



Double Y glanuloplasty for glanular hypospadias

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Received 1 September 2009; revised 23 October 2009; accepted 22 November 2009

Key words:

Hypospadias;
Urethra;
Urologic surgical
procedures;
Flaps;
Male;
Penis;
Glanular

Abstract

Purpose: A double Y glanuloplasty technique is described for the repair of glanular hypospadias with mobile meatus.

Materials: Ninety-seven children with glanular hypospadias and mobile meatus were operated on using this technique in the period from January 2003 to January 2009. Mean age of patients was 12 (range, 4–60) months.

Results: Patients were discharged home within 3 days. The operation resulted in a slit-like meatus. Follow-up ranged from 8 months to 6 years (mean, 45 months). Good cosmetic and functional results were obtained in 94 patients. Complications occurred in 3 patients (3%). Two patients experienced meatal stenosis. This was corrected using ventral meatotomy. One patient suffered from dehiscence of the wound and retraction of the meatus. The meatal retraction was corrected using a modified inverted Y Mathieu technique.

Conclusions: The double Y glanuloplasty technique is suitable for appropriately selected patients with glanular hypospadias and mobile meatus. It provides a cosmetically natural vertical slit at the tip of the glans. © 2010 Elsevier Inc. All rights reserved.

Hypospadias is one of the most common congenital anomalies, with a prevalence of 3.8 per 1000 male newborns [1]. Historically, glanular hypospadias was not repaired routinely because of the high complication rate and, in some, the unsatisfactory cosmetic outcome. Recently, improved techniques with better surgical outcome and increasing concern of parents and older patients [2] have stimulated surgical correction of glanular hypospadias.

A myriad of procedures for glanular hypospadias have been developed during the last 30 years based on the principle of urethral mobilization first described by Beck [3] in 1898. These include meatal advancement glanuloplasty (MAGPI) [4,5] and its modifications [6,7], glans approximation procedure [8], and Koff [9] to mention a few.

Furthermore, there is an increasing interest to decrease postoperative patient discomfort, decrease the risk for complications, and provide cost-effective therapy.

The double Y glanuloplasty (DYG) technique is presented as a simple technique suitable for patients with glanular hypospadias and a mobile meatus. This technique helps achieve a terminal, slit-like meatus with minimal complications.

1. Materials and methods

Between January 2003 and January 2009, 97 children with glanular hypospadias and mobile meatus were operated on using the DYG technique. The age ranged between 4 and 60 months (mean, 12 months). All patients received caudal block before the operation performed under general anesthesia. Patient selection is essential. The decision that the patient is suitable for the DYG technique can only be

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confirmed under anesthesia after proper assessment of the glans and meatus and after confirming that the meatus is mobile and can be pushed to the tip of the glans using a fine-toothed forceps. The presence of a transverse ridge distal to meatus is a helpful tip but not always reliable. A transurethral catheter was used for 1 to 2 days depending on the degree of mobilization and the age of the child.

2. Operative technique

The DYG technique is suitable for selected patients with glanular hypospadias, with mobile meatus, and in the absence of deep chordee (Figs. 1A and 2A). Those patients usually have a little ridge distal to meatus. This ridge can be pushed with a mosquito or toothed forceps to the tip of the glans (Fig. 2B).

If the distal edge of the urethral meatus is immobile (Fig. 3A) and cannot be pushed to the tip of the glans (Fig. 3B), the child is not suitable for the DYG technique; and another technique suitable for distal hypospadias is performed (inverted Y Thiersch in patients with cleft glans or inverted Y Mathieu technique in patients with flat glans, personal communication).

A 5/0 nylon traction suture is placed on the glans, dorsal to the tip of the glans. A tourniquet is placed at the root of the penis, and chordee is excluded using the artificial erection test.

An inverted Y incision is outlined on the glans. The centre of the inverted Y is just above the ridge distal to the meatus. The longitudinal limb extends to the tip the glans where the tip of the neomeatus will be located. Each oblique limb of the inverted Y is 0.5 cm long, and the angle between them is 60° (Figs. 1B and 4A). The incision is deepened, and the flaps are mobilized to allow more mobility of the meatus (Fig. 1C). A

