46 Temporoparietal Fascia Flaps

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◆ Classification

- Type A fasciocutaneous flap

◆ Vascular Pedicle

The temporoparietal fascia (TPF) flap is supplied by the superficial temporal artery. The middle temporal artery supplies the deep temporal fascia, which lies deeper (**Fig. 46.1**).

- Mean arterial caliber: 1.5 to 2.0 mm; length: 4 cm
- Mean venous caliber: 2.0 to 3.0 mm; length: 4 cm
- Sensory innervation: auriculotemporal nerve

The TPF is supplied by the superficial temporal artery, which is located anterior and deep to the superficial temporal vein, and courses superiorly on the surface of the superficial temporal fascia. At a point 2 to 4 cm superior to the zygomatic arch, the superficial temporal artery divides into its terminal branches (frontal and parietal branch) of the superficial temporal artery.

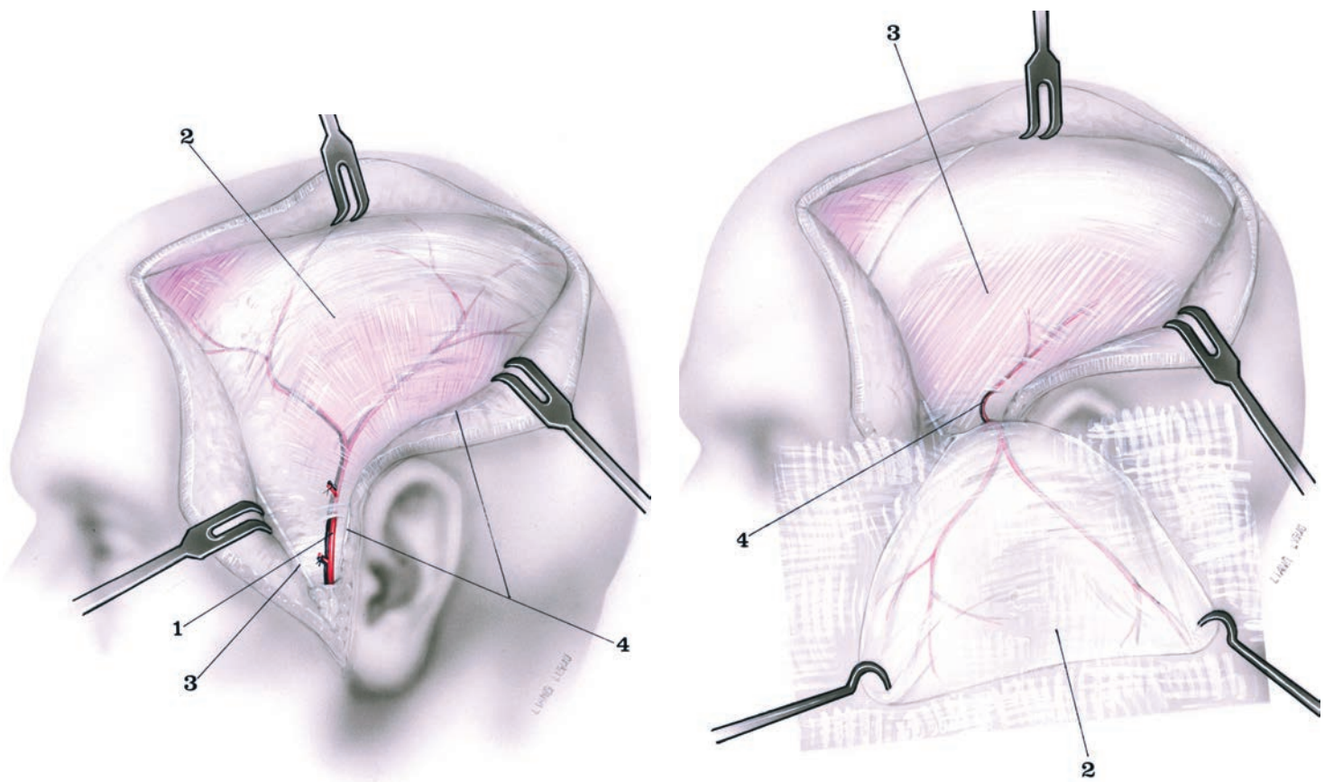
◆ Patient Positioning

The patient is positioned in the supine position.

◆ Surface Markings

The TPF flap is bounded superiorly by the superior temporal fusion line, anteriorly by the orbital rim, inferiorly by the zygomatic arch, and posteriorly by the temporal fossa of the parietal bone. Beyond the temporal fossa, the TPF continues as the galea.

