

EP-068

흉배동맥 천공지 유리피판을 이용한 두피 재건: 증례군 연구

Scalp Resurfacing with a Versatile Thoracodorsal Artery Perforator Free Flap: A Case Series



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Purpose: Scalp defects following wide excision of malignant skin tumors present significant reconstructive challenges due to limited tissue elasticity, frequent calvarial exposure, and prior radiation. This study evaluates the clinical outcomes and reliability of the thoracodorsal artery perforator (TDAP) free flap for oncologic scalp reconstruction.

Methods: A retrospective review was conducted of 14 patients who underwent scalp reconstruction with a TDAP free flap between February 2016 and January 2026. Patients reconstructed with local, regional, or alternative free flaps were excluded. Demographic data, diagnosis, body mass index (BMI), defect location, flap size, pedicle length, operative time, recipient vessels, postoperative complications, secondary procedures, follow-up duration, and tumor recurrence were analyzed. All reconstructions were performed by a single senior surgeon. The superficial temporal vessels were used as recipient vessels in all cases.

Results: The cohort included 8 females and 6 males with a mean age of 62.4 years. Diagnoses included basal cell carcinoma, squamous cell carcinoma, basosquamous carcinoma, angiosarcoma, malignant melanoma, and other malignant tumors. The mean BMI was 23.6 kg/m². The average flap size was 97 cm², with a mean pedicle length of 9.7 cm. The mean operative time was 134.3 minutes. One patient developed venous thrombosis requiring re-exploration; no total flap loss occurred. Secondary procedures were performed selectively for contour refinement or scar revision. No local tumor recurrence was observed during follow-up.

Conclusion: The TDAP free flap provides reliable vascularity, adequate pedicle length, and stable coverage for oncologic scalp defects, with low complication rates and satisfactory oncologic outcomes.

Sex	Age	Diagnosis	BMI	Flap	Location	Flap dimension (cm ²)	Op time (min)
F	52	BCC	26.6	TDAP	Lt. temple	56	120
F	25	SCC	24.2	TDAP	Rt. temple and vertex	80	210
F	32	BCC	18.6	TDAP	Lt. temple	42	90
F	85	SCC	12.8	TDAP	Lt. temple	48	150
M	84	BCC	23.6	TDAP	Lt. temple	72	120
M	56	BSCC	34.6	TDAP	Lt. temple and vertex	165	150
F	38	Procarcinoma	29.9	TDAP	Rt. Temple	63	120
M	74	SCC	16.7	TDAP	Rt. temple	70	120
M	65	angiosarcoma	25.4	TDAP	Rt. temple	120	120
F	76	Malignant melanoma	28.8	TDAP	Lt. temple and vertex	154	120
M	78	SCC	21.4	TDAP	Rt. temple	168	140
M	72	SCC	23.6	TDAP	Rt. temple and vertex	210	150
F	84	BSCC	21.6	TDAP	Lt. temple	56	120
F	52	SCC	22.1	TDAP	Lt. temple	54	150

BCC, basal cell carcinoma; SCC, squamous cell carcinoma; BSCC, basosquamous cell carcinoma; TDAP, thoracodorsal artery perforator free flap

Table 1. Patient demographics, tumor diagnoses, defect locations, and operative characteristics in patients who underwent scalp reconstruction with a thoracodorsal artery perforator free flap.



Figure 1. Clinical photographs of a 56-year-old male patient (BMI 34 kg/m²) diagnosed with basosquamous cell carcinoma, with underlying diabetes mellitus and hypertension. (Left) Preoperative view showing the scalp malignancy involving the temple and vertex regions. (Right) Intraoperative view after wide oncologic excision demonstrating the resultant scalp defect prior to reconstruction.

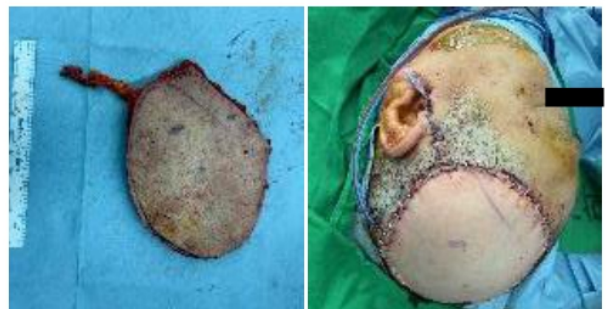


Figure 2. Intraoperative images demonstrating thoracodorsal artery perforator free flap reconstruction for the scalp defect in the same patient. (Left) Harvested TDAP flap measuring 15 × 11 cm (total area 165 cm²) with a pedicle length of 14 cm. (Right) The flap was anastomosed end-to-end to the superficial temporal vessels. Despite the patient's high BMI, defatting of the flap allowed it to match the surrounding contour.