Buccal reharvest for urethroplasty after graft site closure is safe and does not affect long-term oral health

Brian M Inouye MD, Brent D Nosé MD, Kevin Krughoff MD, William R Boysen MD, Andrew C Peterson MD, MPH, FACS

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Buccal reharvest for urethroplasty after graft site closure is safe and does not affect long-term oral health

Authors:
Brian M Inouye, MD
Brent D Nosé, MD *
Kevin Krughoff, MD
William R Boysen, MD
Andrew C Peterson, MD, MPH, FACS

Corresponding Author:
Dr. Brent D. Nosé
Urology Resident
Duke University Medical Center
Division of Urology, DUMC 3146
Duke Clinics, 40 Duke Medicine Circle, Room 1113
Durham, NC 27710
Mob: 408-472-5351
Office: 919-681-7891
Brent.Nose@duke.edu

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OBJECTIVE: To understand the effects of reharvest on safety and long-term oral health in patients requiring buccal mucosa reharvest from a previously harvested and closed site for management of recurrent urethral stricture disease.

METHODS: We conducted an IRB approved retrospective chart review from 2014-2019 of all patients who underwent buccal graft urethroplasty at our referral based academic medical center. Surgical data was collected, and the validated Oral Health Impact Profile (OHIP-14) survey was administered to each patient. Descriptive statistics were performed and compared between patients who underwent a buccal graft reharvest and patients who underwent standard first time buccal harvest. Buccal graft beds were closed on both initial and reharvest.

RESULTS: Four patients underwent a total of five ipsilateral buccal graft reharvests and six patients underwent first time buccal harvest. Median length of follow-up for all patients was 6 months (1-35mo) and the median length of all grafts was 6cm (5-6cm) with no difference in the reharvest and first-time cohorts. For patients that underwent buccal reharvest, their median post-operative OHIP-14 score was 0 (0-9pts) out of a possible 56 points. This compared to a median postoperative OHIP-14 score of 0 (0-10pts) for patients who underwent first time buccal harvests with oral complications limited to one post-operative hematoma in the first-time cohort.

CONCLUSIONS: Buccal grafts can safely be reharvested from a previous site with minimal concern for long-term oral health outcomes.
Introduction

The contemporary management of urethral stricture disease continues to advance with both increased specialization of practice and recognition of the disease prevalence. Urethral stricture disease is estimated to affect 0.9% of men in industrialized countries.\(^1\) While there exist many treatments for male urethral strictures, urethroplasty remains the option with the highest success rates.\(^2\) For patients with long strictures requiring more complex urethroplasties, buccal mucosa has become a preferred graft tissue.\(^3\) However, even with the high success rates with the use urethral substitution, the urethroplasty is not perfect and a small but significant subset of patients require redo urethroplasties.\(^4\) The rate of failure as defined by stricture recurrence is only increased in patients with longer and more complex strictures requiring substitution urethroplasty. In such cohorts, restricture rates range from 3% to 58% depending on the reported series and etiology.\(^3,4,5,6,7\) Particularly, cases of lichen sclerosis, hypospadias and prior surgeries are at increased risk of stricture recurrence.\(^8\)

Amongst these patients, a small cohort who have already undergone two buccal mucosal harvests for their primary and redo urethroplasty, or bilateral buccal mucosal harvest for a primary urethroplasty, will present the complex scenario that raises the question of what urethral substitution is the best option when bilateral buccal mucosa graft sites have previously been harvested. In light of this scenario, alternate graft material has been proposed ranging from skin to lingual and lip mucosa to synesthetic and collagen matrix material; however, these options can respectively have a higher risk
to oral health and increased rates of stricture recurrence.\textsuperscript{9-13} While buccal mucosa remains the preferred substitution material for urethroplasty, concerns regarding oral health and oral health associated quality of life remain and are only heightened in the setting of buccal reharvest.\textsuperscript{14}

In appreciating the importance of oral health across multiple domains, the Oral Health Impact Profile and its shorter and validated Oral Health Impact Profile-14 (OHIP-14) have been generated and utilized to assess the impact of oral health and pain on patients’ overall qualities of life.\textsuperscript{15-18} Because of its ability to assess overall oral health associated quality of life with a limited number of questions that still accommodate more granular detail, the OHIP-14 is becoming increasingly utilized in not only dental and periodontal studies but also urology.\textsuperscript{19}

To date, it has been postulated that previous buccal harvest is a contraindication for another harvest in the same location at a later date and an indication to seek alternative graft material.\textsuperscript{20, 21} However, while short term oral morbidity is associated with the initial harvest of buccal mucosa, studies of redo buccal mucosa graft urethroplasties have been limited to contralateral harvest and not reharvest from a prior graft sight.\textsuperscript{22, 23} To this end, the oral consequences of buccal mucosa graft reharvest have never been studied. Herein, we present our institution’s experience with harvesting buccal graft from a previously harvested site with the aim to understand the effects on safety and the long-term oral health of these patients by using the validated OHIP-14.
Methods

Following institutional review board approval, a retrospective chart review of all patients who underwent buccal graft urethroplasty at our facility from January 2014 through December 2019 was performed. Time between harvests, length and width of graft, length of follow-up, and complications at the graft site were gathered.