1. Preoperatively, the temporal artery can be palpated anterior to the helical root of the ear.
2. Skin markings are made to facilitate exposure of the TPF flap. It is done zigzag to reduce scar contracture.



AQ1 **Fig. 46.1** Blood supply to the temporoparietal fascia (TPF) flap. **(a)** The TPF flap is supplied by the superficial temporal artery. The main vessel branches into the anterior and posterior branches as it traverses the flap. **(b)** The superficial temporal artery (STA) lies on the underside of the temporoparietal fascia flap. Deep to this is the middle temporal artery, which supplies the deep temporal fascia.[1]

◆ Raising the Flap

Step 1: Skin Markings

Skin markings are made to facilitate exposure of the TPF and the posterior aspect of the ear (**Fig. 46.2**). The zigzag incision is made to reduce spreading of scar and prevention of scar alopecia.

Step 2: Skin Incision and Exposure of the Temporoparietal Flap

Thin skin flaps are raised with care not to traumatize the underlying TPF (**Fig. 46.3**). The skin incision is made only down to the subcutaneous tissue with care not to damage the underlying fascia. Observe the presence of the hair follicles illustrating how thin the skin flaps are.

The superficial aspect of TPF flap is exposed. The posterior branch of the superficial temporal artery (*arrow*) can be seen in the medial aspect of the flap. The anterior branch, which courses anteriorly, is ligated during the harvest. The posterior branch of the STA can be seen in a close-up here (**Fig. 46.4**).

Step 3: Separation of the TPF from the Superficial Layer of the Deep Temporal Fascia

Preoperatively, the extent and reach of the flap is measured to reach the posterior aspect of the ear lobule. The anterior incision on the TPF is made and the TPF flap is raised based on the posterior branch of the STA. The anterior branch of the STA is ligated (**Fig. 46.5**).

The TPF is separated from the deep temporal fascia (DTF) by loose areolar tissue which is an avascular plane. The flap is pedicled based on the posterior branch of the superficial temporal artery (**Fig. 46.6**).

Step 4: Harvest of Full Thickness Skin Graft

Full thickness skin graft is harvested from the ipsilateral groin to cover the TPF flap. The donor site is closed primarily (**Fig. 46.7**).

Step 5: Elevation of Auricle

The scalp incisions are closed primarily with Vicryl 5-0 and Ethilon 6-0 stitches (Ethicon, Somerville, NJ) (**Fig. 46.8**). Rib cartilage is fashioned into a C-shaped wedge and placed posteriorly to create the adequate auriculocephalic angle.

The TPF flap pedicle emerges from the superior crus of the neoauricle. The elevated framework is covered by the TPF and inset with Vicryl 5-0. The pedicle of the STA lies at the superior part of the anterior helix. The full thickness skin graft is then inset over the TPF flap (**Fig. 46.9**).

◆ Important Anatomical Structures

Identified and raised with the flap:

- Superficial temporal fascia
- Posterior branch of superficial temporal artery

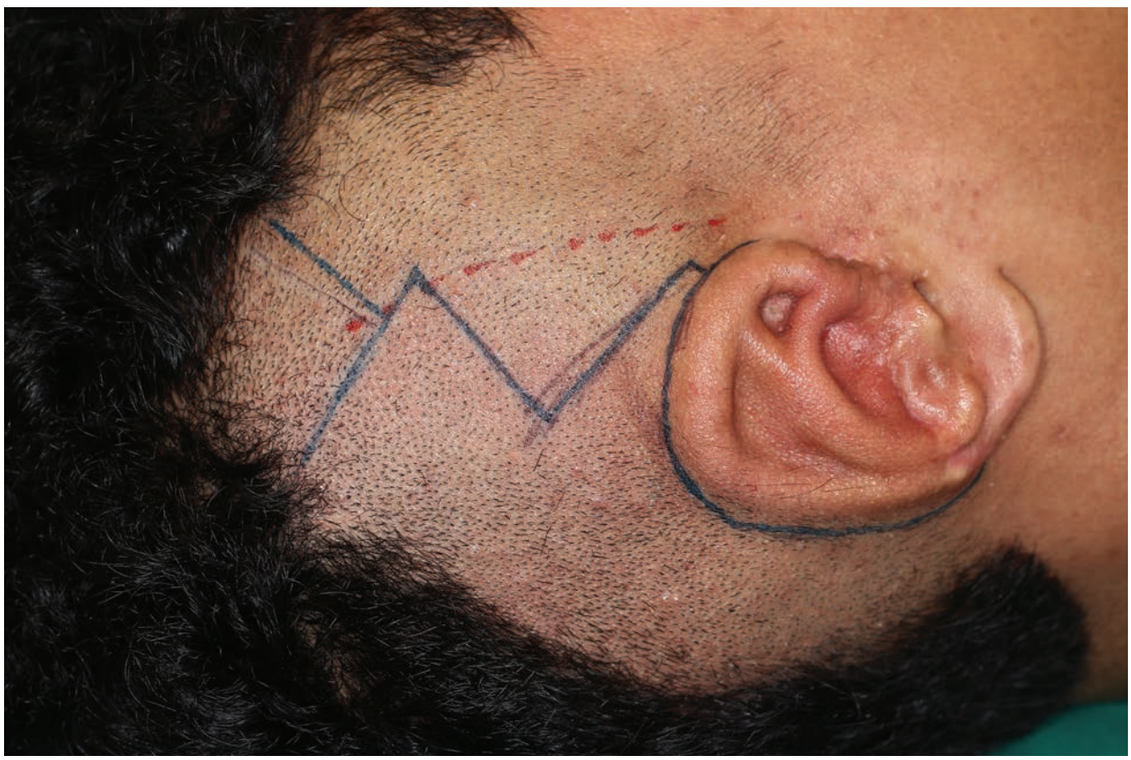
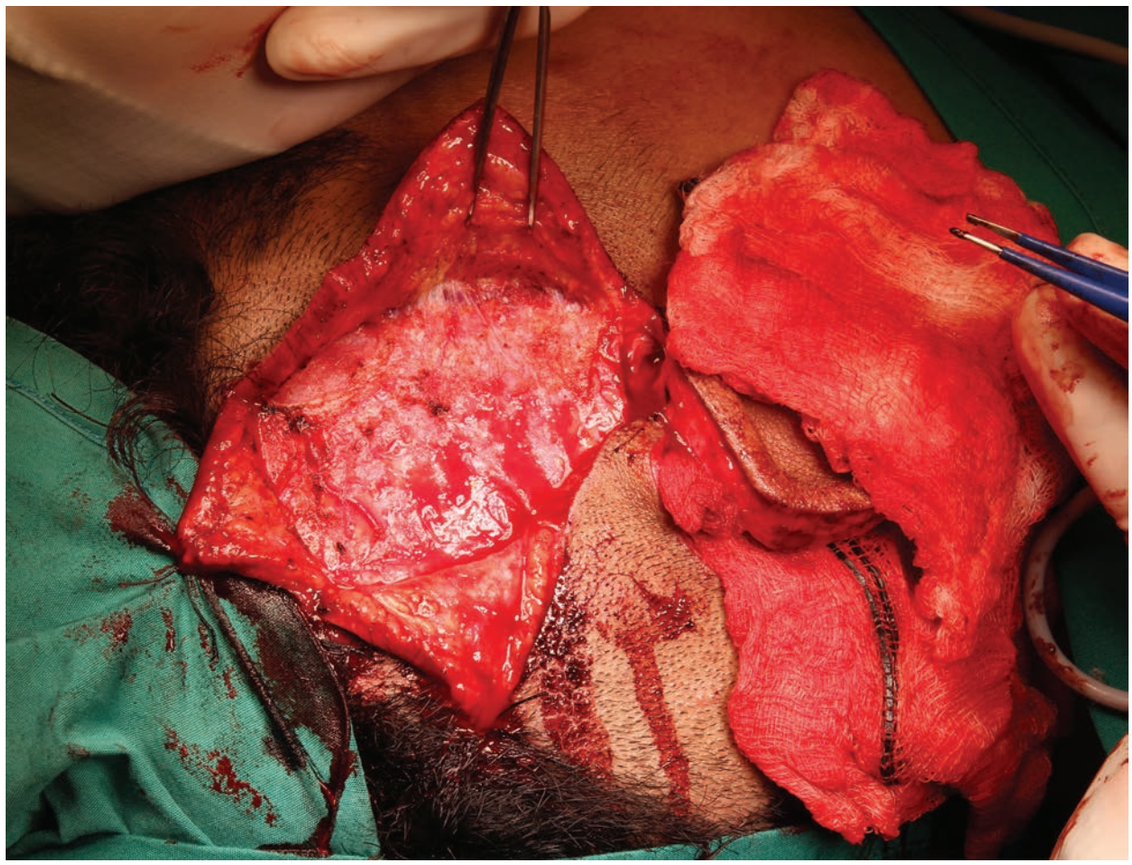


Fig. 46.2 A zigzag incision is used to expose the TPF flap. The *red dotted line* marks the course of the posterior branch of the superficial temporal artery, which is the source vessel for the TPF flap.



a

b

Fig. 46.3 Exposure of the TPF flap. **(a)** The skin flaps are intentionally raised thin so as not to damage the underlying fascia. **(b)** The *arrow* points to the posterior branch of the superficial temporal artery. It lies superficially on the flap.

