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REVIEW ARTICLE

"Make it as long as you can, Doc." Concomitant surgical treatments with penile implant to enhance penile size

Steven K. Wilson[1] · Laurence Levine[2] · Run Wang[3]

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Abstract
The constant refrain for patients seeking penile implant is, "can you make it bigger?" It is a different request when the patient is young and fully potent compared with the mature individual suffering from erectile dysfunction (ED) for whom conservative therapies don't work. The purpose of this workshop is to review strategies to make the ED patient undergoing inflatable penile prosthesis (IPP) have an enhanced penile appearance by having more of his phallus visible outside his body. Our common procedures are to use a combination of vacuum device preparation, oversizing the cylinders 1–2 cm, and daily aggressive cycling of the device for at least 6 months following implantation. More complex surgical solutions are also covered.

Introduction

SKW attended Dr. Brantley Scott's second implant workshop in 1974. He went back to join his father's practice in Fort Smith Arkansas and performed the first inflatable penile prosthesis (IPP) in that state. He taught his first penile implant workshop in 1985 and trained over 500 physicians from 27 countries in the quarterly workshops over 15 years. SKW has been visiting professor at 92 USA training programs and performed an IPP in 53 different countries. He has scrubbed on over 11,000 IPPs. Throughout this journey SKW never stopped hearing, "Can you make it bigger, Doc?" To this he replies, "if I could make a penis longer, I would have become a very wealthy man by now and not be sitting in this office with you".

We must, at this point, make a distinction with regards to the types of patients desiring enhancement of penile size. There is a huge difference from the expectations of a fully potent 35-year old and the typical impotent 65-year old who has failed conservative therapy and wishes a surgical correction of his erectile dysfunction (ED). To say that the former patient is obsessed with penile size is not an exaggeration. To characterize the ED patient, a mature older individual, as mentioning penile size casually or in passing is usually accurate.

The purpose of this article is to review the surgical maneuvers that can be performed at the time of penile prosthesis implantation on the latter ED patient. We are aiming to enhance his penile appearance during prosthesis erection by making more of the penis visible to him and his partner. This aspiration is completely different from the fully potent patient desiring an enhanced flaccid appearance. While this penile dysmorphic patient will vigorously protest, his penis is frequently what would be considered normal in size [1].

Improving girth or length of the patient in flaccidity is penile aesthetic surgery and is certainly disputatious. Both the SMSNA and the ISSM several years ago issued disclaimers cautioning its members (Fig. 1). The SMSNA deemed penile aesthetic procedures as "experimental". Some authorities have indicated these organizations are looking at the subject of penile aesthetics again after the recent FDA clearance of Penuma, an implant used most often for girth enhancement of the phallus. This Wilson workshop is a discussion of surgical maneuvers to enhance the visible erection caused by an IPP. Creating an improved postoperative appearance of the IPP patient with an erection is possible, desirable, and noncontroversial.

{It is difficult to learn surgical procedures from the written word. The reader is reminded that videos

✉ Steven K. Wilson
skwilson@mac.com

[1] Institute for Urologic Excellence, La Quinta, CA, USA

[2] Rush University Medical Center, Chicago, IL, USA

[3] University of Texas Medical School, Houston, TX, USA

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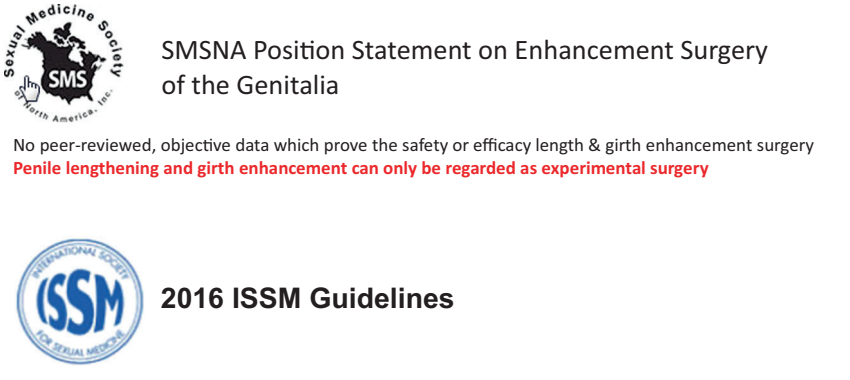

Fig. 1 Disclaimers from our societies.

