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ORIGINAL ARTICLE

Sexual Function

Patient satisfaction and penile morphology changes with postoperative penile rehabilitation 2 years after Coloplast Titan prosthesis

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A common complaint after inflatable penile prosthesis surgery is reduced penile length. We previously reported how using the Coloplast Titan inflatable penile prosthesis with aggressive new length measurement technique (NLMT) coupled with postoperative IPP rehabilitation of the implant for 1-year helped to improve patient satisfaction and erectile penile measurements. This is a 2 years follow-up of a prospective, three-center, study of 40 patients who underwent Titan prosthesis placement, with new length measurement technique for erectile dysfunction. Patient instructions were to inflate daily for 6 months and then inflate maximally for 1–2 h daily for 6–24 months. Fifteen penile measurements were taken before and immediately after surgery and at follow-up visits. Measurement changes were improved at 24 months as compared to immediately postoperative and at 12 months. 67.8% of subjects were satisfied with their length at 2 years, and 77% had perceived penile length that was longer (30.8%) or the same (46.2%) as prior to the surgery. 64.3% and 17.9% of subjects had increased and unchanged satisfaction, respectively, with penile length as compared to prior to penile implant surgery. All but one subject (96.5%) was satisfied with the overall function of his implant. This study suggests using the Coloplast Titan with aggressive cylinder sizing, and a postoperative penile rehabilitation inflation protocol can optimize patient satisfaction and erectile penile measurements at 2 years postimplant.

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INTRODUCTION

The inflatable penile prosthesis (IPP) became available in the early 1970's.^{1,2} Since then, the IPP has become more dependable mechanically with superior flaccidity and rigidity.^{3–5} High patient satisfaction rates with IPP have been reported worldwide.^{5–7} Despite the fact that, after surgery, most patients admit they would have the procedure again, the complaint of penile shortening after implantation is common and can be disturbing to the patient.^{5,8} Indeed, one publication called the number one complaint after prosthesis implantation “the inability to duplicate the full length of natural erections.”⁹ Deveci *et al.* published that 72% of patients thought their penis was shorter after implantation.¹⁰ Wang *et al.* found a statistically significant decrease of penile length following IPP when compared to erection with intracavernosal injection at 12 months.¹¹ Outside of this study, none of the published papers in the literature includes more than a few postoperative penile measurements.

Because IPP surgery is an elective surgery, where patient satisfaction is of utmost importance, the prevalent complaint of reduced length should be addressed. We have previously shown that using the new length measurement technique (NLMT) with Titan cylinders with minimized rear tip extenders (RTEs), and daily, prolonged cycling of the implant for 1-year postsurgery would maintain the patient's immediate postoperative length and girth and minimize postoperative

loss of length.¹² In that study, we introduced a programed post-IPP rehabilitation concept with prolonged cycling of the implant after implantation. To the authors' knowledge, our original study was the first and only prospective, IRB-approved, multicenter study to be submitted for publication in the literature on this important subject. We investigated whether another year of postoperative IPP rehabilitation changed the objective measurements. Also, because satisfaction with IPPs has been shown to improve over time, we evaluated if this finding holds true with a second year of penile rehabilitation.¹³

MATERIALS AND METHODS

This was a prospective, nonrandomized, multicenter 2-year follow-up clinical trial conducted in the United States at three centers for urologic surgery. The patient demographic, baseline data, and methods have been previously described.¹² The study incorporates a previously reported aggressive method of cylinder sizing during implantation (new length measurement technique; NLMT) designed to maximize length of the inflatable portion of the cylinder, as well as a daily postoperative rehabilitation protocol that included maximum inflation of the implant.^{12,14} Daily inflation from the time of teaching at 6 weeks to 2 years was required and a maximum inflation protocol for 1–2 h was instituted from 6 to 24 months from the original surgery. All patients were implanted with a Coloplast (Minneapolis, MN,

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USA) Titan inflatable penile prosthesis. IRB approval was obtained at all study sites, and all patients provided informed consent. Inclusion and exclusion criteria are shown in **Table 1**. A total of 15 penile measurements were recorded (**Table 2**). Follow-up visits were required at 6 weeks, and 6, 12, and 24 months postimplantation. Following the instructional visit at 6 weeks, the patients were instructed to daily inflate to the point of discomfort for a short period of time. At the 6-month visit, the subjects were instructed to inflate their IPP as hard as they could tolerate every day for the next 6–24 months for at least 1 h and not to exceed 2 h per day.

