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# A New Lower Eyelid Reconstruction Using Transverse Facial Artery Perforator Flap Based on Anatomical Study

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## Summary

With the aging of the global society, the demand for lower eyelid reconstruction following malignant skin tumour resection is increasing. For decades, flaps that require excessive dissection have been used to reconstruct relatively large lower eyelid defects. A new, less invasive option is needed for elderly patients. We present a new surgical technique using a transverse facial artery perforator flap. Records of 11 patients who underwent lower eyelid reconstruction with transverse facial artery perforator flaps after malignant skin tumour resection were reviewed. The patients' mean age was  $85.7 \pm 6.7$  years. Six patients underwent surgery under local anaesthesia and five under general anaesthesia. Malignant skin tumours were resected with 4–10 mm of the surrounding skin, depending on the tumour type. An ipsilateral transverse facial artery perforator flap was raised to cover the defect. Primary reconstructions were achieved in all cases. The median follow-up period was 13 (range, 9–33) months. Two minor complications occurred during the follow-up period: pyogenic granuloma (n=1) and temporary ocular pain and conjunctivitis (n=1). The incidence of complications and the results of the functional and aesthetic evaluation based on the modified patient-reported

outcome measure showed no significant differences between the two different anaesthesia groups. To the best of our knowledge, this is the first report to describe the use of a transverse facial artery perforator flap for lower eyelid reconstruction. The flap may be an effective option for lower eyelid reconstruction in elderly patients to achieve good functional and aesthetic outcomes with low risk and minimal invasion.

**Keywords:** *lower eyelid reconstruction, malignant skin tumour, elderly, transverse facial artery perforator flap*

## **Introduction**

With the aging of the global society, the incidence of malignant skin tumours, especially in the facial area, has increased in recent years.<sup>1</sup> Although complete excision is undoubtedly the first-choice treatment of facial malignant skin tumours, successful aesthetic and functional reconstructions are required. However, advances in health care have also increased the number of frail elderly people.<sup>2</sup> In such cases, highly invasive surgery should be avoided from the perspective of perioperative risk management.<sup>3</sup>

The lower eyelid, one of the most important functional and aesthetic areas, has traditionally been reconstructed with local flaps, such as cheek rotation or cervicofacial flaps when the defect size was not small.<sup>4,5</sup> These are preferred because they are less scarring and less likely to cause functional problems, such as ectropion or lagophthalmos. However, applying these flaps to frail elderly patients may be challenging because these flaps require a wide dissection and are difficult to perform under local anaesthesia.

To overcome this problem, a minimally invasive, functional, and aesthetic reconstruction method is needed. Herein, we present a new reconstructive method using a transverse facial artery perforator flap (TFAPF) after malignant skin tumour resection of the lower eyelid. To the best of our knowledge, this is the first report describing lower eyelid reconstruction using TFAPF.

## Patients and Methods

We reviewed medical charts of patients with defect reconstruction using the TFAPF technique, who underwent malignant skin tumour excision in the lower eyelid region between July 2019 and June 2021. This study was approved by the institutional review board of Shimane University Hospital, Japan (IRB no. 5668). Written informed consent was obtained from all study participants, and the investigation was conducted according to the ethical principles outlined in the Declaration of Helsinki.

Data collected included patient age, sex, diagnosis, comorbidities, performance status (PS), presence of antithrombotic medications, type of anaesthesia, distance from the lateral canthus to the perforator, defect size, flap dimensions, postoperative complications, follow-up period, presence of recurrences, and functional and aesthetic outcomes.

General exclusion criteria for applying TFAPF were ipsilateral buccal scarring and severe heart failure intolerable to surgery. To evaluate whether the type of anaesthesia affects the outcome, we divided the patients into two groups according to the type of anaesthesia. The defect size was calculated by multiplying the two longest vertical diameters. Functional and aesthetic outcomes were evaluated using the modified patient-reported outcome measure (PROM), which was originally developed to evaluate outcomes for double eyelid surgery, because there was no instrument to evaluate lower eyelid reconstructions.<sup>6,7</sup> Following the article that reported the original PROM, a patient satisfaction questionnaire (total score, 40) was used to validate the modified PROM. In the case of dementia, the questionnaires were filled out by the patient's family and were completed at least 9 months after surgery. The original PROM consisted of domains that evaluated the severity of scarring, pain, and asymmetry, as well as functional and aesthetic problems, and we adhered to this concept. The questionnaire included 8 questions with a maximum total score of 12. In the scarring domain, scar hypertrophy at the lower eyelid and buccal area was scored as 0 if the patient presented with a painful and ugly

