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ARTICLE

Dorsal phalloplasty accompanying penile prosthesis implantation minimizes penile shortening and improves patient satisfaction

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Abstract

Many patients complain of shortened length following penile prosthesis implantation. Dorsal phalloplasty (DP) can accompany prosthesis placement to mitigate this complaint by resulting in more visible penis outside the plane of the patient's body. DP is done through the same incision. A nonabsorbable suture approximates the under surface of the skin where the penis meets the pubis to the periosteum of the pubic bone. This adjunctive procedure results in more visible proximal penile shaft. We compared penile visible length (pubic skin surface to tip) in patients who had the adjunctive procedure with prosthesis insertion to patients who had only the penile prosthesis. Totally, 66 patients had DP and 60 did not. All patients were operated through a penoscrotal incision. The tacking suture of # 5 nonabsorbable braided polyester was passed through the pubic periosteum then into the subcutaneous tissue and dermis of the under surface of the pubic skin. The suture was tied after prosthesis insertion. Efficacy of DP was evaluated by measured gain in erect visible length in the DP group, maintenance of that length gain until final follow up at 3 years, as well as by the difference in subjective evaluation criteria between both groups. The DP group had a 23% increase in visible length compared to pretacking ($p < 0.0001$) that was durable to 36 months. Subjectively, 80% of patients in the prosthesis alone group reported a shorter penis in contrast to 6.1% in the DP group. The DP group reported 28.4% higher satisfaction with length, compared to the control group ($p < 0.0001$). In conclusion, DP accompanying prosthesis insertion improved visible length, minimized the impression of shortening, and enhanced satisfaction with length.

Introduction

Penile prosthesis implantation (PPI) is a successful treatment for cases of refractory erectile dysfunction (ED), with resultant high patient and partner satisfaction rates. The patient's perceived length is a potential problem following PPI [1, 2], with the implanted length being perceived as less than the original erect length remembered by the patient. Up to 72% of patients may perceive length being shorter following PPI [3]. While this can be a subjective impression, objective comparison of erect length (by hydroinflation) before implantation to the postimplantation length has confirmed a degree of actual shortening [4]. These patient concerns have given rise to various surgical adjunctive procedures accompanying PPI to mitigate this perceived loss of length [5–11].

Dorsal phalloplasty (DP) is a minimally invasive same-session adjuvant technique to PPI, resulting in more of the base of the penis visible in an effort to mitigate shortening accompanying PPI (Figs. 1 and 2) [12, 13]. DP is performed through the same incision as PPI, whether penoscrotal or infrapubic. Following skin incision and prior to corporotomy, a nonabsorbable tacking suture of #5 polyester is placed, approximating the under surface of the peno–pubic skin junction (PPJ) to the pubis. Following insertion of the implant components, the suture is tied, tacking the pubic skin and fat to the pubis, defining the PPJ, and revealing the base of the penis, thereby enhancing "visible length" (length measured from the pubic skin surface to the tip) rather than "true length" (from the pubic bone to tip).

This study compares PPI and DP in 66 cases compared to 60 patients undergoing PPI only (control group), recruited though 2 years. The subjects underwent preoperative and

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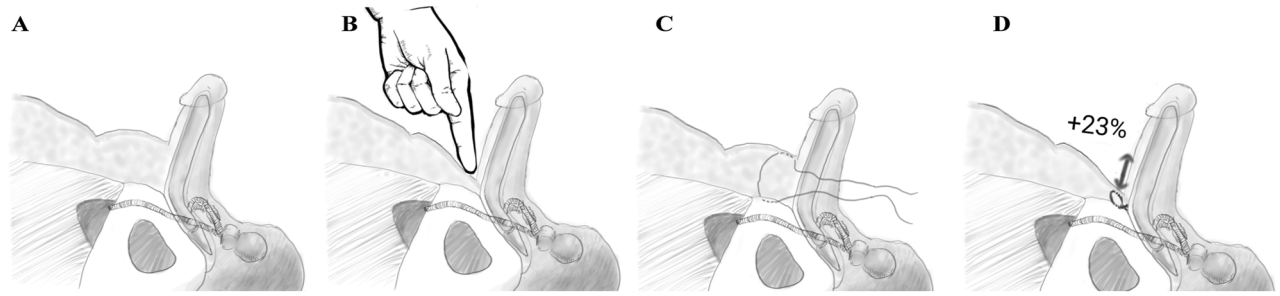

Fig. 1 Illustration of dorsal phalloplasty. **a** Pretacking. **b** Finger-dipping the peno–pubic junction reveals the base of the penis. **c** Suture line passing through the pubic periosteum and the peno–pubic junction. **d** Tacking suture tied, revealing 23% of the visible length of the penis