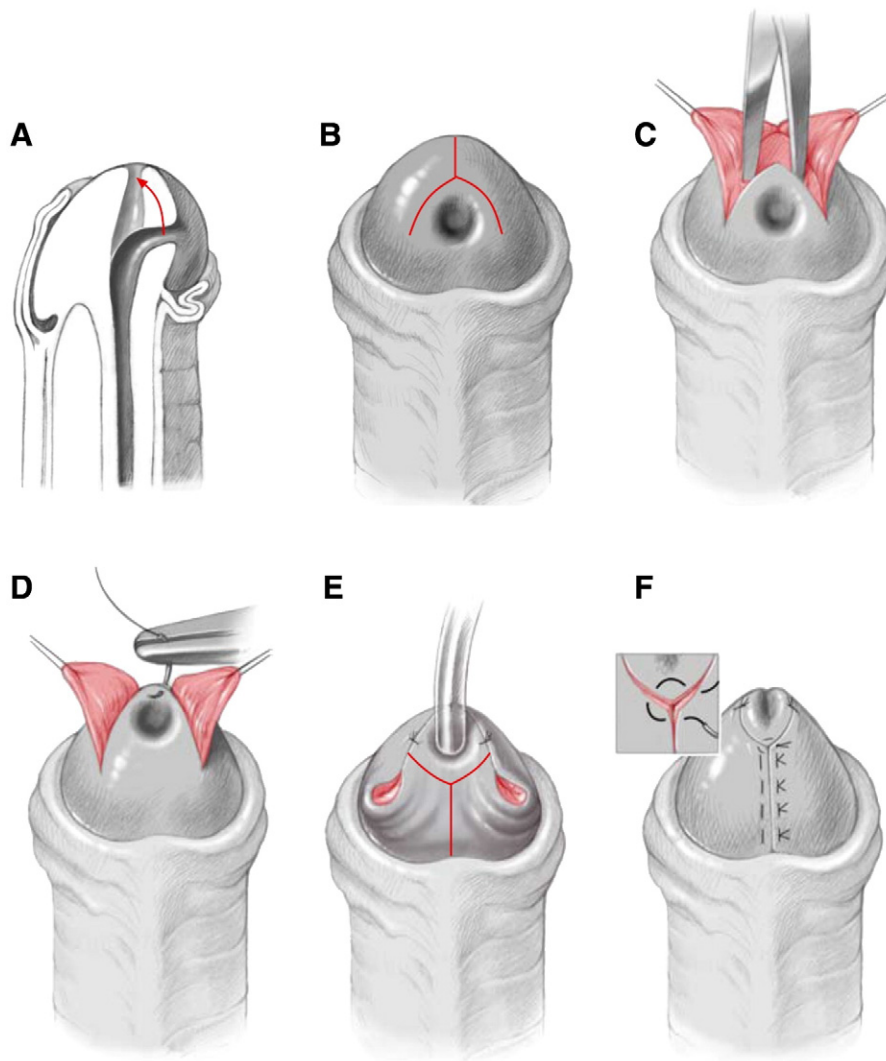


Fig. 1 Steps of DYG. A, Glanular hypospadias with mobile meatus. B, Inverted Y incision. C, The 3 flaps are elevated. D, The apex of the meatus is sutured to the tip of the glans. E, A catheter F10 is introduced inside the urethra, and a Y incision is made that surrounds the meatus and extends down to the coronal sulcus. F, The glanular wings are mobilized deep enough to wrap around the urethra and are approximated in the midline. The 6-o'clock stitch is a 3-point stitch that brings the urethra and the 2 medial edges of the glanular wings together and is magnified in the inset. From Hadidi AT, Azmy AF (Eds) *Hypospadias Surgery, Second Edition*, Springer-Verlag, Berlin Heidelberg, with permission (in press).

