

## Anterior Urethra Reconstruction With Lateral Lingual Mucosa Harvesting Technique



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<b>OBJECTIVE</b>	To describe a new technique for harvesting the long lingual mucosal graft (LMG) to repair the long-segment urethral strictures.
<b>METHODS</b>	We performed a retrospective observational study of patients from whom LMGs were harvested from the lateral lining of the tongue for the long-segment anterior urethral strictures repair from 2012 to 2014 at the Shanghai Sixth People's Hospital. Patients who had 12 months minimum follow-up were included. Patients with incomplete clinical records were excluded. The LMG was applied on the urethra according to the dorsal onlay technique.
<b>RESULTS</b>	The primary outcome of the study was the postoperative failure-free survival rate. The secondary outcome was the rate of early and late complications at the harvesting site. Success was defined as $Q_{max} > 12$ ml/s and no postoperative procedures. One hundred and one patients were included. Median stricture length was $7.1 \pm 3.6$ cm; median LMG length was $7.2 \pm 3.6$ cm. The success rate was 81.2% with a median follow-up of 23 months. Complications at the donor site had occurred in 41 patients at 6-months follow-up, and persisted in 18 patients at the 12-months follow-up. A bilateral harvest and harvest length were the main factors influencing complication rate ( $P = .0038$ for 6 months and $P = .1112$ for 12 months). Almost half of donor site complications subsided within 12 months ( $P = .0018$ ).
<b>CONCLUSION</b>	In patients requiring long oral grafts $> 7$ cm to repair anterior strictures, a valid option is to harvest the graft from the lateral lining of the tongue. UROLOGY 90: 208–212, 2016. © 2016 Elsevier Inc.

Currently, various surgical techniques have been applied to repair long-segment anterior urethral strictures with the goal of reducing morbidity and obtaining the best outcome.<sup>1</sup> Recently, some authors have reported that the management of long anterior strictures involving fasciocutaneous flaps (alone or in combination) showed higher complication rates compared with other techniques.<sup>1</sup> However, it is important to note the poor outcomes of patients who had experienced long-segment urethral strictures due to lichen sclerosus (LS) and multiple previous penile surgeries.<sup>1</sup> Oral mucosa (OM), which emerged in the 19th century as a treatment option, is now

recognized as the most popular substitute material for urethroplasty.<sup>2,3</sup>

In 2006, Simonato et al first described the use of mucosa harvested from the tongue for anterior urethroplasty.<sup>4</sup> A prospective comparative study reported that lingual mucosa graft (LMG) urethroplasty provides the outcomes equivalent to those of OM graft urethroplasty. However, postoperative morbidity and long-term changes in speech make it a second choice for strictures  $> 7$  cm, only for cases where OM graft is unavailable.<sup>5</sup> According to suggestions in the literatures, the widely used harvesting site of LMG for urethroplasty was located in the ventral portion of the tongue.<sup>4,6,7</sup> However, in our experience, Asian people have a smaller tongue body than those of people of western countries, thus the harvest site for the LMG is insufficient for the repair of extensive anterior strictures requiring long grafts. For these reasons, we supposed that the lateral lining of the tongue could provide a more sufficient amount of mucosa for a long segmented urethroplasty. According to the histology evaluation, the ventral tongue is covered with stratified squamous epithelium, but the epithelium of lateral tongue is keratinized stratified squamous epithelium, so the efficacy of urethroplasty with lateral lingual mucosa needs evaluating.

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The aim of this study was to retrospectively review and evaluate the efficacy and complications of patients who had undergone urethroplasty with LMG harvested from the lateral lining of the tongue to repair long-segment anterior urethral strictures.