The OHIP-14, a validated 14 question tool, was utilized for the assessment of oral health associated quality of life. The questionnaire is detailed into seven domains with two questions per domain. The domains include functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Each question is scored from 0 to 4 ranging from never to very often. (Annex 1)

Once patients were identified and surgical data was collected, the OHIP-14 survey was then administered to each patient in October through December of 2020. Descriptive statistics were performed for patients who underwent a second buccal graft harvest from a previously harvested site and compared to patients who underwent standard first time buccal harvest. Two tailed t-tests were performed to evaluate differences in age, OHIP-14 and graft length.

Importantly, all buccal mucosa urethroplasties had graft harvest sites closed with running 5-0 vicryl suture at primary and redo surgeries. Care is always taken to avoid Stensen duct, and an ellipsoid graft is taken at primary and reharvest surgeries. For reharvest, the superior border of the graft is demarcated by the well healed and visible scar from the previous harvest (Figure 1).
Results

Ten patients were identified and available for completion of the OHIP-14. Of these, a total of four patients underwent buccal mucosa graft reharvest from a total of five ipsilateral buccal graft reharvest sites. Six patients underwent first time buccal harvest. Median length of follow-up for all patients was 6 months (1-35mo) and the median length of all grafts was 6cm (5-6cm) with no difference in the reharvest and first-time cohorts. Similarly, the median time from surgery to OHIP-14 survey completion for all patients was 59 months (13-71mo) with no difference in the reharvest and first-time groups. For patients that underwent buccal reharvests, their median overall OHIP-14 score was 0 (0-9pts) out of a possible 56 points. This compared to a median overall OHIP-14 score of 0 (0-10pts) for patients who underwent first time buccal harvests.

For the reharvest cohort, OHIP-14 Subgroup 3 (psychological discomfort) had the highest maximum score of 5 (0-5pts) out of a possible 8 points. This compared to a maximum highest score of 4 (0-4pts) in OHIP-14 Subgroup 4 (physical disability) for the first-time buccal harvest cohort.

Two patients of the buccal reharvest cohort had had dental procedures in the last five years (a crown and wisdom teeth extraction), and none had lost any teeth. Of the first-time buccal harvest group, three had lost teeth and two had had dental procedures. There were no statistical differences in age, OHIP-14 total scores or graft length.

There were no complications at the buccal graft site for the patients who underwent buccal reharvest. For the first time harvest patients, one developed a hematoma at the graft site that did not require intervention and was associated with supratherapeutic
anticoagulation for a history of a cardiac valve replacement. One patient in the first-time 
buccal harvest group underwent bilateral buccal harvest and one in the reharvest cohort 
also underwent bilateral buccal reharvests.

Lastly, one patient in each group ultimately had stricture recurrence. The patient of the 
reharvest cohort who developed a recurrent stricture reported undergoing a perineal 
urethrostomy at an outside facility approximately three years following his redo 
urethroplasty. The patient who developed recurrent urethral stricture after first time 
buccal harvest urethroplasty developed recurrent stricture disease requiring urethral 
dilation 9 months following his urethroplasty.

Discussion

Recurrent stricture disease in patients who have previously undergone bilateral or 
ipsilateral buccal mucosa urethroplasies can be a challenging scenario for both the 
patient and the surgeon. To date, there has been much anxiety regarding what urethral 
substitutes can be best utilized in these patients. The benefits of buccal mucosa are 
well known and accepted given its resilience, lack of hair follicles and similarity to native 
urothelium.\textsuperscript{10} However, the prospect of redo ipsilateral buccal harvest raises concerns 
due to fears for poor oral health outcomes. Despite this, the topic of redo buccal harvest 
is one that remains unexplored.

Unfortunately, the complex scenario of stricture recurrence after prior bilateral buccal 
harvests arises in patients that are most at risk of failure from their first urethroplasty.\textsuperscript{22,} 
\textsuperscript{24} As such, these patients are both the most complex and most in need of resilient 
reconstructive surgery. While factors such as stricture length and etiology have been
associated with failure rates, a true pathophysiologic pathway for why such complex strictures recur remains elusive.\textsuperscript{6} It is therefore necessary to have a viable option for management of recurrent urethral strictures after a prior urethroplasty and bilateral buccal mucosal harvest.