scar, whereas a score of 3 indicated no visible scar (Table 1). In the functional and aesthetic assessment domain, there was one question each (6 total) to evaluate asymmetry, blepharophimosis, ocular pain, depression of the lower lid, difficulty closing the eye, and ectropion (Table 2). For each question, respondents answered either YES (score 0) or NO (score 1). The satisfaction assessment domain, which was the same as the original one, comprised 4 questions with scores ranging from 1-10, where scores of 1 and 10 indicated the lowest and highest satisfaction, respectively. The 4 questions included the following: 1) If you could make the decision again, how likely would you be to undergo this surgery? 2) Will you recommend this surgery to others? 3) Overall, how satisfied are you with the appearance of your eyes? 4) Overall, how satisfied are you with the function of your eyes? To make the modified PROM and satisfaction rate scores comparable, the maximum score of each evaluation system was adjusted by a proportional increase to 120 points.

Correlations between the modified PROM and patient satisfaction were analysed by linear correlation analysis, and statistical analyses of the results of patient characteristics including scores of the modified PROM in different anaesthetic groups were performed by the Mann-Whitney U test. All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA).

### **Anatomy**

In most cases, the transverse facial artery (TFA) is a branch of the superficial temporal artery. However, in some cases, it branches from the maxillary artery. The TFA originates, on average, 1 cm below the tragus, after traversing the layer between the parotid gland and the masseter muscle and branches out at least as one sizable perforator. The TFA is accompanied by the buccal branch of the facial nerve until the perforator branches out. As an indicator, the location of the perforator penetrating the superficial musculoaponeurotic system (SMAS) is typically approximately 3 cm lateral to and 4 cm below the lateral canthus.<sup>8-10</sup> Figure 1 (top) shows the

relationship between the TFA and other anatomical markers and the typical localisation of the perforator.

### ***Surgical procedure***

Surgery was performed under local anaesthesia unless the patient was unable to rest because of dementia or desired general anaesthesia because of anxiety. Malignant skin tumours were resected with 4–10 mm of surrounding skin, depending on their type. We designed a triangle-shaped flap containing a TFA perforator as a vascular pedicle. The location of the ipsilateral TFA perforator was identified and marked before surgery using colour Doppler ultrasound (ARIETTA; HITACHI Inc., Tokyo, Japan) (Fig. 1, bottom). The TFAPF was raised in the supra-SMAS layer, from a supra-lateral to an infra-medial direction until the perforator pedicle was observed. Then, the medial side of the TFAPF was incised to be island-shaped and dissected, while preserving the vascular pedicle. Thus, the TFAPF was transferred in an advancement manner to cover the defect. The flap transfer-related defect was closed primarily. The subcutaneous tissue was approximated with interrupted 5.0 PDS II (polydioxanone; Ethicon Inc., Somerville, NJ, USA) sutures, and the skin was closed with interrupted 5.0 Novafil (polybutester; COVIDIEN Inc., Minneapolis, MN, USA) sutures. The circumference of the lower eyelid margin was sutured with 5.0 polysorb (polysorb; COVIDIEN Inc.). A suction drain was placed under the flap to avoid postoperative haematoma and removed 1–4 days after surgery. The skin sutures were removed on postoperative day 7. A representative surgical case is shown in Fig. 2.

