



26.1 Introduction

Dressing in hypospadias surgery is an essential aspect of management, yet it is the most controversial topic. There are several different techniques of hypospadias dressing, like different surgical approaches. Over the years, many kinds of dressing materials were used with no consensus on one over the other. The rationale for post hypospadias repair dressing is to prevent postoperative bleeding and haematoma formation, prevent bacterial contamination, hold the penis in an upright position, improve lymphatic flow, avoid formation oedema, and avoid urine and faecal soiling [1].

26.2 Difficulties Associated with Hypospadias Dressing

The degree of compression required for the repaired penis is difficult to define. The dressing should be tight enough to prevent haematoma formation with minimal pain and loose enough to allow adequate blood supply to augmented tissues [2]. Flexible dressings tend to fall off prematurely. Dressings adherent to wound cause painful episodes of undressing for the child,

which may require anaesthesia [2]. The most concerning difficulty lie in stabilising the graft tissue on a mobile, soft, and boneless organ, subjected to dynamic changes in all dimensions of erection. There is a concern of frequent urine and faecal soiling of the wound and the dressing. Dressing application becomes challenging when the urethral catheter or splint is placed. In an anxious and active child, anchorage of the dressing is not easy and challenging to manage practically [3]. Immobilisation of the child has been tried with fibreglass pantaloons spica cast but has not shown to be beneficial in either preventing complications or ease of home care [4].

26.3 Ideal Hypospadias Dressing

An ideal hypospadias repair dressing should be easy to apply and to remove, non-adherent to wound, non-allergic, cost-effective, it should effectively absorb the wound leakage, produce adequate compression of the penis, should not compromise on the blood supply, and should allow regular child activity without changing its shape. There is no one dressing which satisfies all the idealistic criteria [5].

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26.4 Dressing Types

Hypospadias repair dressings can be divided into three main categories; totally concealing, partially concealing, and non-concealing dressings [6]. The most frequently used type is the partially concealing dressing and its many variations. In partially concealing, the top end towards meatus is left open to inspect the glans better and to have space for urethral catheter or splint.

In general, hypospadias dressings have 2 to 3 layers of penile coverings, with the first layer is usually a gauze around the wound. The gauze is either dry or soaked with a disinfectant agent (e.g. Betadine), antibacterial ointments, wound non-adhesive agents (e.g. Paraffin), haemostatic agents (e.g. Gelatin sponge), agents help in wound healing (e.g. oxygen-enriched oil-based gel). Adhesive strips, adhesive tapes, adhesive membranes or splints are used as second and sometimes as the third layer, to support the first layer, penile shaft, or catheter/splint. Hence, hypospadias dressings can also be broadly classified as conventional dressings, supportive splint dressings, and adhesive band/membrane dressings. The traditional dressings involve a layer of gauze which is fixed with adhesive strips. The traditional dressing has the disadvantage of premature fall and inadequate penile support. Splint dressings give good penile support; it includes silicon foam dressing, polyurethane foam dressing, or cock-up splint dressings. Adhesive band/membrane dressings are easy to apply post repair.

26.5 Dressing Techniques

Various dressing techniques have been described in the literature over the years; it includes:

- *The X-shaped elastic dressing (1980)*. It is a totally concealing dressing. It consists of a flexible tape compression in X-shaped pattern in the perineum. It had a broad-spectrum of application in paediatric and adult urologic surgery. A documented complication was flex-

ible tape burns due to allergy to the adhesive material [7].

- *Adhesive membrane dressing using OpSite (1982)*. It is an adhesive, semi-permeable, translucent, hypo-allergenic membrane (OpSite). It is applied with ease directly over the wound and does not require any additional dressing. Any collected fluid under the membrane is evacuated by needle puncture. The dressing was kept in place for seven days, and undressing was easy [8].
- *Silicon foam elastomer dressing (1982)*. It is a supportive splint dressing for complex hypospadias repair. Silicon foam is a popular dressing material, commercially available as an unpolymerised base and a catalyst. The mixture was poured into a cup mould or X-ray cylinder tube around the stretched penis. The mixture expands four times its original volume and sets into a soft foam in 3 minutes. The dressing is removed on day 4–6 with scissors or manually tearing it [2, 9].