Fig. 2 Older adult acquired prepubic recession of penis.

illustrating the various operations can be seen on www.vjpu-issm.info. *The references are shown in the text in smaller font in italics*}.

Does the size of a penis changes after implantation of an IPP?

One of the most frequent patient complaints after IPP is his erection is perceived as smaller than the memory of his natural erection. After prosthesis implantation, if queried, 72% of patients will claim loss of length. When stretched penile length before surgery of these men was compared with size at 6 months post IPP, there was no loss of length from the surgery [2]. However, methods of how the preoperative penis is measured may account for the disparity between what is measured and the patient's perception. Mulhall's group showed using penile stretched length underestimated by 20% when compared with an erection induced by intracavernosal injection (ICI) [3]. Two other studies demonstrated objective penile length shortening after penile implants when compared with ICI-induced erections [4, 5]. Interestingly, Perito and Gheiler's group documented conversely a 9.5% increase in length between preimplantation erect length created with hydro-inflation and post IPP implantation [6]. Even though we may demonstrate the IPP does not diminish length, the memory of their erect penis at a younger age or before they lost their erections obviously is an impediment to patient satisfaction. Often, the patient's recall of a larger phallus is accurate. Unfortunately, many maladies cause corporal fibrosis—Peyronie's disease, vascular insufficiency, diabetes, radical prostatectomy, lack of use atrophy. These comorbid conditions will actually cause loss of erectile tissue and resultant shrinkage of the contents of the corporal bodies yielding true loss of measured length over time. Finally, it must be recognized that most men after their IPP do not experience glans engorgement during arousal. This erection that occurs with inflation of the implant without glans engorgement will contribute to the sense that the penis is now smaller.

What strategies do we have to maximize perceived penile size after IPP placement?

It may surprise many readers, but we have many strategies for improving the appearance of a man's IPP erection. Circumcision at birth, abdominal muscle relaxation with aging, suprapubic fat deposits in maturity, the necessity for prostate extirpation, and the truncal portliness of later years all combine to bury centimeters of the penile shaft from vision (Fig. 2). The insertion of a device that becomes rigid coupled with surgical maneuvers to display more of the penile shaft is very effective to improve penile appearance and improve patient outcomes. Some of the tools in use today by experienced implanters include:

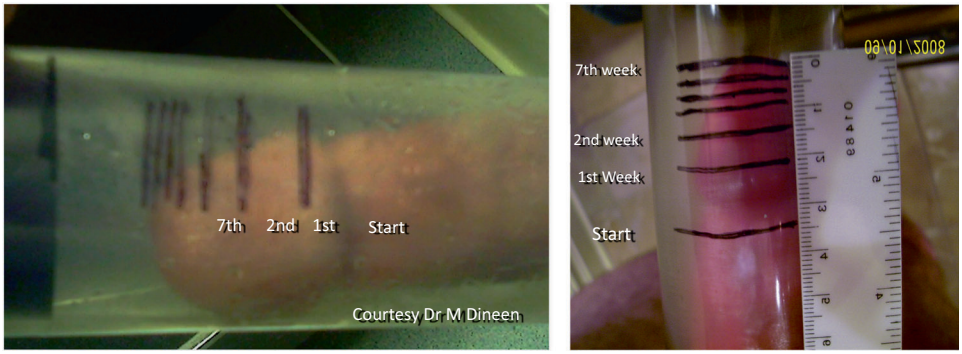

Fig. 3 Vacuum preparation stretches corpora and makes dilatation easier.

(1) Vacuum erection device (VED) stretching pre- and post-operatively.
(2) Mild oversizing of cylinders at time of implantation.
(3) Prolonged inflation postoperatively for months to allow device to act as tissue expander.
(4) Ventral phalloplasty (aka. Scrotoplasty).
(5) Dorsal phalloplasty.
(6) Liposuction or surgical removal of pubic fat pad.
(7) Adjunctive procedures for Peyronie's disease at time of IPP.
(8) A combination of some or all of the above stratagems.

Vacuum erection devices (VED)

Initially before phosphodiesterase inhibitors were available, VED's were quite popular as a treatment for ED. The literature tells us VEDs are effective in 70% of men with ED but are quickly abandoned as long-term solutions [7]. While VEDs are not a good long-term solution to ED, we do have enthusiasm for their use in men prior to IPP particularly those at risk for corporal fibrosis. The conversion of healthy erectile tissue to fibrotic scar because of penile disuse and/or loss of nocturnal erections decreases the elastic nature of the tunica albuginea. The fibrosis destroys the familiar tissue planes within the corpora-increasing dilatation difficulty and generally resulting in less cylinder length implanted. Many men who have not had a working penis for years are also post-prostatectomy, long-term diabetics, with Peyronie's disease or severe arteriosclerotic cardiovascular disease. These patients may have a surprising amount of corporal scarring.

