

## Long-Term Patient Satisfaction after Surgical Correction of Penile Curvature via Tunical Plication

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### ABSTRACT

*Objective:* To assess patient satisfaction and functional results at long term follow-up after surgical correction for Peyronie's disease (PD) and congenital penile curvature (CPC) with the technique of tunical plication.

*Materials and Methods:* One hundred and two men operated for PD (n = 76) or CPC (n = 26) in four different departments of urology in public hospitals agreed to answer a six-question telephone questionnaire about treatment satisfaction. Tunica albuginea plication procedures represented the standard surgical approach. Subjects under investigation were correction of the deformity, feeling of bumps under the skin, pain during erection, penile sensory changes, development of erectile dysfunction (ED) and postoperative ability for complete vaginal intromission. Subjective response rates were compared using the chi square test on the basis of the etiology of the disease (CPC or PD).

*Results:* Significant differences ( $p < 0.05$ ) between patients with CPC and PD were noticed in the prevalence of postoperative penile deformity, sensory changes, ED and ability to complete vaginal intromission, PD patients always showing a more pessimistic view. No significant differences ( $p = ns$ ) were detected in terms of unpleasant nodes under the penile skin or pain during erection.

*Conclusions:* Long-term outcome after surgical correction for PD and CPC with the technique of tunical plication can be poor. Probably patient expectations are above the real performance of surgical techniques. Preoperative information should be more exhaustive.

**Key words:** penis; Peyronie's disease; surgery; erectile dysfunction

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### INTRODUCTION

Peyronie's disease (PD) and congenital penile curvature (CPC) are the most frequent causes of penile deformity. PD is an acquired disorder of the tunica albuginea of the penis characterized by the formation of a plaque of fibrotic tissue, which may be associated to penile deformity, pain on

erection and erectile dysfunction (ED). PD affects up to 9% of men (1,2). CPC is caused by asymmetry in compliance of tunica albuginea of the corpora cavernosa due to developmental arrest during embryogenesis (3). Mostly, ventral and/or lateral deviation of erected penis occurs. The reported prevalence of this condition is 0.04 - 0.6% (4,5).

Pharmacologic therapy has limited efficacy in both entities. Surgical treatment is necessary when significant curvature does not allow coitus. Rarely, penile deformity is also associated with psychological problems in adults with PD disease, but this is a frequent concern in younger patients.

While postoperative satisfaction is the rule, a number of patients find some side effects of surgical procedures unacceptable; apart of residual curvature, frequent reasons for dissatisfaction are unpleasant feeling of bumps under the skin (6), penile sensory changes and penile shortening (7), among others.

The aim of our questionnaire-based study was to assess patient satisfaction and functional results at long-term follow-up after surgical correction for PD and CPC using tunical plication procedures.

## MATERIALS AND METHODS

Two hundred and forty men operated for PD or CPC throughout a 16-year period (January 1990-December 2005) using tunical plication techniques were contacted by telephone and invited to answer a six questions questionnaire about treatment satisfaction.

For different reasons (wrong telephone numbers, patient or spousal reluctance) telephone contact was impossible in 124 cases. Eventually contact was substantiated in 118 cases. One hundred and two patients (102/240, 42.5%) agreed to participate.

Difficulty with intercourse was the most frequent preoperative complaint (82/102, 80.4%). Poor self-image accounted for the rest of consultations (20/102, 19.6%). At the time of surgery, the disease was stable for at least 1 year, and there was no pain.

The diagnosis of PD was based on a palpable penile plaque or acquired penile curvature. Preoperatively the deformity was assessed from self-photographs. Degree of angulation was not recorded. No reliable records on preoperative potency were available. Nevertheless, it is not our policy to use plication procedures in PD or CPC patients also diagnosed with ED; it could be indirectly induced that patients in our study were potent before surgery.

Thirty-one different urologists in four different public hospitals participated in operations. Circumcision was performed to avoid postoperative edema and paraphimosis. After penile degloving, a tourniquet was applied at the base of the penis to facilitate artificial erection injecting saline into the corpora cavernosa through small gauge butterfly needles. Tunica albuginea plication procedures represented the standard surgical approach; briefly, Buck's fascia opposite to the point(s) of maximal curvature was incised to expose the tunica albuginea. No major differences between PD and CPC cases in terms of tissue dissection could be accounted. Care was taken to avoid injury to neurovascular structures. Transversal or longitudinal (Yachia's modification for treatment of CPC) plication sutures of unabsorbable materials (mainly polyester) were placed through the full-thickness of the tunica albuginea. A new artificial erection was created at the end of the procedure to confirm that penile straightening was adequate. Once correction was achieved, the penis was closed in layers and a light compression dressing applied.