The mixture preparation and adequate distribution around the penis were improvised using a special syringe with two applicators for injection of the mixture [10]. Undressing was made simpler by keeping the silk thread laid along the penis before applying the foam, and this silk thread was used to cut the foam like a cheese wire [9].

- *Transparent double Tegaderm sheet dressing (1989)*. Transparent two Tegaderm sheets applied over a Telfa gauze wrap. Dressing left in place for seven days and was advised to use a hair-dryer on the dressing twice a day to avoid foul odour and skin maceration [11].
- *Sticking the gauze to the penis, catheter, and skin of the lower abdomen with adhesive spray (1990)*. The Mastizoil, OpSite, or Nobecutane adhesive spray technique was defined in 1990 as new ideas and innovations. The gauze is supported on the stretched penis by digital pressure until the adhesive spray is dry. The penile support is provided without any circum-

ferential dressings and thereby reducing the risk of vascular compromise [12].

- *Outpatient hypospadias surgery dressing technique using tincture benzoin, Elastoplast, and Dermolite II tape (1991)*. Tincture benzoin used for Telfa strip adhesion to penile skin, followed by application of two circles of surgical gauze and one and half-circle of Elastoplast. All three layers have maximum compression at the tip of the penis and minimum at the base. The fourth layer of Dermolite II strip encircles the penis shaft and fixes to scrotal and pubic skin after applying tincture benzoin. If urethral tubes are placed, they are also painted with benzoin and fixed with two strips of Dermolite II tapes [13].
- *Pantaloön spica cast (1997)*. The idea is to immobilise the child postoperatively. The cast was used with a combination of transparent biomembrane and silicone foam dressing. This immobilisation strategy was conceptualised for better uptake of preputial graft and early discharge of child on postop-

erative day one, thereby reducing the total hospital cost [4].

- *SANAV dressing using plastic OpSite drape (2001)*. It is a totally concealing dressing. It was designed to limit the need for specialist nursing care and has “Saved A Nurse A Visit”. Two betadine gauze (Inadine) made Y cut, one applied behind and other anterior to the penis. A gauze pad placed over this. A sizeable 15 × 28 cm OpSite cut into Y. The two cut end lateral limbs are placed behind each thigh. The dressing was left behind for 7–10 days (Fig. 26.1). Undressing was much more comfortable than those that surround the penis [14].
- *Glove finger dressing (2002)*. It is used for mid and distal penile hypospadias repair. Concept of glove finger for compression derived from condom dressings in adults, which is large for the paediatric group. A betadine gauze and a dry gauze wrapped around the shaft of the penis over which a cut finger of the glove is rolled over the penis from the tip

