

·Clinical Experience·

Pilot study to determine improvements in subjective penile morphology and personal relationships following a Nesbit plication procedure for men with congenital penile curvature

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Abstract

Aim: To determine whether the surgical straightening of congenital penile curvature can improve intromission comfort, penile features, personal relationships and psychogenic erectile dysfunction (ED). **Methods:** Fifty-four patients (mean age 24 years, range 20–31 years) whose congenital penile deviation due to physiological curvature was ≥ 25 degrees, as measured on a graph, and who were experiencing penetration discomfort were assessed specifically for the present study. Of these, 14 patients suffered from psychogenic ED. The assessment included a case history, an objective examination, a pharmacologically-induced erection with prostaglandin E1 10–20 g, a graph taken during erection, a basal and dynamic Duplex ultrasonograph, penile length measurement, nocturnal penile tumescence recording, hormonal profiles and a psychological interview to evaluate the quality of their personal relationships according to Hinde's parameters (contents, number, features, frequency, ability to perceive limits of mutuality, subjective perception of the other person[s], and reliability). All patients underwent the Nesbit procedure. The initial assessment was repeated at 3 and 12 months after surgery. Data analyses were carried out using the z test. **Results:** Subjective judgement of cosmetic penile features and vaginal intromission comfort improved significantly after surgery whereas the quality of personal relationships and ED did not. **Conclusion:** The surgical straightening of congenital penile curvature improved intromission comfort and penile features, but it failed to improve interpersonal relationships or psychogenic ED. (*Asian J Androl* 2008 May; 10: 512–519)

Keywords: congenital penile curvature; Nesbit procedure; penile surgery; personal relationships

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Received 2006-09-25 Accepted 2007-06-11

1 Introduction

The prevalence of congenital penile angulation without epispadias, hypospadias or spongiosal hypoplasia is approximately 0.4/1 000 [1]. The most frequent type of angulation is ventral, sometimes associated with a lateral

curvature, or more rarely, torsion. Pure lateral angulations are rare [2]. A curvature greater than 25–30 degrees affects vaginal intromission [3]. The range of ages at which men seek out medical consultation for this problem is approximately 20–27 years [1, 3, 4]. The accepted therapy for congenital penile curvature is surgery if intercourse is compromised or upon patient request; the rationale is to straighten the penile shaft to facilitate better intromission [1].

The main symptom of congenital penile curvature is difficulty in vaginal intromission. Some studies sustain that the embarrassment of the patients induced by their subjective perception of their disfigured penis might affect either their ability to begin/continue an affective relationship [2, 4] or their erection [1, 2]. Despite the absence of any proof, it is held that aesthetic surgery of male genitalia [5], as well as aesthetic surgery of other organs [6] is associated with an improvement in self esteem. Although comfortable vaginal intromission and satisfactory penile features, which are the outcomes in the vast majority of patients undergoing surgery [1–3], are the common primary endpoints of papers testing the efficacy of this surgery, the improvement of the subjective perception of penis features and of comfort in vaginal penetration, which could modify psychogenic ED and/or the social relationships of these patients, has been studied little. Only Friedrich *et al.* [4] analyzed the psychogenic aspect of this surgery, taking into consideration quality of life (QoL). They reported that, before surgery, sexual intercourse was uncomfortable or impossible in 68% of the patients in their study, and that the QoL was impaired in 84%. Of patients, 81% judged the cosmetic results as satisfactory, 100% reported no problems with sexual intercourse, but only 48% reported an improvement in the QoL after surgery [4]. This discrepancy between the surgical results and the improvement in QoL might demonstrate that satisfactory cosmetic results are not sufficient to improve the QoL for all patients.

Therefore, we are compelled to explore whether surgery can improve the subjective perception of penis features, intromission ability, psychogenic ED and social relationships simultaneously in patients affected by congenital penile curvature.

2 Patients and methods

A single-arm open prospective trial was carried out

with a consecutive series of patients who had been referred for congenital penile curvature limiting successful vaginal intromission. The research was approved by the Società Italiana di Medicina della Riproduzione (SISMER) ethical committee and written informed consent was obtained from each participant.