At each of the four postoperative visits, penile measurements were taken, participant questionnaires were collected, and the number of pumps required for full inflation of the device was determined. Data were compiled and standard statistical analyses were performed using SAS version 9.1 or above (SAS Institute, Cary, NC, USA) or another validated statistical software package.

RESULTS

The patient's average age was 66.2 years. Major etiologies of ED were cancer treatment (50%), vascular disease (32.5%), diabetes (30%), and pelvic trauma/surgery (10%) (**Table 3**). Etiologies for ED were not mutually exclusive.

Table 1: Inclusion and exclusion criteria

Inclusion criteria for the study were subjects who had	
Life expectancy of more than 5 years	
Diagnosis of ED	
Willing and able to meet the follow-up requirements	
Written informed consent approved by the IRB of the respective site	
Exclusion criteria for the study included patients who had	
Previous penile implant or penile lengthening surgery	
Fibrosis of the penis e.g., Peyronie's disease, chordee, priapism	
Recent myocardial infarction or stent placement	
Bleeding disorders or compromised immune systems	
Insufficient manual dexterity to work a prosthesis for daily inflation	

ED: erectile dysfunction; IRB: institutional review board

Table 2: Changes in penile measurements

Measurement	Postoperative to 12 months			Postoperative to 24 months			Change from 12 to 24 months		
	n	Change (cm) <i>±</i> s.d.	P	n	Change (cm) <i>±</i> s.d.	P	n	Change (cm) <i>±</i> s.d.	P
Pubic bone to meatus	31			29			28		
Erect		1.14±1.94	0.003		2.13±2.18	<0.001		0.87±1.18	<0.001
Flaccid		0.99±1.64	0.002		1.65±1.8	<0.001		0.58±0.88	0.002
Stretched		1.04±1.94	0.006		1.83±2.11	<0.001		0.6±1.34	0.024
Pubic bone to proximal end of corona	31			29			29		
Erect		0.94±1.41	0.001		1.76±1.9	<0.001		0.79±1.51	0.01
Flaccid		0.69±1.69	0.031		1.5±1.63	<0.001		0.78±0.97	<0.001
Stretched		0.59±1.59	0.046		1.36±1.86	<0.001		0.7±1.54	0.024
Pubopenile skin junction to meatus	31			29			28		
Erect		0.93±1.41	0.001		1.85±1.66	<0.001		0.83±1.55	0.009
Flaccid		0.71±1.48	0.012		1.5±1.28	<0.001		0.77±1.3	0.004
Stretched		0.95±1.98	0.012		1.78±2.12	<0.001		0.74±1.48	0.013
Pubopenile skin junction to proximal end of corona	31			29			28		
Erect		0.93±1.5	0.002		1.8±1.82	<0.001		0.81±1.54	0.009
Flaccid		0.75±1.58	0.013		1.49±1.64	<0.001		0.7±1.29	0.008
Stretched		0.64±2.00	0.085		1.75±2.04	<0.001		1.04±1.77	0.004
Penile circumference	31	1.08±0.82	0.001	29	1.39±0.73	<0.001	28	0.35±0.66	0.009
Width of penis	31	0.47±0.32	0.001	29	0.58±0.33	<0.001	28	0.14±0.18	<0.001

s.d.: standard deviation

Penile measurements at 12 and 24 months were compared with those immediately postoperative. As reported in the 2015 study, the 12-month follow-up measurements of the erect, flaccid, and stretched penis, as well as circumference and width, all showed an increase of statistical significance postimplantation, and are listed in **Table 2** with *P* values.¹² For the 24-month follow-up, pubic bone to meatus measurements increased by 2.13 cm (*P* < 0.001), 1.65 cm (*P* < 0.001), and 1.83 cm (*P* < 0.001) for erect, flaccid, and stretched penis, respectively. Penile circumference (1.39 ± 0.73, *P* < 0.001) and width (0.59 ± 0.33, *P* < 0.001) of the penis also increased significantly (**Table 2**). All 15 objective penile measurements from 12 to 24 months postimplantation showed statistically significant increases (**Table 2**).