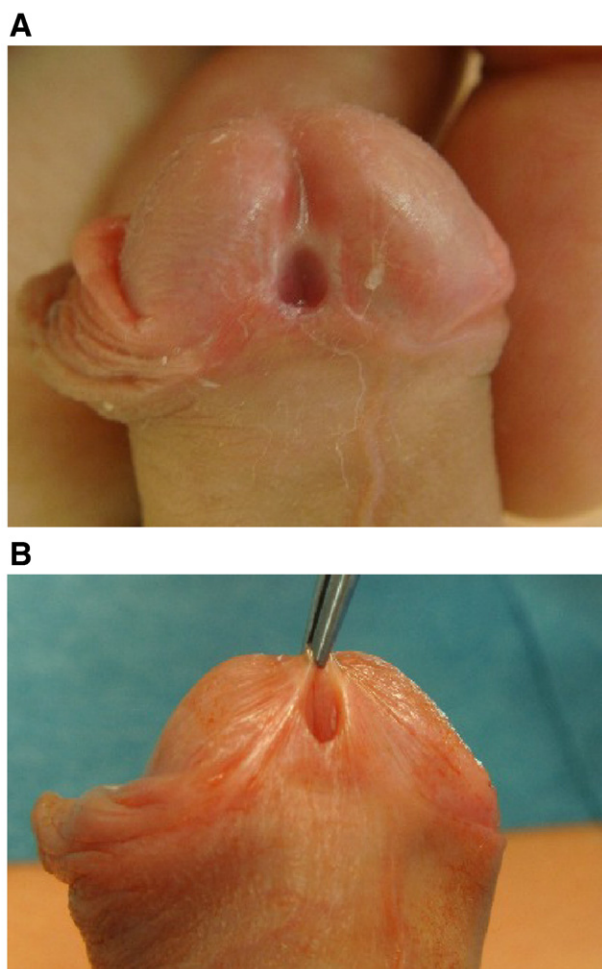


Fig. 2 A child with mobile meatus that is suitable for the DYG technique. A, Distal ridge that is suggestive of a mobile meatus. B, The mobility of the meatus is confirmed under anesthesia using a fine-toothed forceps.

6/0 Vicryl stitch approximates and fixes the meatus at the tip of the glans (Figs. 1D and 4B).

If the meatus is narrow or pinpoint, it is incised to make it wide enough to accommodate a catheter F10 or larger according to the age of the patient and size of the penis. Nelaton catheters are standard simple plastic urinary catheters used worldwide and manufactured by different companies all over the world. In Germany, they are produced by different companies e.g. Ruesh. In USA, by Browne as well as many other companies. A transurethral Nelaton catheter size F10 or larger is inserted into the bladder.

A Y-shaped incision is made proximal to the meatus (Fig. 1E). The longitudinal limb of the Y incision extends from the meatus to the coronal sulcus. Extra care should be taken to avoid injury of the very thin urethra underneath the skin. The use of sharp scissors and traction helps avoid injury of the distal urethra. Traction is applied on the glanular wings, and the incision is deepened using sharp scissors starting proximally at the coronal sulcus. The glanular wings are mobilized off the urethra and are opened like an open book (Fig. 4B). This is a very

important step that helps wrap the glanular wings around the urethra without any tension. The incision is continued around the meatus to meet the lateral limbs of the inverted Y incision.

Buttonhole occurred in the thin distal urethra during mobilization in 3 patients. The hole was repaired with 7/0 Vicryl on a rounded needle, and the repair was covered with thin preputial dartos fascia as a second protective layer.

The upper edges of the 2 glanular wings are fixed to the edges of the urethral meatus using 3 Vicryl 7/0 sutures (Fig. 1F). The medial edges of the glanular wings are sutured together in the midline using Vicryl 7/0 in a transverse mattress manner (Fig. 4C, D). This helps avoid the fine sutures cutting through the glans.

Local gentamycin ointment is applied to the wound; a normal gauze is applied; and adhesive tape fixes the

