

The Use of Flow-through Free Flaps for Head and Neck Reconstruction



Mark A. Maier, BS ¹; Patrick A. Palines, MD ²; Richard F. Guidry, MD ²; Mark W. Stalder, MD ²

¹ School of Medicine, Louisiana State University Health Sciences Center, New Orleans, LA

² Division of Plastic and Reconstructive Surgery, Dept. of Surgery, Louisiana State University Health Sciences Center, New Orleans, LA

mmaie1@lsuhsc.edu; ppalin@lsuhsc.edu; rguid6@lsuhsc.edu; mstald@lsuhsc.edu

Introduction & Purpose

- Reconstructive obstacles in composite head and neck defects are compounded in re-operated, irradiated, and vessel-depleted surgical fields.¹
- Strategic flow-through flap configurations mitigate recipient vessel inaccessibility and inset logistics by providing a built-in option for inflow to a second flap (Figure 1).^{2,3}
- Purpose:** Configure head and neck flow-through free flaps to:
 - Use a lone native recipient vessel
 - Increase reach of inflow vessels and flap flexibility for composite reconstruction

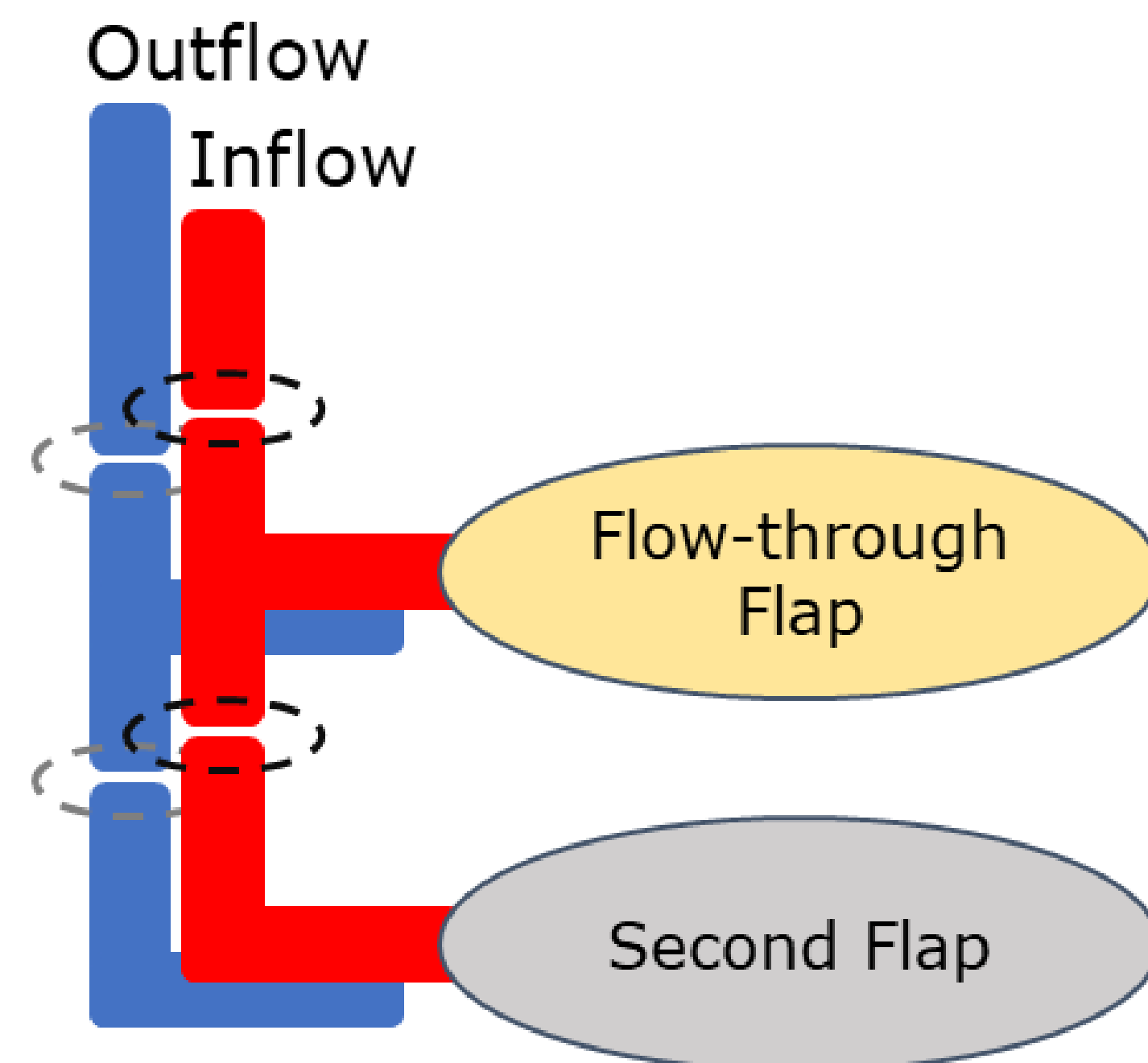


Figure 1. Flow-through flap concept schematic.

OBJECTIVE: Describe our technique and outcomes of reconstructing complex head and neck deformities using soft tissue and bony free flaps in a flow-through configuration.

Methods

- Retrospective Case Review:** 38 head and neck free flap cases were reviewed from University Medical Center in New Orleans, LA from March 2019 to April 2021; 9 cases configured free flaps in a flow-through fashion.
- Flow-through Flaps:** soft tissue and osseus flaps are arranged in series connecting recipient vessels to the proximal flap and the proximal flap to the distal flap (Figures 2, 3).
- Analysis:** patient age/sex, history, tobacco, radiation, defect, recipient vessels, flow-through flap, number of perforators, second flap, complications, and follow-up were reviewed and described (Table 1).