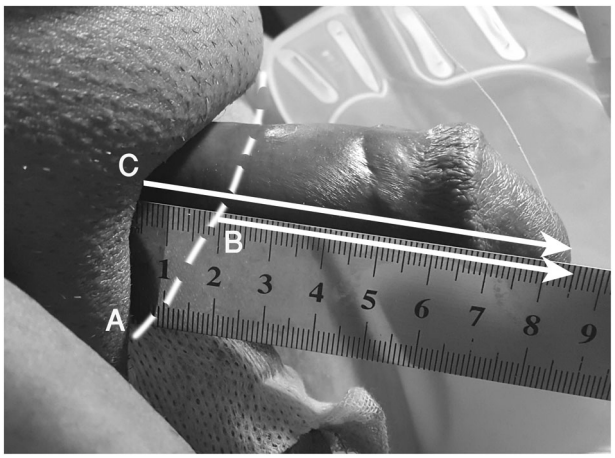

Fig. 2 The essence of dorsal phalloplasty is revealing the base of the penis. Line A demarcates the original skin line. Dorsal phalloplasty tacks the skin line in, with an increasing the visible length of the penis from line B to line C, a difference of 17.6% in the case depicted

Table 1 Patient characteristics and measurements

		PPIDP	Controls
Number		66	60
Age		57.9 ± 6.9	55.8 ± 8.2
BMI		29 ± 4.4	26.4 ± 5.4
Preoperative flaccid stretched visible length (cm)		9.8 ± 3	12.1 ± 1.6
Preoperative flaccid stretched true length (cm)		12.9 ± 2.5	14.5 ± 1.9
Implant	Inflatable 3 piece	11	7
	Inflatable 2 piece	8	8
	Semirigid	47	45
Intraoperative Length (cm)	Pretacking	10.1 ± 3	
	Posttacking	13.1 ± 2.5	
	Postimplantation		12.2 ± 1.6
Length at final follow up (cm)		13 ± 2.5	12.1 ± 1.5
Length comparison	Longer	28	2
	Same	34	10
	Shorter	4	48
Satisfaction with length		4.9 ± 0.3	3.8 ± 0.5
Drop outs		36	29

postoperative measured length, reported their subjective impression of length compared to preimplantation and their level of satisfaction with the operative result.

Patients and methods

Ethical approval was obtained from the Internal Review Board of the Department of Andrology. One hundred twenty six consecutive patients with refractory ED were given the choice of prosthesis implantation with or without accompanying dorsal phalloplasty. Patient inclusion into either group was as per patient choice, after evaluation of the potential effect of DP by manually depressing the junction of penile skin with pubic skin (Fig. 1). The choice of implant (semirigid penile prosthesis or girth-expanding inflatable penile prosthesis) was governed by financial considerations, since PPI is not supported by the health insurance system in Egypt. Surgery was performed through a penoscrotal incision in all 126 patients. Simultaneous DP and PPI were done in 66 patients and 60 received only a prosthesis. Table 1 shows the age difference and type of prosthesis implanted, being comparable in both groups (p value for age = 0.06, percentage of girth-expanding inflatable implants in DP group being 28.8%, and 25% in the PPI only group). Cases requiring further intervention such as lipectomy or plaque incision and grafting were excluded from the study as was those with class II/III obesity.

In order to assess length in patients who were unable to achieve an erection we measured flaccid stretched length from the pubic bone to tip (true length), and from the pubic skin surface to tip (visible length) (Table 1).

Dorsal phalloplasty surgical technique

After dartos dissection and prior to making the corporotomy for component implantation, the finger and a slim curved