These penises should be pretreated with a VED for at least a month. The suction created by the vacuum stretches the corpora cavernosa softening the dense scar tissue and returning some elasticity to the tunica albuginea. Placing the penis in a VED without the constriction band for 15 min twice a day can increase the visible length of the erect penis in the VED by 2–3 cm, is thought to make dilatation easier and allow the placement of longer cylinders [8, 9] (Fig. 3). It has not been scientifically proven, but Wilson also believes that the VED treatment patients are more satisfied with their postoperative result because they have seen the growth of the penis in the VED and have had "skin in the game".

Oversizing cylinders

Traditionally implanting surgeons were taught to undersize cylinders a bit during IPP placement. This thinking came from experience with malleables and the lengthening cylinder, American Medical Systems (AMS) Ultrex [10]. The malleables were downsized a centimeter to avoid constant painful pressure on the head of the penis. The Ultrex was downsized 2 cm to temper its ability for uncontrolled lengthening. Since inflatables are not often applying the pressure of a rigid cylinder and since the Ultrex has been replaced by the AMS length and girth expansion (LGX) cylinder that is restricted to only 20% length growth, under sizing can be abandoned in IPP's.

Experienced implanters have noted that repeated inflation of cylinders will act to some degree as a tissue expander [11] (Fig. 4). Commonly when removing a broken implant, the surgeon will note that the intra-corporal measurements have increased 2–3 cm allowing placement of longer replacement cylinders. Even better tissue expansion of 3-5 cm can be noted when replacing cylinders in patients whose corpora were extensively damaged by infection or priapism [11] (Fig. 4c). If cylinders are deliberately oversized and repeated long-term inflation is conducted by the patient, researchers have noted a wider, longer penis than that measured at implantation will result [11, 12]. Even better in Henry's study [11], 65% of patients were pleased with their length, 74% perceived increased length of at least 1 cm, and all patients noted it took more pumps to exhaust their cylinders capacity. Enthusiasm for oversizing at initial surgery and use of an aggressive inflation regime is growing. Welliver recently documented a trend in the United States toward using longer cylinders and fewer rear tip extenders compared with 5 years previously [13].

Fig. 4 IPP as tissue expander allowing longer replacement cylinders. a 19 cm IPP removed for infection; corporal fibrosis shrinks penis. **b** 14 cm narrow cylinders 1 Y previous, with usage now too short. **c** Standard cylinders substituted 3 cm longer. Note scrotoplasty.

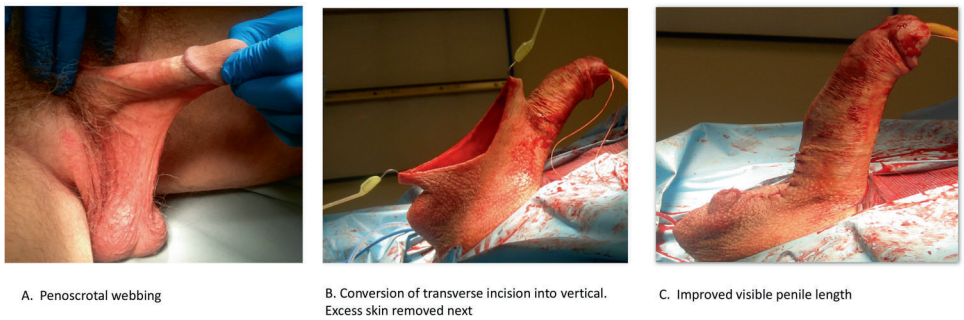

Fig. 5 Ventral phalloplasty or scrotoplasty. a Penoscrotal webbing. **b** Conversion of transverse incision into vertical. Excess skin removed next. **c** Improved visible penile length.

