

## DORSAL ONLAY ORAL MUCOSAL URETHROPLASTY FOR ANTERIOR URETHRAL STRICTURE: A STUDY ON LONG-TERM RESULTS FROM BANSADHARA HOSPITAL, BHERAMPUR

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### Abstract

**Background:** Dorsal onlay oral mucosal graft urethroplasty, utilising a modified Barbagli technique, is used to treat urethral stricture all over the world.

**Aim and Objectives:** In patients with anterior urethral stricture, the purpose of this study was to look at the long-term complications, urethral function, and sexual function after dorsal onlay oral mucosal urethroplasty.

**Material and Methods:** Over the course of four years, a prospective, single-center study was conducted. The study comprised male patients over the age of ten who had an anterior urethral stricture of less than two centimetres and had an oral mucosal graft dorsal onlay urethroplasty. During the follow-up period, the patient's demographics, the origin of the stricture, the length and location of the stricture, early problems, and postoperative flow rates, as well as urethral and sexual function, were assessed.

**Results:** A total of 372 patients were involved in this investigation. The patients were 45 (14-75) years old on average, with 238 (64%) having non-lichen sclerosus aetiology and 134 (36%) having lichen sclerosus. The average length of the stricture assessed during surgery was 6 cm (2 to 15 cm). Pan-anterior strictures were the most common (39.25 percent), followed by bulbar strictures (32.80 percent). Early problems after surgery were seen in 62 (16.67%) of patients, with parotitis (n=20) and local wound infection (n=12) being the most common. Erectile dysfunction (n=38) and post-void dribbling (n=52) were two delayed consequences that were investigated in 170 participants. A total of 32 patients (18.82%) did not respond to treatment.

**Conclusion:** Dorsal onlay oral mucosal urethroplasty with long-term advantages is an effective and satisfying procedure for treating anterior urethral strictures.

**Keywords:** Buccal mucosal graft urethroplasty, dorsal onlay, mouth mucosa, urethral stricture, urethroplasty.

### Introduction

The first case of urethral stricture was documented by Shusruta of India (1000 BC), the pioneer surgeon. Urethral stricture can affect one's quality of life and sexual health, resulting in UTIs, calculi, fistulas, and renal failure<sup>1</sup>. Urethroplasty has become the most cost-effective treatment option in recent decades, and it is still the gold standard for longer and more difficult urethral strictures. Long-term studies, however, have shown that between 2% to 30% of patients do not respond. Buccal mucosa is used to heal urethral strictures and has a high success rate<sup>2</sup>. Success rates range from 65.8% to 100%, depending on the definition of failure, the length of follow-up, and the technique utilised to augment the urethra, with an average of more than 80%. Dorsal onlay oral mucosal graft urethroplasty, utilising a modified Barbagli technique, is used to treat urethral stricture all over the world<sup>3</sup>. It has become a well-known method for treating strictures of varied etiologies and lengths. However, urethral division and suture placement, particularly in the proximal bulbar area of very narrow calibre strictures, is a problem<sup>4</sup>. Pre-operative urethral dilatation of all types of strictures 2 days

before urethroplasty provides a large channel to simplify urethral division, suture placement, and improves results, according to the researchers. Surgical success rates are usually the focus of surgical outcomes<sup>5</sup>.

**Aim and Objectives:** In patients with anterior urethral stricture, the purpose of this study was to look at the long-term complications, urethral function, and sexual function after dorsal onlay oral mucosal urethroplasty.

### Material and Methods

**Study design and population:** This was a four-year prospective single-center study undertaken in a tertiary healthcare facility in Central India. This study looked at the long-term results of oral mucosal graft dorsal onlay urethroplasty in male patients over the age of ten who had an anterior urethral stricture of less than two centimetres. Patients were then followed up on. The study excluded patients with oral mucosal disease or who had previously undergone urethroplasty. The Institutional Ethics Committee evaluated and approved the study protocol, patient information sheet, and permission form. The research was carried out in compliance with the ethical principles outlined in the Declaration of Helsinki. The

following information was obtained from each study participant: the origin of the stricture, the length and location of the stricture (as established by a retrograde urethrogram [RUG]), intra-operative findings, early problems, and postoperative flow rates. During the follow-up phase, urethral and sexual function was assessed.

