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**INTRODUCTION**

By definition, a keloid is a scar that extends beyond the boundaries of a wound and commonly occurs after trauma. These lesions are expected to occur 15 times higher in African American populations, with an incidence range of 4.5% to 16%, for reasons that are not entirely clear. Histologically, there are four features that consistently help define keloids: 1) keloidal, hyalinated collagen; 2) tongue-like, advancing edges underneath normal epidermis and papillary dermis; 3) fibrous bands in the reticular dermis; and 4) abundant, fascia-like, fibrous bands.

There are many ways of treating auricular keloids, such as occlusive dressings, compression devices, corticosteroids, excision, radiation, cryosurgery, laser, and topical agents. Although prevention is of utmost important, it appears that combinations of the above therapies can result in 5-year recurrence rates from 8% to 50%. After resection of an auricular keloid, the overlying skin can be successfully, quickly, and easily used for a full-thickness autograft. This allows for adequate defect coverage, in addition to saving the patient further keloid development associated with harvesting a graft from another site. We describe our institution’s experience using the skin from resected, auricular keloids as autografts for existing defects.

**MATERIALS AND METHODS**

This retrospective review included three patients with large, auricular keloids who elected to undergo resection between October 30, 2013, and August 17, 2016. The patients were counseled on further, conservative therapies and reconstructive options that included the described autograft technique. The safety and reduced morbidity of this technique were emphasized to each patient. This study was conducted at the University of Mississippi Medical Center (Jackson, MS), and was exempt from institutional review board approval due to the number of patients involved. Despite this, all patient data was kept secured, with access available only to the two authors (D.M.K. and J.R.J.). This article describes a retrospective review of one author’s technique of using resected, auricular, keloid skin as a full-thickness autograft for the reconstruction of an existing defect.

**Patient Characteristics**

Three patients (2 male, 1 female) were identified who underwent this technique. The mean age was 43 years (range, 19–76 years), and mean follow-up was 114 days (range, 6–202 days). The mean keloid size was 29 cm² (range, 12–64 cm²), with the helix being the most common location (Fig. 1). All patients were nonsmokers with well-controlled, medical conditions. Each patient underwent postresection radiation therapy. Table I details the pertinent patient data, and Figure 1 shows patient 2 preoperatively.

**Operative Technique**

The procedure is performed either in the clinic or outpatient surgery setting under local or monitored anesthesia care. The keloid is removed using sharp dissection, paying attention to not violate the underlying perichondrium and cartilage. The defect is then measured accordingly. A full-thickness skin graft is crafted from the keloid skin, taking care to appropriately defat and thin the thickened dermis (Fig. 2). The graft is perforated and sutured into position as an autograft in a tension-free manner. A bolster dressing is applied using antibiotic ointment, gauze, adhesive, and Micropore tape (3M Company, St. Paul, MN). Antibiotics with cartilage coverage such as ciprofloxacin are provided. In addition to water precautions, the patient is instructed to avoid heavy lifting and manipulation of the dressing.

**Follow-up**

Each patient is seen in follow-up within 1 week of the procedure. The bolster dressing is removed, and the wound is inspected for any areas of dehiscence, fluid collection, necrosis, or infection. If infection is noted, the antibiotic is changed to another, such as cephalexin, amoxicillin/clavulanate, doxycycline, or clindamycin. Depending on the extentiveness of the postoperative inflammation, varying amounts of 40 mg/mL Kenalog (Bristol-Myers Squibb, New York, NY) are injected at the 1-month follow-up and beyond. A clean dressing is replaced...
RESULTS

All three patients experienced satisfactory, aesthetic results. The mean age was 43 years (range, 19–76 years) and mean follow-up was 114 days (range, 6–202 days). The mean keloid size was 29 cm$^2$ (range, 12–64 cm$^2$), with the helix being the most common location. Each patient had 100% viability of the autograft, with patient 2’s result shown in Figure 3. Two patients required Kenalog (Bristol-Myers Squibb) injections and antibiotics during the postoperative course, with complete resolution of localized inflammation and infection. All patients underwent postresection radiation therapy with 600 centigray (cGy) fractions for a total of 1,800 cGy, with no recurrence of the keloid through the follow-up period.

