

Letter to the editor

# Penile length is a very important factor for cosmesis, function and psychosexual development in patients affected by hypospadias: Results from a long-term longitudinal cohort study

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## Abstract

Few studies of long-term outcome of hypospadias treatment in terms of voiding, surgical complications, sexual functioning, intimate relationships and cosmetic results have been investigated and contrasting results have been obtained so far. The aim of our study is to investigate the long-term outcome of urinary and sexual function, cosmesis and the quality of intimate relationships in a series of hypospadias. In this study, 42 patients who underwent surgery for hypospadias were prospectively followed for 15 years. Medical records provided the hypospadias data, the number of reconstructive operations and the reconstruction technique that was used. Patients underwent physical examination, including penile length measurement and completed International Prostatic Symptoms Score (I-PSS), International Index Of Erectile Function (IIEF 15) and the Penile Perception Score questionnaire (PPPS). Twenty patients agreed to participate in the study. At the enrolment, the median value of HOSE was 13, as regards PPPS, 18/20 (90%) were satisfied, while in 1998 only 80% were satisfied. No significant statistical difference has been reported from the results obtained at enrolment and those obtained at follow-up, in terms of PPPS ( $P = 0.81$ ), IPSS and IIEF-15. Penile length was 6.5 cm flaccid and 10.5 cm stretched. Our data show how cosmesis, function and psychosexual development for these patients are highly connected to surgical outcome, which is understood to be a decrease in penile size.

## Keywords

HOSE, hypospadias, IIEF-15, IPSS, penile size, PPPS, psychosexual development

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## Introduction

Hypospadias is a common urogenital abnormality of the penis with a reported incidence of 0.8–8.2 cases in 1000 living boys and men.<sup>1</sup> The objective of reconstructive surgery in hypospadias is to produce a penis that is aesthetically and functionally normal. This requires a penis that is straight on erection with a vertically orientated meatus at the tip of the glans, thus generating a single coherent urinary stream.<sup>2,3</sup> Only few studies of long-term outcome of hypospadias treatment in terms of

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voiding, surgical complications, sexual functioning, intimate relationships and cosmetic results have been investigated and contrasting results have been obtained so far.<sup>4-6</sup> However, most groups used questionnaires only<sup>7,8</sup> and others described a relatively short follow-up or a small number of patients.<sup>5,6</sup> The aim of our study is to investigate the long-term outcome of urinary and sexual function, cosmesis and the quality of intimate relationships in a series of hypospadias representative of a Mediterranean European country. The main limitations of a surgical correction of hypospadias are represented by the unpredictability of the cosmetic and functional results over time. A major purpose of this study is precisely to evaluate these aspects over time, trying to decide how surgery can improve hypospadias outcome.

## Method and materials

Forty-two patients who underwent surgery for hypospadias between January 1983 and January 1995 were prospectively followed for 15 years. They were screened during the year 1998 in a series of 11,649 young men where >90% were aged 18 years or older and living in the region of Tuscany (Italy)<sup>1</sup> in order to evaluate their attitude to the enlistment for the compulsory military service. They were followed every 5 years by a telephone interviewer and by an examination after 15 years of follow-up. Medical records provided the hypospadias data, the number of reconstructive operations and the reconstruction technique that was used.

On arrival at the clinic, each patient was supplied with copious amounts of diluted orange juice (about 500 mL). At the same time, the patients were asked to fill out a series of Questionnaires: I-PSS<sup>2</sup> for lower urinary tract function, IIEF 15<sup>3</sup> for sexual function and PPPS<sup>4</sup> for penile cosmesis perception and, after an appropriate interlude, the patients were asked to urinate into a uroflowmeter in privacy. Once the questionnaire and the uroflowmeter were completed, the patients were invited for clinical consultation, and at this stage, the Hypospadias Objective Scoring Evaluation (HOSE) was evaluated.<sup>5</sup> The patients underwent physical examination, including penile length and testicular volume measurement. Stretched penile length was measured from the symphysis to the glans tip with the penis maximally stretched while

compressing the presymphyseal fat. The testicular volume was calculated by Prader orchidometer.

## Statistical analysis and ethical considerations

The present study has been planned as a longitudinal cohort study, since it is a correlation research study that involves repeated observations of the same variables over long periods of time, in a specific group of people who share a common characteristic or experience within a defined period, considered as a cohort.<sup>6</sup> The Fisher's exact, chi-square or Wilcoxon tests were used to assess statistical significance with  $P < 0.05$  considered significant. Two-sided tests of significance were performed for all analyses (Statistical software: SPSS® 11.5 for Apple®-Macintosh®). The local research ethical committee approved the present study.

## Results

Twenty-eight out of 42 (66.6%) patients were traced after 15 years of follow-up. Of these, 20 (71.5%) agreed to participate in the study (Table 1).