### **Results**

Eleven patients (six men and five women) with a mean age of  $85.7 \pm 6.7$  years underwent lower eyelid reconstruction using the TFAPF. Eight patients had basal cell carcinoma, two had sebaceous gland carcinoma, and one had Merkel cell carcinoma. Three patients had dementia and one was bedridden. One patient each had taken apixaban for atrial fibrillation, clopidogrel

sulphate for internal carotid artery stenosis, and dipyridamole for angina. Four patients had PS 2, four had PS 0, and the remaining three had PS 1, 3, and 4. Six patients underwent surgery under local anaesthesia and five under general anaesthesia. The mean location of the perforator was  $3.6 \pm 0.5$  cm lateral to and  $4.6 \pm 0.8$  cm below the lateral canthus. The mean defect size was  $5.3 \pm 3.6$  cm<sup>2</sup>, and the mean flap dimensions were  $8.0 \pm 1.6$  cm  $\times$   $4.0 \pm 1.5$  cm. Primary lower eyelid reconstruction using TFAPF was performed in all patients. The follow-up period ranged from 9 to 33 (median, 13) months. Two minor complications occurred in two patients during the follow-up period; one had pyogenic granuloma, and the other had temporary ocular pain and conjunctivitis. No flap congestion, ischaemia, haematoma, or infection was observed. Tumour recurrence was not observed during the follow-up period. Regarding functional and aesthetic outcomes, the mean score of the modified PROM was 10.4 (maximum, 12), indicating that patients were generally satisfied with the results. Table 3 summarises the data collected from each patient. In the comparison of two groups with different types of anaesthesia, although the average age was significantly older in the local anaesthesia group ( $89.3 \pm 6.1$  years vs  $81.4 \pm 4.9$  years,  $p = .03$ ), the average defect size, incidence of complications, and the modified PROM score results showed no significant differences (Fig. 3). Patient satisfaction scores and modified PROM scores showed a positive linear correlation ( $p < .05$ ,  $R^2 = .96$ ).

## Discussion

Several reconstructive methods for relatively large lower eyelid defects are available. These include cheek rotation, cervicofacial, and lateral orbital flaps.<sup>4,5,11</sup> Reconstruction with these flaps may reduce the risk of persistent conjunctivitis and conspicuous deformities such as ectropion that are likely to occur in the inferior-to-superior V-to-Y advancement flaps, particularly in patients with defects that extend to the eyelid margins.<sup>12</sup> However, patients treated with these conventional flaps tend to complain of delayed wound healing or partial flap

loss, resulting from subcutaneous haematoma associated with extensive subcutaneous flap dissection.<sup>12</sup> Prolonged operative times and wide ranges of flap dissection may also cause unbearable intraoperative pain under local anaesthesia. These problems might be acceptable for relatively young, healthy patients with low risks. However, with increasing demands for onco-surgery in frail elderly patients, a less invasive and more mobile perforator pedicled island-shaped flap, sufficient to cover the defect, seems to be an ideal method. Herein, we successfully reconstructed 11 lower eyelid defects using TFAPF. Although the sample size was too small to evaluate the significance, the outcomes of the local anaesthesia group were at least comparable with those of the general anaesthesia group.

The perforator of the TFA, utilised as a vascular pedicle in this flap, has been studied anatomically over the past 20 years, although it was mainly for safe and effective face lifting. Jacobovicz et al. investigated the localisation of the TFA cutaneous perforator in 40 healthy volunteer women using Doppler ultrasound. They reported that the mean localisation values of the cutaneous perforator of TFA were  $30\pm 4$  mm lateral to and  $38\pm 4$  mm below the lateral canthus.<sup>9</sup> Bozikov et al. conducted a study in 24 formalin-preserved cadaver head halves. They reported that at least one TFA perforator, located on average 31.7 mm lateral to and 39.4 mm below the lateral canthus, was present bilaterally in all cadavers.<sup>8</sup> By contrast, perforators from the zygomatico-orbital, zygomatico-facial, and zygomatico-temporal arteries, which together with those of the transverse facial artery compose the subdermal vascular network in the lateral orbital and cheek region, were absent in 10 cadavers.<sup>8</sup> Pierrefeu et al. studied 14 hemifaces of fresh adult cadavers and reported the presence of at least one sizable perforator of TFA in which the mean perforator diameter was  $1.01\pm 0.3$  mm and the location was  $31\pm 8$  mm lateral to and  $38.7\pm 8.8$  mm below the lateral canthus.<sup>10</sup> Their anatomical study also showed a mean single perforator surface area of  $25.3\pm 18.34$  cm<sup>2</sup>.<sup>10</sup> These findings logically support the usefulness of TFAPF for lower eyelid reconstruction. However, perforator locations in our



study targeting the super-elderly patients tended to be approximately 6 mm apart and lateral to and below, respectively, compared with the locations shown in previous studies.<sup>8-10</sup>