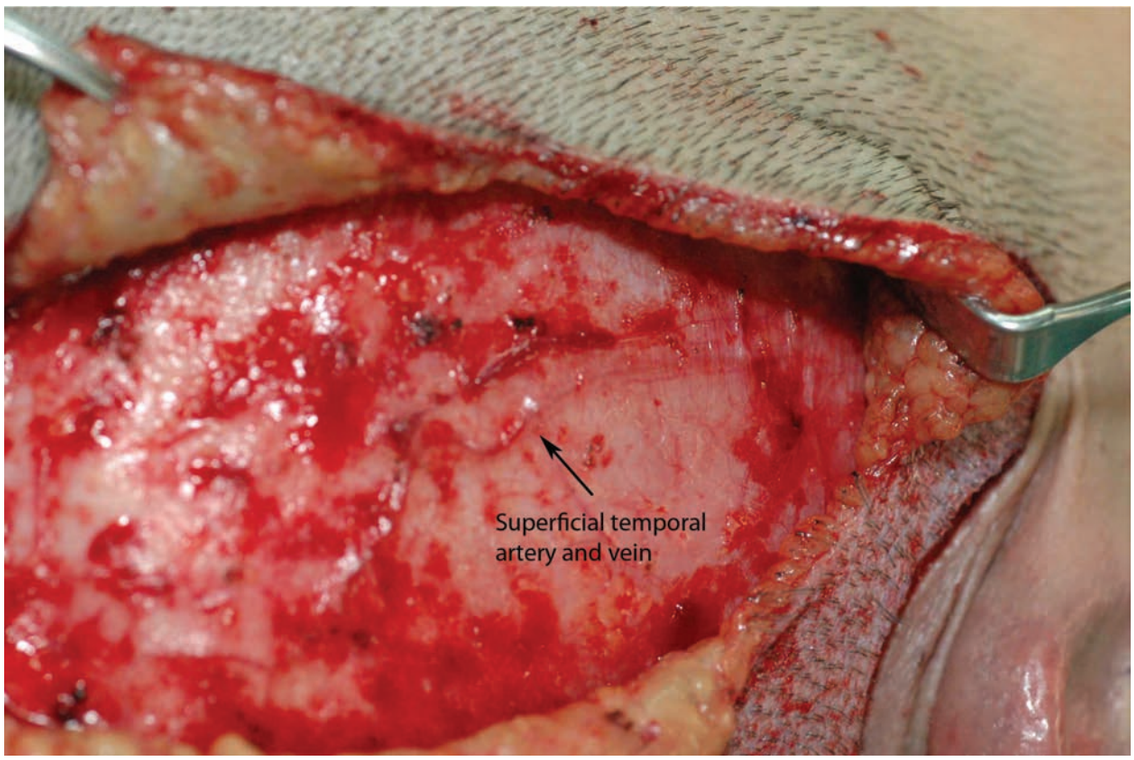


Fig. 46.4 Close-up showing the superficial temporal artery.

a

Fig. 46.5 Elevation of the TPF flap. **(a)** Upon complete exposure of the TPF flap, the posterior edge is incised and the TPF flap is raised off the deep temporal fascia. *(continued)*