A specialized clerk assistant contacted all patients. Subjects under investigation were postoperative correction of the deformity (yes/no), feeling of bumps or lumps under the skin (yes/no), pain during erection (yes/no), penile sensory changes (yes/no), diminished erection (yes/no) and inability to complete vaginal intromission due to penile deformity (yes/no).

Subjective response rates were compared using the chi square test on the basis of the etiology of the disease (congenital or acquired). A commercial software (SPSS v.11.5) was used for statistical treatment. Confidence intervals (CI) of 95% were used for all comparisons.

## RESULTS

Median time from the intervention to the interview was 56 months (min 1, max 194). Mean age at surgery was 48.6 years (SD 15.4, min. 12, max. 69). Table-1 shows the principal patients' characteristics at diagnosis.

According to the patient answers, correction of the curvature was only achieved in 50% of the cases (51/102). Similarly, 41 patients (41/102, 40.2%)

**Table 1** – Patient characteristics.

	<b>Peyronie's Disease</b> (n = 76)	<b>Congenital Penile Deformity</b> (n = 26)	<b>p Value</b>
Age at surgery (mean, SD)	54.5 yrs, 10.7	31 yrs, 14.5	Students' t test < 0.001
Follow-up (mean, SD)	70.5 months, 46.5	55.9 months, 39.8	Students' t test = 0.16
Preoperative inability for penetration (%)	65/76 (85.5)	17/26 (65.4)	chi square test < 0.001

SD = standard deviation.

complained of suture-related complications as unpleasant feeling of bumps under the skin; in 24.5% of the cases (25/102), pain was present during erection while 56% (57/102) suffered penile sensory changes. Forty-eight patients (48/102, 47.1%) declared some degree of postoperative ED while 46 out of 82 (46/82, 56.1%) preoperatively unable to have vaginal penetration due to penile deformity were eventually able to complete sexual intercourse.

A significant difference (chi square = 0.006) was noticed in terms of subjective improvement in penile deformity between patients with CPC (19/26, 73.1%) and PD patients (32/76, 42.1%). Also, postoperative sensory changes were significantly more prevalent (chi square = 0.001) among PD patients (50/76, 65.8%) compared to patients with CPC (7/26, 26.9%). Different degrees of postoperative ED were significantly more prevalent among PD patients (60.5% and 7.7% for PD and CPC patients, respectively). The proportion of men with CPC able to complete vaginal intromission after surgery (15/17,

88.2%) was significantly higher (chi square = 0.003) compared to the results in PD patients (31/65, 47.7%). No significant differences (p = 0.21) were detected in terms of unpleasant nodes under the penile skin or pain during erection. Table-2 summarizes this phase of the study.

## COMMENTS

Treatment end points after surgical correction for penile curvature include erection that is pain-free, coitus comfortable for patient and partner, and deformity that does not interfere with vaginal intromission.

Overall, the reported success rate with tunica albuginea plication procedures is 85-100% (8-11); in our experience, patient dissatisfaction was the rule. Why such discrepancy? Most studies dealing with postoperative outcome rely on non-validated questionnaires thus making comparisons pointless

**Table 2** – Postoperative results according to patient interview. Denominator used for the analysis of question #6 was different since only patients complaining of difficulties for preoperative vaginal intromission were taken into account for calculations.

		<b>Peyronie's Disease</b> (n = 76)	<b>Congenital Penile Deformity</b> (n = 26)	<b>p Value</b>
Question #1	Deformity corrected (%)	32/76 (42.1)	19/26 (73.1)	chi = 0.006
Question #2	Bumps under the skin (%)	27/76 (35.5)	14/26 (53.8)	chi = 0.10
Question #3	Pain during the erection (%)	21/76 (27.6)	4/26 (15.4)	chi = 0.21
Question #4	Penile sensory changes (%)	50/76 (65.8)	7/26 (26)	chi = 0.001
Question #5	Postoperative erectile dysfunction (%)	46/76 (60.5)	2/26 (7.7)	chi < 0.001
Question #6	Postoperative ability for penetration (%)	31/65 (47.7)	15/17 (88.2)	chi = 0.003

