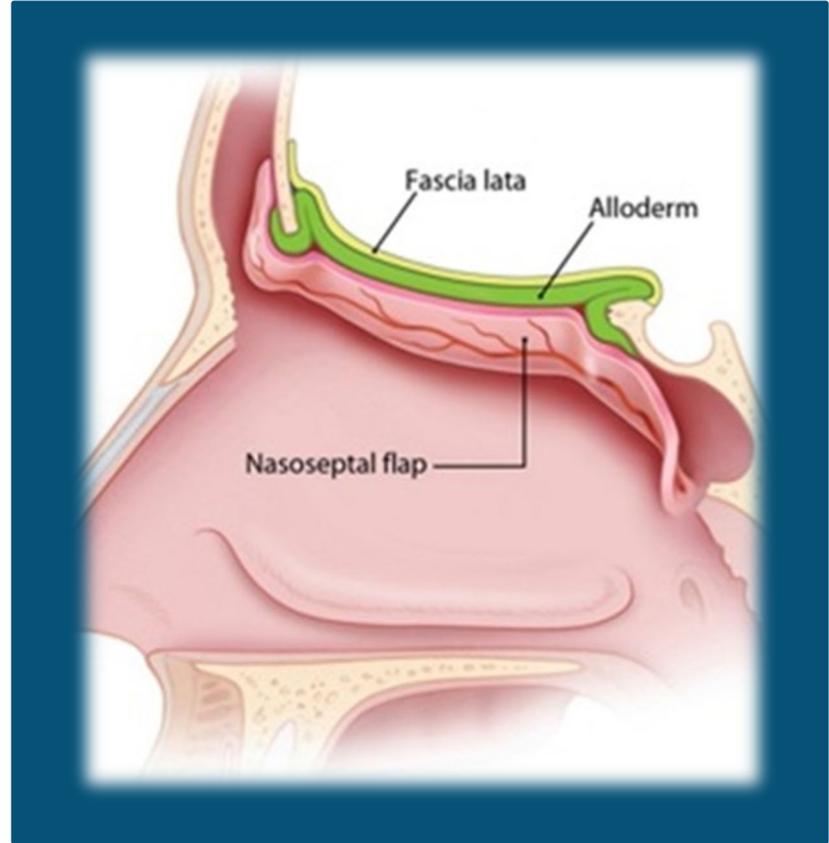


Transfer of Vascularized Nasal Tissue

ICD-10 Coordination and Maintenance
Committee Update
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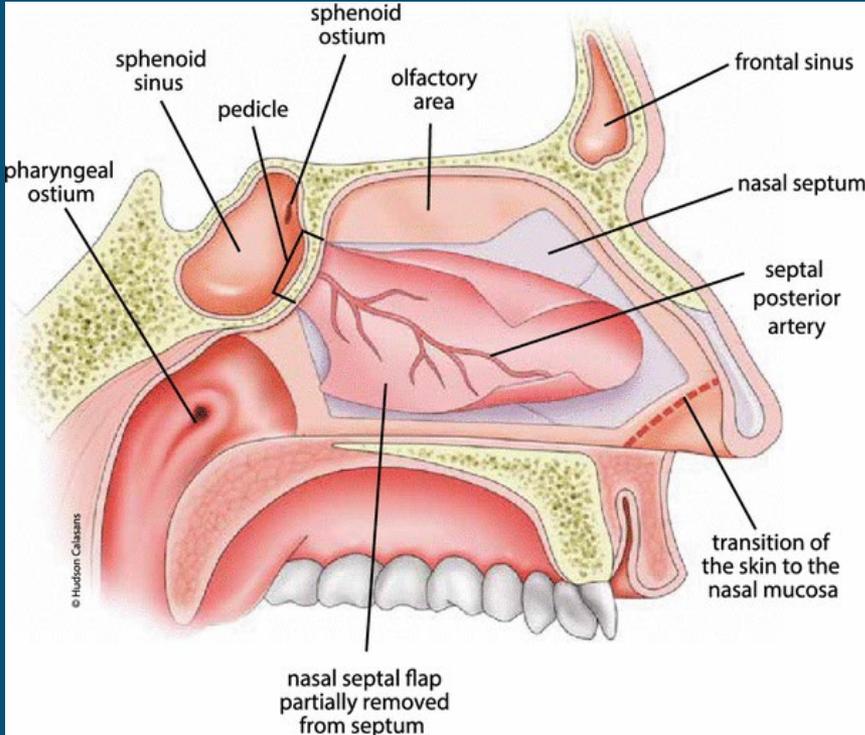


Background

The goal of this procedure is to achieve a watertight closure of the intracranial space during reconstruction of a skull base defect.

Reconstruction is needed to:

- Eliminate a spontaneous or post-procedural cerebrospinal fluid (CSF) leak, or
- Reduce risk of leak, pneumocephalus or infection after skull base surgery



What is the Skull Base?

