Title
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Journal
Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery, 155(6)

ISSN
0194-5998

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Publication Date
2016-12-01

DOI
10.1177/0194599816667929

Peer reviewed

HHS Public Access

Author manuscript

Otolaryngol Head Neck Surg. Author manuscript; available in PMC 2018 March 20.

Published in final edited form as:

Otolaryngol Head Neck Surg. 2016 December ; 155(6): 1061–1064. doi:10.1177/0194599816667929.

Auricular Split Thickness Skin Graft for Ear Canal Coverage

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Abstract

Split thickness skin graft (STSG) continues to be the preferred means of external auditory canal (EAC) reconstruction. We thus sought to describe our experience using skin from the posterior aspect of the auricle (SPAA) as a donor site in EAC reconstruction. Grafts were on average 5x10mm in size and obtained after tumescence injection using a #10 blade. A total of 39 patients who underwent 42 procedures were retrospectively reviewed. Of the 38 patients with both 3 and 6 month follow-ups, no post-operative stenosis or bony exposure occurred at that time point. STSG from the SPAA can be a good option in EAC reconstruction. Total EAC/TM coverage can be obtained using STSG from the SPAA.

Keywords

split thickness skin graft; STSG; auricular; ear canal; EAC reconstruction

Introduction

External auditory canal (EAC) reconstruction for coverage of the canal is commonly required when there is inadequate residual healthy skin. While up to 50% of EAC skin can be lost and still heal successfully without grafting, greater defects require grafting to prevent restenosis.[1] One of the common complications of EAC reconstruction is restenosis of the EAC.[2] Reconstruction can be performed with split-thickness skin grafts (STSG), full-thickness grafts, pre-auricular flaps, or post-auricular flaps.[3] If STSG is desired for reconstruction, there are multiple possible donor sites, most commonly the medial arm or anterior thigh. We herein present our outcomes of patients who had STSG obtained from the skin from the posterior aspect of the auricle (SPAA).

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Disclosure: The authors have no conflicts of interest to report

Manuscript to be presented at the American Academy of Otolaryngology – Head and Neck Surgery Meeting in San Diego, California, September 2016

Materials/Methods

After approval by our IRB, we performed a retrospective review of patients who underwent STSG from SPAA by the senior surgeon from 2009–2016. A total of 39 patients who underwent 42 procedures were included.

Injection is performed with 1% lidocaine with 1:100,000 epinephrine into the SPAA in the subcutaneous plane. Once adequate tumescence is achieved, a #10 blade is used to harvest the STSG in a sawing fashion [Figure 1]. We aim for grafts to be thinner than that of the thickness of the blade (0.36mm). On average, the grafts obtained are ~5x10mm, and eight grafts are obtained per patient [Figure 2]. In cases where a postauricular incision was made, we leave 5 mm between the incision and the donor site. The grafts are prepared off the field and placed on 0.005 inch silastic coated with a thin layer of bacitracin. The STSG is then laid down in the EAC with the silastic. Once positioned, the silastic was removed. Extreme caution is taken to ensure that the entire skin defect is covered and that the grafts are laid down in a flat configuration [Figure 1]. If grafts are placed along the tympanic membrane (TM), thick 0.51 mm silastic sheets are used to keep the graft in place and the anterior sulcus angle sharp. If a cartilaginous canal meatoplasy was performed, the meatus is injected with triamcinolone acetonide (40mg/ml) in four quadrants to prevent stenosis. Otherwise, otowicks are placed in the EAC as a stent and keep the grafts compressed against the canal. Tegaderm is placed over the donor site. All patients were seen post-operatively in 1-week for packing removal and at approximately 4–6 weeks. Thirty-eight patients additionally had 3 and 6 month follow-ups.

Results

The average age of the patients was 35.4 years (range 2–80 years). The average time of last follow up was 54 weeks (range 4–282 weeks). Indications for the procedure included EAC stenosis from chronic EAC infection/granulation in 17 patients, congenital EAC stenosis in 9, cholesteatoma in 6, tumor in 5, and bony exposure from previous ear surgery in 5.