2.1 Patients

The patients were first assessed by an andrologist (Giorgio Cavallini) and then by a psychologist (Stefano Caracciolo). Two separate settings were used: private clinics (Giorgio Cavallini) and university clinics (Stefano Caracciolo).

All patients whose main complaints were congenital penile curvature responsible for producing uncomfortable vaginal intromission were eligible for the current study. The cut-off angle of the curvature was > 25 degrees according to the current published literature [6]. Patients were not admitted to the study if any of the following exclusion criteria were present: (i) Peyronie's disease (no cases); (ii) previous penile fracture (no cases); (iii) epispadias, hypospadias or spongiosal hypoplasia (2 cases); or (iv) hormonal alterations (no cases). The patients were fully counselled on the 100% probability of penile length loss with surgery.

2.2 Patient andrological management

This research was carried out exclusively by means of interviews; the reasons for this are presented in the discussion section.

Each patient underwent an initial assessment prepared and carried out exclusively for the current study. The assessment included a case history, an objective examination (inspection and palpation of the penis and of the testicles), a pharmacologically-induced erection using intracavernosal prostaglandin E1 (PGE1) 10–20 g (intracavernous injection [ICI] test), a photograph taken during erection at an outpatient clinic according to the Kelami procedure [7], a basal and dynamic (with intracavernosal PGE1 10 g) echo-color Doppler ultrasonograph (performed with ESAOTE-AU5-EPI equipment, a 7.5 MHz digital probe and a gel wedge), a penile length measurement [8] and a nocturnal penile tumescence (NPT) recording. The NPT recording was performed with RigiScan (Urohealth System Corporation; Costa Mesa, CA, USA); a rigidity increase > 70% above baseline at the base of the penis and > 60% at the top, and a circumference increase > 2 cm at the top of the penis and > 3 cm

at the base were considered “full erections”. For three consecutive nights, the total duration in minutes of the patients’ full erections were recorded; 3–6 full erections per night, longer than 10 min each, were considered to be the normal range [9]. Hormonal serum profiles (follicle-stimulating hormone, luteinizing hormone, free and total testosterone and prolactin) were also performed [9].

2.3 Patient psychological management

Psychological interviews were carried out for each patient by a single unblinded clinical psychologist (Stefano Caracciolo) before and after (3 and 12 months) surgery to investigate the patients’ interpersonal relationships. Modifications in interpersonal relationships before and after surgery were compared. Interpersonal relationships are intended as social interactions and were defined using Hinde’s parameters [10]:

1. Contents: quality of oral translation of personal feelings in the course of relationships.
2. Number: extension and variety of relationships.
3. Features: deepness and typology of relationships.
4. Frequency: rate and distribution of relationships.
5. Ability to perceive limits of mutuality: patient skill in the evaluation of gains and/or losses in terms of personal advantages from social relationships.
6. Subjective perception of the other person: individual feeling towards other people: competitors, judges, allies, etc.
7. Reliability: trust in interpersonal relationships.

The patients were operated on by a single surgeon using the Nesbit procedure (Giorgio Cavallini). The patients were instructed to avoid sexual intercourse for 2 months after surgery. Surgical complications were recorded.

2.4 Variables assessed

The initial assessment was repeated at 3 and 12 months after surgery with the exclusion of hormonal profiles, and basal and dynamic Duplex sonographs. The following variables were assessed before and after surgery:

1. Comfort of vaginal intromission.
2. Cosmetic penile features defined as satisfactory or unsatisfactory based on whether patients were embarrassed or not about their subjective perception of penis features.
3. Penile length.
4. NPT (to ascertain whether the Nesbit procedure

interferes with nocturnal spontaneous erections).

5. The indications from Hinde’s parameters as to an improvement, worsening, or no change, based on the patients’ reports which were subjectively judged by the psychologist.