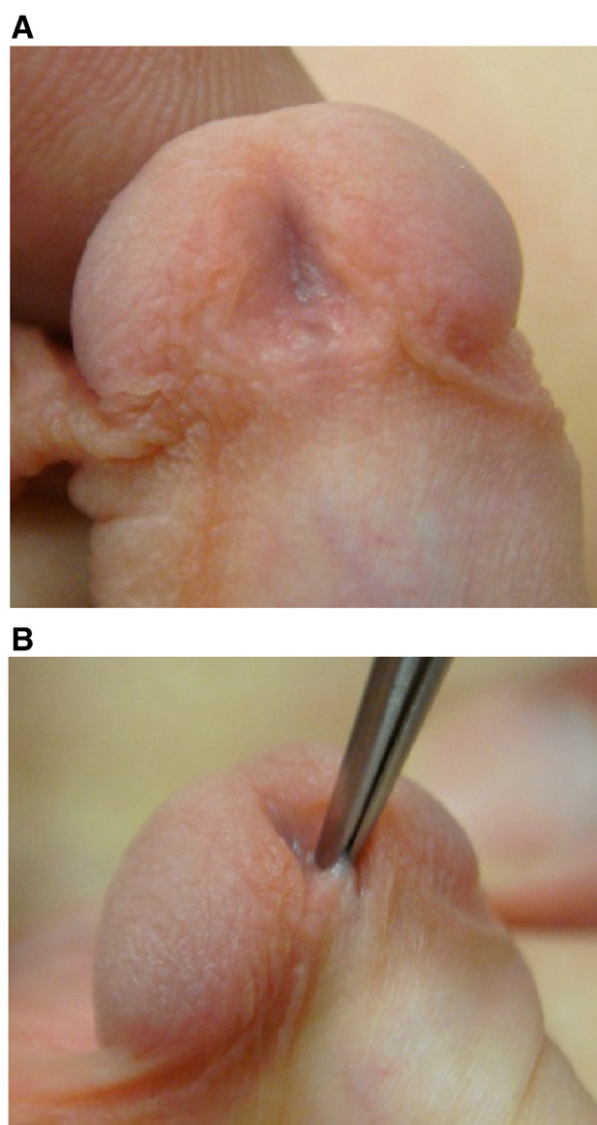


Fig. 3 Patient with glanular hypospadias with an immobile meatus, unsuitable for the DYG technique. A, No clear ridge is seen distal to the meatus. B, A fine-toothed forceps cannot push the meatus to the tip of the glans.

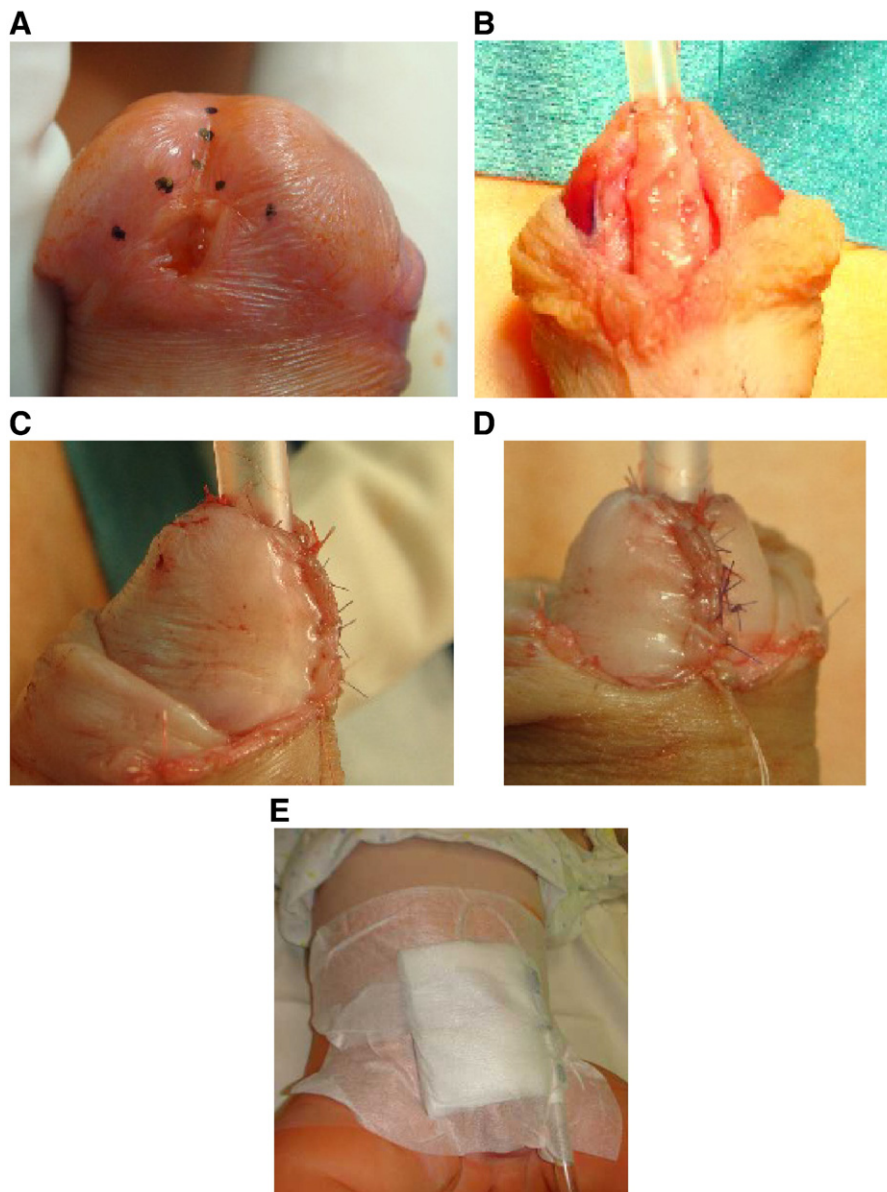


Fig. 4 Operative steps of the DYG technique. A, An inverted Y incision is outlined on the glans. B, The glanular wings are mobilized, and the distal edge is fixed to the tip of the incision. C and D, After closure of the glanular wings around the urethra. E, Application of the dressing, fixing the penis and catheter against the abdominal wall, and allowing free mobility of the child.

gauze, the catheter, and the penis against the lower abdominal wall (Fig. 4E). This allows free mobility of the patient and secures the catheter and penis against the lower abdominal wall.