Patient satisfaction profiles were evaluated at 12 and 24 months post-IPP placement (**Supplementary Table 1**). Patients were asked to report on their and their partners' satisfaction with prosthesis function, penile morphology, and sexual performance; overall function of the IPP, including ability to deflate and inflate their IPP; satisfaction with their penile length, overall size, rigidity and length when inflated, concealment when deflated, sexual performance, and confidence in initiating and having intercourse. All of these aforementioned parameters improved more at the second year postimplant as compared to the first. At year 2, 96.4% of the patients reported being very satisfied or extremely satisfied in regards with the surgery fulfilling their expectations, versus 83.3% for the first year. More patients also reported that their sexual relationship with their partner and their partners' perception of their sexual relationship was better than or much better than before the implant at year 2 in comparison to year 1. All of the respondents reported that they would recommend it to others or have it repeated again when asked at year 2, compared to 97% and 91.2%, respectively at year 1 (**Supplementary Table 1**).

When asked "Over the past 4 weeks, how satisfied are you with your penile length?" 64.3% of respondents reported improved satisfaction with penile length from prior to implantation, compared to 61.3% at 12 months (**Table 4**).

All patients received a Titan IPP with distribution amongst cylinder sizes 16, 18, 20, 22, and 24 cm, at 10%, 20%, 32.5%, 35%,

2.5%, respectively; showing a preponderance of larger length cylinders. There was a statistically significant increase in the number of pumps to full inflation at 6, 12, and 24 months postimplantation compared to immediately postimplantation (Table 5). Observed adverse events included cylinder crossover in one patient (2.5%), hematoma development in 2 (5%), epididymitis in 2 (5%), and implant infection in 1 (2.5%).

DISCUSSION

The goals of this study were to evaluate the Coloplast Titan IPP at maintaining penile length at 24 months after IPP implantation; to determine specific changes in phallus dimensions following a postoperative IPP rehabilitation protocol believed to maximize dimensions of the cylinder and surrounding capsule and to evaluate any further dimensional changes to determine if the continued rehabilitation protocol helped with patient satisfaction.

An aggressive cylinder sizing technique was used to ensure the optimal length of the cylinder was implanted, with a minimum of RTE

length. The fact that 90% of cylinders were 18 cm and larger attests to successful implantation of larger-sized available cylinders. These larger cylinders may be helpful for tissue expansion since these larger cylinders are manufactured to have larger width expansion (19.6–22.1 mm) than the smaller 14 and 16 cm Titan cylinders (16.9 mm). We postulated that maximizing the amount of inflatable cylinder in the corpora to take advantage of the innate properties of the Bioflex material would enhance column strength, girth, and rigidity. In addition, the participants were instructed to daily inflate their prostheses for the first 4.5 months after the first instructional postoperative visit and then to maximum inflate the implants for the next 18 months, leaving it inflated for at least 1 h per day. Utilization of a postoperative IPP penile rehabilitation consisting of daily maximum inflation may help create optimal tissue expansion of the corpora cavernosa in terms of resulting penile length and girth measurements.