6. Percentage of patients suffering from psychogenic ED. ED was diagnosed as psychogenic in all cases on the basis of clinical, psychological, instrumental and laboratory outcomes [9, 11]. The fulfillment of this endpoint was subjectively evaluated by Stefano Caracciolo during the course of psychological interviews. There were no cases of ED secondary to the Nesbit procedure.

In the current study we tested the hypothesis that surgery would simultaneously improve (i) satisfaction with the subjective perception of penis features; (ii) the comfort of vaginal intromission; (iii) interpersonal relationships; and (iv) psychogenic ED. As for the efficacy of the surgery, the endpoint was the attainment of all goals (i, ii, iii and iv). Furthermore, we attempted to determine whether differences exist in penile length between satisfied and dissatisfied patients with regard to their subjective perception of penis features after surgery.

2.5 Statistical analysis

The amplitude of the sample was determined using Bross’ method of sequential analysis [12].

All data analyses were carried out according to a pre-established analysis plan; the preoperative data were compared with the postoperative data. Proportions were compared using the z-test and means were compared using the Tukey test [12].

3 Results

The present study enrolled 64 eligible patients between January 2, 1996 and May 31, 2004. Of these, four patients refused the intervention (fear of surgery) and six dropped out during the course of follow-up. A telephone follow-up was carried out to determine the reasons and it found that: (i) three patients sustained that they did not need any psychological counselling; (ii) one patient was called to military service; and (iii) two patients were dissatisfied because they felt that their penis was too short after surgery. Even though these last patients are confirmed treatment failures, they were eliminated from the study because they could not undergo the planned postoperative assessments.

In total, results were available from 54 patients (mean

Table 1. Baseline demographic and clinical characteristics of the trial group. [†]No patient with erectile dysfunction (ED) had any risk factor for ED outside penile deformity; [‡]No homosexual patients were found in the sample; [§]At least 6 months long. [¶]Patients had sexual intercourse with prostitute(s). PSV, peak systolic velocity; EDV, end diastolic velocity.

A) Characteristics	Number of patients (%)
Type and degrees of penile deviation (mean \pm SD)	
Ventral (40.7 \pm 9.5)	44 \pm 81.5
Ventral + left (29 \pm 7)	9 \pm 16.7
Left (38)	1 \pm 1.9
Coexisting disease	
Psychogenic erectile dysfunction [†]	14 \pm 25.9
Phimosis	48 \pm 88.9
Marital status [‡]	
Married/divorced/widowed	0
Stable relationship(s) [§]	26 \pm 54.0
Occasional relationship(s)	15 \pm 27.8
No relationship(s) [¶]	13 \pm 24.1
B) Hormonal profiles (mean \pm SD)	
(Normal ranges are within brackets)	
Total testosterone, ng/mL (2.42–8.26)	5.28 \pm 2.60
Free testosterone, pg/mL (5.6–40.0)	22.3 \pm 8.9
Luteinizing hormone, IU/L (1.7–8.6)	4.1 \pm 1.3
Follicle-stimulating hormone, IU/L (1.5–9.5)	4.0 \pm 1.7
Prolactin g/L (4.1–18.4)	7.0 \pm 2.4
C) Arterial dynamic duplex penile patterns (cm/s, mean \pm SD)	
Left cavernosal artery	
PSV	48.3 \pm 7.4
EDV	2.6 \pm 1.9
Right cavernosal artery	
PSV	51.5 \pm 6.2
EDV	2.1 \pm 1.2
Left dorsal artery	
PSV	54.2 \pm 8.1
EDV	2.2 \pm 1.4
Right dorsal artery	
PSV	55.3 \pm 6.7
EDV	2.1 \pm 1.3

age 24 years, range 20–31 years). The baseline demographic and clinical characteristics of the trial group are presented in Table 1.

