

# The utility of full-thickness skin grafts (FTSGs) for auricular reconstruction

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**Background:** Full-thickness skin grafts (FTSGs) are a common repair option on the external ear, but there are few large case series examining graft sublocations, dimensions, and outcomes.

**Objective:** We sought to report our experience with FTSGs for repair of postsurgical defects of the external ear.

**Methods:** We conducted a retrospective review of all FTSGs on the ear performed by 2 surgeons (J. C., 2000-2014; B. C. L., 2007-2014) after clearance by Mohs micrographic surgery at a single institution.

**Results:** A total of 1519 FTSGs on the ear were performed between June 2000 and March 2014. The most common sublocations were the superior helix (38.8%), the crura of the antihelix or scapha (18.9%), and the back of ear/back of helix (15.4%). The overall complication rate was 1.6%, and the most common complication was graft failure (1.2%).

**Limitations:** Data were collected retrospectively from a single institution. Follow-up beyond 3 months was limited. A standardized assessment tool for aesthetic outcomes was not performed.

**Conclusion:** By taking advantage of predictable “pincushioning” and combining with local flaps or cartilage grafts, FTSGs can provide more volumetric replacement than previously described. They reliably preserve the height and complex topography of the ear with a low complication rate. (J Am Acad Dermatol <http://dx.doi.org/10.1016/j.jaad.2016.01.028>.)

**Key words:** anatomic location; composite graft; external ear; full-thickness skin graft; Mohs micrographic surgery; nonmelanoma skin cancer.

Approximately 8% to 10% of all skin cancers presenting to Mohs micrographic surgeons occur on the ears.<sup>1,2</sup> Studies of head and neck basal cell carcinomas have shown that tumors on the ear tend to present as larger lesions, require more Mohs layers, and produce larger final surgical defects on average than other head and neck sites.<sup>3,4</sup> Squamous cell carcinomas on the ear have similarly been shown to exhibit more aggressive clinical behavior, resulting in larger surgical defects.<sup>5-7</sup>

Larger surgical wounds, tightly adherent skin, limited tissue reservoirs, and a complex topography

of labyrinthine convexities and concavities together pose a unique set of challenges to the Mohs surgeon approaching ear reconstruction. Although arguably not as aesthetically important as the central aspect of the face, the appearance of the ears does significantly influence patient self-perception and well-being. Studies of microtia in the plastic surgery literature have shown that abnormalities in ear shape, positioning, or symmetry may cause patients significant psychological distress.<sup>8,9</sup> For these reasons, appropriate efforts should be extended to the repair of surgical wounds of the ear.

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Funding sources: None.

Conflicts of interest: None declared.

Accepted for publication January 20, 2016.

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Published online March 2, 2016.

0190-9622/\$36.00

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<http://dx.doi.org/10.1016/j.jaad.2016.01.028>

In addition to aesthetic concerns, the goals of reconstruction after tumor removal include functional preservation or restoration, cost-effectiveness, and if possible, a 1-stage repair. There are numerous reconstructive options for surgical defects of the ear, each with advantages and limitations. Secondary-intention healing is a viable choice for small wounds on concave surfaces of the skin, including the external ear.<sup>10</sup> Primary side-to-side closure is an option for some smaller defects, where the closure will not introduce anatomic distortion. However, larger wounds on the helix repaired in this fashion have a tendency to result in a pointed or “pixie” appearance to the ear. Local random pattern flaps may be used to repair smaller wounds, but are problematic for larger defects because of limited tissue reservoirs and predicated distortions. Wedge excision or variations on the Antia-Buch chondrocutaneous advancement flap<sup>11,12</sup> may significantly shorten the ear’s vertical height, diminish the size of the lobe, and result in poor aesthetic results. One- and 2-staged retroauricular flaps such as the mastoid pull-through flap<sup>13</sup> or mastoid interpolation flap<sup>14</sup> are useful for a variety of helical and nonhelical defects, but may be unnecessarily complex and expensive, and require multiple procedures when a more simple repair may result in an equally refined aesthetic outcome.

Full-thickness skin grafts (FTSGs) have been widely described as a first-line option for reconstruction of cutaneous defects of the upper two thirds of the ear.<sup>15,16</sup> A recent survey of 20 Mohs surgeons showed 19% of ear defects were repaired with skin grafts, among the highest rates of all anatomic locations.<sup>17</sup> FTSGs are traditionally selected to repair superficial defects, and when properly executed, are a simple, economical, 1-stage repair option that does not significantly alter the overall dimensions and topography of the ear. However, in addition to their utility for shallow wounds, we have expanded their role to defects with more significant volumetric deficiencies than is commonly accepted. This is accomplished by taking advantage of predictable “pincushioning” or combination with other flaps or cartilage grafts. Herein we report on our experience with FTSGs for repair of postsurgical defects of the external ear.

## METHODS

This study was approved by the Medical University of South Carolina Institutional Review Board. We performed a retrospective review of all Mohs micrographic surgery defects on the ear repaired with FTSGs by 2 dermatologic surgeons at the Department of Dermatology, Medical University of South Carolina, after tumor clearance by Mohs micrographic surgery (J. C., 2000-2014; B. C. L., 2007-2014).

All Mohs micrographic surgery cases and subsequent repairs during this time period were recorded in a commercially available database (Microsoft Access, Microsoft Corp, Redmond, WA; Malachite Corp, Durham, NC). The database was searched for any patient who underwent FTSG repair of the ear. Data were collected on

sublocation, tumor type, tumor size at presentation, postoperative defect size, and surgical complications, which included hematoma, graft failure, and infection.

All Mohs micrographic surgeries were performed with clean technique (nurses and doctors wear surgical masks and nonsterile gloves), whereas reconstructions were performed using sterile technique (sterilized instruments, sterile gloves, donor and recipient sites cleaned with a surgical scrub). All surgeries were performed in an office setting under local anesthesia. Wounds were dressed with petroleum jelly, nonstick gauze, and surgical tape, and sutures were generally removed 1 week after surgery. Typically, patients received a 5- to 7-day course of prophylactic postoperative antibiotics.

## RESULTS

A total of 1519 FTSGs on the ear were performed over the study period after extirpation of a variety of tumor types, which are summarized in [Table I](#). The most common locations for lesions repaired with a FTSG were the superior helix (38.8%), the crura of the antihelix of helical fossa (18.9%), and the back of helix/back of ear (15.4%) ([Fig 1](#)). The mean preoperative tumor diameter was 1.23 cm (0.3-4.3 cm). The mean postoperative diameter, which was equal to the graft diameter, was 2.09 cm (0.7-5.5 cm).

A total of 24 postoperative complications were recorded in 23 patients (1.6%) ([Table II](#)). The most

### CAPSULE SUMMARY

- Full-thickness skin grafts are a commonly used repair on the external ear.
- They are a versatile and reproducible repair option, providing consistent aesthetically pleasing results with low complication rates.
- These repairs can provide significant volumetric replacement by taking advantage of predictable “pincushioning” or combination with local flaps or cartilage grafts.

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