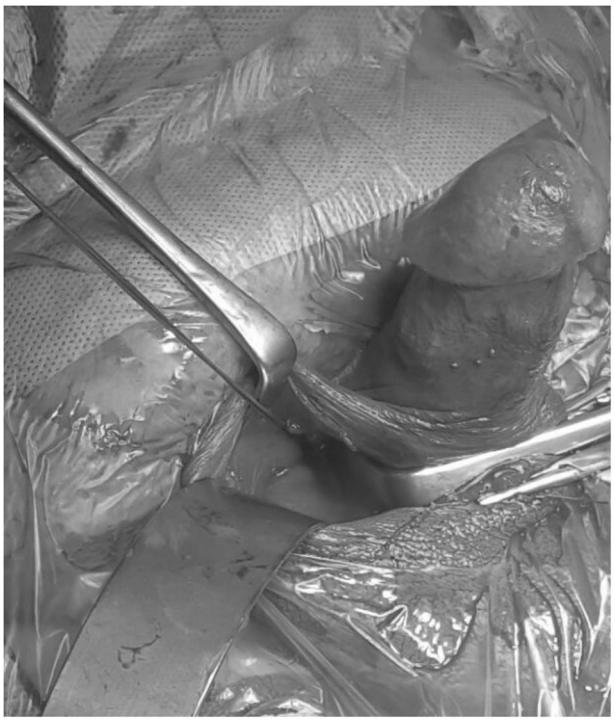

Fig. 3 Exposing the pubis through the penoscrotal incision

Fig. 4 Tying the taking suture

retractor are passed deeply with blunt dissection alongside the penis exposing the superior surface of the right pubic tubercle. Retracting skin, subcutaneous fat and the spermatic cord to the right side and the base of the penis to the left side, the pubis is exposed (Fig. 3). The tacking suture was placed using size-5 nonabsorbable braided polyester suture material (Trubond™, Sutures India PVT, Bangalore, India) on a 55 mm needle. The suture was passed through the pubic periosteum then into the subcutaneous tissue and dermis of the pubic skin junction with the penis and left untied. Penile prosthesis implantation proceeds as usual. After implantation was complete, a raw area was created over the pubic periosteum and on the under surface of the skin by diathermy, and the tacking suture was tied with the implant inflated/erect (Fig. 4). Tying of the suture is facilitated by the surgical assistant depressing the junction of penile and pubic skin toward the pubis.

Evaluation for both groups was as follows: erect visible length measured intraoperatively by rigid ruler, before tying the tacking suture and after tying it; re-evaluated at final follow up with erect visible length measured by the investigator. Subjectively, at final follow up, whether in-office or on a phone interview, patients were asked to evaluate their personal impression of postimplantation erect length compared to that before ED with choices being "longer", "same", or "shorter", and to report on their satisfaction with length postimplantation on a five-point Lickert scale.

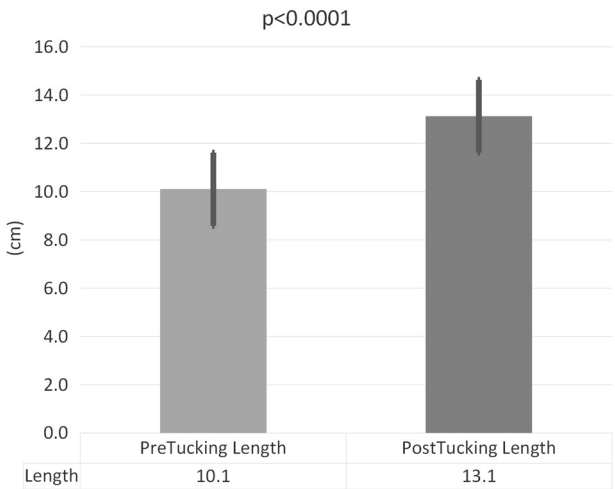

Fig. 5 Pretacking versus posttacking length

Statistical analysis was performed using Microsoft Excel 2010 and SPSS for windows version 19. Results were expressed in mean ± standard deviation, frequencies (number of cases) and percentages when appropriate. Comparison of means was performed using paired samples *t* test. Student *t* test was used to evaluate statistical significance for continuous numerical values, while chi-square test was used

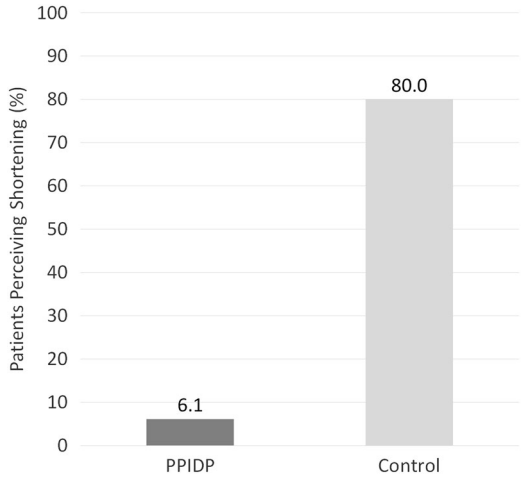

Fig. 6 Impression of shortening in the PPIDP group versus the Control group

to evaluate categorical data. A probability value (p value) less than 0.05 was considered statistically significant.