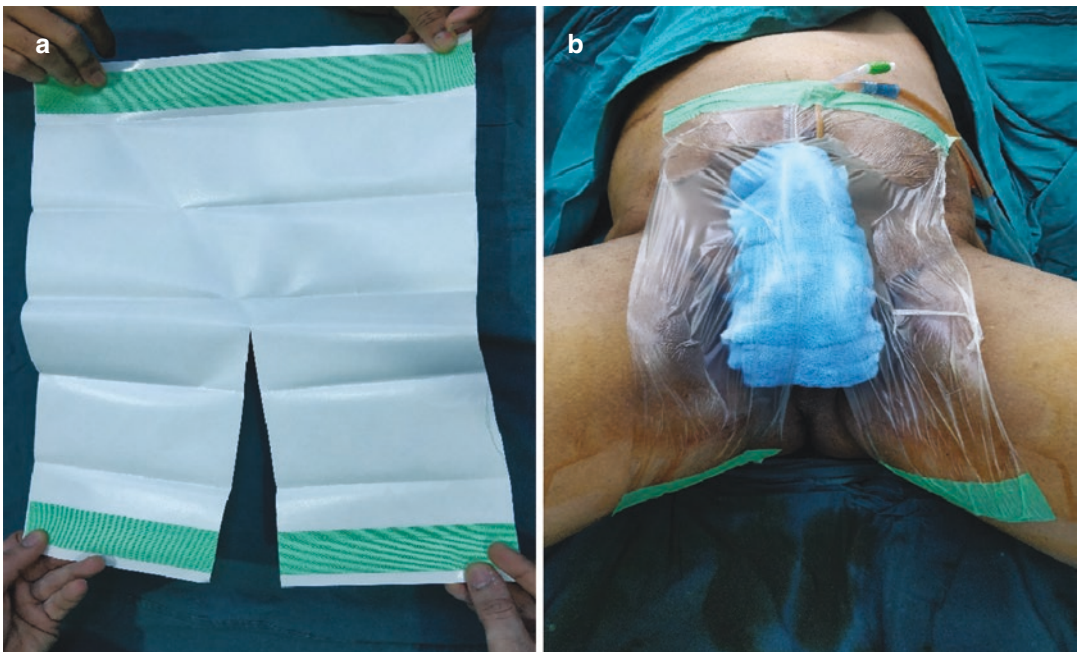


Fig. 26.1 Totally concealing plastic OpSite drape dressing. (a) 15 × 30 cm size OpSite made Y cut, (b) the two lateral limbs of OpSite adhere to the back of each thigh

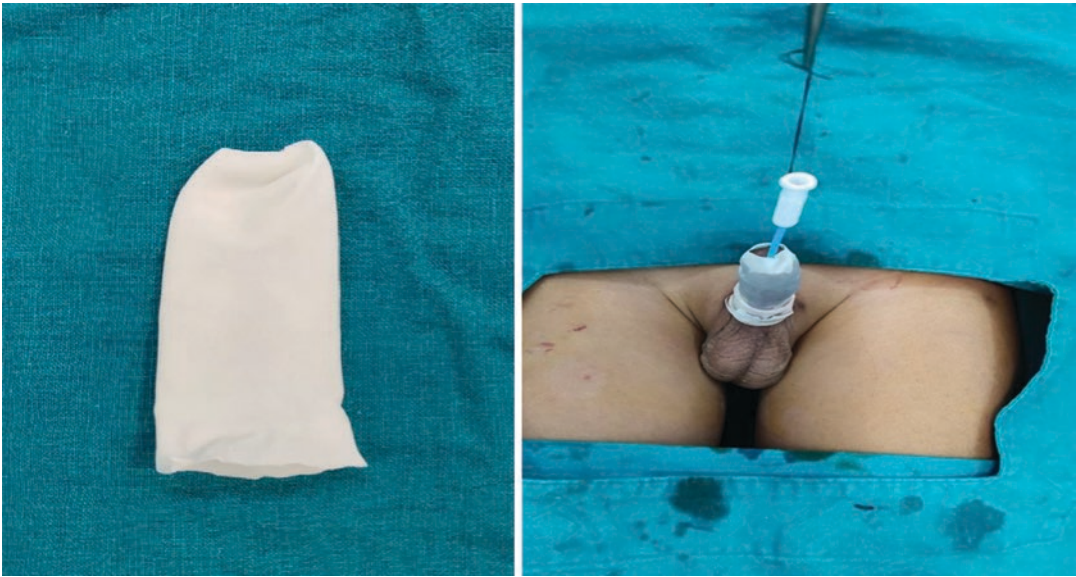


Fig. 26.2 Glove finger with rent for catheter, rolled over the penis from tip to base direction

to the base, with rent at the tip of the glove (Fig. 26.2). It has the advantage of being universally available, cost-effective, provide uniform compression, easy to inspect for wound soakage, easy to apply, and easy to remove with comparative less pain [15].

