REVIEW ARTICLE

# Supraclavicular Artery Island Flap in Head and Neck Reconstruction: A Case Series and Literature Review

Shelley Wong[1]; Malia Brennan[1]; Scott Nishikawa, MD[2]; Jae H Lim, MD, PhD[3]

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## ABSTRACT

**Introduction:** Supraclavicular artery island flap (SCAIF) is emerging as an efficient and reliable flap for various complex head and neck defects after tumor extirpation.

**Objective:** To examine a series of cases using a SCAIF for head and reconstruction at our institution.

**Methods:** We performed a retrospective review of 8 patients who underwent SCAIF reconstruction of various head and neck defects from 2015 to 2018 at our institution. We also reviewed the English-language literature of reports of a SCAIF used for head and neck defects.

**Results:** Eight patients underwent SCAIF reconstruction of head and neck defects. Various anatomic sites were reconstructed including the neck (n = 4), oral cavity (n = 1), and parotid/lateral skull base (n = 3). Two patients had partial flap necrosis, requiring débridement and wound care. There was no total loss of the flap or donor-site complication.

**Conclusion:** SCAIF is an excellent choice for reconstructing various head and neck defects, with low complication rates and donor-site morbidity. The outcomes of our SCAIF reconstruction are comparable to previously published outcomes.

## INTRODUCTION

Reconstruction of head and neck defects after tumor extirpation is often challenging and time consuming. Although free tissue transfer has been the workhorse for larger defects, the supraclavicular artery island flap (SCAIF) has emerged as an efficient and reliable flap choice for various head and neck defects.[1-6]

The SCAIF is a thin, axial, fasciocutaneous pedicled flap with its blood supply from the transverse cervical artery in the neck. In 1979, Lamberty[7] described the axial pattern of the supraclavicular flap. However, it fell out of favor because of reported distal flap necrosis.[8] Pallua and colleagues[9] repopularized the technique, defining it as the "supraclavicular artery island flap" for reconstruction of postburn mentosternal contractures. Its use was subsequently expanded in head and neck reconstruction.[10] Because of its versatility, quick harvest, and excellent skin-color matching, the SCAIF has become an important reconstructive option in head and neck defects.[2,4]

## CASE PRESENTATIONS

We performed a retrospective chart review of patients who underwent head and neck reconstruction with a SCAIF from 2015 to 2018 at our institution, Kaiser Permanente Moanalua Medical Center in Honolulu, HI. The English-language literature was reviewed to summarize the employment of a SCAIF in head and neck reconstruction.


Figure 1 (case 1). A. Neck defect after tumor resection. B. Three months after reconstruction with a supraclavicular artery island flap, the flap in the neck is healed.

Our institution performed 8 (5 men and 3 women) SCAIFs from 2015 to 2018 for various head and neck reconstructive procedures after tumor removal. The mean age of the patients was 71 years old (range: 62-80 years). Two patients had a history of prior chemoradiation therapy (cases 2 and 4), and 1 individual had received chemotherapy treatment (case 3). There was no total flap loss. Two patients had partial flap loss and were treated conservatively with local wound care (cases 2 and 5). Adequate healing of the flaps and donor site occurred within 3 to 4 weeks, allowing for subsequent radiation therapy (cases 1, 4, and 6). Individual cases are highlighted here by type of defect.

## NECK DEFECTS

### Case 1

A 70-year-old man with a history of left-sided T1N0 floor-of-mouth squamous cell carcinoma (SCC) presented with nodal recurrence in the submental region involving his skin a few years after his initial surgery. He underwent left-sided modified radical neck dissection with resection of the mylohyoid muscle, anterior digastric muscle, and overlying skin. The defect was reconstructed with a SCAIF on the left side (Figures 1A and 1B).

### Case 2

A 76-year-old woman with a history of SCC on the right lateral aspect of the tongue had undergone partial glossectomy and neck dissection followed by chemoradiation therapy. She had a nodal recurrence in the right side of the neck several years after her initial treatment and underwent salvage neck

**Author Affiliations**

[1] John A Burns School of Medicine, University of Hawaii, Honolulu

[2]Department of Plastics and Reconstructive Surgery, Hawaii Permanente Medical Group, Honolulu

[3]Department of Otolaryngology-Head and Neck Surgery, Kaiser-Moanalua Medical Center, Honolulu, HI

**Corresponding Author**

Jae H Lim, MD, PhD (jaelim75@gmail.com)

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Figure 2 (case 3). One month postoperatively, the patient has a well-healed flap in the neck and donor site in the shoulder region.

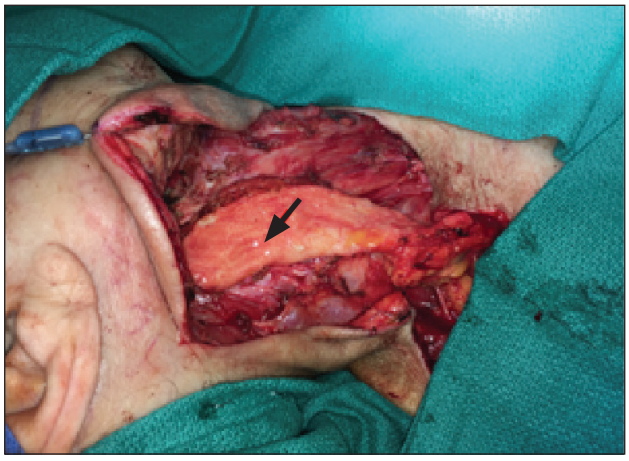

Figure 3 (case 4). Completely deepithelialized buried coverage of the supraclavicular artery island flap (arrow) of the carotid artery in the neck.

dissection. An open wound then developed on the right side of the neck, with carotid artery exposure. The wound was reconstructed with a contralateral SCAIF because the ipsilateral transverse cervical artery was compromised from prior surgery. Partial distal flap necrosis occurred, and it was successfully treated with débridement and a 2-week course of negative-pressure wound therapy.