#### Surgical technique

Patients who satisfied the eligibility criteria were admitted 3 days prior to surgery for dilatation (in most cases), and only a handful returned for urethroplasty after 3 days of dilatation. Before serial urethral dilation up to 8 French with Teflon dilators, one preoperative prophylactic dose of culture specific antibiotic was given, and the urethra was viewed with a 6 French scope if possible. It was decided to use an 8Fr Foley catheter or a feeding tube. Under the supervision of an experienced consultant, all of the patients were operated on by the same team of surgeons. The bulbar urethra was exposed and mobilised on the left side of the patient (modified Barbagli technique) and from its dorsal attachments through a longitudinal perineal incision. On the strictured area, a dorsal urethrotomy was performed, with no separation of the urethra but extending 0.5-1 cm proximally and distally beyond obvious mucosal alteration and spongiofibrosis. Penis was brought into the perineal wound in patients with penile/pan-anterior strictures. Inspection and palpation were used to determine the length and narrowest region of the stricture, as well as the degree of spongiofibrosis. A buccal mucosa transplant was taken from the inner cheek, and if necessary, lower lip or lingual mucosa was employed. Initially, the oral mucosa was

sutured shut, but later on, following hemostasis, the wound was left open. Before being integrated into the urethra as a dorsal graft, the graft was prepared and sutured against the underlying corpora for stability. A 14 Fr Silastic urethral catheter was retained in place for 3 weeks after the wound was closed. After the first day of surgery, ambulation was encouraged, and patients were usually discharged on the fourth day. Urethrocystoscopy was performed at the first month, uroflowmetry (UFR) at the third month, urethrocystoscopy at the sixth month, and RGU at the 12th month, with UFR at 6-month intervals following. Normal voiding with good flow rates ( $Q_{max} > 12$  ml/s) or effective calibration with a 14 Fr Nelton catheter were considered successful outcomes (a maximum one attempt of post-operative dilatation). FileMaker Pro 12 was used to enter all of the information.

#### Results

A total of 372 patients who had oral mucosal graft dorsal onlay urethroplasty were included in the study. The average (range) age of the males was 45 (14-75), with 70 men having previously undergone urethral dilatation and 44 having undergone optical urethrotomy (Table 1). The average length of the stricture assessed during surgery was 6 cm (2 to 15 cm). The majority of the cases had moderate or severe spongiofibrosis. Pan-anterior strictures were the most common (39.25 percent), followed by bulbar strictures (32.80 percent). A total of 238 individuals (64%) had a non-lichen sclerosis aetiology, while 134 patients (36%) had lichen sclerosis.

**Table 1: showing demographic factors and baseline characteristics**

Parameter	N=372
Age (years), mean (range)	45 (14-75)
Stricture length (cm), mean (range)	6 (2-15)
Aetiology	
Lichen sclerosis	134 (36 %)
Non-lichen sclerosis	238 (64 %))
Stricture Site	
Penile	38 (10.22 %))
Bulbar	122 (32.80 %))
Penobulbar	66 (17.74 %))
Pan-anterior	146 (39.25 %))
Previous urethral dilatation	26 (6.98 %))
Previous optical urethrotomy	44 (11.83 %))

Only buccal mucosal grafts were used in 314 (84.41%) of the patients; however, buccal and labial grafts were used in 48 (12.90%) of the patients, and buccal and lingual grafts were used in 10 (2.69%) of the patients (Table 1). All patients were followed up on according to protocol, with a mean (range) follow-up time of 42.6 (18-70) months. In 62 (16.67%) of the patients, there were early problems after surgery. Twelve patients had local wound infection, with two requiring abscess drainage; additional complications included UTI (n=10), penile edoema (n=8), scrotal

ecchymosis (n=4), urethrocutaneous fistula (n=2), and post-operative clot retention (n=2). Twenty patients experienced parotitis, and four had long-term lower-limb myalgia. There were no major problems at the location where the BMG was gathered. On post-operative day 4, all patients' donor sites had healed completely. Almost all of the patients were able to accept liquids on post-operative day one, and the majority were able to tolerate solid foods on post-operative day three. In both groups, pain was the most common symptom in the post-operative period, peaking on the first

post-operative day. In the first week after surgery, the restriction of mouth opening was the most irritating. The majority of individuals had it, and it went away totally

within three weeks. There was no damage to the parotid duct, and no patients experienced paresthesia in the cheek.