- *Elastic and Velcro dressing (2004)*. It is custom-made, cost-effective dressing material consisting of elastic strip and stitched Velcro with hook and loop fasteners. Width of the strip corresponds to the distance between the penoscrotal angle, and the corona of the stretched penis and length is one and a half to two times the penile girth. The technique includes application of antibiotic ointment over which multilayer gauze and Velcro are wrapped. The drainage tube is sandwiched between the hook and loop of Velcro. Dressing changed on 5th, 10th, and 15th postoperative day with a new set or wash-dry reused [16].
- *Non-adherent Trilaminare (Allevyn) dressing (2009)*. Dressing material is a triple-layered foam dressing consisting of inner non-adherent, middle absorbent, and outer water and microbial proof layers. The technique

involves splitting the lower end onto two lateral flaps which are fixed to scrotal and pubic skin with adhesive tape and the upper end wrapped around the penile shaft with closure on the dorsal aspect with sutures. Dressing removed at 2 to 5 postoperative day [17, 18].

- *Cyanoacrylate glue dressing (2012)*. Cyanoacrylate glue is an acrylic resin, which polymerises when in contact with water forming long, strong chains. Adequate compression is achieved by applying several layers of glue on a stretched penis wound (Fig. 26.3). It is impermeable to urine and faeces. The patient is discharged in 24 h, dressing peels off by 7–10 days [19].
- *Wet dressing using multi-perforated sugarcane biopolymer membrane (2013)*. The sugarcane biopolymer membrane produced by bacterial action over sugarcane molasses. It is an inert material. Even when left in-situ for long-duration, it maintains its characteristics without the need for replacement. The dressing does not loosen due to its natural adhesive nature [20].
- *Haemostatic Gelatin sponge dressing (2014)*. Gelatin is a readily available haemostatic



Fig. 26.3 Cyanoacrylate glue poured directly over the wound in multiple layers

agent for minor ooze used in internal cavity. The gelatin sponge is placed over gauze and wrapped around the penis for compression. It has the advantage of the ease of availability and no wound adhesion [21].

- *Tubular elastic silicon mesh netting bandage (2015)*. It is an “elastic silicon mesh netting” which is placed onto the penile shaft with the help of a patented metal device. It has the advantage of gentle compression due to its elasticity and at the same time patient can void with the bandage in place. Wound inspection is possible through a bandage network. Undressing done on the fifth postoperative day [22].
- *Mepilex Border foam dressing (2017)*. Mepilex Border is a self-adherent, soft, silicone foam dressing applied as a single layer with ease [23].
- *Cock-up splint dressing (2019)*. It was designed for proximal penoscrotal hypospadias repair. It is a layered foam splint consisting of an aluminium shield which is hand moulded to the size of penile girth to keep the graft in position. The splint is fixed with an adhesive tape. It is fast, adjustable, easy to apply, prevent secondary contracture, and cheap, as reused during subsequent changes in the same patient [24].
- *Oxygen-enriched oil-based gel dressing (2020)*. It is based on the concept of the ozone effect on wound healing. It is described for distal hypospadias repair. A wet gauze, impregnated with oxygen-enriched oil-based

gel is wrapped around the penis and gauze is covered by an elastic net bandage. Faster wound healing was observed (Fig. 26.4) [5].

The author uses partially concealing dressing technique using Coban self-adherent bandage for mid and distal penile hypospadias (Fig. 26.5). For proximal penoscrotal hypospadias or hypospadias repairs with extensive tissue dissection, use Dynaplast elastic adhesive bandage technique similar to Redman et al. (Fig. 26.6).