(12,13). It is generally agreed that self-applied validated questionnaires should be used when possible. Nevertheless, there is no well-structured questionnaire for penile curvature correction. The present study was based in a telephone interview using a 6-questions questionnaire elaborated ad hoc. It is difficult to disclose to what extent it really reflects the domain of patient post-operative satisfaction; it might well be mirroring dissatisfaction with the medical establishment or translating couple frustration. In our four centers, tunical plication procedures are considered “low complexity” surgical interventions; this is why mainly general urologists participated in surgical interventions. It remains a matter of speculation if technical aspects were responsible for the current results. In spite of this limitation, a clear difference in outcomes was detected between patients with congenital and acquired disease. It has been suggested that after tunica albuginea plication procedures the force of penile erection might allow the sutures to cut through the albuginea layers thus partially explaining a number of failures. This hypothesis does not explain the differences detected in the present study between PD and CPC patients. Actually, our results are in contradiction with already published material, using absorbable sutures where younger patients (< 24 yr) had a higher chance of suture failure than elder patients (14).

Long-term results of plication techniques in the pediatric setting are rarely reported, but success seems to be the rule (8,9,15,16). In our experience, the long-term degree of subjective satisfaction among patients with CPC was remarkable and supports the philosophy of corporoplasty in this setting.

In our study, more than half of the PD patients declared unresolved difficulties for complete vaginal intromission after surgery; again, the degree of satisfaction of patients with CPC in this topic was higher, perhaps reflecting a better long-term anatomical result.

Some authors have raised concerns about the possibility of postoperative loss of glanular sensation (7,10,11). In our study, penile sensory changes were more prevalent in PD patients. While the surgical principles were identical for both PD patients and patients with CPC, it is unlikely that technical aspects could explain those differences. Indeed, most of CPC

were ventral thus deserving dorsal plications, which theoretically could result in a higher rate of damage to the dorsal sensory nerves. Anyway, diminished postoperative penile sensitivity due to irritation and/or damage of the dorsal neurovascular bundles can be avoided by careful attention to spare the penile dorsal nerves.

A common problem after plication procedures is the formation of granulomas around the sutures at the plication sites. Palpable induration and irregularity have been noted by patients in previous studies (6,12,15). In this study, postoperative induration was highly prevalent. Probably this was one of the most objective questions in our questionnaire thus ending in similar results both for patients with congenital and acquired (PD) penile curvature.

Postoperative de novo pain during erection is a frequent complaint after plication procedures (17-19). It can act against full sexual activity in up to 60% of the patients (17,19). In this experience, while highly prevalent, no major differences between patients with CPC and PD were noticed. It is also remarkable the prevalence of different degrees of subjective impotence among PD patients. Due to the nature of the study -questionnaire-based and focused in overall results of plication procedures- it cannot be clarified if the reported incidence of different degrees of ED really translates late side-effects of curvature correction or it simply mirrors naturally occurring events. What is evident is that CPC patients' answers to question #6 were significantly more optimistic.

In general, comparisons between men operated for CPC and PD yield interesting findings. In previous studies, satisfaction results were almost identical in both settings (16,20). In our experience, the differences affected all aspects including those related to the curvature correction, perhaps reflecting a better performance of plication techniques in the management of totally stable deformity, as in congenital curvatures; in other words, it might be that patients with PD presumed stable were still in progression. Otherwise, it is difficult to explain why plication techniques were more successful in patients with CPC in terms of mere curvature correction. Given most of them presented with ventral deformities, it could be argued that Nesbit procedures are more effective in this particular type of curvature. This has

not been proven yet. Another hypothesis to explain the differences detected in this study is that younger patients could have a more optimistic approach to the postoperative outcome. It has been reported elsewhere that quality of life issues heavily depend on age (21,22).

Anyway, achieving a good correction at the end of the case (as shown in all cases in our study by creating an artificial erection) represents a subjective criterion for clinical success that does not necessarily means that patients will be satisfied in the long run (11). Quality of life is multifactorial and aspects related with sexual life can be even more complicated. Subjectivity could be playing a very important role in this study. A more elaborated approach to the performance of tunical plication procedures in the field of penile deformity correction is needed.

## CONCLUSIONS

Long-term results of surgical correction for penile deformity, via tunica plication, in the hands of general urologists - irrespectively of patient's age at surgery and etiology - can be poor. Patient expectations are above the real performance of surgical techniques. Probably, preoperative information should be more exhaustive.

## CONFLICT OF INTEREST

None declared.

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**EDITORIAL COMMENT**

Long term outcome of surgery for penile curvature is quite important to evaluate the durability of the procedure and treatment strategies. Authors presented a poor long term outcome of tunical plication surgery especially in cases with Peyronie's disease (PD).

