2015;116(6):965-972.
24. Shaeer O. Trans-corporal incision of Peyronie's plaques. *J Sex Med* 2011;8(2):589-593.
25. Clavell-Hernández J, Wang R. Penile size restoration with nondegloving approach for Peyronie's disease: initial experience. *J Sex Med* 2018;15(10):1506-1513.
26. Weinberg AC, Pagano MJ, Deibert CM et al. Sub-coronal inflatable penile prosthesis placement with modified no-touch technique: a step-by-step approach with outcomes. *J Sex Med* 2016;13(2):270-276.
27. Wilson SK, Mora-Estaves C, Egydio P et al. Glans necrosis following penile prosthesis implantation: prevention and treatment suggestions. *Urology* 2017;107:144-148.