The patients were treated exclusively with the Nesbit procedure [2]. There was a mean of 2.2 (range 1–3)

dorsal ellipses per part in the case of ventral deviation, and a mean of 2.1 (range 1–3) dorsal-right ellipses in the case of ventral + left deviation. Left deviation required one right ellipse. Correct penile straightening was checked with saline erection during the course of surgery, and with auto-photography and ICI tests during follow-up. The adverse effects of surgery were: transient (4 months) glandular paresthesia (1 case), delayed healing of the subcoronal incision (3 cases), postoperative bleeding (1 case corrected with surgical haemostasis 8 h after surgery) and paraphimosis (3 cases, corrected with circumcision 15–30 days after the initial surgery). Paraphimosis occurred in 3 out of 8 patients who wanted to preserve their prepuce for aesthetic reasons.

The proportion of patients satisfied with their cosmetic penile features and with the comfort of intromission significantly improved after surgery (Table 2). Only a non-significant percentage of patients reported a change in their interpersonal relationships after surgery: three reported that their interpersonal relationships had worsened whereas four reported that they had improved. Interviews indicated that no significant difference occurred between pre-surgical and post-surgical percentages of patients complaining about ED; 14 patients complained about non-satisfactory penile rigidity and/or referred to losing it completely in the course of sexual intercourse and/or vaginal penetration attempts before surgery and these reports did not change after surgery (Table 3). These patients were all subsequently invited to partake in psychotherapy sessions.

Nine patients complained about a subjective excessive shortening of their penile shaft and, for this reason, they were dissatisfied and three of them reported that their relationships had worsened. A comparison of penile length after surgery and of penile shortening because of surgery between satisfied and non-satisfied patients gave a negative result for significant difference ($F < 1$ in both cases, P not significant, Table 4). Psychological sessions revealed that these patients had very poor social relationships before and after surgery; no patient had previously had any sexual intercourse with any partner but had had sexual intercourse with a prostitute. Of the nine, seven routinely used narcotic drugs 4–7 days a week, five had no deep friendships and three spent most of their free time indoors by themselves. Phosphodiesterase-5 inhibitors (PDE-5i) were not used as first line treatment for psychogenic ED because these patients are obliged to use PDE-5i every time they want to achieve a

Table 2. Proportion of patients subjectively achieving improvement in satisfaction of penile features and comfort of vaginal intromission after surgical penile straightening for congenital deviation. Differences were analyzed using a z test. NS, not significant. ^b*P* < 0.01, compared with after surgery; ^a*P* > 0.05, compared with 12 months after surgery.

Surgical end points	Before surgery (%)	After surgery (%)	
		3 months	12 months
Cosmetic penile features			
Satisfactory	2 (3.7)	45 (83.3)	45 (83.3)
Unsatisfactory	52 (96.3)	9 (16.7)	9 (16.7)
Vaginal intromission			
Comfortable	0/32 (0)	38/38 (100)	38/38 (100)
Uncomfortable	32/32 (100)	0/38 (0)	0/38 (0)

Table 3. Percentage of patients in whom interpersonal relationships and/or erectile dysfunction (ED) improved, remained unchanged or worsened after surgical penile straightening for congenital deviation. Differences were analyzed with a z-test.

Psychological endpoint	Number (%) of patients with different grades of modifications of psychological end points	
	3 months	12 months
Hinde' s parameters of personal relationship		
Content		
Improved	4 (7.4)	4 (7.4)
Unchanged	49 (85.2)	49 (85.2)
Worsened	1 (1.9)	1 (1.9)
Number		
Improved	2 (3.7)	2 (3.7)
Unchanged	51 (94.4)	51 (94.4)
Worsened	1 (1.9)	1 (1.9)
Feature		
Improved	3 (5.6)	3 (5.6)
Unchanged	49 (90.7)	49 (90.7)
Worsened	2 (3.7)	2 (3.7)
Frequency		
Improved	3 (5.6)	3 (5.6)
Unchanged	48 (88.9)	48 (88.9)
Worsened	3 (5.6)	3 (5.6)
Mutuality		
Improved	2 (3.7)	2 (3.7)
Unchanged	50 (92.6)	50 (92.6)
Worsened	2 (3.7)	2 (3.7)
Subjective perception of the other person(s)		
Improved	4 (7.4)	4 (7.4)
Unchanged	49 (90.7)	49 (90.7)
Worsened	1 (1.9)	1 (1.9)
ED	14 (25.9)	14 (25.9)

