

# Fistula Repair After Hypospadias Surgery Using Buccal Mucosal Graft

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**Introduction:** The aim of this study was to evaluate the success rate of urethrocutaneous fistula repair using buccal mucosal graft in patients with a previous hypospadias repair.

**Materials and Methods:** We reviewed records of our patients with urethrocutaneous fistula developed after hypospadias repair in whom buccal mucosal graft fistula repair had been performed. All of the patients had been followed up for 24 postoperative months. A successful surgical operation was defined as no fistula recurrence or urethral stricture. Retrograde urethrography and urethrocystoscopy would be performed in patients who had any history of decreased force and caliber of urine or any difficulty in urination.

**Results:** Fistula repair using buccal mucosa patch graft had been done in 14 children with urethrocutaneous fistula developing after hypospadias reconstruction. The mean age of the children was  $8.70 \pm 1.99$  years old (range, 4 to 11 years). Seven fistulas were in the midshaft, 4 were in the penoscrotal region, and 3 were in the coronal region. Repair of the fistulas was successful in 11 of 14 patients (78.6%). In the remaining children, the diameter of the fistula was smaller than that before the operation, offering a good opportunity for subsequent closure.

**Conclusion:** Our findings showed that fistula repair using buccal mucosal graft can be one of the acceptable techniques for repairing fistulas developed after hypospadias repair.

*Keywords: hypospadias, postoperative complications, cutaneous fistula, surgical flaps, reoperation*

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## INTRODUCTION

Urethrocutaneous fistula is the most common problem in hypospadias repair. The Reported incidence varies from 5% to as much as 55%, depending on the severity of the initial deformity.<sup>(1-3)</sup> Many techniques have been described for correction of urethrocutaneous fistula. Where enough intact penile skin is available, simple closure of a fistula is used. Skin flaps are used for repairing fistulas that are too large for simple closure, provided

that the local skin is pliable and adequate.<sup>(4)</sup>

A paucity of local tissue and subsequent skin coverage is the challenge in many cases. In such cases, extragenital tissue, split-thickness and full-thickness skin grafts, and bladder mucosa have been proposed as the alternative donor sites.<sup>(4-9)</sup> Buccal mucosa has been used with good results in complex urethral reconstruction and bulbar urethral stricture for more than 15 years<sup>(4,10,11)</sup>; however,

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few reports suggest that this tissue may be used for fistula closure. We reviewed our clinical experience in urethrocutaneous fistula repair using a buccal mucosal graft in patients with a history of previous hypospadias repair.

## MATERIALS AND METHODS

### Patients

We performed a retrospective study on patients with urethrocutaneous fistula developing after hypospadias repair who were treated at the reconstructive urology section in Shohada-e-Tajrish Hospital in Tehran, Iran. Hospital and follow-up records of patients with buccal mucosal graft fistula repair between 2000 and 2005 were reviewed. Urethrocystoscopy had been done in all patients before the operation. Our exclusion criteria for this study were urethral diverticulum and urethral stricture or multiple urethral fistulas needing total breakdown of fistula repair or any kind of surgical intervention to address the strictures. We included patients with meatal stenosis if it could be dilated with nonsurgical methods.

### Surgical Technique

A circumferential incision was made around the fistula, and the urethral wall was dissected from the surrounding tissue. In patients with more than 1 fistula that were not too large or too far apart needing total previous repair breakdown, we incised the tissue between the fistulas and turn them into 1 fistula defect. A suitable size of buccal mucosa patch was harvested from the inner part of the cheek. After tailoring the graft to the defect size and removing its fat, the mucosal graft was sutured over the defect to the urethral epithelium using 5-0 vicryl separate sutures. The graft was then covered by a dartos flap which was prepared from the adjacent area. The skin was closed with 4-0 vicryl interrupted sutures. An indwelling silicone urethral catheter was inserted for 10 to 14 days. All of the patients were discharged 3 to 5 days postoperatively.

### Follow-up

All of the patients had been followed up for

24 months with monthly clinical visits for 3 months, and then, clinical visits every 3 months until 24 months after the operation. Retrograde urethrography and urethrocystoscopy had been performed in patients who had any history of decreased force and caliber of urine or any difficulty in urination to rule out any urethral structure. We considered the operation successful if we would not notice any fistula recurrence or urethral stricture during the 24-month follow-up period.

## RESULTS

We had 14 patients with urethrocutaneous fistula developed after hypospadias repair who had undergone buccal mucosa patch graft. The mean age of patients was  $8.70 \pm 1.99$  years old (range, 4 to 11 years). Their characteristics are listed in the Table. Seven fistulas were in the midshaft, 4 in the penoscrotal region, and 3 in the coronal region. Seven patients had fistulas larger than 4 mm and 6 had more than 1 fistula. None of the patients needed total previous repair breakdown.