DISCUSSION

Initially described by Apfelberg et al. in the plastic surgery literature in 1976, keloid skin can be used as a successful autograft in the reconstruction of an auricular defect.\(^4\) After the keloid is excised, a full-thickness skin graft is harvested and sutured into position. Bolstering is often used, and follow-up is arranged to monitor for surgical success, often defined as graft viability, aesthetic acceptability, and keloid recurrence. In the aforementioned study, five patients with large keloids of the auricle were included. Three of five patients (60%) achieved success as a result of the procedure. Three important findings were gleaned: 1) The autografts are easily harvested and ample in amount; 2) the color, contour, and texture match are identical; and 3) donor morbidity, defined as the development of another keloid due to the harvest, is eliminated because grafts from a secondary site are unnecessary.

<table>
<thead>
<tr>
<th>Age (years); Sex; Length of Follow-up (days)</th>
<th>Size(s), cm$^2$</th>
<th>Mechanism; Location</th>
<th>Comorbidities</th>
<th>Smoking Status</th>
<th>Postresection Radiation; Amount</th>
<th>Revision or Complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>19; M; 6</td>
<td>64</td>
<td>Bite; helix</td>
<td>Sickle cell disease</td>
<td>Never</td>
<td>Yes; 1,800 cGy</td>
<td>None</td>
</tr>
<tr>
<td>34; F; 202</td>
<td>20; 20</td>
<td>Curling iron burn; conchal bowl and helix</td>
<td>–</td>
<td>Never</td>
<td>Yes; 1,800 cGy</td>
<td>Yes, inflammation requiring Kenalog injection* $\times$ 2</td>
</tr>
<tr>
<td>76; M; 134</td>
<td>12</td>
<td>Car accident; helix</td>
<td>Hypertension, cardiac disease</td>
<td>Never</td>
<td>Yes; 1,800 cGy</td>
<td>Yes, infection requiring ciproflaxacin $\times$ 2</td>
</tr>
</tbody>
</table>

*Kenalog (Bristol-Myers Squibb, New York, NY). cGy = centigray; F = female; M = male.
Ziccardi and Lamphier in 2000 detailed a similar technique in one patient with a keloid of the lobule.\(^5\) The keloid occurred after an ear piercing. The autograft’s dermis was appropriately thinned, and the patient was noted to have a successful, postoperative result with no keloid recurrence through the subsequent 6 months. Key findings were similar to the above study, with good color match and eliminated, donor morbidity noted. Aside from these two studies, there is a paucity of literature regarding this technique, especially in otolaryngology.

Many other techniques exist in the treatment of keloids, which range from conservative such as occlusive dressings and compression devices to more invasive options such as corticosteroid injections, laser therapy, topical immunomodulatory creams, and radiation therapy. Our results demonstrate 100% graft success and satisfactory, aesthetic results in three patients. The auricular keloids were deemed large, with a mean size of 29 cm\(^2\) (range, 12–64 cm\(^2\)), and the most common location being the helix. The average patient’s age was 43 years (range, 19–76 years), making this treatment option appropriate even for young patients. The mean follow-up was 114 days (range, 6–202 days), with no recurrence of keloids noted throughout this period.

To our knowledge, this is the first description of the technique in the otolaryngology literature. We feel that this technique is easily performed and presents low risk to the patient because it can be done under local anesthesia in the outpatient setting, if desired. The skin of the resected keloid is viable, an excellent aesthetic match, and ample in amount for reconstructive purposes. By using this skin, even if the graft is not successful, the surgeon avoids the possibility of creating another keloid from a secondary donor site. Postoperative complications such as infection, prolonged inflammation, and recurrence of the keloid are common but can be mitigated with antibiotics, repeated corticosteroid injections, and consistent follow-up incorporating radiation therapy, respectively.

**CONCLUSION**

In this series, we present a retrospective review of three patients who underwent resection of large auricular keloids and were treated with full-thickness skin grafts from the keloid. This technique utilizes autografting of the skin covering the keloid as a reliable, reconstructive option. Patients should be counseled on the importance of postoperative wound care to prevent untoward sequelae. Long-term follow-up is also critical because recurrence is common. Adjunctive radiation therapy should be combined in appropriate cases with surgical resection to achieve optimal outcomes. Longer term follow-up is needed to further support this technique in the treatment of large, auricular keloids.

**BIBLIOGRAPHY**