### Case 3

In a 62-year-old woman with a diffuse large B-cell lymphoma, a large necrotic right-sided neck wound developed after initiation of chemotherapy. The wound was débrided and reconstructed with a SCAIF (Figure 2).

### Case 4

A 58-year-old woman experienced a local neck recurrence of her cancer after chemoradiation therapy for T1N1 SCC of the right piriform sinus. She underwent radical neck dissection with completely deepithelialized, buried SCAIF flap coverage of the right carotid artery (Figure 3). She then received repeated radiation therapy.

## ORAL CAVITY DEFECT

### Case 5

A 64-year-old man with T2N0 floor-of-mouth SCC underwent wide local excision of the right-sided floor of the mouth and right-sided neck dissection. The defect in the oral cavity was reconstructed with a SCAIF. He had partial necrosis of the distal portion of the flap and an orocutaneous fistula. He underwent débridement of the necrosis, followed by 1 week of negative-pressure wound therapy, with resolution of the orocutaneous fistula.

## PAROTID/LATERAL SKULL BASE DEFECTS

### Case 6

An 80-year-old man had a recurrent mucoepidermoid carcinoma of the left parotid gland, with the tumor infiltrating the skin. He underwent left total parotidectomy with neck dissection. The parotid gland and skin defects were reconstructed with a SCAIF.

### Case 7

A 67-year-old man with a history of a bilateral lung transplant and receiving an immunosuppressive agent had a spindle cell SCC of the left ear with metastasis to the left parotid gland underwent left partial auriculectomy, left superficial parotidectomy, and left-sided modified radical neck dissection, followed by SCAIF coverage.

### Case 8

A 77-year-old man with recurrent basal cell carcinoma of the right ear involving the ear canal and conchal bowl and lobule. He underwent a right subtotal auriculectomy, right lateral temporal bone resection, right superficial parotidectomy, and reconstruction with a SCAIF (Figure 4).

Figure 4 (case 8). Supraclavicular artery island flap reconstruction of the parotid gland and temporal bone at 1 month postoperatively shows a well-healing flap and donor site.

## DISCUSSION

A major tumor extirpation in the head and neck region frequently requires free-tissue transfer surgery. However, free-flap reconstructive surgery can be lengthy and is often not a viable option for patients of advanced age and with comorbidities. It also requires considerable microvascular surgery experience, and hence its availability is often limited to larger medical centers.[1-6]

SCAIF for head and neck reconstruction after tumor extirpation has been gaining popularity. This technique has several advantages over free tissue transfer, including flap pliability with excellent color matching in the head and neck area. Moreover, a SCAIF can be harvested quickly with low donor-site morbidity and does not require microvascular surgery.[11]

Results of published studies demonstrate the use of SCAIF reconstruction of defects in a multitude of areas, including the following: Cervical and facial cutaneous, oral cavity, postpharyngectomy, pharyngoesophageal, pharyngostomal, tracheostomal, lateral aspect of the skull base, parotid, mandible, temporal bone, and neck defects.[1,2,4,6,12-26] Authors of most studies reported minimal or no complications. Of those reported, common complications of the recipient site included partial flap necrosis, pharyngocutaneous leak, wound infection, and wound dehiscence. Common complications of the donor site included wound dehiscence and delayed wound healing. Incidents of complete flap loss or necrosis were noted in a minority of publications, supporting an overall successful use of this reconstructive technique.[4,6,17,21,24,26]

Although the number of cases in our series is small, the findings nonetheless support the use of a SCAIF in a variety of anatomical sites within the local radius of the flap, with excellent results. These cases included patients with medical comorbidities, a prior history of chemotherapy and/or radiation therapy, and advanced tumors from various head and neck subsites. The complications were few in our case series and comparable to those in published studies. Specifically, there was no total flap necrosis or donor-site complication. Partial distal flap necrosis occurred in 2 patients, and an orocutaneous fistula developed in 1 patient. All these patients were treated conservatively, with excellent outcomes.

Although we did not see a particular increase in complications after SCAIF reconstruction among the patients who had prior chemotherapy and/or radiation therapy in our study, other studies have noted various complications, including total and partial flap loss, oral cutaneous leak/fistula, wound dehiscence, and carotid artery blowout, in these higher-risk patients.[4,6,21,23] Interestingly, whereas some authors have reported higher rates of complications in patients with a history of radiation therapy and multiple neck operations,[23] others found no association between prior neck dissection or radiation treatment and flap loss.[21] We believe that many factors contribute to potential flap loss, including the length of the harvested flap, prior neck surgery, history of radiation therapy, and patient comorbidity. Therefore, careful patient selection is key to successful reconstruction using a SCAIF in the head and neck region.

## CONCLUSION

This case series demonstrates the successful use of a SCAIF in head and neck reconstruction. With its low complication rates and donor-site morbidity as well as ease of harvest, SCAIF should be considered as one of the primary reconstructive options for various head and neck defects. ❖

**Disclosure Statement**

*The author(s) have no conflicts of interest to disclose.*

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