Patient satisfaction in IPP surgery is critical for its continued success. Papers have shown increases in patient satisfaction over time. Mulhall *et al.* demonstrated “that satisfaction increased in year 1 after implant surgery with significant improvements in the second half of year 1.”¹³ At 2-year follow-up, we also observed similar findings with regard to patient satisfaction in our study. In the postoperative evaluations, our patients were requested to report on several parameters of their and their partners’ satisfaction with regards to prosthesis function, penile morphology, and sexual performance. The 1-year and 2-year data are available in **Supplementary Table 1** for comparison. All patients but one at 24 months were mostly or completely satisfied with regards to the overall function of the IPP, and this individual patient reported being “neutral.” Patient reports included an easier time deflating and inflating their IPP at the second year over the first. With regards to their satisfaction with their penile length, overall size, rigidity and length when inflated, concealment when deflated, sexual performance, and confidence in initiating and having intercourse, all patients had improvement in these parameters at 2 years in comparison to the first year. Patients’ fulfillment of expectations was remarkably high and better at year 2, with 96.4% of the patients reporting being very satisfied or extremely satisfied, compared to 83.3% for the first year. More patients also reported that their sexual relationship with their partner and their partners’ perception of their sexual relationship was better than or much better than before the implant at the year 2 mark as compared to year 1. Finally, whereas 97% and 91.2% of the patients would recommend the IPP procedure to others and have the procedure themselves again, respectively when asked at year 1; all (100%) of the respondents would recommend it to others or have it repeated again at year 2.

The penile measurement increases at 12 and 24 months, as compared with immediately postoperation were statistically significant for flaccid, stretched, and erect states, and circumference and width of the penis, validated our previous study’s findings. However, 61.3% and 64.3% of subjects after the first and second year, respectively, reported improved satisfaction with penile length. This suggests that patient perceived satisfaction with length does not always correlate with the demonstrated measured increases in length. Penile measurement changed not only from 6 to 12 months but as well as 12 to 24 months. In this study, both time periods showed statistically significant improvement in the measured parameters, suggesting additional improvement beyond the development of the fibrotic membrane, or capsule, which eventually surrounds objects implanted in the body.

The prolonged and daily usage of inflatable penile prostheses may cause the cylinders to act as tissue expanders. Tissue expansion has been well documented in plastic surgery and breast reconstruction

Table 3: Subject demographics

Characteristic	Mean±s.d. or n (%)
Age (years)	66.2±11.4
Primary indications (not mutually exclusive)	
Vascular disease	13 (32.5)
Diabetes mellitus	12 (30.0)
Postcancer treatment	20 (50.0)
Pelvic surgery	4 (10.0)
Neurogenic	1 (2.5)
Psychological causes	0 (0.0)
Pelvic trauma	2 (5.0)
Iatrogenic	0 (0.0)
Other	5 (12.5)

s.d.: standard deviation

Table 4: Changes in penile satisfaction at 12 and 24 months

Question	12 months			24 months		
	n	% (n/N)	P*	n	% (n/N)	P*
Over the past 4 weeks, how satisfied are you with your penile length?						
Worsened	31	22.6 (7/31)	<0.001	28	17.9 (5/28)	<0.001
Unchanged	31	16.1 (5/31)		28	17.9 (5/28)	
Improved	31	61.3 (19/31)		28	64.3 (18/28)	

*The probability of a satisfactory response (“somewhat/completely satisfied”) was compared between baseline, 12 and 24 months using a generalized estimating equation model with a binomial outcome and accounting for repeated measures within a subject

Table 5: Number of pumps to full inflation at each visit

Visit	n	Mean	Median	s.d.	Minimum	Maximum	Difference from baseline P*
Immediate postoperative	40	20.2	20	7.5	7	45	N/A
6 weeks	39	15.1	12	8.1	4	37	<0.001
6 months	33	24.0	25	13.2	6	60	0.015
12 months	31	27.6	27	14.7	10	69	<0.001
24 months	28	34.6	37	15.0	10	58	<0.001