26.6 Undressing

The wound healing process starts within hours after wound closure and deeper structures are completely sealed from the external environment by 48 hours. The dressing can be removed on postoperative day three or four, and some dressing technique removal is extended even up to postoperative day fifteen. A survey suggested that most surgeons keep the dressing for more than three days [6]. Dressing removal timing mainly depends on tissue dissection, hypospadias repair technique, and type of dressing. Some centres use anaesthesia for undressing or change of dressing. Conventional dressing auto falls off prematurely, while dressings like silicon foam and single-layer adhesive spray are easily removed in the ward setting without discomfort to the child. The dressing should be removed



Fig. 26.4 Oxygen-enriched oil-based gel dressing (with permission Esposito et al. 2020 [5] @ copyright Springer Nature)

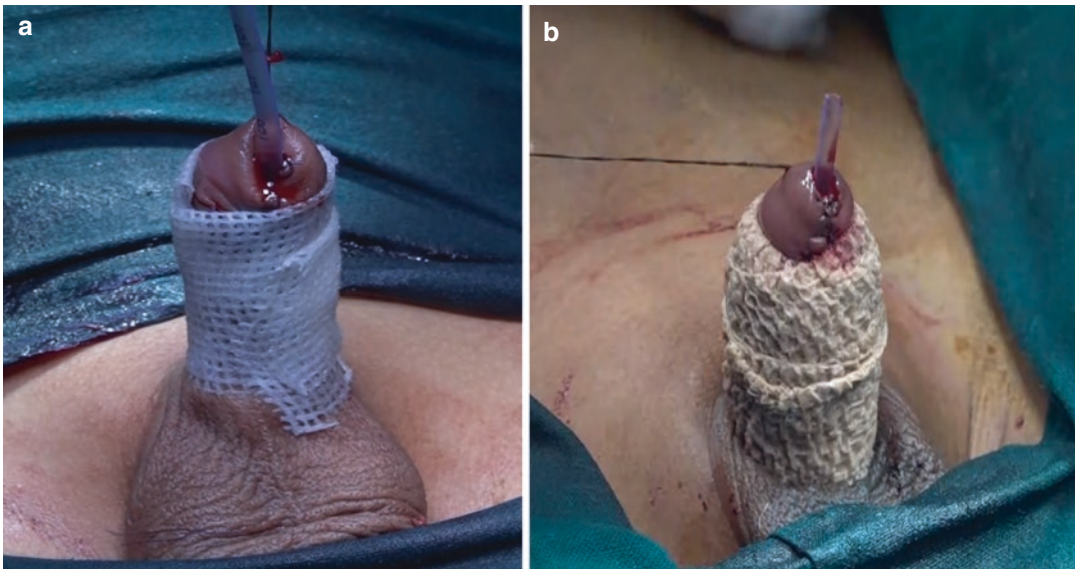


Fig. 26.5 Partially concealed dressing technique using Coban self-adherent bandage at our institute; (a) showing Bactigras (chlorhexidine with paraffin gauze) as a first

layer covering, (b) Penis fixed by Coban self-adherent bandage from the base to corona keeping glans and meatus open with splint in-situ

early if soiled by urine or faecal matter, due to bacterial contamination risk.

26.7 Dressing v/s No Dressing

The role of dressing following hypospadias surgery is still controversial. Dressing in hypospadias repair is used to limit the degree of oedema,

as there is concern that postoperative oedema could cut through the repair and stitches. However, compression from a dressing may also hamper the blood flow to the penis.

In a questionnaire survey study on the opinion of surgeons managing hypospadias repair by Cromie et al. in 1981, strongly suggested the need for dressing, mainly for penile immobilisation and reduction of oedema [6]. Van Savage