There were 6 patients who had 2 previous fistula repairs using local tissue. Repair of the fistulas using buccal mucosa graft was successful in 11 of 14 patients (78.6%). In successful cases, the urinary stream was good after removal of the catheter. Three patients (21.4%) returned with recurrent fistula, 1 of which was in the coronal, the second in the midshaft, and the third in the penoscrotal regions. In these patients, the

Characteristics of Patients With Fistulas After Hypospadias Repair

Patient	Age, y	Number of Fistulas	Location of Fistulas
1	4.0	1	Midshaft
2	10.3	2	Midshaft
3	9.1	2	Coronal
4	9.0	1	Midshaft
5	6.0	3	Penoscrotal
6	11.0	1	Midshaft
7	7.1	1	Coronal
8	11.0	2	Penoscrotal
9	8.3	1	Midshaft
10	7.0	2	Coronal
11	9.0	1	Midshaft
12	11.0	2	Midshaft
13	10.0	1	Penoscrotal
14	9.0	1	Coronal

diameter of the fistula was significantly smaller than that before the operation, offering a good opportunity for subsequent closure. Two of the patients with failed fistula repair had a history of a failed previous fistula repair.

## DISCUSSION

Urinary fistula is a common complication of hypospadias repair. There are some different surgical options for repairing such fistulas. The size and location of the fistula and status of the surrounding skin usually determine the optimum technique.<sup>(4)</sup> It is believed whenever good penile skin is available, it should be used as the first choice.<sup>(12)</sup> However, each repair attempt may further deplete local resources for any repair that would be required later. In these cases, an extragenital tissue source is required.<sup>(4)</sup> When good penile skin is available, simple closure of a fistula is done. The problem of this technique, however, is that the overlying suture lines form a potential risk of recurrence.<sup>(4,7)</sup> The published data show that the success rate of the first simple closure of fistula after hypospadias repair is 71% to 92%.<sup>(4,7)</sup>

Skin flaps are used for repairing fistulas that are too large for simple closure, provided that the local skin is pliable and adequate.<sup>(4,8,9)</sup> Richter and colleagues<sup>(1)</sup> reported their experience in the management of recurrent urethrocutaneous fistulas of 28 patients, in order to understand the outcome of secondary repair of a failed fistula closure after hypospadias surgery. They had 12 coronal fistulas which were converted into coronal hypospadias. Thereafter, the urethral plate was tubularized using a wider strip (Thiersch tube) with ( $n = 3$ ) or without ( $n = 9$ ) a relaxing midline incision (Reddy-Snodgrass). Of the 12 repairs, 11 were successful. In 7 children, the cause of the fistula was a urethral diverticulum, which was successfully excised and closed in multiple layers (well voiding and no stricture or fistula). In 4 children (1 with multiple fistulas), the repair of the fistulas included island onlay flap or a buccal mucosal graft ( $n = 2$ ). All of the 4 patients achieved a successful outcome.<sup>(1)</sup>

If local tissue cannot be used for hypospadias fistula repair because of extensive scar formation or a compromised vascular supply, buccal

mucosal grafts can provide a reliable option.<sup>(1)</sup> Many authors have recommended buccal mucosal graft in secondary and complex hypospadias repair.<sup>(13-15)</sup> There are some reports about successful use of buccal mucosa in urethral fistula repair. In 1994, Nahas and Nahas reported successful use of buccal mucosal graft fistula repair in 1 patient.<sup>(12)</sup> Kiss and colleagues used the same technique in 7 patients with an 85% success rate.<sup>(4)</sup> In 2006, Barbagli and colleagues used buccal mucosa graft technique for repairing fistula after hypospadias reconstruction in 18 patients and yielded an 82% overall success rate.<sup>(16)</sup> Our overall success rate of 78.6%, which is compatible with the results of the above studies, suggests that buccal mucosal graft is an appropriate alternative material for repairing fistulas developing after hypospadias repair.

The main risk factor of fistula recurrence in our patients was a previous fistula repair and the resultant scar tissue of previous surgeries. Other studies have shown that risk factors of operative failures are wound infection, urine extravasation, hematoma, ischemia, necrosis of the flap and graft, and errors in design, technique, and postoperative care.<sup>(16)</sup> This technique is especially advantageous in patients with multiple previous urethral surgeries and scarred local tissues that precludes the use of local skin for such repairs. The disadvantage of this technique is that it is a more demanding surgery than a simple closure technique and it is still prone to necrosis and other local complications. In fact, complications following childhood hypospadias repair are still difficult to treat, and a high failure rate is seen in repeat surgical operations.<sup>(16)</sup> Penile urethroplasty, whether an onstage or a multistage repair, is intrinsically prone to complications such as hematoma or infection, which in turn can lead to secondary complications such as fistula, which do not occur in the bulbar or posterior urethra.<sup>(17)</sup> The ideal surgical method for complex penile repairs has not been established, and surgeons must have different reconstructive techniques in their armamentarium to choose the best approach to the individual patient.<sup>(18)</sup>

## CONCLUSION

The best surgical method for treatment of

urethrocutaneous fistula after hypospadias reconstruction repair is still unknown, and different reconstructive techniques should be considered to choose the best approach based on the individual characteristics of the patient. Our experience showed that buccal mucosa graft hypospadias repair is one of the acceptable techniques that can be taken into consideration for repairing the fistula of a previous hypospadias repair.

### CONFLICT OF INTEREST

None declared.

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