

# Mastoid fistula closure

**BY VALERIE KIM AND MILES BANNISTER**

This article describes a clear and useful technique for the repair of a troublesome mastoid fistula. The clear instructions make this easy to apply in daily practice.

**M**astoid fistula is a rare condition whereby an abnormal connection develops between a mastoid cavity and external environment through the skin [1]. Fistulae usually develop following multiple mastoid operations due to post-auricular dehiscence and breakdown following repeated incisions or, less commonly, in cases of advanced cholesteatoma, localised radiotherapy treatment or following surgery removing middle ear tumours [1-2]. Symptoms include ongoing discharge through the fistula, chronic severe pain and bleeding. Long-

standing discharge causes inflammation and excoriation of the surrounding skin, leading to fistula enlargement and perpetuation of symptoms, whilst bleeding can be severe as the sigmoid venous sinus is irritated from ongoing exposure to the external environment.

Fistula repair centres on the removal of active middle ear disease and of chronically infected skin. Primary closure is almost always inadequate to repair the defect formed, and healthy tissue is required to be placed into the affected area to create a seal. A number of techniques have been

described, including skin transposition from the external auditory meatus, temporalis muscle flaps and free tissue transfer with vascular anastomosis [3-5]. We describe our technique using two axial rotational advancement flaps, allowing fistula closure and adequate wound coverage.

The limits of the fistula opening are marked along with surrounding scar tissue and diseased skin, which is removed to achieve as clean a postoperative field as possible for the soft tissue flaps to be transposed into. An incision is marked inferiorly to gain access to the superior

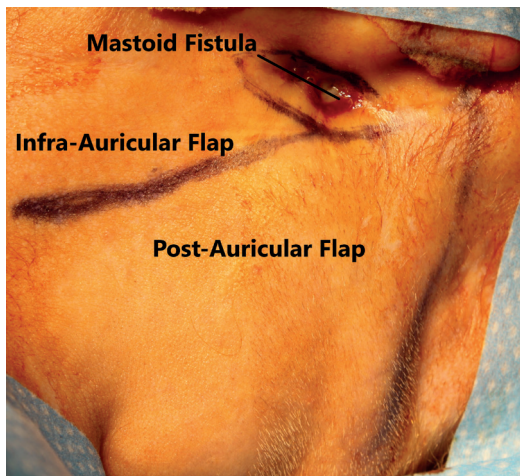


Figure 1: Mastoid fistula and designed skin flaps.

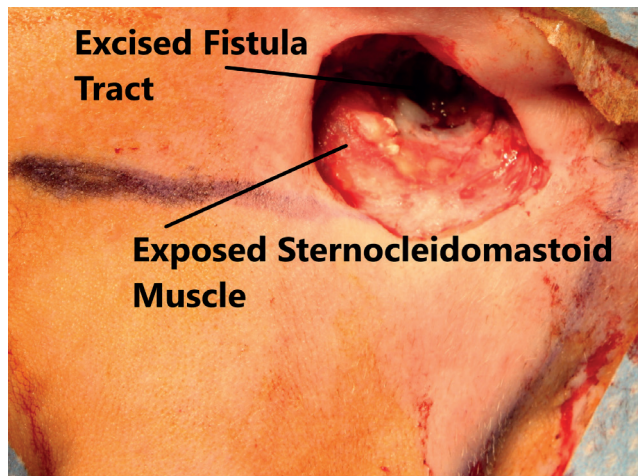


Figure 2: Excised fistula extending to open mastoid cortex.

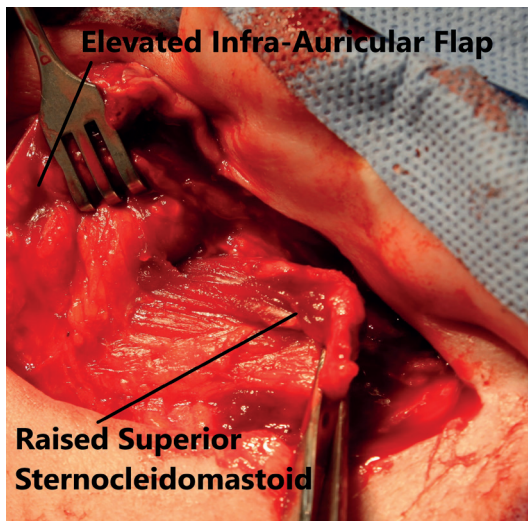


Figure 3: Infra-auricular flap raised to expose sternocleidomastoid before detachment from bone.

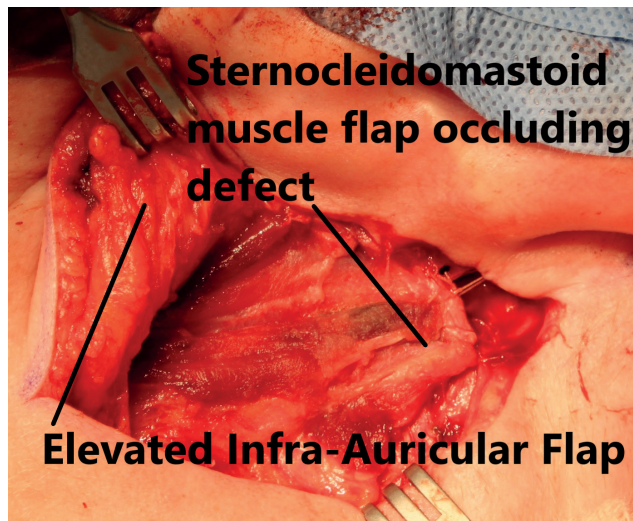


Figure 4: Sternocleidomastoid flap transposed over mastoid fistula defect.