*The probability that there was a difference in number of pumps required to reach full inflation between baseline and the 6 weeks, 6 months, 12, or 24 months visit was calculated using a generalized estimating equation model with a negative binomial outcome and accounting for repeated measures within a subject. s.d.: standard deviation; NA: not available



literature.^{15,16} Moreover, in the general surgery literature, capsular fibrotic changes with mesh repairs of hernias have been noted even years after surgery. Whereas the expected fibrosis from the foreign body response may be responsible for postoperative chronic pain after inguinal herniorrhaphy with mesh, studies have shown a subsequent spontaneous resolution or a “fading out” of this pain with longer follow-up in some patients.^{17,18} Every frequent implanter has seen instances where an implant is removed for mechanical reasons and the corporal measurements following removal suggest the replacement cylinders should be 2–3 cm longer.¹⁹ Some prosthetic urologists have seen this change with Peyronie’s disease after IPP implantation. It has been shown that after placing an IPP in a patient with Peyronie’s disease, 30° of curvature or less will improve to a completely straight penis with subsequent inflation over 8–12 months.²⁰ Hourglass, or cicatrix, deformities will similarly change into a symmetrical width penis with postoperative inflation and usage. Wilson *et al.* have also documented that the shortened, fibrotic penis resulting from priapism or previous removal of an implant for infection will stretch with daily inflation after placing a downsized prosthesis.²¹ We postulate that if diseased corporal fibrotic scar can expand, it stands to reason that healthier unscarred tissue should expand.

In our initial study, we found a statistically significant reduction in the amount of pumps to full inflation at 6 weeks postimplant as compared to immediately postoperation. This effect is likely explained by anesthesia allowing the physician to maximally distend the cylinders at the operating table, whereas postoperative soreness limits expansion at 6 weeks. At 6 and 12 months, the amount of pumps needed statistically increased from immediately postoperative measurements, suggesting there is more volume in the cylinders. This change in the number of pumps continued to increase at 24 months postoperatively, reaching a statistically significant increase needed to reach full inflation compared to 12 months. Considering that each pump is a little more than 2 cc’s, this indicates a real increase in cylinder volume.

We have already demonstrated a statistically significant increase in all 15 penile measurements from 6 to 12 months.²² This was also seen to be statistically significant from 12 to 24 months in the current study. This appears to be attributed to the protocol of maximum inflation for at least 1 h daily. Tissue expansion involves making the tunica albuginea more compliant so it will stretch and allow larger distention by the inflated cylinder. Experience with repetitive vacuum device application shows the tunica will respond with short exposures to the vacuum therapy. Sellers showed that 10 min a day of vacuum device application twice a day for 7 weeks promoted visible penile lengthening in the vacuum cylinder when marked weekly in first-time implant patients. This allowed the implanting physician to upsize his cylinder approximately 3 cm when compared to the average implant without vacuum preparation.²² The pressure difference between a hydraulic pump push inside the penis compared with low pneumatic suction on the external penis should be more than a thousand-fold stronger. Another important point is perhaps an IPP should be left partially inflated for the first several weeks to possibly allow a larger capsule to form around the cylinders early on. Due to this continuing data, all of the authors now leave the IPP cylinders about 70%–80% inflated for the first several weeks, but have encountered mild reservoir capsule contraction that required forcible deflation at 6 weeks. More study must be done to determine how much to leave the IPP inflated postoperation and when to teach the patient. Moreover, another needed study is one with a similar protocol on length expansion IPPs to determine if postoperative IPP rehabilitation increases penile measurements as shown in this study. It would seem that using NLMT/

aggressive postoperative rehab with the length expansion IPPs there could be similar or greater results, but these IPPs lack the axial rigidity of the Titan. Nevertheless, postoperative IPP rehabilitation appears to increase penile measurements in this study group and is gaining in popularity among prosthetic urologists.

Limitations of this study include that the patients were not randomized; patients with corporal fibrosis, Peyronie’s disease, or tunical defects, or revision cases were excluded; and some patients were lost to follow-up. In addition, the measurements were taken by the implanting surgeons, and could involve surgeon bias. Finally, the number of pumps can vary per visit, due to a wide number of circumstances and may not provide the best measurement of cylinder volume.

CONCLUSION

This study confirms with extended follow-up of our initial study the use of the Coloplast Titan cylinder, combined with optimization of cylinder length, and daily inflation for 2 years postoperation, results in patient satisfaction with penile length and girth of the implanted erect penis. Penile measurements before, at the time of surgery, 1 year, and 2 years later suggest this regimen can maintain or even increase girth and length when compared to the patient’s immediate postoperative measurements.