Results

In the dorsal phalloplasty group, a statistically significant 23% increase in visible length was noted posttacking, compared to pretacking ($p < 0.0001$, Fig. 5). The added length was an average of 3 ± 1.3 cm (23%) overall, 4 ± 0.9 cm (32.3%) in obese, and 1.8 ± 0.4 cm (14.2%) in nonobese patients. At final follow up, this increase in visible length was maintained, with the difference between posttacking length and length at final follow up being a scant 1.3% (Table 1, $p = 0.378$). Subjectively, 80% of patients in the prosthesis only group reported a shorter penis compared to their remembered erect length in contrast to 6.1% in the adjunctive phalloplasty group (Fig. 6, Table 1). Notably, the phalloplasty group reported 28.4% higher satisfaction with length, compared to the control group (Table 1, $p < 0.0001$). Final length in the phalloplasty group was comparable to the preoperative stretched true length, while in the control group, it was comparable to the preoperative stretched visible length (Table 1).

Within the DP group, obese patients demonstrated higher mean length increase: $32.3\% \pm 9.5$, compared to nonobese: $14.2\% \pm 4.2$ ($p < 0.0001$). Nevertheless, satisfaction with length was high in both subgroups with no statistically significant difference: 4.9 ± 0.2 and 4.8 ± 0.4, respectively, $p = 0.075$.

None of the 126 patients demonstrated complications, whether infection, extrusion, or persistent pain. One patient in the DP group suffered a stitch sinus that dictated removal of the tacking suture at 3 weeks postoperation, with no consequent effect on the implant, length gain, or satisfaction with length.

Discussion

One of the most common complaints in men following PPI is subjective and objective loss of penile length [2]. One report demonstrated that postimplantation length was 9.5% shorter than erect preoperative length (induced by hydro-inflation), and 5.8% shorter than preoperative flaccid stretched length [4]. Shortening can be accentuated in cases of Peyronie's disease, neglected ischemic priapism, postradical prostatectomy, concealed penis, obesity or scarred corpora cavernosa following removal of an infected implant. In contrast, another study measured flaccid stretched penile size before surgery and postimplantation length, and was unable to find a significant measured length loss despite a subjective penile length loss perceived by 72% of patients [3]. The 2016 "Current Recommendations From the International Consultation on Sexual Medicine" recommends that the patient undergoing penile implantation should be informed preoperatively of specific potential areas of complication and/or dissatisfaction, including decreased length [2].

Methods used to address this shortening or impression of shortening include counseling (both preoperative and postoperative), the use of phosphodiesterase inhibitors or intraurethral inserts for enhancing glans tumescence, implantation of length expanding implants, traction to the penis or vacuum therapy for several months prior to implantation [14], or penile augmentation techniques. Augmentation techniques whether concomitantly with PPI or postimplantation include penile suspensory ligament release with or without V–Y skin plasty [5], suprapubic lipectomy to reduce an overhanging fat pad buried penis [6], "ventral phalloplasty" removing penoscrotal webbing [7, 8], a combination of elongation, girth augmentation, and glans augmentation [9]. More recently prosthetic surgeons have described penile disassembly techniques including the double dorsoventral sliding technique [10], and the sliding technique with and without grafting [11]. Some of those techniques result in an actual increase in true length (pubis to tip), such as the PSL release and the sliding techniques, while others improve visible length (pubic skin surface to tip) without enhancing the true length, including ventral phalloplasty and the technique at hand; dorsal phalloplasty.

Dorsal phalloplasty (DP) is a minimally invasive same-session technique that durably improves visible length and satisfaction. DP was first reported in the year 2015 [12]. Initial experience with 13 patients was reported in 2017 [13], though without a control group of implanted patients to evaluate against. Average gain in length after tying the