Findings at the first postoperative visit are shown in Table 1. Patients with EAC granulation were managed with silver nitrate application, triamcinolone ointment application, or both. All patients with EAC granulation demonstrated resolution at the 4 week follow up. Patients with evidence of acute edema were managed with triamcinolone acetonide injections in 4 quadrants of the EAC. Two patients required prolonged wicking for 3 weeks. No patient developed prolonged post-operative EAC stenosis or bony exposure. At the last visit, all patients demonstrated at least 90–95% canal opening.

With regard to donor site complications, one patient developed a 5 mm skin bridge between the donor site and the post-auricular incision. This was lysed and a steri-strip was applied to prevent reformation. One patient developed donor site bleeding and pain. No patients developed long term complications of the donor site, and all donor sites appeared well-healed on last follow-up. Figure 3 demonstrates the typical donor site appearance at the 6-week postoperative visit.

Discussion

Our experience supports that SPAA is a good source for STSG in patients requiring EAC reconstruction. This appears to be a reasonable alternative to an extremity donor site, which requires the intraoperative preparation of an alternate site and can potentially lead to a more visible scar. STSG reconstruction of the EAC has been evaluated in several case series, most of which have demonstrated low rates or re-stenosis in small case series.[4,5] While acute post-operative edema/granulation or mucosalization from STSG from SPAA are possible, no patients in our series developed prolonged postoperative EAC stenosis or bony exposure.

The STSG used in EAC reconstruction needs to be thin to ensure improved take and decrease the risk of stenosis, which is why we aim for the grafts to be thinner than that of the thickness of the blade. During harvest, the blade edge should remain visible through the skin graft. The use of a fresh blade facilitates obtaining a very thin graft that is sizeable. The blade is generally used for 2–3 grafts at most before switching to a fresh blade. Tumescence and stretching of the auricle using a finger inside of the concha also facilitates harvest of a very thin graft. During harvest, it is beneficial to leave very thin strips of intact skin between the grafts to reduce the likelihood of scar formation and to assist in donor site healing. At no point should fat become visible in harvesting of the graft.

Our series found that the long-term risks of obtaining a STSG from SPAA for EAC reconstruction to be very low, comparable to that reported in other series. This study is not without its limitations. We did not have pre and post-operative audiometry in several patients, and there was no objective report on the donor site. Longer follow-up can also be beneficial. Prospective evaluation of this technique and comparison of SPAA to alternate donor sites is necessary.

Conclusion

The SPAA is a possible donor site for STSG in EAC reconstruction and may have advantages over STSG from other donor sites.

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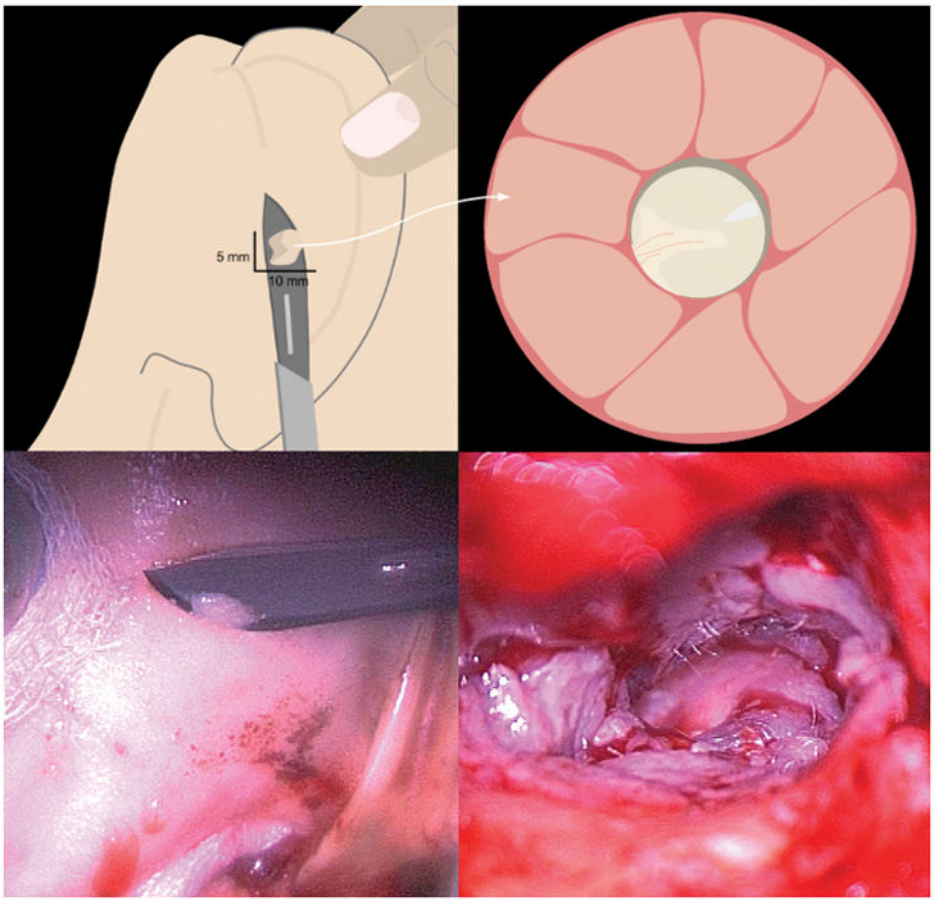