At enrolment, the median value of HOSE was 13; as regards PPPS, 18/20 (90%) were satisfied, while in 1998 only 80% were satisfied. No significant statistical difference has been reported from the results obtained at the enrolment and those obtained at the follow-up, in terms of PPPS ( $P = 0.81$ ). The median value of IPSS was 3; the IIEF-15 was 23 while in 1998 it was 23.3 ( $P = 0.447$ ;  $t = 0.44$ ;  $df = 18$ ). The Qmax median (16.5 mL/s) and Qmedium median (11 mL/s) were in normal range. Testicular medium volume was 20.5 and penile length was 6.5 cm flaccid and 10.5 cm stretched (Table 2).

## Penile length

Despite a general agreement in mean values across most studies, the definition of the lower normal limit is still a matter of debate. Wessells et al.<sup>7</sup> considered a normal penis to be of any length within the 2 SDs of the mean, i.e. according to their data, a flaccid length of  $\geq 4$  cm or a stretched length of  $\geq 7.5$  cm. Ponchiotti et al.,<sup>8</sup> in a large series of Italian military conscripts, expressed penile dimensions as 'percentiles', with 9 cm in flaccid length and 12.5 cm in stretched length falling in the 50th percentile. By

assuming the 25th percentile as threshold, they found, as did Wessells et al.,<sup>7</sup> that <4 cm for the flaccid penis and <7 cm for the stretched penis were below the normal range. Ponchietti concluded that 4 and 7 cm should not be taken as an absolute standard to define a pathological situation that needs treatment, but they should be interpreted in light of other

variables, like the body mass index, which is correlated strongly with penile size.<sup>8</sup> Looking at the results of penis length as it is detected in our study, we can state that the dimensions are within 2 SDs cited by Wessells, while it was not possible to correlate the length of the penis to body mass index as indicated by Ponchietti.

The penis should be measured along its dorsal side, from the pubic-penile skin junction to the tip of the glans.<sup>9</sup>

The term 'lengthening phalloplasty' summarises a small group of surgical procedures aiming at elongating the shaft, mainly in the flaccid state. The most common techniques to lengthen the penis (that combines the sectioning of the penile suspensory ligament, infrapubic liposuction and a V-Y or Z plasty of the suprapubic skin) provide only rudimentary results and a high rate of dissatisfaction in the patients.<sup>10</sup>

## Discussion

Few studies of long-term outcome of hypospadias treatment have been investigated and contrasting results have been obtained so far.

Jiao et al. reported in a series of 174 patients who underwent a variety of hypospadias repairs

**Table 1.** Baseline characteristics in patients with hypospadias from medical records (conscript visit 1998) and at 15 years follow-up (2013).

			P
Patient evaluation year	1998	2003	
Patients (n)	42	20	
Median age at first surgery (years)	4.6	5	
Age of surgery completions	5.3	6.2	
Operations (n)			
0	4 (9.52%)	0 (0%)	
1	19 (45.23%)	13 (65%)	
2	14 (33.3%)	5 (25%)	
3	3 (7.14%)	2 (10%)	
4 or more	2 (4.76%)	0 (0%)	
HOSE (median)	X	13	
PPPS (%)	90	80	0.81
IPSS	X	3	X
IIEF-15	23.3	23	0.44

**Table 2.** Questionnaire and outpatient visit outcomes in respondents with hypospadias.

Patientno.	HOSE	PPPS	IPSS	IIEF-15	Max urinary flow (mL/s)	Medium urinary flow (mL/s)	Urine volume (mL)	Testis volume (mL)	Penile length (flaccid/ stretched)
1	13	Satisfied	3	23	26	14	433	20	6/9.5
2	13	Satisfied	0	25	15	10	103	20	5/8.5
3	10	Satisfied	1	23	11	6	114	20	6.5/10
4	11	Satisfied	12	24	13	8	229	15	8/11
5	15	Satisfied	2	24	17	12	170	25	6/8
6	14	Satisfied	11	22	8	5	128	20	7.5/10.5
7	11	Satisfied	16	20	23	17	183	25	9/12.5
8	15	Satisfied	0	23	27	19	358	20	8/11.5
9	13	Satisfied	3	24	22	13	201	20	7.5/11
10	12	Unsatisfied	8	25	16	7	180	20	6/8.5
11	13	Satisfied	2	23	22	15	312	20	6/9
12	12	Satisfied	0	25	14	11	105	20	5/8.5
13	10	Satisfied	2	23	13	7	200	20	6.5/10
14	11	Satisfied	11	25	14	7	222	15	8/11.5
15	14	Satisfied	3	24	16	11	188	25	6/9
16	13	Satisfied	10	21	8	6	133	20	7.5/10.5
17	10	Satisfied	14	20	25	17	178	25	9/12.5
18	15	Satisfied	0	22	25	29	346	20	8/11.5
19	14	Satisfied	3	24	22	11	212	20	7.5/11
20	11	Unsatisfied	8	25	20	10	187	20	7.5/11.5
Median	13		3	23	16.5	11	187.5	20	6.5/10.5

that 53.5% of patients were dissatisfied with the overall cosmesis of the penis. The factors of dissatisfaction were the small size and the residual curvature of the penis.<sup>11</sup> In a series of 104 men, Kiss showed that better cosmetic outcome was related to better sexual outcome.<sup>12</sup> Robinson reported that in 18 patients followed for 10 years, 94% had a normal Q max (medium 16.4) and an average value of 15.4 in HOSE questionnaire.<sup>13</sup>