The transurethral catheter is left for 1 to 2 days depending on the degree of mobilization and the degree of postoperative edema of the penis. Caudal block was used as a routine to reduce postoperative pain.

3. Results

Mean operating time was 45 minutes. The postoperative period was uneventful. Five patients experienced mild

bleeding on the dressing that stopped spontaneously within 24 hours. Postoperative hospital mean stay was 2 to 3 days depending on the age of the patient and the degree of postoperative edema. All cases were recorded photographically before and after the procedure for follow-up and aesthetic evaluation.

Follow-up ranged between 8 months and 6 years (mean, 45 months). At the follow-up visits, a good slit-like meatus in a near-normal-looking glans (Fig. 5A, B) was seen in 94 patients. The results were assessed by an independent outpatient nurse. Complications occurred in 3 patients (3%). Two patients developed postoperative meatal stenosis 3 to 4 weeks after surgery and responded well to simple meatotomy and had satisfactory end result.

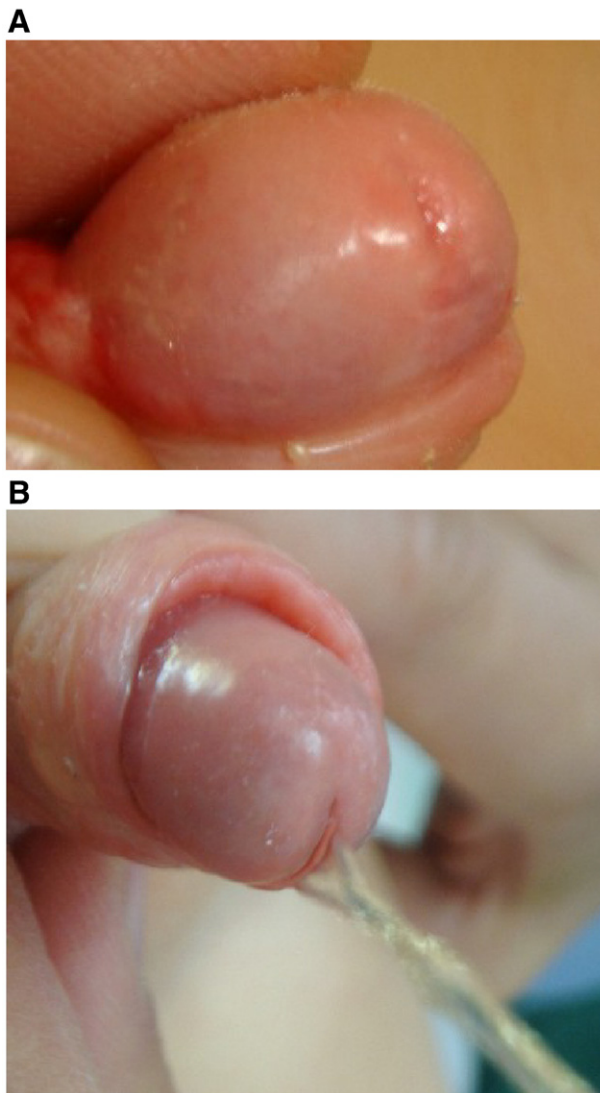


Fig. 5 Patient with glanular hypospadias 1 year after the DYG technique. A, Final appearance of the meatus. B, Passing urine in a stream.

One patient suffered from retraction of the meatus. This patient was corrected 6 months later using an inverted Y Mathieu technique.

4. Discussion

For many years, surgical techniques had an unacceptable morbidity in glanular hypospadias and did not consistently achieve shift of the meatus to the tip of the glans. Because those patients exhibited a minimal functional impairment, surgeons were reluctant to undertake an operation because the complications might leave the patient worse off than if the anomaly were left untreated. During the past 30 years, several techniques became available for the surgical correction of glanular hypospadias.