AUTHOR CONTRIBUTION

MP reviewed and compared the analysis of postoperative measurements and satisfaction profiles to draft the manuscript. GH conceived the study, participated in its design, helped draft the manuscript, and was responsible for the surgical placement of 20 Titan implants. RC and RW participated in the study design and surgically implanted 10 Titan implants each.

COMPETING FINANCIAL INTERESTS

MP declares no competing financial interests. GH have competing financial interests in Endo/American Medical Systems. RW and RC has competing financial interests in Endo/American Medical Systems and Coloplast.

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Supplementary Information is linked to the online version of the paper on the *Asian Journal of Andrology* website.

REFERENCES

- 1 Scott FB, Bradley WE, Timm GW. Management of erectile impotence. Use of implantable inflatable prosthesis. *Urology* 1973; 2: 80–2.
- 2 Henry GD. Historical review of penile prosthesis design and surgical techniques: part 1 of a three-part review series on penile prosthetic surgery. *J Sex Med* 2009; 6: 675–81.
- 3 Wilson SK, Henry GD, Delk JR Jr, Cleves MA. The mentor alpha 1 penile prosthesis with reservoir lock-out valve: effective prevention of auto-inflation with improved capability for ectopic reservoir placement. *J Urol* 2002; 168: 1475–81.
- 4 Montague DK, Lakin MM. Early experience with the controlled girth and length expanding cylinder of the American Medical Systems Ultrex penile prosthesis. *J Urol* 1992; 148: 1444–6.
- 5 Montorsi F, Rigatti P, Carmignani G, Corbu C, Campo B, *et al.* AMS three-piece inflatable implants for erectile dysfunction: a long-term multi-institutional study in 200 consecutive patients. *Eur Urol* 2000; 37: 50–5.
- 6 Carson CC, Mulcahy JJ, Govier FE. Efficacy, safety and patient satisfaction outcomes of the AMS 700CX inflatable penile prosthesis: results of a long-term multicenter study. AMS 700CX Study Group. *J Urol* 2000; 164: 376–80.
- 7 Natali A, Olianias R, Fisch M. Penile implantation in Europe: successes and complications with 253 implants in Italy and Germany. *J Sex Med* 2008; 5: 1503–12.
- 8 Miranda-Sousa A, Keating M, Moreira S, Baker M, Carrion R. Concomitant ventral