Ventral phalloplasty or scrotoplasty

In countries where circumcision at birth (e.g., USA) is the norm, the foreskin is usually excised by a pediatrician utilizing a Gomco Clamp. More skin than necessary is frequently removed, and the patient in adulthood develops insertion of his penoscrotal junction moved distal on the penis (Fig. 5a). Scrotoplasty in combination with IPP is of interest because it makes the penis appear longer in flaccidity after removal of the scrotal web when a small amount of fluid is carried in the implant cylinders. In erection the penis is not tethered by the web and the appearance is enhanced further by uncovering of the ventral proximal penile shaft (Fig. 5c). Scrotoplasty was first described in the pediatric literature for buried penis in the 1970s. The technique was first published in prosthetic urology literature by Wilson [11]. It is a quick adjunct to scrotal incision IPP implantation. After implantation is complete, the surgeon makes a simple conversion of the high transverse scrotal incision to a vertical one with removal of the redundant skin (Fig. 5b). Carrion's group performed a prospective study of patient's receiving his version of ventral phalloplasty that is basically a "check mark" incision with subsequent longitudinal closure of the scrotal skin after IPP components are placed (Fig. 6). The study convincingly promoted the idea that resection of the scrotal web could be done on virtually all circumcised patients receiving an IPP. They published improved perception of penile length (84%) in men undergoing concomitant scrotoplasty with IPP compared with an identical percentage (84%) of patients complaining of postoperative shortening who received IPP without phalloplasty [14].

Dorsal phalloplasty

Shaeer recently published a surgical tactic to expose more of the dorsal aspect of the penis. As the male ages, his suprapubic fat pad proliferates, and his abdominal musculature becomes lax. This results in prepubic recession of the penis where the previously visible proximal dorsal shaft of the penis is obscured by the mons pubis [15] (Fig. 2). This phalloplasty adds 25.6% visible length to the phallus and is quite quick and easy to perform. It can be accomplished through an infrapubic or penoscrotal incision and, if necessary, can be accompanied by resection of the mons pubis [16] or liposuction to enhance penile visibility even more. Basically, a nonabsorbable suture like 00 Ethibond is used to pin the undersurface of the pubic skin to the symphysis pubis on both sides of the penis (Fig. 7a, b). This adds definition (Fig. 7c, d) to the penopubic junction resulting in visibility of the obscured length of the dorsal shaft. Notably 54% of patients undergoing the adjunctive procedure to IPP reported a longer penis [15].

{*Shaeer O. Penile prosthesis implantation and superpubic lipectomy through the abdominal crease incision. VJPU. 2018;2:142. Shaeer O. Dorsal phalloplasty and monsplasty for lengthening. VJPU. 2018;2:128*}.