Rynja reported that a high median age at initial operation was to be considered as exceptional or the result of a misinterpretation, since at that time hypospadias surgery was supposed to be performed before the age of 18 months.<sup>14</sup> Fievet et al. indicated that penile length in children with hypospadias whether proximal or distal is within the normal range.<sup>15</sup>

In our series, the patients underwent the first surgery at an older age (4.6 years) and this is probably a key aspect in reading data which provides an important input for a subsequent study. Over 90% were satisfied with the cosmetic result. The urinary and sexual functions were normal. The testicular volume was also normal. The data on penile length (6.5 cm/10.5 cm) contrasted the data previously reported by Rynja; in fact we found a reduction in size as compared to the healthy population (9 cm/12.5 cm).<sup>8,14</sup> The difference of data as compared to the work of Rynja could be the result the first surgery taking place at a later age in our patients, or a different way to classify the sample. It could be interesting to try to produce a meta-analysis that compares the two works on important factors such as the length of the penis. Ten percent of patients reported difficulty in the couple relationship connected to penile size as a result of such surgery. Thus, it could be argued that psychosexual perceptions were particularly critical in this group.<sup>14</sup> The implication is that psychosexual reassurance and education could be clinically beneficial in children when provided both to parents and patients during key developmental periods. A special attention to penile size during surgery for hypospadias should be taken into great consideration for its implications in the distance.

In conclusion, our data, unique to the type of specimen and representative of an entire population, show how psychosexual development for these patients is highly connected to the surgical outcome, which results in a decrease in penile size.

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### Declaration of conflicting interests

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### References

1. Mondaini N, Ponchietti R, Bonafè M et al. (2002) Hypospadias: Incidence and effects on psychosexual development as evaluated with the Minnesota Multiphasic Personality Inventory test in a sample of 11,649 young Italian men. *Urology International* 68(2): 81–85.
2. Barry MJ, Fowler FJ, O'Leary MP et al. (1992) The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. *Journal of Urology* 148(5): 1549–1557.
3. Rosen RC, Riley A, Wagner G et al. (1997) The international index of erectile function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology* 49(6): 822–830.
4. Weber DM, Landolt MA, Gobet R et al. (2013) The Penile Perception Score: An instrument enabling evaluation by surgeons and patient self-assessment after hypospadias repair. *Journal of Urology* 189(1): 189–193.
5. Holland AJ, Smith GH, Ross FI et al. (2001) HOSE: An objective scoring system for evaluating the results of hypospadias surgery. *BJU International* 88(3): 255–258.
6. Porta M and York N (2009) *A Dictionary of Epidemiology*. 5th edn. Oxford: Oxford University Press.
7. Wessells H, Lue TF and McAninch JW (1996) Penile length in the flaccid and erect states: Guidelines for penile augmentation. *Journal of Urology* 156(3): 995–997.
8. Ponchietti R, Mondaini N, Bonafè M et al. (2001) Penile length and circumference: A study on 3,300 young Italian males. *European Urology* 39(2): 183–186.
9. Mondaini N, Ponchietti R, Gontero P et al. (2002) Penile length is normal in most men seeking penile lengthening procedures. *International Journal of Impotence Research* 14(4): 283–286.
10. Wessells H, Lue TF and McAninch JW (1996) Complications of penile lengthening and augmentation seen at 1 referral center. *Journal of Urology* 155(5): 1617–1620.

11. Jiao C, Wu R, Xu X et al. (2011) Long-term outcome of penile appearance and sexual function after hypospadias repairs: Situation and relation. *International Urology and Nephrology* 43(1): 47–54.
12. Kiss A, Sulya B, Szász AM et al. (2011) Long-term psychological and sexual outcomes of severe penile hypospadias repair. *Journal of Sexual Medicine* 8(5): 1529–1539.
13. Robinson AJ, Harry LE and Stevenson JH (2013) Assessment of long term function following hypospadias reconstruction: Do flow rates, flow quality and cosmesis improve with time? Results from the modified Bretteville technique. *Journal of Plastic, Reconstructive & Aesthetic Surgery* 66(1): 120–125.
14. Rynja SP, Wouters GA, Van Schaijk M et al. (2009) Long-term followup of hypospadias: Functional and cosmetic results. *Journal of Urology* 182(Suppl. 4): 1736–1743.
15. Fievet L, Harper L, Chirpaz E et al. (2012) Penile length is comparable in boys with and without hypospadias. *Journal of Pediatric Urology* 8(5): 493–496.