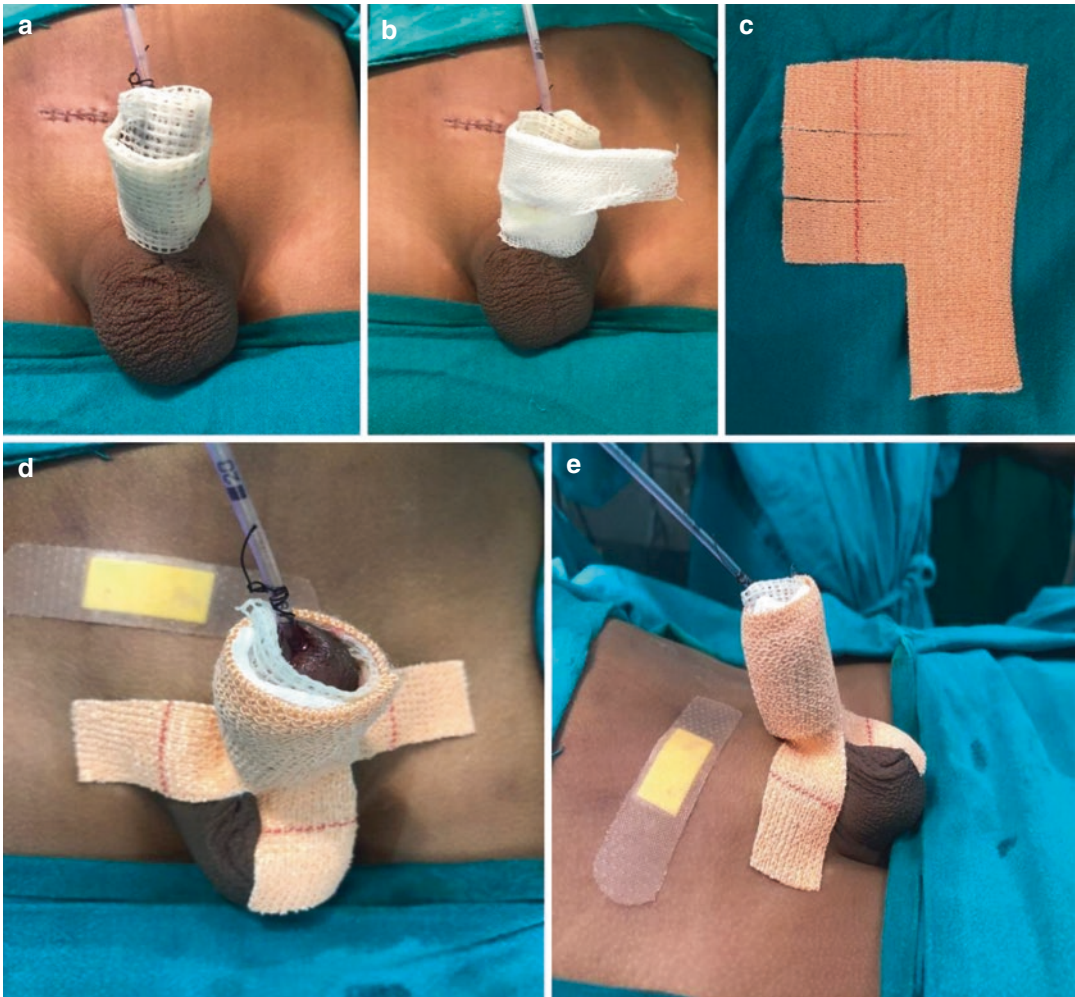


Fig. 26.6 Partially concealed dressing technique using Dynaplast elastic adhesive bandage at our institute; (a) showing Bactigras (chlorhexidine with paraffin gauze) as a first layer covering, (b) dry gauze second layer covered

over the first layer, (c) Dynaplast elastic adhesive bandage is cut into “reverse-F” fashion with three arms, and (d & e) Penis fixed in erect position from the base at three points with the three sleeves of Dynaplast

et al. (2000) concluded that dressings might not be indicated for all types of hypospadias repair in a randomised controlled trial. McLorie et al. (2001) in a prospective study, concluded that absent dressing simplified postoperative parents delivered home care and recommended omission of routine dressing. Hadidi et al. (2003) in a randomised trial, said that results of hypospadias repair without dressing are statistically better [6]. These studies supported Herman’s (1965) theory that very few bacteria retain their vitality on an exposed dry wound [6].

26.8 Conclusions

There are several different techniques with different dressing materials due to the unique challenges posed by hypospadias repair wounds. There is no consensus on the superiority of one technique over the other. The rationale behind the hypospadias dressing is for haematoma and oedema prevention, but this has been challenged in a few randomised studies. However, these results need further high volume studies, as most centres practise dressing after hypospadias surgery.

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