Here we present outcomes for a cohort of patients who had their primary graft site closed at the time of the first-time buccal urethroplasty. The benefits of closing the primary graft site remain debated with studies supporting both closure and non-closure at the time of urethroplasty.\textsuperscript{26-28} While the debate regarding closure focuses primarily on postoperative pain and immediate oral health associated quality of life, the topic of the viability or capacity for reharvest has not yet been broached nor explored. We feel the closure of the prior harvest site is tantamount to the enabling of later buccal graft reharvest if it is needed. With that said, it remains unclear if buccal reharvest is as tolerable or viable in the setting of non-closure of the original harvest. By having a well healed scar to demarcate the superior harvest border, unmanipulated buccal mucosa can be harvested safely. However, further study is needed to be able to translate such outcomes to patients that didn’t undergo primary closure.

The OHIP-14 is a validated tool that is growing in use within the field of reconstructive urology.\textsuperscript{16, 18} Its assessment of various domains of oral health and its origins within the dental, periodontal and maxillofacial specialties make it an optimal tool in assessing the oral health associated quality of life for patients who undergo a buccal harvest.\textsuperscript{16} However, the tool has not been validated for use within this unique subset of patients.

Finally, this study is limited by the relatively low incidence of stricture recurrence following bilateral buccal mucosal harvests. By selecting the most in-need urethral
Stricture patients, the quantity of subjects is limited and biased to selection for patients at higher risk of stricture recurrence. Furthermore, while we present a cohort of patients who successfully underwent redo ipsilateral buccal harvest with no perceived impact on oral health associated quality of life or complications in the harvest bed, the use of the oral health impact profile is in its nascency in urology. Despite this, the OHIP-14 serves as a powerful validated tool to assess the impact of oral health on patients’ well-being.\textsuperscript{19} So far, this has been used to interrogate whether oral health quality of life can impact the quality of graft tissue, but the administration of the OHIP-14 in the post-buccal harvest setting has not yet been broadly adopted.\textsuperscript{25}

**Conclusion**

Stricture recurrence is an uncommon but definite risk following buccal augmented urethroplasty. Here we demonstrate that a buccal graft can be safely reharvested from a previously closed harvest site without much worry about long-term oral health outcomes; and these outcomes mirror those of patients who undergo buccal harvest for the first.

**References**


Figure 1: (A) A well healed scar has developed following closure of the graft site at the time of first time or native buccal harvest (B) the buccal reharvest is measured and diagramed starting just inferior to the previous scar with Stensen duct clearly demarcated away from the reharvest site (C) The reharvest site is closed with running 5-0 vicryl suture
Table 1. Oral Health Impact Profile 14 for patient undergoing first time and redo buccal harvests

<table>
<thead>
<tr>
<th>OHIP-14 Domain (0-8)</th>
<th>Redo buccal harvest (n=4)</th>
<th>First time buccal harvest (n=6)</th>
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<tbody>
<tr>
<td>Medium Functional limitation (range)</td>
<td>0 (0-2)</td>
<td>0 (0-2)</td>
</tr>
<tr>
<td>Medium Physical pain (range)</td>
<td>0 (0-2)</td>
<td>0 (0-4)</td>
</tr>
<tr>
<td>Medium Psychological discomfort (range)</td>
<td>0 (0-5)</td>
<td>0 (0-2)</td>
</tr>
<tr>
<td>Medium Physical disability (range)</td>
<td>0 (0-0)</td>
<td>0 (0-4)</td>
</tr>
<tr>
<td>Medium Psychological disability (range)</td>
<td>0 (0-0)</td>
<td>0 (0-0)</td>
</tr>
<tr>
<td>Medium Social disability (range)</td>
<td>0 (0-0)</td>
<td>0 (0-2)</td>
</tr>
<tr>
<td>Medium Handicap (range)</td>
<td>0 (0-0)</td>
<td>0 (0-0)</td>
</tr>
<tr>
<td>Total (range)</td>
<td>0 (0-9)</td>
<td>1 (0-10)</td>
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Table 2. Stricture and perioperative results for patients undergoing first time and redo buccal harvests

<table>
<thead>
<tr>
<th></th>
<th>Redo buccal harvest</th>
<th>First time buccal harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Total number of buccal graft sites</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Average Age at surgery (range)</td>
<td>46 (22-59)</td>
<td>62 (50-70)</td>
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<tr>
<td>Average graft length (range)</td>
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<td>5.7 cm (5-6cm)</td>
</tr>
<tr>
<td>Number of patients with oral or dental procedures in the last 5 years</td>
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<td>2</td>
</tr>
<tr>
<td>Graft site complications</td>
<td>0</td>
<td>1</td>
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