The cheek island flap reported by Heywood et al., similar to the present flap, does not require extensive dissection and has a low risk of causing secondary ectropion.<sup>13</sup> In their case series, although they discussed that the vascular pedicle was presumed to be a branch of the TFA, the flap itself was based on a subcutaneous pedicle. By contrast, as the TFAPF is based on the cutaneous perforator of the TFA, it has a more reliable blood supply and sufficient mobility that makes it suitable for covering defects. We also believe that the concept is quite similar to the keystone flap first reported by Behan et al., which is currently used for various parts of the body.<sup>14</sup> Although keystone flaps can be used to reconstruct lower eyelid defects, even with limited knowledge of TFA perforators, using pure TFAPF should achieve safer and more effective reconstructions.

One of the major potential drawbacks of TFAPF is a conspicuous donor-site scar in the centre of the cheek region, which limits its application in a younger population with fewer wrinkles. However, in the elderly population, the cheek scar is embedded in wrinkles and is less conspicuous and thus more acceptable.

In conclusion, to our knowledge, this study is the first to report the use of TFAPF for lower eyelid reconstruction. The TFAPF is a reliable flap because of its constant presence in the vascular pedicle. We suggest that the TFAPF is an effective option for lower eyelid reconstruction in elderly patients to achieve good functional and aesthetic outcomes with low risk and minimal invasion.

### **Meeting presentation**

This material has been presented at the 64th Annual Meeting of the Japan Society of Plastic and Reconstructive Surgery, Tokyo, April 15, 2021.

### **Ethical Approval:**

This study was approved by the institutional review board of Shimane University Hospital, Japan (IRB no. 5668).

#### **Patient Consent for Photo Publication:**

Written informed consent, including for use of photographs, was obtained from all study participants.

#### **Declaration of Competing Interest**

The authors have no conflicts of interests to disclose.

#### **Source of Funding**

The authors have no source of funding to disclose.