Results & Case Images

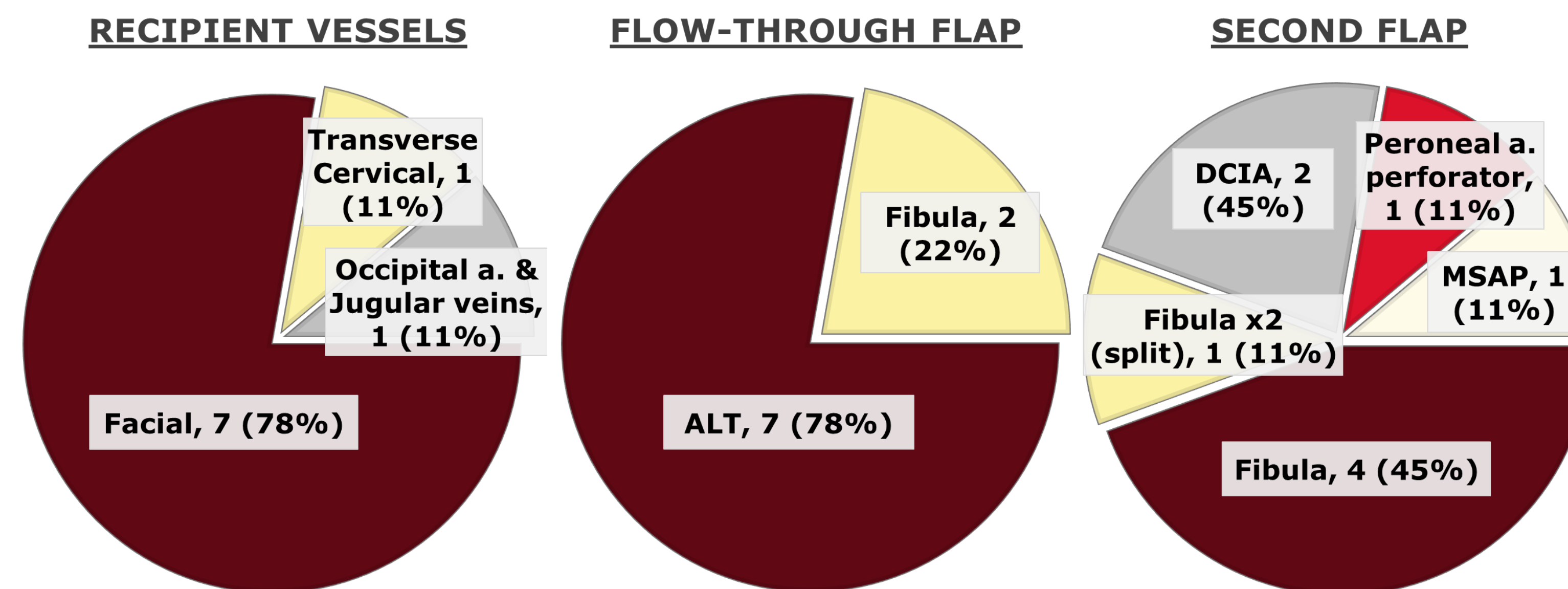


Figure 2. Pie charts outlining recipient vessels, flow-through flap, and second flap (n=9).



Figure 3. 50 F intra-op configuration. A) Free fibula flap split into osteocutaneous, osseus, and fasciocutaneous flaps. B) Flow-through anastomosis for osseus to fasciocutaneous flap.

Age/ Sex	History	Tobacco	Radiation	Indication	Recipient Vessels	Flow- through Flap	Number of Perforators	Second Flap	Vascular- related Complications	Follow- up (days)
				Head & Neck Defect						
50 / F	GSW	N	N	L hemi-maxilla; L ramus to R angle mandible	L facial	Fibula	1 artery; 1 vein	Peroneal artery perforator	N/A	646
48 / M	Adenoid cystic carcinoma	N	Y	R maxillectomy; R frontal craniotomy	R facial	Fibula	1 artery; 1 vein	MSAP	N/A	125
71 / F	Liposarcoma, ORN	N	Y	L parasymphaseal to L subcondylar mandibulectomy	L facial	ALT	1 artery; 1 vein	Fibula	N/A	533
62 / M	SCC, ORN	N	Y	L ramus to L body mandibulectomy	L facial	ALT	1 artery; 1 vein	Fibula	N/A	732
58 / F	SCC	Y	N	R angle to L body mandibulectomy	R facial	ALT	1 artery; 1 vein	Fibula	N/A	158
62 / F	SCC	Y	Y	R angle to L angle mandibulectomy, full-thickness anterior neck and lower lip defect	R transverse cervical	ALT	1 artery; 1 vein	Fibula	Arterial thrombosis, hematoma	53
49 / M	SCC, ORN	N	Y	Bilateral body mandibulectomies	R occipital a., R external and internal jugular v.	ALT	1 artery; 2 veins	Fibula x 2 (split)	N/A	319
56 / M	GSW	Y	N	Anterior segment of mandible	R facial	ALT	1 artery; 1 vein	DCIA	N/A	87
58 / M	SCC, prior flap failure	Y	Y	L ramus to R ramus mandibulectomy	L facial	ALT	1 artery; 1 vein	DCIA	Hematoma	680

Table 1. Case series of flow-through free flaps for head and neck reconstruction. ALT = anterolateral thigh flap; DCIA = deep circumferential iliac artery flap; DS = donor site; GSW = gunshot wound; MSAP = medial sural artery perforator flap; ORN = osteoradionecrosis; SCC = squamous cell carcinoma.