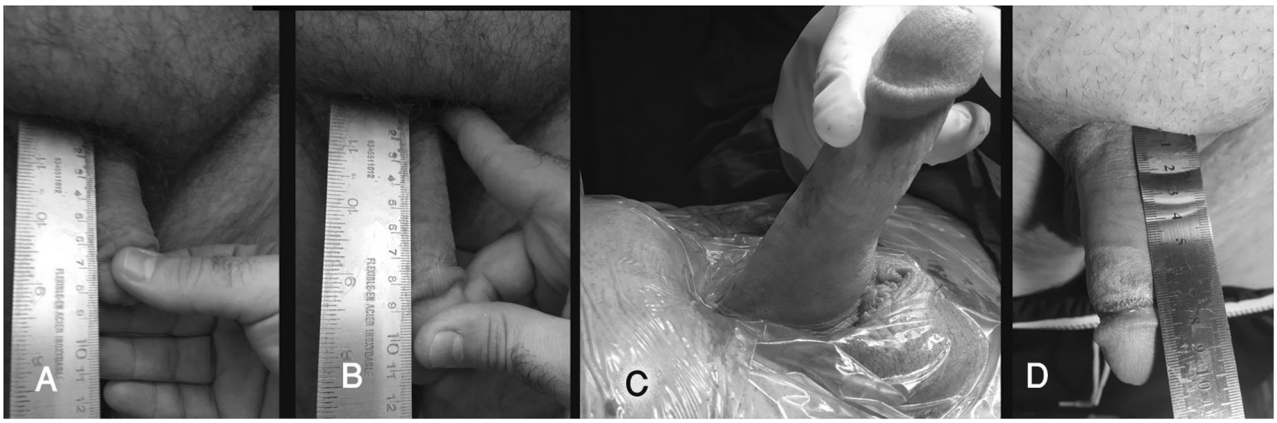

Fig. 7 Preoperative versus postoperative results. **a** Preoperative flaccid stretched length before dipping-in the PPJ (8.2 cm). **b** Preoperative flaccid stretched length with the PPJ dipped-in (9.9 cm). **c** Intraoperative definition of the PPJ by dorsal phalloplasty. **d** Postoperative length following PPIDP (9.8 cm)

tacking suture was 25.6%. The current work builds on the previous reports with a larger sample number, longer follow up, and comparison to a control group of PPI patients without adjunctive DP. Although actual length has not been augmented, the increase in visible length has been shown to reflect positively on patient's impression of length, with only a minority of patients reporting shortening (6.1%), compared to controls where PPI without DP resulted in an impression of shortening in 80%. Additional operative time above that needed for implantation alone is approximately 5 min, without the need for a secondary incision and without significant additional morbidity.

DP alongside PPI is an augmentation technique that does not undermine the value of other techniques such as ventral phalloplasty, lipectomy, liposuction, or PSL release. It can be combined with one or more of such techniques for even greater visible length. DP has yielded promising results in both nonobese and obese patients up to grade I obesity. In morbid obesity, fat removal may be necessary.

Preoperatively, choosing the candidate for DP is preferably done by manually dipping the skin junction with the patient standing in front of a mirror and both the surgeon and patient deciding whether the increase in visible length is enticing (Fig. 7). What the patient sees preoperatively is what he gets postoperatively. Mildly obese patients and nonobese patients with loose pubic skin are the best candidates. It should be noted that while preoperative patient approval is mandatory for ethical reasons, the solicitation of his opinion may have resulted in bias toward satisfaction, since patients in the DP group were the ones who were enthusiastic for dorsal phalloplasty before surgery.

Although inflatable implants are the gold standard for PPI and were recommended for all cases, semirigid rods were used in the majority of patients due to financial considerations. This should have no affect or bias on the results of the current study considering that the percentage of these implants was comparable in both groups.

Points of technique

DP is feasible through both the infrapubic and penoscrotal approaches. Nevertheless, we recommend the scrotal incision particularly in circumcised patients. The added visible length stretches the dorsal skin of the penis, causing traction on the infrapubic incision which could result in wound dehiscence.

The needle of the tacking suture should pick up the pubic periosteum to provide a good anchor; otherwise tacking will not be fully effective. It is recommended to pull on the pubic arm of the suture line to make sure it is well-anchored. It is possible to place more tacking sutures in both pubic tubercles to tack-in a wider area of the PPJ.

Picking the right point on the under surface of the skin for tacking is of utmost importance, otherwise there may be shortening instead of elongation if distal penile skin is picked up in the tacking suture. To pick the right point, with the penis fully stretched, the PPJ is manually dipped-in at several potential points around the base of the penis, rejecting the ones that pull back on penile skin. Passing the needle through the dermis (and fat) results in more effective and sustained tacking relative to merely passing the needle through subcutaneous fat only. However, the suture should not be placed too superficially to avoid a stitch sinus. After placement of the skin under surface suture, pull down on it to make sure tacking is effective, and examine for a dimple. If a dimple is noted, re-place the suture slightly deeper on the PPJ side. The thick # 5 suture material is less liable to break upon tying the knot, and more prone to sustain long term adherence.

Creating a raw area on the pubis and on the under surface of the PPJ induces adhesions that will enhance adherence of

the two surfaces, even in the remote possibility of a stitch sinus and the subsequent removal of the tacking suture.

Conclusion

Dorsal phalloplasty is a minimally invasive and effective method for elongation of the visible length of the penis upon penile prosthesis implantation. Tacking the peno–pubic junction to the pubis minimizes the impression of shortening and enhances patient satisfaction with resultant length following semirigid or inflatable prosthesis implantation.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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