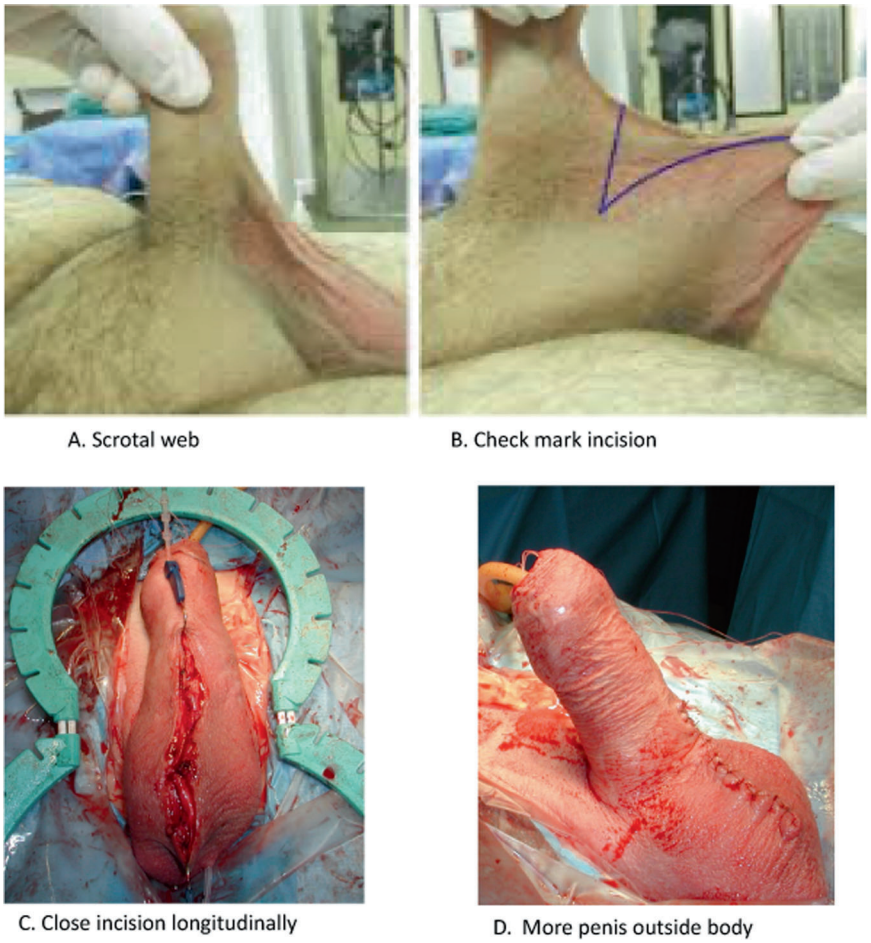

Fig. 6 Carrion's ventral phalloplasty improves appearance of penis. a Scrotal web. **b** Check mark incision. **c** Close incision longitudinally. **d** More penis outside body.

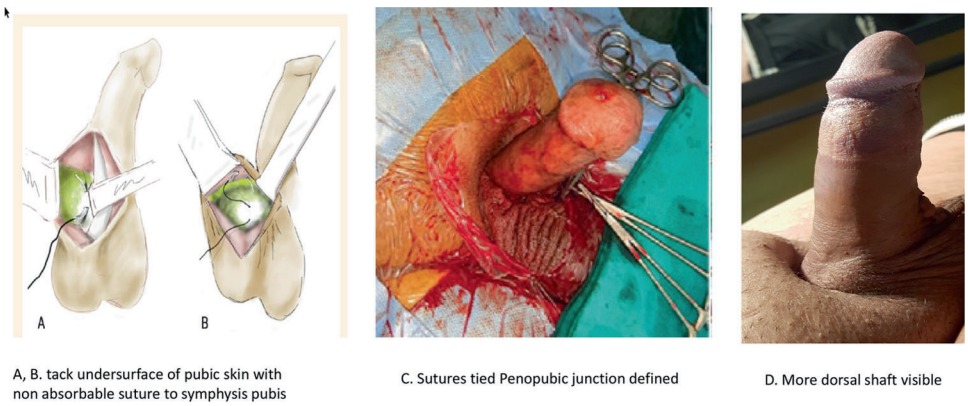

Fig. 7 Shaeer's ventral phalloplasty. a, b Tack undersurface of pubic skin with nonabsorbable suture to symphysis pubis. **c** Sutures tied Penopubic junction defined. **d** More dorsal shaft visible.

Adjunctive procedures for Peyronie's disease

This subject has been extensively covered in Wilson's Workshop #1 [17]. Most of the techniques are meant for straightening but the sliding procedure and multiple slit operations are aimed at achieving a genuine increase in penile length. The sliding procedure has fallen out of favor because of rare (but devastating) glans ischemia. {*Ralph D. Sliding procedure for penile lengthening with IPP. VJPU. 2018;2:130*}. One of the risk factors for this complication was a circumcising or subcoronal incision [18]. Our paper's co-author, RW, published a modification of the sliding procedure in 2018 utilizing a long ventral penile incision with encouraging penile length gain and no occurrences of ischemia [19]. For this Wilson workshop RW queried his latest as yet unpublished data: they have now performed 31 procedures through a long ventral penile incision thus avoiding the classically described subcoronal incision.

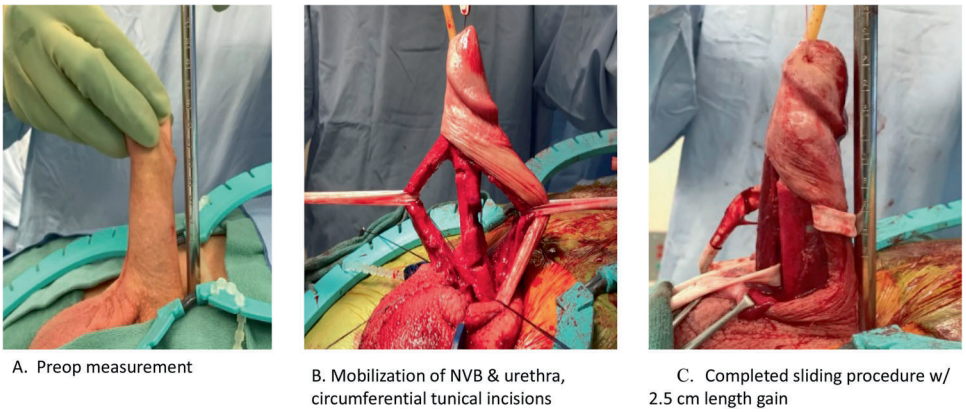

Fig. 8 Wang's sliding procedure through long ventral penile incision. a Preop measurement. **b** Mobilization of NVB and urethra, circumferential tunical incisions. **c** Completed sliding procedure w/2.5 cm length gain.