#### **Acknowledgments**

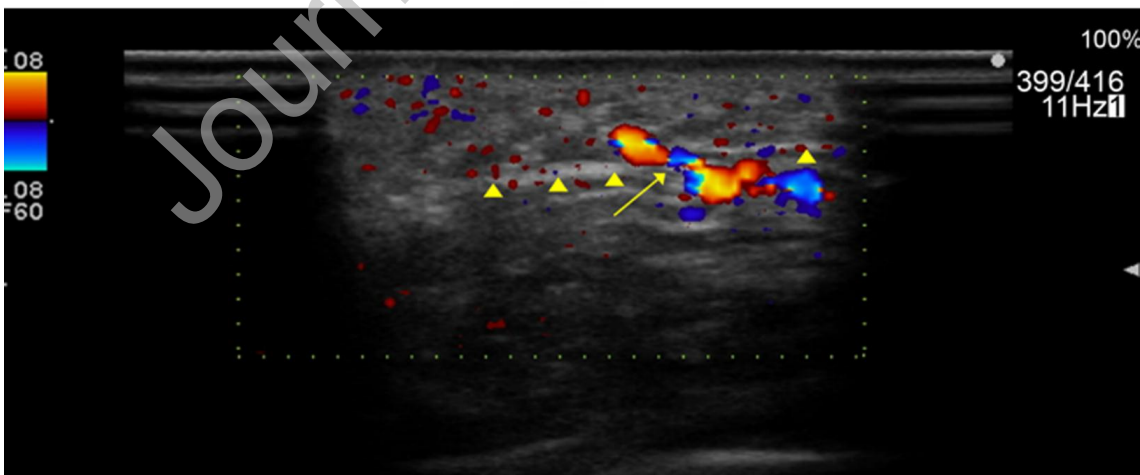
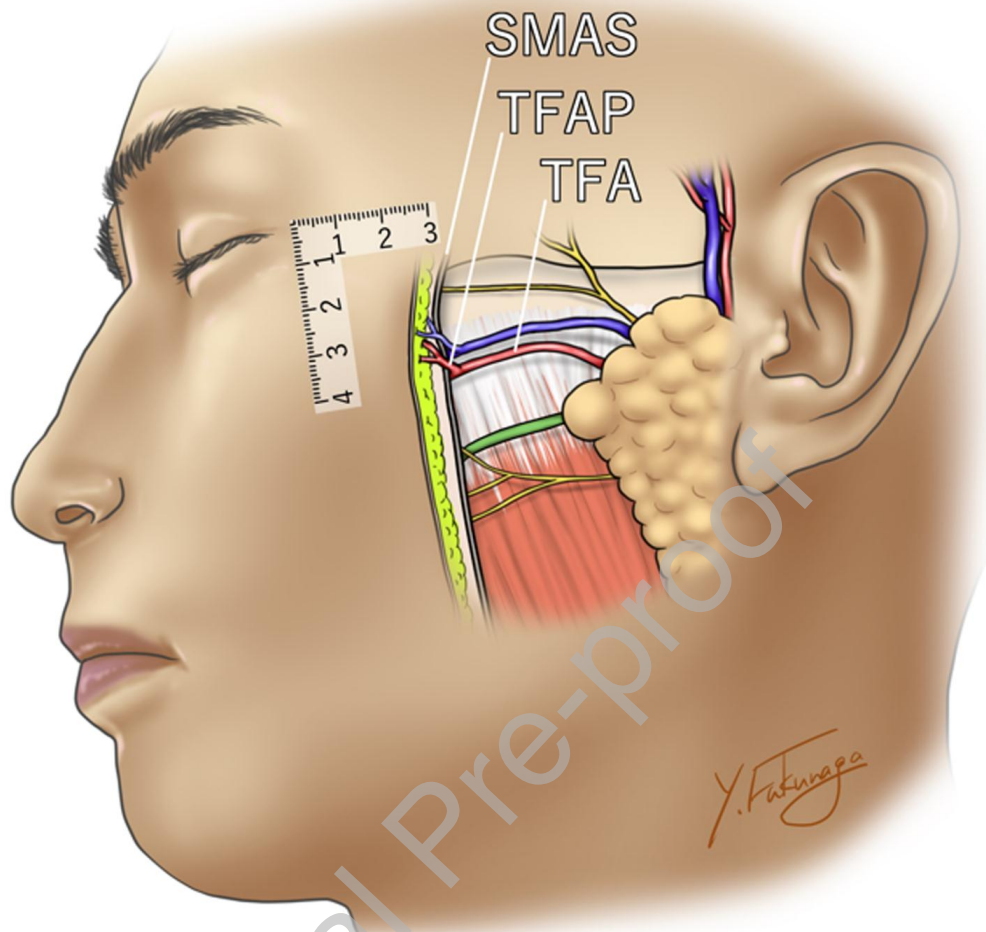
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#### **References**

1. Garcovich S, Colloca G, Solla P, et al. Skin cancer epidemics in the elderly as an emerging issue in geriatric oncology. *Aging Dis* 2017;8;643-61.
2. Hardin RE, Le Jemtel T, Zenilman ME. Experience with dedicated geriatric surgical consult services: Meeting the need for surgery in the frail elderly. *Clin Interv Aging* 2009;4;73-80.
3. Fukui K, Fujioka M, Yamasaki K, Yamakawa S, Matsuo H, Noguchi M. Risk factors for postoperative complications among the elderly after plastic surgery procedures performed under general anesthesia. *Plast Surg Int* 2018;2018;7053839.
4. Callahan MA, Callahan A. Mustardé flap lower lid reconstruction after malignancy. *Ophthalmology* 1980;87;279-86.
5. Mercer DM. The cervicofacial flap. *Br J Plast Surg* 1988;41;470-4.
6. Zhai JY, Guo XS, Song GD, et al. Surgical outcome and patient satisfaction after