**Table 2: showing post-operative early complications**

Parameter	N=372
Early complications	62 (16.67 %))
Perineal wound Infections	12 (3.23 %))
UTI requiring catheterisation	10 (2.69 %))
Penile edema	8 (2.15 %))
Scrotal haematoma	4 (1.08 %))
Urethrocuteaneous fistula	2 (0.54 %))
Post-operative clot retention	2 (0.54 %))
Parotitis	20 (5.38 %))
Prolonged lower limb myalgia	4 (1.08 %))

For 170 individuals, delayed complications were assessed. Erectile dysfunction was noted in 38 (22.35 percent) of the participants (Table 3), and nearly half of them (n=18) improved their erectile function during a 6-month period. A total of 52 patients (30.59%) experienced dribbling after voiding. 18.82 percent (n=32) of the patients were classified as failures based on predetermined criteria. Failures occurred in 16/68 (23.53 percent) of lichen sclerosus cases and 16/102 (15.69 percent) of non-lichen sclerosus cases (Table 3). When the success rate was calculated based on the length of follow-up, it was found to be 76.5 percent, 83.2 percent, and 85.8%, respectively, with minimal follow-up of 5 years, 3 years, and 2 years.

**Table 3: showing delayed complications**

Parameter	N=170
Success rate	138 (81.18 %))
Based on stricture site	
Penile (n=18)	14 (77.78 %))
Bulbar (n=52)	38 (73.08 %))
Penobulbar (n=34)	30 (88.24 %))
Pan-anterior (n=66)	46 (84.85 %))
Based on aetiology	
Lichen sclerosus (n=68)	52 (76.47 %))
Non-lichen sclerosus (n=102)	86 (84.31 %))
Erectile dysfunction	38 (22.35 %))
Post void dribbling	52 (30.59 %))

## Discussion

We prospectively studied 372 patients over the course of four years in order to look at both short- and long-term outcomes of dorsal onlay oral mucosal graft urethroplasty<sup>6</sup>. To affect flow rate, the change in urethral diameter should be smaller than 10 Fr. Due to the difficulty of urethrotomy and suture placement during urethral augmentation due to a narrow urethral plate, pre-operative urethral dilatation (2 days before urethroplasty) was used in the current study, which provided an adequate lumen to facilitate urethral division and suture placement, improving overall outcomes<sup>7</sup>. Patients who have had urethroplasty before may have had their results altered, maybe due to significant spongiobrosis. Kessler discovered that patients who had previously undergone two urethrotomies had a greater likelihood of failure. In this study, there were no significant differences between the untreated group before urethroplasty and the pretreatment group (62/302) (8/70) with a good outcome. These distinctions persist over time<sup>8</sup>.

McLaughlin consistently reported a 94 percent success rate, with no difference in outcomes between patients who had prior dilatation or endoscopic urethrotomy before urethroplasty. Because it is easy to harvest, has enough surface area, and is similar to the stratified squamous epithelium of the penile and glandular urethra, oral mucosa is regarded one of the finest choices<sup>9</sup>. Blood vessels and nerve fibres from the submucosa infiltrate into the lamina propria after urethroplasty, causing angiogenesis and revascularization. Another benefit of employing oral mucosa is that it includes a specific immune system (MALT) that aids in infection prevention by limiting microbe access. Barbagli's dorsal onlay urethroplasty is widely used by urologists around the world. Overall success rates are still very high, ranging from 77.3 percent to 100 percent. The overall success rate of the dorsal onlay bulbar procedure was 88.37 percent for 934 patients with an average follow-up of 42.2 months in a systematic analysis; however, the buccal and lingual mucosa success rates were 91.2 percent and 84 percent in 39.1 and 15.7 months,