- phalloplasty during penile implant surgery: a novel procedure that optimizes patient satisfaction and their perception of phallic length after penile implant surgery. *J Sex Med* 2007; 4: 1494–9.
- 9 Montague DK. Penile prosthesis implantation for end-stage erectile dysfunction after radical prostatectomy. *Rev Urol* 2005; 7 Suppl 2: S51–7.
 - 10 Deveci S, Martin D, Parker M, Mulhall JP. Penile length alterations following penile prosthesis surgery. *Eur Urol* 2007; 51: 1128–31.
 - 11 Wang R, Howard GE, Hoang A, Yuan JH, Lin HC, *et al*. Prospective and long-term evaluation of erect penile length obtained with inflatable penile prosthesis to that induced by intracavernosal injection. *Asian J Androl* 2009; 11: 411–5.
 - 12 Henry GD, Carrion R, Jennermann C, Wang R. Prospective evaluation of postoperative penile rehabilitation: penile length/girth maintenance 1 year following Coloplast Titan inflatable penile prosthesis. *J Sex Med* 2015; 12: 1298–301.
 - 13 Mulhall JP, Ahmed A, Branch J, Parker M. Serial assessment of efficacy and satisfaction profiles following penile prosthesis surgery. *J Urol* 2003; 169: 1429–33.
 - 14 Henry G, Houghton L, Culkin D, Otheguy J, Shabsigh R, *et al*. Comparison of a new length measurement technique for inflatable penile prosthesis implantation to standard techniques: outcomes and patient satisfaction. *J Sex Med* 2011; 8: 2640.
 - 15 Rawlani V, Buck DW, Johnson SA, Heyer KS, Kim JY. Tissue expander breast reconstruction using prehydrated human acellular dermis. *Ann Plast Surg* 2011; 66: 593.
 - 16 Schwarz K, Tahiri Y. Subcutaneous pre-expansion of mastectomy flaps before breast reconstruction with deep inferior epigastric perforator flaps: eliminating the patch-like appearance and improving aesthetic outcomes. *Ann Plast Surg* 2011; 66: 124.
 - 17 Burgmans JP, Schouten N, Clevers GJ, Verleisdonk EJ, Davids PH, *et al*. Pain after totally extraperitoneal (TEP) hernia repair might fade out within a year. *Hernia* 2015; 19: 579–85.
 - 18 Jenkins JT, O'Dwyer PJ. Inguinal hernias. *BMJ* 2008; 336: 269–72.
 - 19 Wilson SK. Management of penile implant complications. In: Mulcahy J, editor. *Topics in Clinical Urology: Diagnosis and Management of Male Sexual Dysfunction*. New York: Igaku-Shoin Medical Publishers, Inc.; 1997. p. 210–8.
 - 20 Wilson SK. Surgical techniques: modeling technique for penile curvature. *J Sex Med* 2007; 4: 231–4.
 - 21 Wilson SK, Delk JR, Mulcahy JJ, Cleves M, Salem EA. Upsizing of inflatable penile implant cylinders in patients with corporal fibrosis. *J Sex Med* 2006; 3: 736–42.
 - 22 Sellers T, Dineen M, Wilson SK. Use of vacuum preparation protocol and cylinders that lengthen allows implantation of longer cylinders reducing complaints of shortened penile length following implantation. *J Sex Med* 2009; 6 (s5): 447–9.

Supplementary Table 1: Patient satisfaction

Question	12 months		24 months	
	n	% (n/N)	n	% (n/N)
Over the past 4 weeks, how satisfied are you with your penile length?	31		28	
Completely dissatisfied		12.9 (4/31)		21.4 (6/28)
Somewhat dissatisfied		22.6 (7/31)		7.1 (2/28)
Neutral		N/A		3.6 (1/28)
Mostly satisfied		16.1 (5/31)		10.7 (3/28)
Completely satisfied		48.4 (15/31)		57.1 (16/28)
How do you perceive your penile size after implant surgery?	31		26	
Shorter		25.8 (8/31)		23.1 (6/26)
Same		45.2 (14/31)		46.2 (12/26)
Longer		29.0 (9/31)		30.8 (8/26)
How has the implant fulfilled your expectations as a treatment for erectile dysfunction?	30		28	
Somewhat effective		3.3 (1/30)		3.6 (1/28)
Moderately effective		13.3 (4/30)		0
Very effective		53.3 (16/30)		57.1 (16/28)
Extremely effective		30.0 (9/30)		39.3 (11/28)
Compared to before you were implanted, how have you been able to perform sexual intercourse since the penile prosthesis has been implanted?	30		28	
Same as before		20.0 (6/30)		17.9 (5/28)
Better than before		36.7 (11/30)		21.4 (6/28)
Much better than before		43.3 (13/30)		60.7 (17/28)
Compared to before you were implanted, as a results of the implant, how has your sexual relationship with your partner(s) changed?	30		27	
Worse than before		0		3.7 (1/27)
Same as before		23.3 (7/30)		18.5 (5/27)
Better than before		40.0 (12/30)		40.7 (11/27)
Much better than before		36.7 (11/30)		37 (10/27)
Compared to before you were implanted, how does your partner(s) feel about your sexual relationship?	30		28	
Much worse than before		3.3 (1/30)		0
Worse than before		6.7 (2/30)		0
Same as before		13.3 (4/30)		21.4 (6/28)
Better than before		40.0 (12/30)		28.6 (8/28)
Much better than before		36.7 (11/30)		50 (14/28)
As a result of the implant, how confident are you when initiating sexual activity?	30		28	
Moderately confident		23.3 (7/30)		14.3 (4/28)
Very confident		46.7 (14/30)		42.9 (12/28)
Extremely confident		30.0 (9/30)		42.9 (12/28)
As a result of the implant, how confident are you during actual sexual intercourse?	29		28	
Not confident at all		3.4 (1/29)		
Moderately confident		10.3 (3/29)		14.3 (4/28)
Very confident		58.6 (17/29)		42.9 (12/28)
Extremely confident		27.6 (8/29)		42.9 (12/28)
Overall function	30		28	
Somewhat dissatisfied		6.7 (2/30)		3.6 (1/28)
Mostly satisfied		46.7 (14/30)		28.6 (8/28)
Completely satisfied		46.7 (14/30)		67.9 (19/28)