- Z-epicanthoplasty and blepharoplasty. *Int J Ophthalmol* 2018;11;1922-5.
7. Mo YW, Jung GY. Surgical Results and Patient Satisfaction After A New Surgical Technique for Asian Medial Epicanthoplasty: A Modified Skin Redraping Method Using a Horizontal Point Incision and Staged 'Y-Shaped' Dog Ear Correction. *Ann Plast Surg* 2021;87;389-95.
  8. Bozиков K, Shaw-Dunn J, Soutar DS, Arnez ZM. Arterial anatomy of the lateral orbital and cheek region and arterial supply to the “peri-zygomatic perforator arteries” flap. *Surg Radiol Anat* 2008;30;17-22.
  9. Jacobovicz J, Tolazzi ARD, Timi JRR. Doppler ultrasound localization of the facial transverse artery cutaneous branch. *Plast Reconstr Surg* 2008;121;336e.
  10. Pierrefeu A, Brosset S, Lahon M, et al. Transverse facial artery perforators: Anatomical, two- and three-dimensional radiographic study. *Plast Reconstr Surg* 2019;143;820e-28e.
  11. Ogawa Y, Takemoto T, Suzuki K, Kusumoto K. Application of the lateral orbital flap to reconstruction of the upper and lower eyelids and the eye socket after enucleation. *Ann Plast Surg* 2011;66;360-3.
  12. Sugg KB, Cederna PS, Brown DL. The V-Y advancement flap is equivalent to the Mustardé flap for ectropion prevention in the reconstruction of moderate-size lid-cheek junction defects. *Plast Reconstr Surg* 2013;131;28e-36e.
  13. Heywood AJ, Quaba AA. A cheek island flap for the lower eyelid. *Br J Plast Surg* 1991;44;183-6.
  14. Behan FC. The keystone design perforator island flap in reconstructive surgery. *ANZ J Surg.* 2003;73:112-20.