Summary

- Flow-through flaps for head and neck reconstruction advantages (Figure 4):
 - Only need a single recipient artery/vein in difficult surgical fields
 - Allows for more flexibility with the flap inset due to an inherent increase in pedicle length

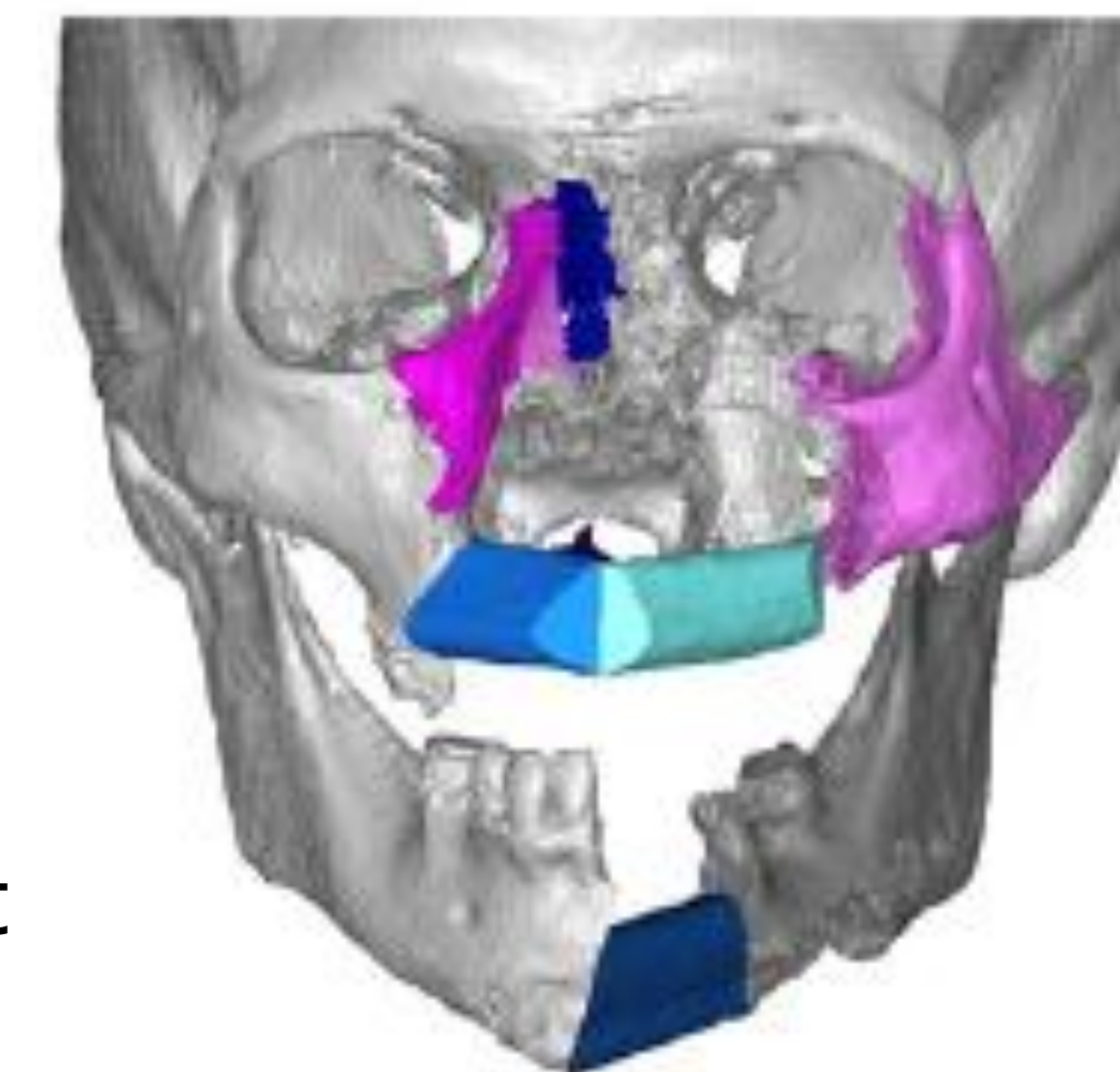


Figure 4. Virtual surgical planning highlighting the use of soft-tissue and bony flow-through free flaps in mandibular reconstruction in 50 F patient.

References

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