

Modification of the "Mustardé-Mathieu" and "Horton-Devine" urethroplasty in the management of hypospadias

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Summary—This paper reports on the method of repairing distal or mid-shaft hypospadias in 42 patients using a modification of the Mustardé-Mathieu and Horton-Devine techniques. A terminal meatus was achieved in all cases; there were two fistulae and one meatal stenosis.

Any surgeon dealing with hypospadias should have in his armamentarium more than one technique. Each should be tailored to the existing conditions of each patient. At present the trend in hypospadias repair is towards a one-stage procedure. The selection of the operation depends on the site of the meatus, the degree of chordee and the personal experience of the surgeon. Glandar, coronal, subcoronal and distal shaft hypospadias constitute the main bulk of this anomaly. The MAGPI procedure of Duckett (1981), with its simplicity and minimal complications, has proved its value in the management of the glandar and coronal types. Extending its use to subcoronal hypospadias needs to be taken cautiously for only those very near to the coronal sulcus and without chordee can benefit from it. For the distal shaft, many operations have been described. Duckett's transverse preputial flap (Duckett, 1980), the Mathieu (1932), Mustardé (1965) and the Horton-Devine flip flap (Horton and Devine, 1970) are now the commonly used operations.

Duckett's is not a simple operation and has a potentially high fistula rate. In many centres the Mathieu and Mustardé techniques are used only for coronal and subcoronal hypospadias. In addition, stenosis of the neo-meatus in these operations is not uncommon. The Horton-Devine flip flap procedure cannot work for all distal penile hypospadias; it, too, is limited to cases where the meatus is close to the glans, *i.e.* subcoronal. In this technique the presence of two suture lines in reconstructing the neo-urethra may increase the incidence of fistula formation.

Patients and method

Forty-two boys were operated upon at Ismailia General Hospital in the period from December

1982 to June 1986. Ages ranged between 18 months and 17 years (Table 1). A child was considered suitable for this technique if the distance between the meatus and the scrotum was equal to or preferably more than the distance between the meatus and the tip of the glans. This measurement indicated the length of the tube needed. Children with severe chordee were considered unsuitable as after correction of the chordee the gap to be bridged would be longer than the proximal tube. All the children had a mild to moderate degree of chordee. The locations of the meatus in the operated boys are shown in Table 2.

Surgical procedure (Fig. 1)

A 3/0 black silk traction suture is passed through the glans. A U-shaped incision is made extending

Table 1 Age distribution of 42 boys with penile hypospadias

Age/ Years	No. of Patients
0-2	3
2-4	21
4-6	14
>6	4

Table 2 Distribution of urethral meatus location in 42 boys with penile hypospadias

Site of Meatus	No. of Patients
Subcoronal*	4
Distal penile†	31
Mid penile‡	7

*Subcoronal—not suitable for a MAGPI

†Distal third of penile shaft.

‡Junction of distal and middle thirds of the penile shaft.