## Legends

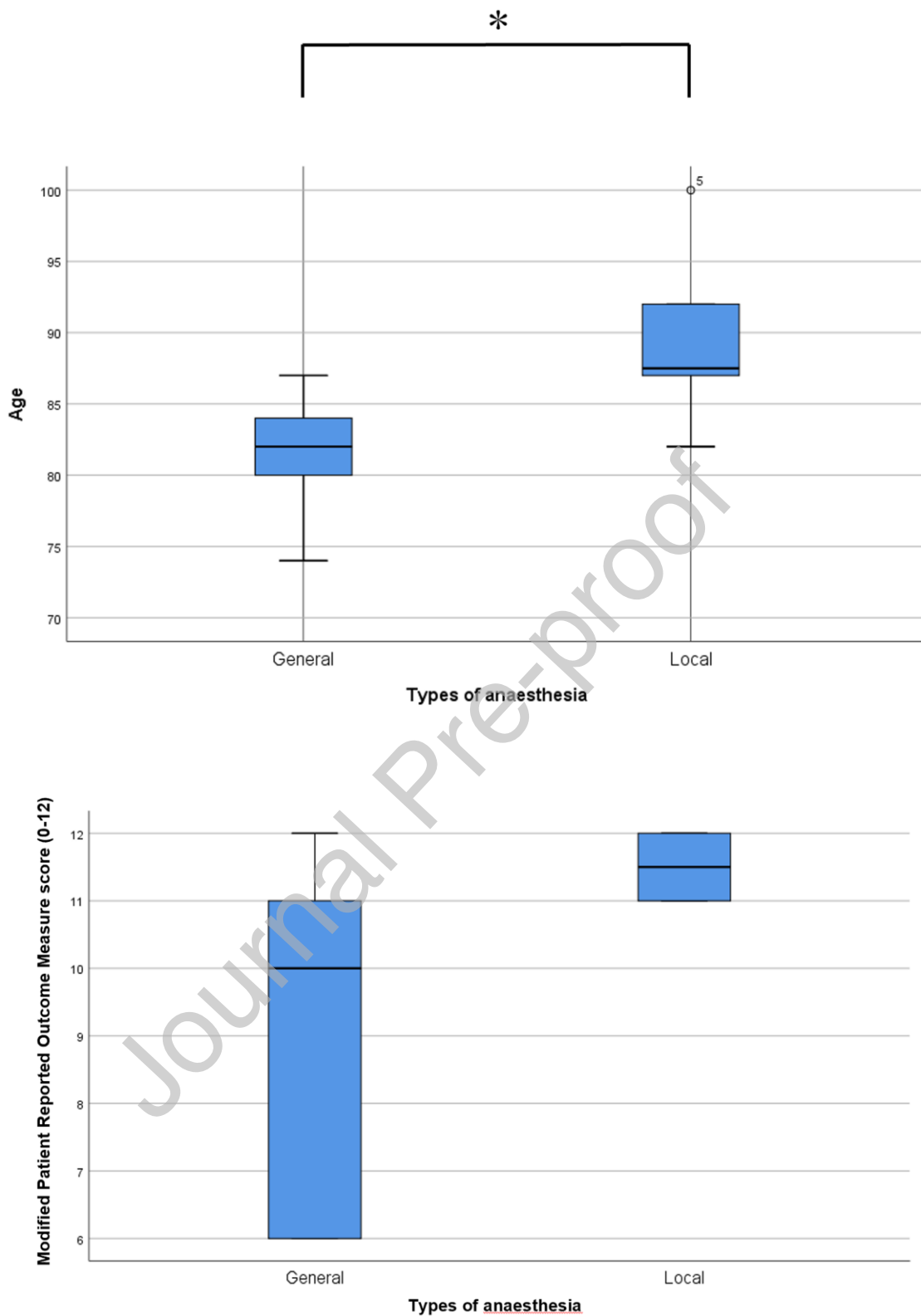


**Figure 1.** Relationship between the transverse facial artery and other anatomical markings, and typical localisation of the perforator (top). The perforator of the transverse facial artery is typically located 3 cm lateral to and 4 cm below the lateral canthus.

The location of the ipsilateral transverse facial artery perforator is identified and marked using colour Doppler ultrasound before surgery (bottom). *Arrowheads* indicate the superficial musculoaponeurotic system. The *arrow* indicates where the perforator penetrates the superficial musculoaponeurotic system.



**Figure 2.** An 84-year-old man with left lower eyelid basal cell carcinoma underwent total tumour resection (top left). After tumour resection with a 6-mm safety margin, a 7 cm × 4 cm transverse facial artery perforator flap was designed, including one perforator, which was marked with colour Doppler ultrasound preoperatively (top right). The flap was raised in the layer on the superficial musculoaponeurotic system based on the perforator indicated by the *arrow* (bottom left). At the 17-month follow-up examination, no tumour recurrence, ectropion, or lagophthalmos was observed, and the patient was satisfied with the inconspicuous appearance of the scar (bottom right).



**Figure 3.** (A) Ages according to the type of anaesthesia. Statistical analyses using the Mann–Whitney U test were performed. The ages are shown as box-and-whisker plots.  $n = 11$ ,  $*p < .05$ . (B) Postoperative modified patient-reported outcome measure scores according to the

type of anaesthesia. Statistical analyses using the Mann–Whitney U test were performed. The scores are shown as box-and-whisker plots.  $n = 11$ ,  $p = .126$ .

**Table 1. Modified patient-reported outcome measure scoring system based on the questionnaire used for scarring evaluations**

Scar hypertrophy at the lower eyelid	Painful and ugly scar	<b>0</b>
	Conspicuous scar	<b>1</b>
	Slightly conspicuous scar	<b>2</b>
	No visible scar	<b>3</b>
Scar hypertrophy at the buccal area	Painful and ugly scar	<b>0</b>
	Conspicuous scar	<b>1</b>
	Slightly conspicuous scar	<b>2</b>
	No visible scar	<b>3</b>
<b>Total</b>		<b>0-6</b>

**Table 2. Modified patient-reported outcome measure scoring system based on the questionnaire used for functional and aesthetic evaluations**

Asymmetry	<b>Yes</b>	<b>0</b>
	<b>No</b>	<b>1</b>
Blepharophimosis	<b>Yes</b>	<b>0</b>
	<b>No</b>	<b>1</b>

Ocular pain	Yes	0
	No	1
Depression of the lower lid	Yes	0
	No	1
Difficulty closing eye	Yes	0
	No	1
Ectropion	Yes	0
	No	1
<b>Total</b>		<b>0-6</b>

**Table 3. Characteristics of the patients who underwent lower eyelid reconstruction with a transverse facial artery perforator flap**