The MAGPI was introduced by Duckett [4] in 1981. The technique was not always completely satisfactory, which led the author to modify and refine it in 1991 [5] to reduce the risk of meatal retraction. However, meatal advancement with the Heineke-Mikulicz tissue rearrangement, the focal point of MAGPI, can lead to an abnormal meatal and glanular configuration [10] that even in the terminal position may appear round and abnormally puckered [11]. In fact, Hodgson [12] considered MAGPI to be an “illusion” because the glans is incorporated into the meatus and not the contrary.

The glans approximation procedure [8] procedure is ideal for patients with wide, deep glanular groove; but it entails suturing of the urethra with the potential risk of fistula formation.

Redman [13] described a technique for “minimal distal balanitic hypospadias.” This technique entails excision of the small triangle distal to the urethral meatus and suturing the distal meatus to the tip of the glans as a form of Heinz-Mikulicz technique or the first part of MAGPI technique.

Seibold et al [14] described the meatal mobilization technique for coronal and subcoronal hypospadias with mobile meatus. In this technique, a transverse incision is made proximal to the meatus, the penis is degloved, and the glanular wings are mobilized and sutured together proximal to the urethral meatus.

Vallasciani et al [10] described another modification of MAGPI in the form of a midline incision distal to the urethral meatus. This incision is deepened for 4 to 5 mm behind the meatus and is left unsutured. This was followed by rotation of the glanular wings in a manner similar to MAGPI. The midline distal incision is in fact similar to the incision of the tubularized incised plate procedure.

Adorisio et al [15] described a modification of Koff technique where a circumcision incision is made distal to the coronal sulcus and the hypospadias meatus. The penile skin and the urethra are mobilized down to the penoscrotal junction. A “Ψ” incision on the distal portion of the glans associated to a deep incision of the distal urethral plate was performed to place the urethra inside the glans.

Mollaieian et al [16], despite using a similar technique, reported 2 cases of persistent curvature owing to inappropriate case selection, whereas Roodsari et al [17] applied the V glanular flap technique to those patients with anterior hypospadias with good cosmetic results and few complications.

The DYG technique is suitable for ambulant day-case surgery. The DYG technique was used in the first 25 patients without leaving a transurethral catheter during 2003-2004. At the end of the procedure, during anesthesia, the bladder was compressed and urine was emptied from the bladder. A compressive dressing was applied for 4 to 6 hours, and the child was allowed to pass urine through the penis. This was stressful for the child and the parents. It was then found that leaving the catheter in for 1 to 2 days relieved the distress of the child and his parents. The decision to perform the

technique as a day-case surgery or with the pattern outlined will vary in different societies and does vary with the hospital organization and with the distances from the treatment center that the patients have to travel.

There is usually severe swelling and edema of the glans after hypospadias surgery. Most parents and patients are usually worried immediately after surgery and report spraying of urine rather than a single stream. This occurred in more than 50% of patients included in this study in the period after removal of the catheter. The urine stream on micturition became steadily more whorl like; and after 1 month, spraying had ceased in 94 patients.

Two patients experienced meatal stenosis early in the series. This occurred in a period of 2-4 weeks after surgery. The meatus in those two patients cases was in the form of narrow fibrous ring. This was avoided later in the series by cutting the fibrous ring rather than dilating it.

The choice of age of the patients was determined by the time of referral and ranged from 4 months to 5 years. Patients with a narrow urine stream or straining during micturition may benefit from earlier surgery. In the author's experience, infants have quicker recovery from surgery and less complications than children older than 3 years.

The cause of meatal retraction in 1 patient in this study was caused by an error in assessing the patient at the outset of the operation. The mobile meatus emphasized above was not fully appreciated, and he had a relatively immobile meatus. The principal cause of complications is failure to limit application of a technique to the precise set of circumstances for which the method is designed. The author does not prefer to use the DYG technique in coronal or distal hypospadias as suggested by several authors [4,5,10,14-17].

The DYG technique, inspired by all the above-mentioned techniques, is suitable for selected patients with glanular hypospadias and mobile urethral meatus, with a 3% complication rate in the present series. Any attempt to force a fixed urethral meatus distally is liable to complications and regression of the meatus. Adequate mobilization of the glanular wings allows the surgeon to have a wide, slit-like, urethral meatus at the tip of the glans that is unlikely to develop stenosis.

The follow-up in the present series ranged from 8 months to 6 years. It remains to be seen if this technique's success is sustained into adulthood after the pubertal growth period.

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