## METHODS

A retrospective observational study was performed with a cohort of patients from whom LMGs were harvested from the lateral lining of the tongue for long-segment anterior urethral stricture repair. The study was approved by the institutional ethics Committee of Shanghai Sixth People's Hospital of China. Data were collected from January 2012 to March 2014. Patients who had undergone a 1-stage dorsal urethroplasty using lateral lingual mucosa and had a 12-month minimum follow-up met the inclusion criteria for the study. Patients with incomplete clinical records at follow-up analysis were excluded from the study (Supplementary Fig. S1). The primary outcome of the study was the postoperative failure-free survival rate in the overall population. The clinical outcome was considered a failure when any postoperative instrumentation was needed. The secondary outcome of the study was an evaluation of the early and late complications at the harvesting site. Urethral complications were also reported. Clinical history, physical examination, urine culture, uroflowmetry, and retrograde and voiding cystourethrography were included in preoperative evaluation. The oral surgeon was invited to the ward to conduct different tests of sensations before and after harvesting the lingual graft from the lateral margin of the tongue. The diagnosis of LS was confirmed by evaluating multiple biopsy specimens from the glans, penile skin and urethral mucosa. Dichotomous variables were analyzed with chi-square test, and continuous variables were compared with Student's *t*-tests using SPSS 17.0 software (SPSS Inc., Chicago, IL). *P* values <.05 indicated significant differences.

## SURGICAL TECHNIQUES

### Harvesting Lingual Mucosal Graft

The mouth and tongue were disinfected routinely. A standard mouth opener was put in place and the tongue was towed out of the mouth with a stitch through the apex to make both the lateral surfaces of the lingual mucosa adequately exposed. The graft was measured and marked with a surgical pen around the area of required mucosa (Fig. 1A). Usually, when the length of required mucosa was <7 cm, the lingual mucosa was incised along the margin of the tongue ranging from the orifice of the sublingual gland of one side to the tip of the tongue (Fig. 1B). If the length of mucosa needed was >7 cm, the area of harvesting often had to encircle the tip of tongue, then extended to the direction of the contralateral orifice of the sublingual gland (Fig. 1C). The width of the LMG was normally 1.5-2.0 cm (Fig. 1D). A solution of 0.01% adrenaline and 0.9% normal saline was mixed and injected into the submu-

cosa. The edges of a full-thickness mucosal graft were incised and harvested with a scalpel. The bleeding of the wound surface was examined carefully and closed with 4-0 polyglactin running sutures. Graft defatting was performed to remove the underlying fibrovascular tissue before urethroplasty.

### Urethroplasty

A circumcoronal incision of the foreskin was made for a complete degloving of the penis. In cases with a stricture >10 cm extending into the bulbar urethra, a perineal incision was made in addition to the penile incision. The urethra was dissected from the corpora cavernosa along the left side, then the incision of the stricture segment was conducted along a dorsal longitudinal line which extended for 1-2 cm proximally to distally, into the healthy urethra. Three biopsy specimens were sent for pathology tests. After the entire stricture had been incised, the length and width of the urethral plate were evaluated. The LMG of proper size was fixed over the tunica albuginea of the corpora cavernosa with intermittent 5-0 polyglactin stitches. Despite the steady fixation of the LMG to the corpora cavernosa on the margin, the sufficient fixation of the LMG to corpora cavernosa at the inside area with intermittent stitches could decline the incidence of dead space (Supplementary Fig. S2). The urethral epithelium was then fixed to the margin of the LMG with 5-0 polyglactin stitches in a running continuous manner following the insertion of a Foley 14 F to 18 F grooved silicone catheter. With the skin being closed, the penis was wrapped with soft elastic bandage.

### Postoperative Care and Follow-up

The patients received broad-spectrum intravenous antibiotics for 5-7 days, then oral antibiotics was applied until the catheter was removed. Five days after the surgery, the patients were discharged and transferred to health-recovery hospitals or community hospitals. The catheter remained in place for 3 weeks after surgery. All patients were followed up 4 weeks postoperatively and at 3, 6, 12, 24, and 36 months with retrograde and voiding urethrography and uroflowmetry. During all follow-up visits, patients underwent an office interview and a clinical evaluation by a urologist and an oral surgeon. A questionnaire was used to assess the morbidity of the tongue including measures of pain, numbness, parageusias, slurring of speech, and the swallowing functions. Descriptive statistical analysis and comparative simple analysis with Student's *t*-tests were performed by dedicated software.

## RESULTS

The data of 101 patients as subjects in the study are summarized in Supplementary Table S1. Age ranged from 18 to 78 years (median 40 ± 16), 37 patients (36.6%) had undergone previous open surgeries, 23 patients (22.7%) had undergone direct visual internal urethrotomy, and 44 patients (43.6%) had dilation. Urethral infections occurred

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