Age	Dia	Como	P	Antith	Type	Late	De	Flap	Posto	P	Tum	Mo
*/Sex	gnosis	rbidities	S	rombotic	s of anaesthesia	ral cant	fec t	dime nsion s (cm)	perati ve compl icatio n	O D	our recu rrence	difi ed PR OM score (0-12)
						hust	size					
						perforator distance (cm later						



							al, cm belo w)						
1	82/ F	BC C	Deme ntia	2	None	Gene ral	3.7, 4.8	2.5 6	8 × 2	None	99 2	No	12
2	92/ F	MC C	Deme ntia, Gastr ostom y	4	None	Loca l	4.0, 4.2	9.9 2	10 × 4.5	None	55 3	No	12
3	82/ M	BC C	Intern al caroti d stenosi s	0	Clopid ogrel Sulpha te	Loca l	2.5, 5.0	1.2 2	4.5 ×	Temp orary ocular pain and conju nctivit is	51 1	No	11
4	84/ M	BC C	Chron ic atrial fibrill ation	1	Apixab an	Gene ral	3.2, 3.2	3	7 × 4	Pyoge nic granu loma	51 0	No	11
5	100/ M	BC C	Angin	2	Dipyri	Loca l	3.5, 3.7	3.7	8 ×	None	43	No	11

	<b>F</b>	<b>C</b>	<b>a</b>		<b>damole</b>	<b>l</b>	<b>4.2</b>	<b>5</b>	<b>4.5</b>		<b>5</b>		
<b>6</b>	<b>87/</b>	<b>SG</b>	<b>Deme</b>	<b>2</b>	<b>None</b>	<b>Gene</b>	<b>4.0,</b>	<b>5.4</b>	<b>8 × 7</b>	<b>None</b>	<b>38</b>	<b>No</b>	<b>6</b>
	<b>F</b>	<b>C</b>	<b>ntia</b>			<b>ral</b>	<b>4.5</b>	<b>4</b>			<b>6</b>		
<b>7</b>	<b>88/</b>	<b>BC</b>	<b>None</b>	<b>2</b>	<b>None</b>	<b>Loca</b>	<b>4.0,</b>	<b>4.4</b>	<b>7 × 6</b>	<b>None</b>	<b>37</b>	<b>No</b>	<b>12</b>
	<b>M</b>	<b>C</b>				<b>l</b>	<b>5.0</b>				<b>8</b>		
<b>8</b>	<b>74/</b>	<b>BC</b>	<b>None</b>	<b>0</b>	<b>None</b>	<b>Gene</b>	<b>3.2,</b>	<b>4.3</b>	<b>8 × 4</b>	<b>None</b>	<b>36</b>	<b>No</b>	<b>10</b>
	<b>M</b>	<b>C</b>				<b>ral</b>	<b>3.6</b>	<b>5</b>			<b>3</b>		
<b>9</b>	<b>87/</b>	<b>BC</b>	<b>None</b>	<b>0</b>	<b>None</b>	<b>Loca</b>	<b>4.4,</b>		<b>10 ×</b>	<b>None</b>	<b>36</b>	<b>No</b>	<b>11</b>
	<b>M</b>	<b>C</b>				<b>l</b>	<b>4.6</b>	<b>2.2</b>	<b>3</b>		<b>3</b>		
<b>1</b>	<b>87/</b>	<b>BC</b>	<b>None</b>	<b>0</b>	<b>None</b>	<b>Loca</b>	<b>3.8,</b>	<b>9.5</b>	<b>10 ×</b>	<b>None</b>	<b>35</b>	<b>No</b>	<b>12</b>
<b>0</b>	<b>M</b>	<b>C</b>				<b>l</b>	<b>5.8</b>	<b>7</b>	<b>4</b>		<b>0</b>		
<b>1</b>	<b>80/</b>	<b>SG</b>	<b>Deme</b>		<b>None</b>	<b>Gene</b>	<b>3.2,</b>	<b>12.</b>	<b>8×3</b>	<b>None</b>	<b>27</b>	<b>No</b>	<b>6</b>
<b>1</b>	<b>F</b>	<b>C</b>	<b>ntia</b>	<b>3</b>		<b>ral</b>	<b>5.5</b>	<b>25</b>			<b>9</b>		

\* Age in years.

BCC, basal cell carcinoma; F, female; M, male; MCC, Merkel cell carcinoma; POD, postoperative days; PROM, patient-reported outcome measure; PS, performance status; SGC, sebaceous gland carcinoma.