Question	12 months		24 months	
	n	% (n/N)	n	% (n/N)
Soft enough to conceal when deflated	30		28	
Completely dissatisfied		3.3 (1/30)		3.6 (1/28)
Somewhat dissatisfied		6.7 (2/30)		10.7 (3/28)
Neutral		6.7 (2/30)		21.4 (6/28)
Mostly satisfied		40.0 (12/30)		64.3 (18/28)
Completely satisfied		43.3 (13/30)		
Ease of deflation	30		28	
Somewhat dissatisfied		6.7 (2/30)		3.6 (1/28)
Neutral		10.0 (3/30)		7.1 (2/28)
Mostly satisfied		43.3 (13/30)		28.6 (8/28)
Completely satisfied		40.0 (12/30)		60.7 (17/28)
Ease of inflation	30		28	
Somewhat dissatisfied		3.3 (1/30)		
Neutral		6.7 (2/30)		3.6 (1/28)
Mostly satisfied		36.7 (11/30)		32.1 (9/28)
Completely satisfied		53.3 (16/30)		64.3 (18/28)
Rigidity when inflated	30		28	
Somewhat dissatisfied		3.3 (1/30)		3.6 (1/28)
Neutral		6.7 (2/30)		3.6 (1/28)
Mostly satisfied		30.0 (9/30)		21.4 (6/28)
Completely satisfied		60.0 (18/30)		71.4 (20/28)
Width when inflated	30		28	
Somewhat dissatisfied		10.0 (3/30)		3.6 (1/28)
Neutral		3.3 (1/30)		10.7 (3/28)
Mostly satisfied		50.0 (15/30)		17.9 (5/28)
Completely satisfied		36.7 (11/30)		67.9 (19/28)
Length when inflated	30		28	
Somewhat dissatisfied		13.3 (4/30)		3.6 (1/28)
Neutral		3.3 (1/30)		3.6 (1/28)
Mostly satisfied		53.3 (16/30)		42.9 (12/28)
Completely satisfied		30.0 (9/30)		50 (14/28)
Compared to before surgery, do you have intercourse	30		28	
More often		66.7 (20/30)		60.7 (17/28)
Same frequency		26.7 (8/30)		32.1 (9/28)
Less often		6.7 (2/30)		7.1 (2/28)
Would you recommend this penile implant device to men with the same erectile difficulty that you had?	31		28	
Probably not		3.2 (1/31)		0
Don't know		3.2 (1/31)		0
Yes, probably		N/A		21.4 (6/28)
Yes		93.5 (29/31)		78.6 (22/28)
If you had the decision to make again, would you undergo this penile implant procedure again?	31		28	
No		3.2 (1/31)		0
Probably not		3.2 (1/31)		0
Don't know		3.2 (1/31)		0
Yes, probably		3.2 (1/31)		28.6 (8/28)
Yes		87.1 (27/31)		71.4 (20/28)
Do you currently have a regular sexual partner?	31		28	
Yes, one partner		83.9 (26/31)		75 (21/28)
Yes, more than one partner		6.5 (2/31)		10.7 (3/28)
No		9.7 (3/31)		14.3 (4/28)
Accidental inflation	28		N/A	
Neutral		7.1 (2/28)		
Mostly satisfied		21.4 (6/28)		
Completely satisfied		71.4 (20/28)		

Contd...

NA: not available