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Can separation of the scrotal sac in proximal hypospadias reliably predict the need for urethral plate transection?

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Summary

Introduction
One of the main challenges in proximal hypospadias repair is correcting curvature. The best technique to achieve this remains the object of debate. Indeed, some authors believe the urethral plate should be kept and used as often as possible. In some cases, however, even after extensive mobilization and dorsal plication, significant curvature remains and it is necessary to transect the urethral plate. Having a reliable pre-dissection marker of the need for urethral transection would be useful in choosing a technique.We wanted to determine if presence of marked separation of the scrotal sac (SSS), also referred to as bifid scrotum, could reliably predict the need for urethral plate transection.

Study design
We prospectively enrolled a series of boys with proximal hypospadias. We noted age, degree of hypospadias, meatal position, presence of cryptorchidism, and presence or absence of SSS. During surgery we fully degloved the penile shaft, freeing all ventral tissues, and radically dissected the more proximal bulbar urethra. We then performed an erection test. If there was residual curvature $<30^{\circ}$ we performed a dorsal plication, if it was $>30^{\circ}$ we transected the urethral plate.

Results
Twenty-nine patients were included, of whom 18 presented SSS. The average age was comparable in both groups, as was type of hypospadias and meatal position. We estimated transection of the urethral plate to be necessary in 15 out of the 18 children with SSS, and 2 out of the 11 children without SSS. The relative risk for requiring urethral plate transection in case of SSS in this series was 4.58.

Conclusion
Techniques that commit to urethral plate transection are criticized because they preclude using the urethral plate. In our study presence of SSS was predictive for the need to transect the plate. Obviously one can decide to keep the urethral plate at all cost, and mobilize it more than we did, or accept more residual curvature, but in reality our aim was to determine a preoperative marker allowing us to define a patient category. We believe presence of SSS is a marker of severity, and that this "severity" translates into "a less usable urethra". As recent studies caution us about the evolution of the reconstructed native urethra and the possibility that it may not grow as well as the other penile tissues, we believe this extra information could influence the surgeon's decision as to the most appropriate technique for each patient.

Table Results of bivariate analysis.

Results	Total	No SSS	SSS	*p*
Age, years	4.2	3.4	4.7	0.68
Urethral transection	17 (58.6%)	2 (18.2%)	15 (83.3%)	**0.001**

A p-value <0.05 was considered statistically significant.

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Introduction

Most hypospadiologists would agree that the main challenge in proximal hypospadias repair is correcting curvature, as normal long-term function depends on having a straight penis during erection. The best technique to achieve this remains the object of debate. Indeed, some authors believe the urethral plate should be kept and used as often as possible, and therefore recommend extensive mobilization of the urethra and urethral plate associated with, if necessary, dorsal placation [1—4]. Dorsal plication has been criticized as it can affect penile length, which is known to play an important role in long-term satisfaction for hypospadias patients [5]. Furthermore, in some cases, even after extensive mobilization and dorsal plication, significant curvature remains and it is necessary to transect the urethral plate [6]. In techniques such as the Koyanagi technique, urethral plate transection is performed from the beginning, before complete urethral mobilization [7]. Although this technique allows for complete correction of the curvature in many cases, its commitment to urethral plate transection, thus precluding use of the urethral plate, has been criticized [7]. Therefore, having a reliable pre-dissection marker of the need for urethral transection would be useful in choosing a technique. Meatal position alone is well known to be unreliable and correct assessment of division of the corpus spongiosum often requires complete degloving. We wanted to determine if presence of marked separation of the scrotal sac (SSS), also referred to as bifid scrotum, could reliably predict the need for urethral plate transection thus facilitating choice of technique.

Patients and methods

We prospectively enrolled a series of boys with proximal hypospadias. The inclusion criterion was presence of severe proximal hypospadias, and the exclusion criterion was a history of previous penile surgery including circumcision. At surgery, we noted age, degree of hypospadias, meatal position, penile length, presence of cryptorchidism, and presence or absence of marked SSS. This was a visual assessment made under general anesthesia before incision by the same single senior surgeon. Presence of marked SSS was noted before dissection in all cases, therefore before any decision about urethral transection. Marked SSS was noted when each scrotal sac was separated by a deep groove as in Fig. 1A, as opposed to no SSS as in Fig. 1B.

During surgery we fully degloved the penile shaft, freeing all ventral tissues, and radically dissected the more proximal bulbar urethra as described by Bhat *et al.* [4]. We added plate elevation only if the urethral plate was wide enough to allow for tubularization without incision. If the plate was not wide enough we did not associate elevation with plate incision. Chordee was evaluated with an artificial erection in which the erectile bodies were inflated with a saline solution after placing a tourniquet at the base of the penis. Angulation was measured with a protractor. If there was residual curvature $<30^{\circ}$ we performed a dorsal plication, if it was $>30^{\circ}$ we transected the urethral plate. The test was repeated after urethral plate transection. If there was significant residual chordee after transection, a dorsal plication was added. If the plate was transected we performed an Asopa-Duckett urethroplasty, if the plate was not transected we tubularized it, with or without plate incision, or performed an onlay graft. Presence or absence of residual chordee was determined by auto or hetero clinical evaluation during follow-up. No postoperative erection tests were performed, so either an erection was observed during visits at follow-up or the child or parents were asked if the penis was straight during erection.

Qualitative variables were described as frequencies and proportions. Quantitative variables were described as means, standard deviations, and medians. Normality of distributions was assessed using Shapiro-Wilk's test. Bivariate analysis of quantitative variables was performed using Mann—Whitney's test. Bivariate analysis of qualitative

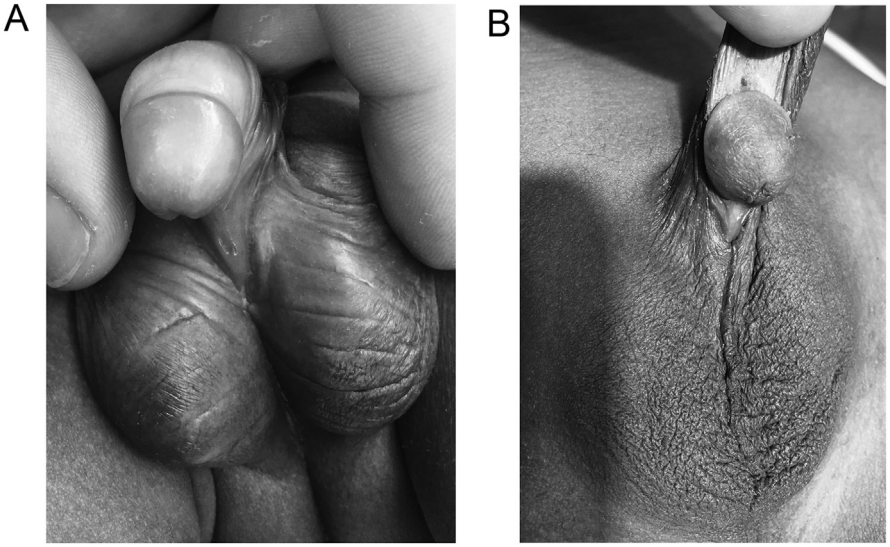

Figure 1 A. Hypospadias with separation of the scrotal sac/bifid scrotum. B. Hypospadias without separation of the scrotal sac/bifid scrotum.