b

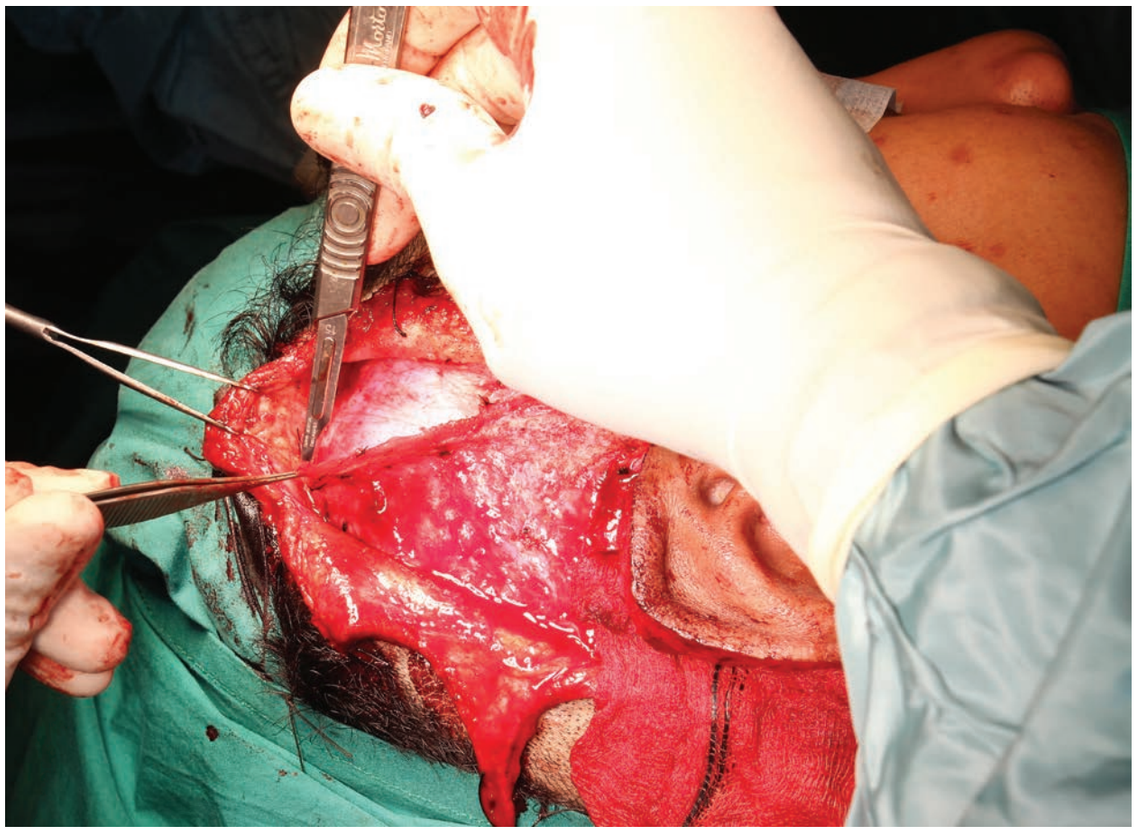


Fig. 46.5 *(continued)* **(b)** The anterior edge of the TPF flap is incised to mobilize the flap. The anterior branch of the STA may have to be ligated so that the flap can reach the inferior lobule.