One crucial point is timing of the surgery. In cases with congenital penile curvature, the direction of curvature is usually ventral and the surgery is usually performed at diagnosis. On the other hand, in cases with PD, their presenting symptoms are plaque, painful erection and penile deformity at erection, and the surgery should be performed once the disease has stabilized. There are some differences in treatment strategies between both groups though tunical plication was performed for penile curvature.

Another point is a surgical procedure. Surgical approaches for the correction of PD can be divided into three basic categories; tunical plication, plaque excision (incision) and grafting procedures, and penile prosthesis implantation (1). In addition, new insights of penile anatomy (2,3) plication technique (4) have been reported. Timing of surgery, understanding of

the penile anatomy, selection of surgical method and the meticulous surgical procedures to preserve neurovascular bundles may be important to improve the long term outcome and to reduce the complications.

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## EDITORIAL COMMENT

It is unexceptionally advisable on penile curvature correction surgeries regardless of using Nesbit procedure, tunical plication or a grafting surgery in the literature. These procedures might, subsequently, be regarded as easy uro-surgical works. Among them, the plication surgery seems to be recently popular because of its simplicity and reproducibility. Should their outcomes be consistently reliable since all methods are based on a traditional description of the tunica albuginea in which a single layer with uniform thickness and strength circumferentially is unequivocally depicted (1)?

After the efforts of chronological studies have been made we find that the three dimensional ultra-architecture of tunica albuginea is, however, a bi-layered structure with inner circular and outer longitudinal collagen bundles which account for the variable thickness and strength circumferentially and can be clearly seen even under naked eye with an os-equivalent structure - distal ligament extending into glans penis (2-4). The outer longitudinal layer is the determinant tissue of establishing penile morphology as well as functional integrity since it is essential in making the most ideal environment in the entire human body to apply Pascal's law which depicts that pressure applied to any part of the enclosed fluid at rest is transmitted undiminished to every portion of the fluid and to the walls of the containing vessel (5). It is the tissue being operated during penile morphological reconstruction surgery because it acts as the wall. Therefore, it is not surprise to see this unfavorable report on the tunical plication surgery since this determinant layer is consistently overlooked in urology literature.

Some adverse complications are not indispensable since the surgical tissue is the tunica albuginea where neither significant vascular or lymphatic vessels nor nominate nerve is distributed. After degloving of the tissues superficial to the Colle's fascia is made, we consistently use a hydro-pressure technique in which normal saline solution is injected into the expected surgical region between the tunica albuginea and its overlying tissue in order to expand and separate them before immobilization attempt. This

is very helpful in facilitating the completeness of dissection at minimal expense of damaging the neurovascular bundle otherwise (6). A postoperative penile sensory change is no more observed as usual. Similarly, the prevalence of penile lump can be minimized while using finer 6-0 nylon suture to replace a coarser-unabsorbable ones. Besides from these interesting observational factors in this study in order to avoid the penile shortage which was frequently complained postoperatively by patients who underwent either a modified Nesbit procedure or a tunical plication surgery despite it is not remarkable from surgeon's view, a grafting surgery was, therefore, meticulously developed and recommended despite it is challenging and might be away from consensus (7,8). Accordingly, on penile morphological surgery all procedures seem intriguing rather than easygoing uro-surgical entities, which should be more exhaustive preoperatively as advised by authors in this study. Overall, it appears that neither surgical methodology nor surgical outcome for penile curvature correction, including tunical plication method, has been elucidated already. Further scientific study is warranted.

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## EDITORIAL COMMENT

This paper tries to compare the outcome of tunical plication surgery for congenital curvature of the penis and Peyronie's disease (PD). This is a retrospective study based on cases done over a 16-year period.

The cases were done by 31 urologists, which does not reflect uniformity in surgical technique. One drawback of this study is the fact that there is no documentation of preoperative erectile dysfunction. Peyronie's disease is frequently associated with erectile dysfunction. Inability for penetration could be due to penile deformity, erectile dysfunction (ED) or a combination of both.

The congenital curvature group has a lower mean age (31 years). This group is more likely to have

good erectile function and be satisfied with the results of surgery, even if there is some amount of residual curvature.

On the other hand, the mean age of the PD group is significantly higher (54.5 years). The incidence of preoperative erectile dysfunction will be higher and very likely to contribute to patient dissatisfaction with surgery. Surgery could lead to worsening of ED.

The apparent difference between the two groups in ability to have penetration may be a reflection of the difference in erectile function and may not be a difference in surgical outcome.

The authors are correct in stating that preoperative information should be more extensive in Peyronie's disease surgeries.

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