suitable erectile response to a sexual stimulation; therefore, the use of PDE-5i as a first line treatment for psychogenic ED entails the risk of inducing a dependency on drugs [10, 12]. Of the 14 patients complained about non-satisfactory penile rigidity and/or referred to losing it completely in the course of sexual intercourse, three used PDE-5i as a second line treatment for ED: one because he refused psychotherapy and two because psychotherapy failed to achieve any improvement of their ED. All these patients reported that PDE-5i (Sildenafil 50 mg in case of need) was effective.

Four patients reported improved interpersonal relationships after surgery. They agreed to the surgery because they had engaged in significant relationships with women: one was embarrassed by his penile features and three could not penetrate.

Nocturnal penile tumescence recordings were within the normal range [9] and no significant difference was found between pre-operative and post-operative full erection periods during the course of three night recordings. Full erection periods were always within the normal range, and surgery did not significantly modify them: preoperative NPT (mean ± SD) = 195 ± 22 min; postoperative (at 3 months) NPT = 199 ± 20 min; postoperative (at 12 months) NPT = 196 ± 21 min (*F* = 1.23, *P* not significant).

4 Discussion

The data collected herein indicate that surgical penile straightening for congenital deviation significantly improves subjective penile features, intromission comfort and patient satisfaction of their subjective perception of penis features, but these results rarely modified

Table 4. Comparison of penile length after surgery as well as that of penile shortening because of surgery between satisfied and non-satisfied patients. Penile length was measured according to Wessells *et al.* [8].

	Dissatisfied patients (<i>n</i> = 9)	Satisfied patients (<i>n</i> = 45)
Penile length after surgery (cm, mean \pm SD)	14.7 \pm 2.5	14.1 \pm 2.6
Penile shortening because of surgery (cm, mean \pm SD)	2.2 \pm 0.8	2.4 \pm 0.7

personal relationships. Post-surgery penile length and after surgery shortening did not significantly differ between satisfied and dissatisfied patients, thus showing that subjective perception of the penile aspect does not depend on surgical shortening.

ED did not improve after surgery. Since sexual intercourse represents an aspect of personal relationships [11, 13], which did not improve with surgery, it is not surprising that the patients studied still complained about ED after the Nesbit procedure.

The causes of the negligible efficacy of surgery on interpersonal relationships are unknown. A future study could ascertain whether an individual personality trait is involved. The initial project of this research included a study of patient personality, but it was abandoned because we noticed early on that the number of patients who would benefit from surgery in terms of personal relationships would be very low; we therefore concluded that obtaining a representative number of patients to study would have been extremely difficult.

A key aspect of the present study was the technique used to assess interpersonal relationships.

The QoL and interpersonal relationships are regarded as important psychological issues to be assessed in sexual medicine [11, 13]. The QoL can sometimes be directly related to “health” and explores, for example, energy and work satisfaction, which are unrelated to sexual health [13]; therefore, it was felt to be too broad an instrument for testing the population studied. We carried out tests prior to this research in the course of which QoL assessment was determined to be too conditioned by the emotional status of the patients related simply to cosmetic penile features or to penetration comfort.

Interpersonal relationships are commonly assessed using questionnaires or in the course of psychological sessions [11, 13]. In a preliminary approach, scales were used, but they proved unreliable because the data were not replicable. A survey indicated that patients gave too many evasive answers because they felt the scale items were too intrusive regarding their intimate feelings. This intrusion further provoked low patient compliance for