a

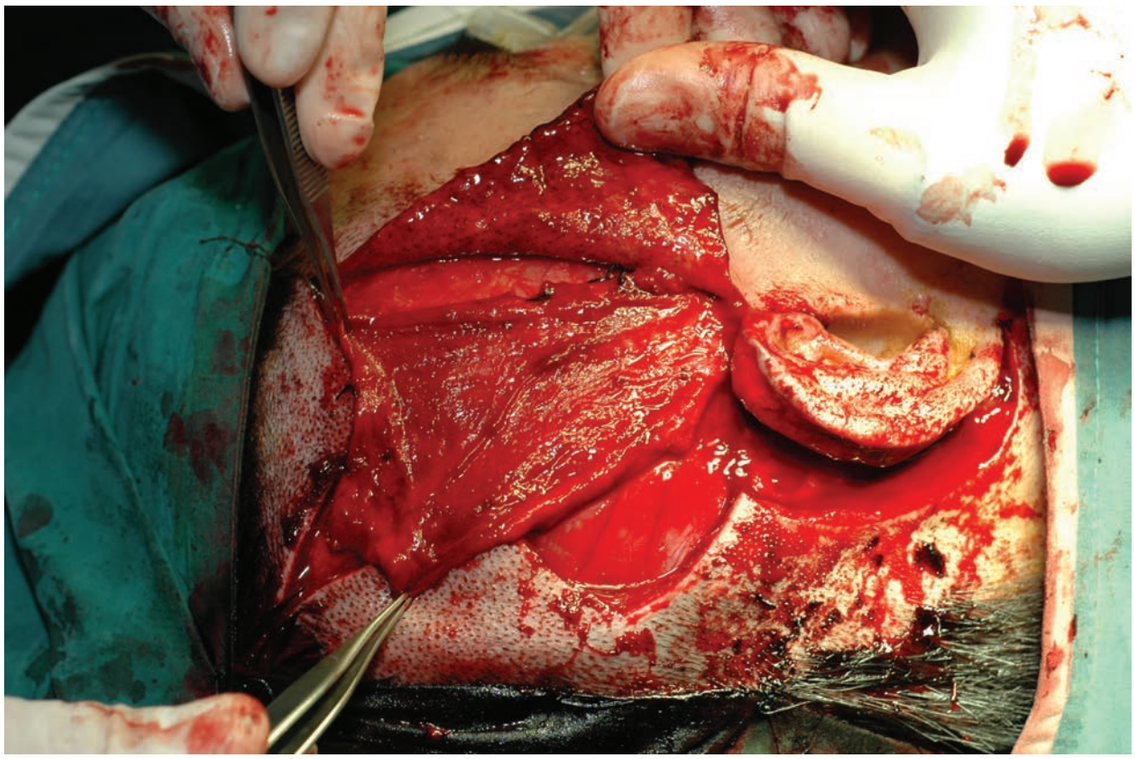
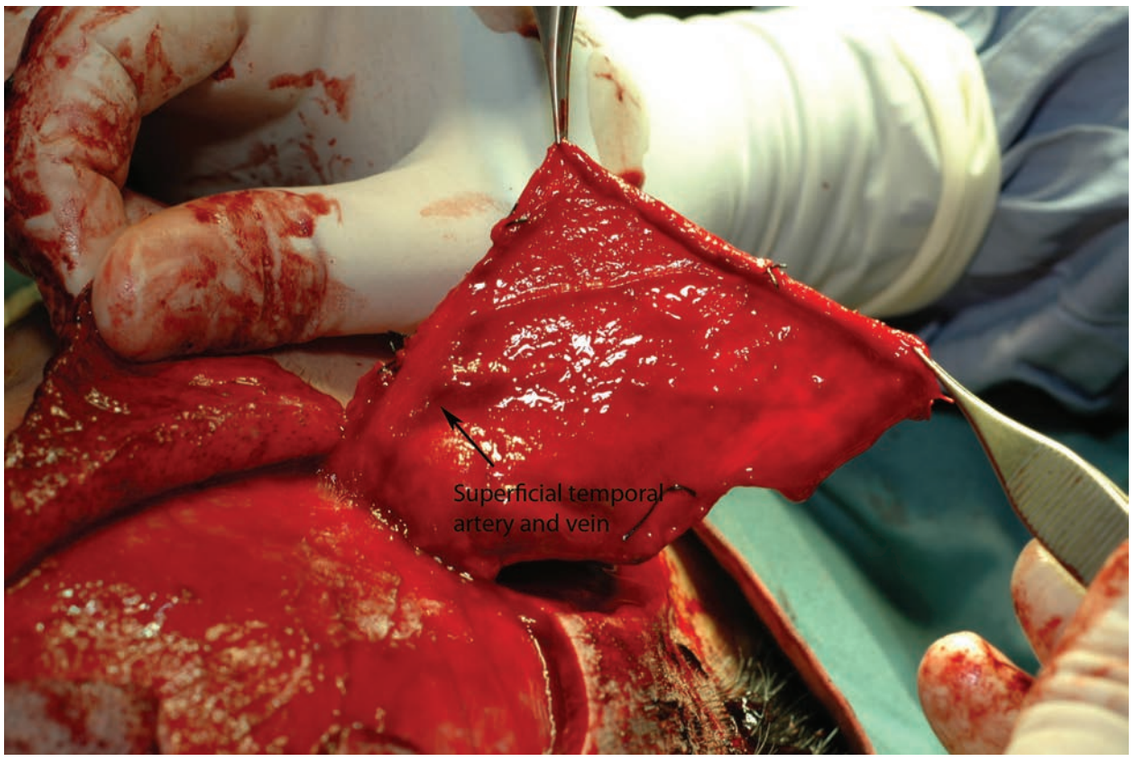


Fig. 46.6 Elevation of the TPF flap. **(a)** The TPF flap is shown here completely elevated and ready to be transposed over the neoauricle. *(continued)*