Figure 1.
A #10 blade being used to obtain a STSG from SPAA of the right ear after tumescence injection. Postoperative complete EAC coverage of the right ear with the grafts.

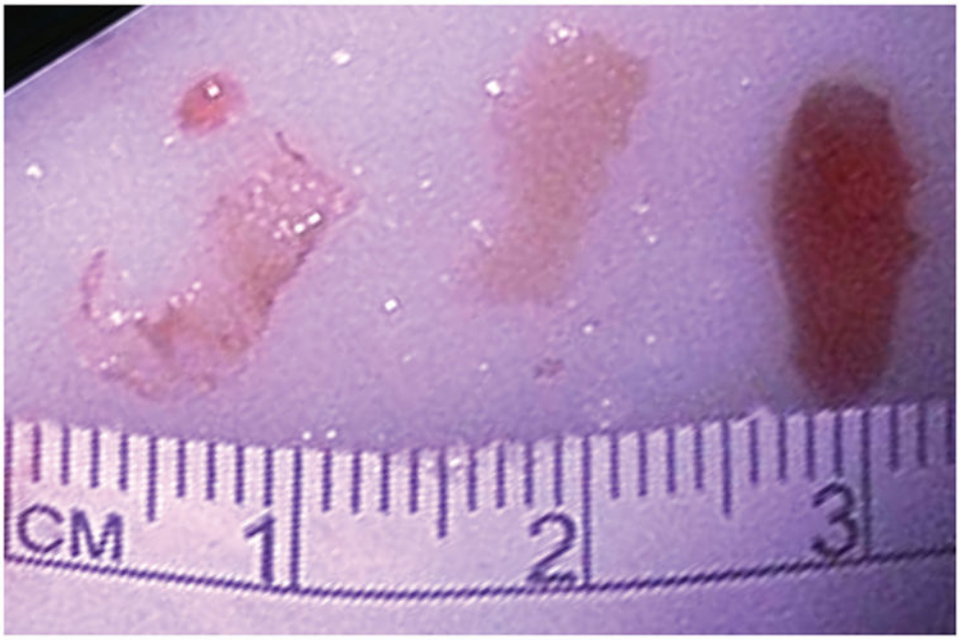

Figure 2.
STSG pieces obtained, average graft sizes are 5x10 mm.

Figure 3.
Post-operative STSG donor site at six-week visit

Table 1

One week postoperative findings. Several patients had multiple findings.

Finding	Number of procedures (percentage in parentheses)
EAC granulation	7 (16.7%)
EAC/TM mucosalization	5 (11.9%)
Acute EAC edema	5 (11.9%)
Otorrhea	3 (7.1%)
Donor site skin bridge between donor site on posterior auricle and post-auricular incision	1 (2.4%)
Donor site pain/minor bleeding	1 (2.4%)

Table 2

Diagnosis, amount and depth of stenosis in patients with auricular split thickness skin graft

Location of Stenosis	**No**	**%**
Entire Canal	7	17
Lateral 2/3	4	10
Middle 1/3	3	7
Medial 1/3	27	66
Total	41	100
Preoperative Stenosis (%)	**# Ears**	**Percentage**
100	21	51
76–99	1	3
51–75	8	19
30–50	11	27
Total	41	100
Diagnosis	**# Ears**	Percentage
Tumor	5	12
Congenital EAC stenosis	9	22
Chronic EAC infection/granulation	26	63
Post-surgical bony exposure	1	3
Total		100