## HOW I DO IT

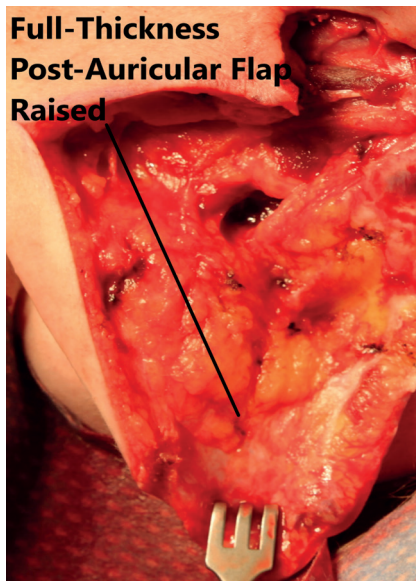


Figure 5: Post-auricular flap elevated to cover and reinforce sternocleidomastoid flap.

third of the sternocleidomastoid muscle. This muscle flap receives a reliable axial-pattern blood supply from the occipital artery. A further curved incision is marked posteriorly that will allow a post-auricular subcutaneous flap to be raised and placed superficially to the muscle flap. This subcutaneous flap also receives an axial-pattern blood supply directly from the post-auricular artery, and a large area of tissue can be raised to enable closure of the largest mastoid fistulae excised.

Patients' scalp hair is shaved to ease access and prevent its inclusion within the wound. The skin is cleaned with 7.5% providone-iodine and allowed to fully dry to achieve the maximal bacteriostatic effect. The fistula, post-auricular flap and inferior incision site are infiltrated with 15mls of Lignospan™ Special to reduce haemorrhage from the vasoconstrictor effect but also to provide short-term anaesthesia to the patient, as sternocleidomastoid flap elevation and transposition is particularly painful. Intravenous antibiotics are administered during induction of general anaesthesia due to the contaminated nature of the fistula site and for prophylaxis against wound infection. Following fistula site excision using a number 15 scalpel blade, the wound site and mastoid cavity are washed out with 500mls warm 0.9% saline and suctioned to dryness to remove debris and residue that could otherwise infect the muscle flap.

The sternocleidomastoid is then detached from its insertion into the mastoid process using a new scalpel blade. It is raised along the medial surface to the lower limit of the superior

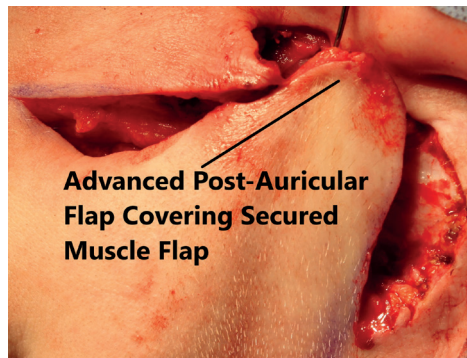


Figure 6: Post-auricular and infra-auricular flaps are sutured peripheral to sternocleidomastoid flap.

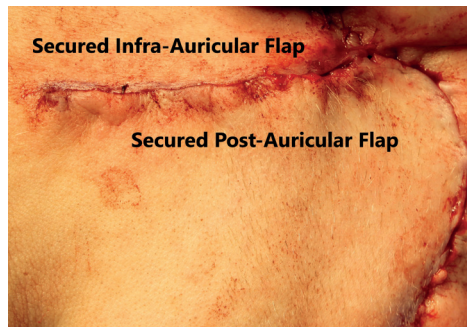


Figure 7: Both skin flaps provide sufficient bulk and coverage over the muscle flap for fistula defect closure and wound healing.

third of the muscle, using either a blade or needle-tipped monopolar diathermy device. The muscle is then transposed into the defect created by excision of the fistula tract and sutured to temporalis muscle superiorly using interrupted 4-0 Vicryl Rapide sutures. Over time, the muscle flap regresses deep into the fistula tract and occludes part of the mastoid cavity, similar to how the Palva flap does in primary mastoid surgery.

The post-auricular flap is raised by sharp scalpel blade dissection with spot bipolar diathermy as required. It then undergoes rotation advancement anteriorly to cover the sternocleidomastoid flap and is sutured into the post-auricular sulcus in two layers to prevent wound dehiscence and to provide soft tissue bulk over the muscle. A subcutaneous layer is closed with interrupted 4-0 Vicryl Rapide sutures and a cuticular layer closure with continuous 4-0 monocryl suture. The infra-auricular flap is then lowered and secured in an identical technique.

The wound is covered with topical chloramphenicol ointment and a Jelonet dressing. Unfolded gauze swabs and a head bandage are then applied. Patients remain admitted overnight for a further 24 hours of intravenous antibiotics for infection prophylaxis. The head

bandage is removed after 24 hours, prior to discharge from hospital. Chloramphenicol application to the wound continues for three times a day for seven days, along with oral antibiotics for five days.

### References

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