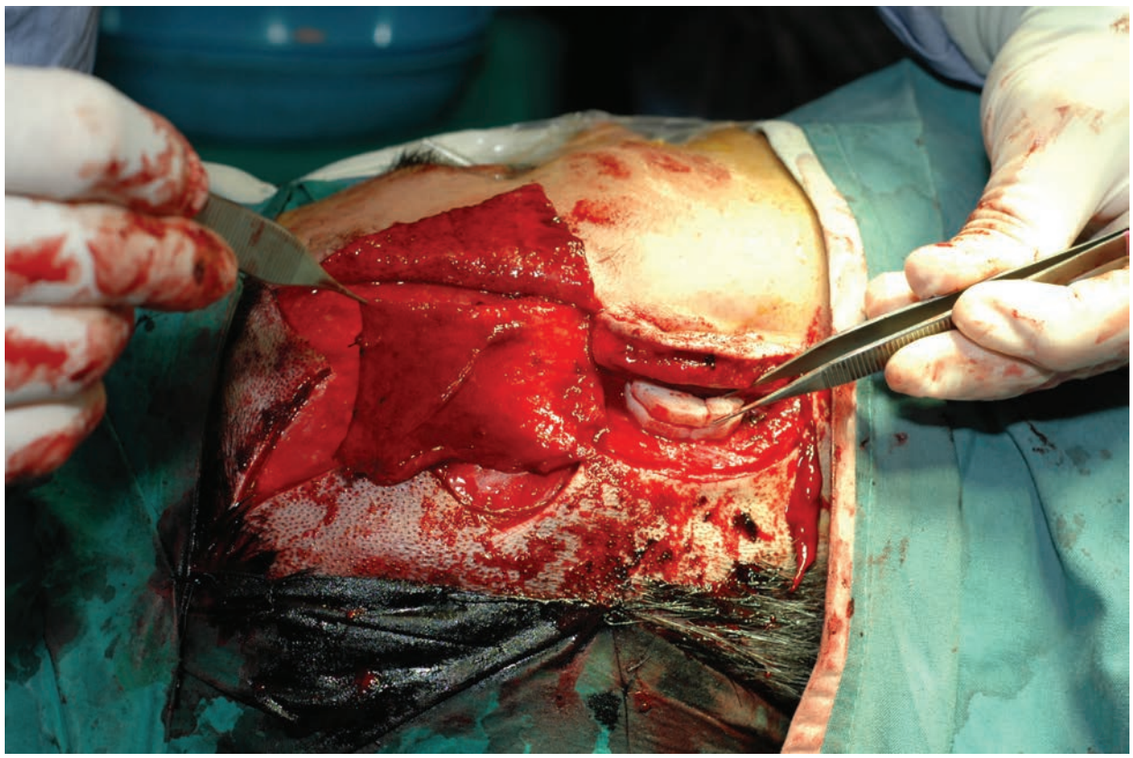


b

Fig. 46.6 *(continued)* **(b)** The underside of the TPF flap is shown with the posterior branch of the STA (*arrow*) coursing along the anterior edge of the flap.

Fig. 46.7 Full thickness skin graft, for coverage of the TPF flap, is harvested from the groin crease.

a



b

Fig. 46.8 Inset of the TPF flap. **(a)** A C-shape construct is made using rib cartilage. This is used to re-create the auriculocephalic angle. **(b)** The TPF flap is islanded such that the pedicle of the STA lies at the helical root of the neoauricle. *(continued)*

c

Fig. 46.8 *(continued)* **(c)** The TPF flap is inset over the cartilage construct of the neoauricle and the C-shaped cartilage.

Fig. 46.9 Full thickness skin graft is laid over the TPF flap and the reconstruction is complete.

Identified and preserved:

- Deep temporal fascia
- Auricular temporal nerve
- Anterior branch of superficial temporal artery

◆ Clinical Perspectives

The temporoparietal flap is a very useful flap that can be used as a pedicled flap for reconstruction of small defects in the head and neck region or as a free flap for reconstruction of defects of the extremity. The flap is thin and very well vascularized.

The patient is a 30-year-old man with Tanzer type II microtia. He had undergone stage I Nagata reconstruction 6 months prior to this surgery. A right TPF flap is raised to cover the ~~elevate~~ cartilage framework of the neoauricle.

The TPF flap was raised pedicled on the posterior branch of the superficial temporal artery. The flap was inset over the defect and ~~split~~ skin graft was laid over the TPF. Donor sites were closed primarily.

Microtia reconstruction using a cartilage construct and the temporoparietal flap. **Fig. 46.10a** shows the preoperative Tanzer stage microtia. **Fig. 46.10b** shows the neoauricle after Nagata stage I reconstruction, where the neoauricle is created using a rib–cartilage framework. However, note that the ear is not elevated and there is no auriculocephalic angle. **Fig. 46.10c** shows the completion of the Nagata stage II reconstruction with re-creation of a normal auriculocephalic angle. The patient's recovery was uneventful. ~~**Fig. 46.10d** shows the flap fully healed at 9 months' follow-up~~.

Complications of temporoparietal fascia flaps include scar alopecia, and loss of sensation over the auriculotemporal distribution.