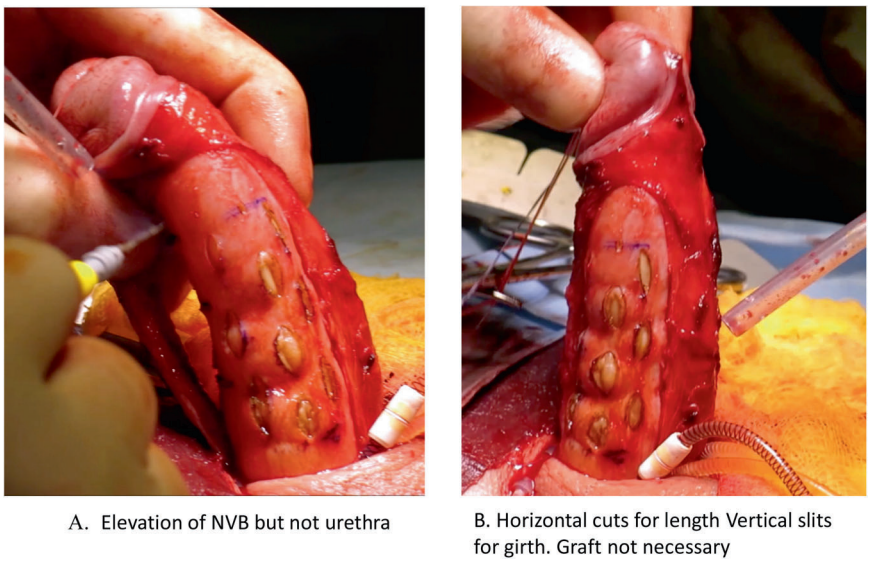

Fig. 9 Egydio's multiple slit technique (MUST). a Elevation of NVB but not urethra. **b** Horizontal cuts for length vertical slits for girth. Graft not necessary.

Mean penile length gain was 2.8 cm (2.0–3.3 cm). Mean follow-up is 16 months (3–36). There have been no serious complications (Fig. 8). It must be stressed that this sliding procedure is only employed in patients desiring aesthetic improvement of their penis in flaccidity in addition to correcting the curvature in erection. The hazards and complexity of the surgery yielding a modest 1-inch length gain seems overkill for the average older patient with Peyronie's who requests, "make it as big as you can, Doc". {*Clavell-Hernandez, J. Non-degloving approach for Peyronie's disease incision with IPP. VJPU. 2019;3:150*}.

A Brazilian urologist, Paulo Egydio, has been a pioneer in straightening curvature and penile aesthetics. He has originated and published extensively various adjunctive techniques (including sliding procedure) aimed at straightening a curved penis concomitantly with penile implant while also achieving an authentic gain of phallus length in both flaccidity and erection [20, 21]. His latest iteration, the multiple slit technique, requires mobilization of the neurovascular bundle but avoids mobilization of the urethra, which was another risk factor for ischemic glans [18] (Fig. 9a). After an experience of 138 patients (75% received malleables, 25% IPP), he had a mean length gain of 3.1 cm (range 2–5 cm). Median follow-up was 15 months (6–36 months) with only one glans necrosis (a malleable patient). While in this surgeon's hands, this new adjunct to IPP provides a solution for patients who have ED, curvature, and penile size impairment, the potential complications of the extensive procedure should limit deployment to only very experienced surgeons who counsel their patients extensively. {*Garaffa G. Peyronie's disease: tunical string vest incisions for girth and length restoration after penile prosthesis implantation. VJPU. 2018;2:140*}.

Other thoughts on penile implants

- Penuma: while this paper has discussed use of surgical length enhancements for the erect penis with a penile implant, there is one augmentation for the flaccid penis that improves girth along with visibility of the flaccid penis. The Penuma is a soft silicone implant, the first penile aesthetic device cleared by the FDA. The silicone

Fig. 10 Penuma penile implant for prepubic recession. a Penuma soft silicone sleeve, placed subcutaneously. **b** Pre-op adult acquired buried penis. **c** 3 mo. Post-op, more penis outside body.