successive psychotherapy and the SISMER ethical committee considered the use of experimental systems that could interfere with any kind of therapy successive to the research as unethical. Furthermore, even though some trials used these scales, they are considered to have limited clinical value [9, 13]. Therefore, we were compelled to collect data on social relationships using psychological semi-structured interviews. Hinde [10] fully described the variables of personal relationships and defined parameters that are accepted by the current literature in the field [11]. These parameters were used in psychological interviews to explore social relationships because they are strictly interdependent and mutually control each other [10, 11]. Repeated interviews with the same patients using Hinde’s parameters found replicable data in the course of pre-surgical testing. Interviewers blind to the treatment could not be used because we immediately noticed that it was extremely difficult to collect data about the efficacy of the surgery without being able to discuss it. Subjective methods (i.e. psychological sessions) were used as well to assess ED; in our study, scales were not so reliable, mainly in the patients with the worst social relationships. Additional ED questionnaires were constructed for patients with stable relationships, while 7/14 patients with ED had only occasional (1–2 experiences in the course of 1–4 years) and short (2–6 weeks) relationships, and 3/4 experienced attempts of sexual intercourse only with prostitutes. Multiple interviews in the course of pre-surgical testing found replicable data.

This study used the Nesbit procedure exclusively because (i) there is a higher recurrence rate of the deviation with the simple placcation as compared to a Nesbit procedure [14]; (ii) the Nesbit procedure improves erections in Peyronie’s disease, even 4 years after surgery [15]; and (iii) impairment of erection after the Nesbit procedure occurs in patients already affected by ED prior to surgery [16, 17]. Since 2002, Lue’s team [18] has been using a 16-dot plication technique to correct congenital penile curvature, but we did not use it in this trial for the sake of homogeneity.

The Nesbit surgical procedure can improve erections via circumflex vein ligation, but it can also affect sexual potency through a lesion of the dorsal neurovascular bundle [9, 15]. The absence of any significant difference between pre-surgery and post-surgery NPT indicates that the Nesbit procedure did not significantly influence erections. Actually, the improvement of erections after the Nesbit procedure was found exclusively in those suffering from Peyronie's disease [9, 15]. As a confirmation, no significant difference emerged between the pre- and postoperative data of penile artery spectral traces. Spectral traces of the cavernosal and the dorsal arteries are not so different in terms of velocity in our research, although some series report that the dorsal artery velocity is higher than the cavernosal velocity [9]. This is true mainly in the complete/rigid phase of erection, although it has been recommended that arterial spectral traces be measured 5–10 min after the PGE1 injections, during the latency/tumescence phase [9].

The measurement of Rigidity Activity Units (RAU) and Tumescence Activity Units (TAU) is an accepted method for assessing NPT. Unfortunately, the appropriate software was not available in our unit. However, RAU and TAU measurements were introduced to simplify NPT quantification, but the absence of these measurements does not modify NPT reliability [9, 13]. Even though larger series regarding the Nesbit procedure have used a longer follow-up (up to 90 months [17]), we stopped postoperative follow-up empirically at 12 months because the preliminary experience of our team in this field showed that a longer follow-up affects patient participation in psychotherapy; therefore, the SISMER ethical committee did not allow longer periods of patient observation (see above). The intention-to-treat analysis is generally favoured to avoid the bias associated with a non-random loss of participants. Therefore, it is mainly used to analyze multiple arm trials. This is a single-arm trial so conventional analyses were preferred [19]. A survey of our data indicated that the intention-to-treat analysis did not modify the significance or non-significance of the results.

The validity of these data is the patients' complaint of poor social relationships because of congenital penile curvature. In most cases, this complaint should be regarded as an ego defence [11] rather than as an effect of the deformity. It is felt that psychological intervention is mandatory to ensure satisfactory social relationships in patients with congenital penile curvature

and problematic inter-relationships, especially in the cases where ED is present.








Our data bring up doubts about the efficacy of cosmetic surgery of the penis (i.e. surgery aimed at improving dimensions) for the improvement of social relationships of subjects undergoing this surgery. In fact, in the literature, all papers concerning plastic surgery of male genitalia deal with the penile dimension aspect but not with interpersonal relationships before and after surgery [5, 20–22].

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Edited by Dr Ching-Shwun Lin

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