◆ Hints and Tips

- The scalp is shaved and a Doppler is used to mark out the superficial temporal artery and its branches. The flap is centered over the posterior branch of the STA.
- The flap is raised thinly (**Figs. 46.1b** and **46.3a**) so that the hair follicles are preserved to prevent postoperative alopecia. Using a Colorado needle tip diathermy is very useful.
- The frontal branch of the facial nerve crosses anteriorly with the anterior branch of the STA and is not in the field of the surgery. The auricular temporal nerve is identified and spared to prevent numbness.
- Meticulous hemostasis is crucial so as to prevent tissue staining. This will help with the identification of the tissues planes and facilitate raising of the flap.
- This flap can be raised as a pedicled flap or as a free flap. The TPF flap has an inferior arc of rotation that can reach the ear and superior and middle thirds of the ipsilateral face. It can also be raised as a free flap for reconstruction of distal defects in the upper or lower limbs or contralateral face.
- When a fasciocutaneous flap is raised, the flap can be extended by including the skin and galea extending over the temporoparietal and occipital regions. The use of a tissue expander can also extend the territory of this flap, providing both flap delay and assisting in donor site closure.

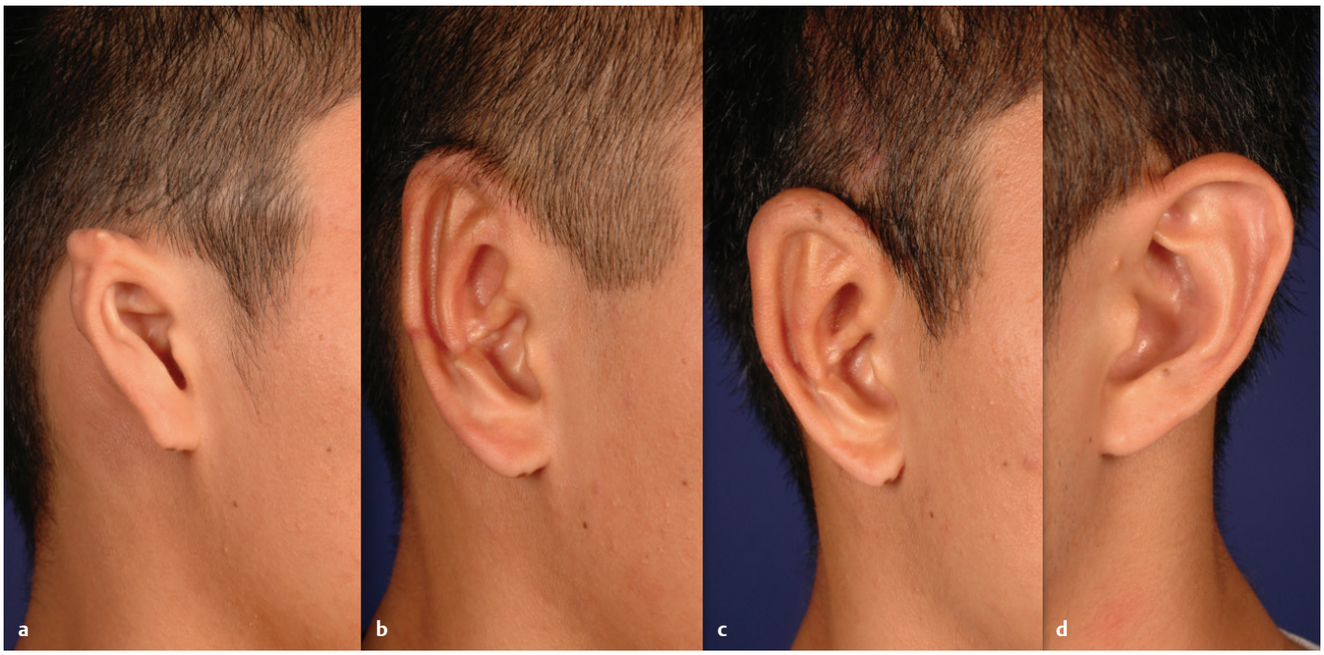


Fig. 46.10 Reconstruction of right microtia. **(a)** The preoperative microtia of the right ear. **(b)** Results after Nagata stage I reconstruction of the neoauricle. Note that there is a new cartilage framework but it is not elevated. **(c)** Completion of the Nagata stage 2 reconstruction at 9 months' follow-up. **(d)** The normal left ear.

- A segment of outer table temporoparietal bone may be elevated with the temporoparietal fascia as vascularized bone. This is due to the vascular communications between the parietal branch of the STA and the periosteum of the cranium. The galea aponeurotica is included with the TPF overlying the vascularized bone.

Suggested Further Reading

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Figure Credits

1. Strauch B, Yu HL. Atlas of Microvascular Surgery: Anatomy and Operative Approaches. 2nd ed. New York, NY: Thieme; 2006

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