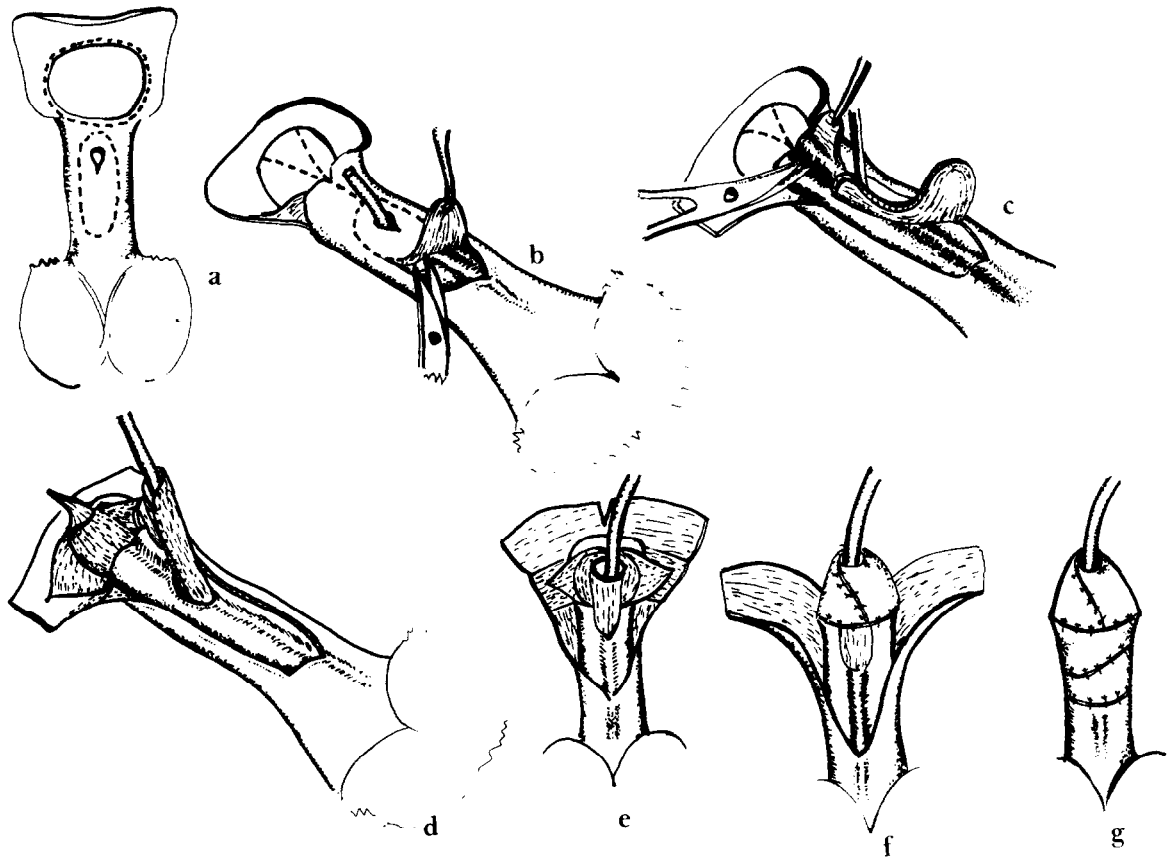


Fig. 1

Figure 1—Steps of the operation.

proximally from the meatus for a distance equal to the distance from the meatus to the tip of the glans. The transverse diameter of the skin flap should be wide enough when turned into a tube to be equal to the normal urethral diameter. The two limbs of the U-shaped incision meet distal to the meatus, making a transverse incision in front of it. When the meatus is close to the coronal sulcus, this incision will be extended laterally around the shaft proximal to the coronal sulcus, as a circumcision incision. If the meatus is more proximal, a midline incision extending between the incision distal to the meatus and the circumcision incision will give a good access for excising the chordee. The flap is elevated by sharp dissection from the corporal bodies and formed into a tube around a No. 10 to 12 infant feeding tube which passes through the urethra; 6/0 vicryl or catgut continuous sutures, with the first knot on the inside, are used to form

the tube. The last 0.5 cm of the tube is left, opened as a fish tail. The lateral penile skin is mobilised proximally starting from the circumcision incision, partially degloving the penis. All chordee distal to the meatus is excised. A V-shaped flap is cut in the middle of the glans and elevated. The lateral margins of the V are undermined more deeply, creating two lateral glandular wings. Dissection beneath the glans is important to divide chordee attached to its undersurface.

Bleeding is usually not a problem. It is important when opening the glans to keep the dissection deep to avoid entering the vascular lateral corporal bodies. The penile tube flap is turned forward with the suture line facing the corporal bodies. The middle triangular flap is sutured to the V-shaped gap at the end of the tube. The mobilised lateral glandular wings are wrapped around the tube. The end of the tube is turned over and sutured to the

wings. This creates a terminal meatus formed ventrally by the tube and dorsally by the middle glandar flap.

The foreskin is laid open and divided longitudinally, forming Byars flaps (Byars, 1955) which are brought ventrally, closing the skin defect. Alternatively, an Ombredanne type hood could be used. For distal penile hypospadias there is no urinary diversion. A feeding tube is fixed in place as an indwelling catheter and a stent for 2–3 days. In the mid-penile cases, suprapubic urinary diversion is carried out and a small silastic tube left as a stent for 48 hours. The suprapubic catheter is removed on the sixth postoperative day.

Results

A terminal meatus was achieved in all the cases. Mild and moderate degrees of chordee were corrected. Children without diversion were sent home on the third postoperative day and those with diversion on the sixth postoperative day, after removal of the suprapubic catheter. Complications were minimal. Fistulae occurred in two boys; one, 15 years old, was a re-do after failed two-stage Denis–Brown repair. In the second, a 5-year-old, the flap was punctured while dissecting it close to the meatus. Superficial necrosis of the turned over end of the tube occurred in two cases. In one of these mild stenosis occurred, responding completely to dilatation. This was the only case of stenosis encountered. All the children were followed up for a period of 6 months.

Discussion

The technique described in this series is based on the principle of the proximal penile tube flap as in the Mathieu–Mustardé operations, combining it with the glandar flaps of Horton–Devine to create a neo-urethra.

This approach has allowed us to overcome the limitations of each operation separately. The selection of the patients suitable for this operation is important. The basic limiting factor is the availability of enough skin proximal to the meatus.

Complications were minimal. In this series only 2 out of the 42 developed a fistula. The presence of one suture line, well protected, lying in contact with the corporal bodies is an important factor for the low fistula rate. The blood supply of the tube is debatable. It probably comes from the tissues around the meatus but it may also be that this tubed flap is behaving as a free graft.

Differing techniques have been described to bring the neo-urethra through the glans. Mustardé advocated tunnelling of the glans. Mathieu described splitting the glans in the midline. The main problem with these techniques was the high rate of meatal stenosis. The glandar flaps technique described by Horton and Devine is simple and the urethral meatus will achieve a terminal position, formed partially from glandar skin and partially by the tube. This is an important factor in the avoidance of stenosis.

Urinary diversion was performed only in patients with mid-penile hypospadias and no complications occurred in the non-diverted group. Suprapubic urinary diversion using a trocar and canula was found to be simple and efficient.

In the presence of a moderate degree of chordee and sufficient penile skin, the operation can be used for mid-penile hypospadias. It is simpler than other procedures using local or preputial flaps.

The procedure described has allowed a simple one-stage procedure to be performed with few complications, avoiding the need for more technically demanding operations.

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