respectively<sup>10</sup>. To maintain the free graft, we improved the modified Barbagli approach, which preserves the vascularity of spongiosal tissue ventrally or corpora cavernosa dorsally. In addition to retaining native lateral vascularity, it preserves the one-sided bulbar artery. Ventral onlay urethroplasty is the most common therapy for urethral stricture, with success rates ranging from 80 to 100 percent. The classic approach of ventral onlay urethroplasty has had success rates ranging from 80% to 100%. Based on the existing literature, the overall success rate for ventral onlay urethroplasty utilising buccal mucosa was assessed to be 88.84 percent with an average follow-up of 34 months in 563 patients in a recent comprehensive review. Barbagli found that the overall success rate of dorsal and ventral BMG is equivalent, thus dorsal onlay urethroplasty is technically recommended because the corpus spongiosum is thickest. Using uroflowmetry, urethroplasty failure is characterised as a Qmax less than 12 value<sup>11</sup>. The long-term effectiveness of autologous buccal graft has been proven in several investigations. The success rate of dorsal onlay mucosal grafts was reported to be around 86 percent in a study by Singh et al. Barbagli et al. claimed an 80% success rate with single-stage bulbar urethroplasty in another study, although Levine et al. reported an 81 percent success rate in 2007. Our results (81.18 percent success rate) corroborated these findings. In patients with pan-anterior stricture, the success rate was 84 percent; nevertheless, prior studies showed success rates of 88 to 100 percent. Harvesting the graft from the lower lip was linked to higher long-term morbidity in a previous study. Lip mucosa closure can also cause eversion of vermillion and lip contracture<sup>12</sup>. Mucosa from the lower lip was employed in 48 cases in our study, all of which required graft lengths of more than 13 cm and all of which had an open harvest site. No cosmetic abnormalities or long-term morbidity were discovered. Other issues linked to graft harvest, such as hematoma at the harvest site, prolonged bleeding that necessitated a return to the operating room or packing, or other wound healing issues, were not observed. Barbagli et al. studied the prevalence and location of anastomotic fibrous ring strictures occurring at the apical anastomosis between the graft and the urethral plate and were uniformly distributed among the different surgical procedures, utilising either skin or buccal mucosal grafts. The most prevalent site of failure in this study was the proximal anastomotic constricting ring at the graft and native urethra. Early problems after surgery were recorded in 62 (16.67%) of the patients in this study, which is consistent with a prior report by Al-Qudah et al (40 percent ). Longer follow-up periods lead to less positive results. Barbagli et al. discovered that as time goes on, the number of stricture recurrences increases. The success rate of urethroplasty after 5 years is roughly 66%, with the biggest number of failures occurring in the first 6-12 months. A follow-up period of less than one year may exaggerate a technique's success rate. Urethral patency is frequently used to assess the functional result of urethral surgery. Although this is a significant outcome metric, it may also be necessary to assess continence,

erectile dysfunction, post-void dribbling, and patient satisfaction. Penile skin necrosis (27.2%), penile rotation (7.1%), post-void dribbling (1.6-24.5%), and urinary fistula are among the complications reported in the literature (11 percent ). Substitution urethroplasty is known to cause post-void dribbling<sup>13</sup>. This is caused by the bulbourethral muscle being split longitudinally and the urethra being augmented, resulting in a dilated and atonic region where urine can stay for a while before dribbling out a few minutes after micturition. When compared to dorsal onlay urethroplasty, the condition is found to be greater following ventral onlay urethroplasty (33%). (10 percent ). We had a high rate of post-void dribbling (30.66%) in our study. We recommended massaging the bulbar urethra after voiding to avoid soiling garments by emptying the accumulated urine in the bulbar urethra. In a prior study, the rates of erectile dysfunction after anastomotic repair and graft urethroplasty were reported to be 5% and 0.9 percent, respectively. Another study found that 26.8% and 19.2% of patients were unhappy with their erection after anastomotic urethroplasty and buccal mucosa graft, respectively<sup>14,15</sup>.

## Conclusion

For the treatment of anterior urethral strictures, dorsal onlay oral mucosal urethroplasty with a unilateral urethral mobilisation approach is an effective and satisfying procedure. The urethrotomy and anastomosis are made easier with pre-operative dilatation up to 8 Fr. Morbidity and complications were minimal, and the results were good. Because the recurrence rate rises with time, long-term monitoring is needed. In addition to urethral patency, continence, erectile function, post-void dribbling, and general satisfaction should all be assessed.

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