Fig. 11 Two patients IPP + Penuma Implant. a Full inflation after Penuma. **b** 30% inflation before and after.

sleeve vaguely resembles a hot dog bun that is placed subcutaneously beneath the penile skin but does not overlie the urethra (Fig. 10a). Since this Penuma device is a penile implant we can document its effectiveness not only for girth enhancement in patients with penile dysmorphism but also those older individuals plagued by prepubic recession or the so-called adult acquired "buried penis" [22] (Fig. 10b, c). While the Penuma's primary purpose is for aesthetic enhancement of the flaccid penis, it has also been used to correct perceived shortening and narrowing after IPP implantation. The Penuma is placed months after IPP. Following placement of an IPP, nine patients reported loss of penile length and seven of the nine reported loss of girth

Fig. 12 "S"-shaped deformity of lengthening cylinder. a AMS Ultrex "S" deformity. **b** 2 examples AMS 21 cm LGX post 2 years "S" deformity and poor rigidity. **c** Replaced with Coloplast. Straight with better rigidity.

following IPP. 2 years after Penuma subcutaneous insertion, patients had a flaccid length gain of 2.4 cm and girth gain of 3.4 cm [23] (Fig. 11). The risks and complications of the placement of Penuma implant (e.g., suture dehiscence, infection) were not different from placement in a patient without an IPP. {*Elist J. The Penuma® silicone implant: a new implantable device improving penile appearance and adding additional length and girth of penis outside the body. VJPU. 2018;2:119*}.

- Boston Scientific formerly AMS LGX cylinders: a manuscript studying IPP and length would be remiss without depicting the LGX, a length expanding IPP cylinder. Boston Scientific makes two standard size inflatable cylinders: CX (controlled expansion in girth) and LGX (length and girth expansion). The predecessor to the LGX was called Ultrex and had unrestricted elongation. This cylinder stretched in length excessively in the capsule that had formed around the uninflated and therefore unlengthened cylinder. Since the mature capsule could not be influenced by the tip of the cylinder, the cylinder eventually elongated like a snake within the shorter capsule causing the configuration of an "S" in the unyielding capsule (Fig. 12a) [24]. This affected penile appearance and erection rigidity. Today's LGX ability to elongate is restricted to 20%. If a regimen of prolonged daily inflation is not performed by the patient for the first 4 months after surgery, the stretched penile length measured before the surgery will not be maintained [25]. If this aggressive cycling is not adhered to by the patient, the LGX with usage can still cause an S deformity as shown by these two patients revised by Wilson (Fig. 12b). Strangely, there have been no studies, as yet, reported in the literature quantitating the penile length gain of LGX with a maximum inflation protocol [25]. One caveat should be mentioned. Experienced implanters tend to avoid using the LGX cylinders in the longer lengths (Fig. 12b, c). All lengths of LGX cylinders only expand to 18 mm resulting in 36 mm penile girth which, in our opinion, is insufficient for a finger in glove fit on full inflation in the wider corpora of a long penis, and therefore less girth. In addition, bench testing shows with lengthening, the rigidity of the LGX is compromised when compared with the Coloplast Titan [26].

Conclusion

Creating an improved postoperative appearance of the IPP penis with an erection is possible, desirable and non-controversial. Recipients of IPP are older with diminishment of their visible erection typically caused by anatomic and comorbid factors. These maneuvers merely allow more of the proximal penile shaft to become observable creating perceived improvement in length of the phallus when the penile implant is inflated. We commonly use a combination of vacuum device preparation, oversizing the cylinders 1–2 cm and daily aggressive cycling of the device for at least 6 months following implantation. If a prominent mons pubis or scrotal web is evident, we usually will add dorsal and/or ventral phalloplasty to the mix. The reader is advised to contemplate the other more extensive surgical techniques

outlined in this paper and apply them as needed after thorough advance discussion with the patient of the risks, complications, benefits, and alternatives.

Compliance with ethical standards

Conflict of interest SKW: Consultant AMT, Coloplast, International Medical Devices. Stockholder Neotract. Lecturer Boston Scientific. LL: Consultant Coloplast, International Medical Devices. RW: Consultant Coloplast, International Medical Devices.

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