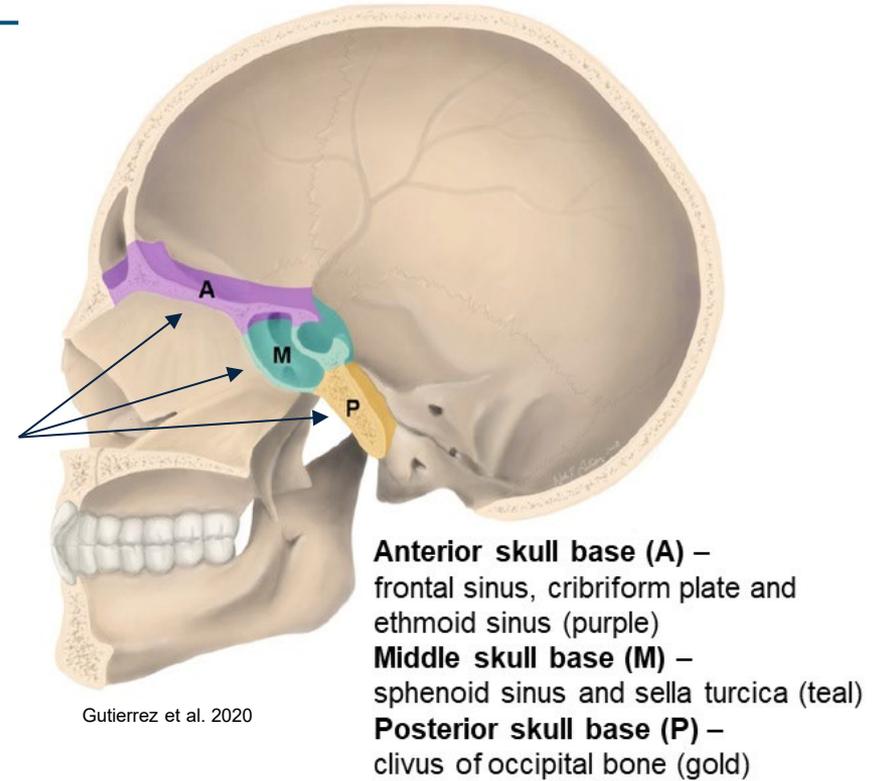
The skull base is the lowermost area of the skull located behind the eyes and nose. It forms the floor of the cranial cavity, separating the brain from the structures of the face and neck.

There are three regions of the skull base:

- Anterior (purple)
- Middle (teal)
- Posterior (gold)

The skull base can be reached with endoscopic transnasal surgery.

Regions of the Skull Base



Gutierrez et al. 2020

Skull Base “Inside”

Anterior Skull Base:

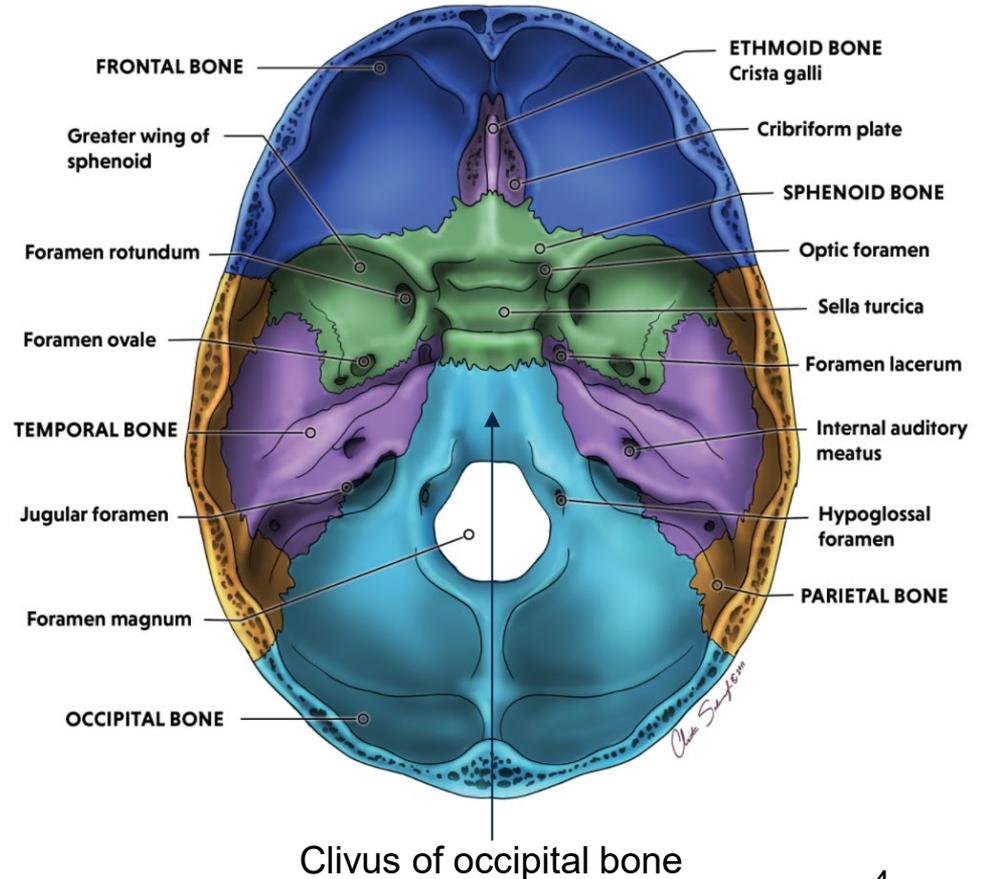
- Frontal bone (here in blue)
- Ethmoid bone (here in light purple), includes the cribriform plate, per the body part key

Middle Skull Base:

- Sphenoid bone (here in green), includes the sella turcica, per body part key

Posterior Skull Base:

- Clivus of occipital bone (here in teal), requested for the body part key



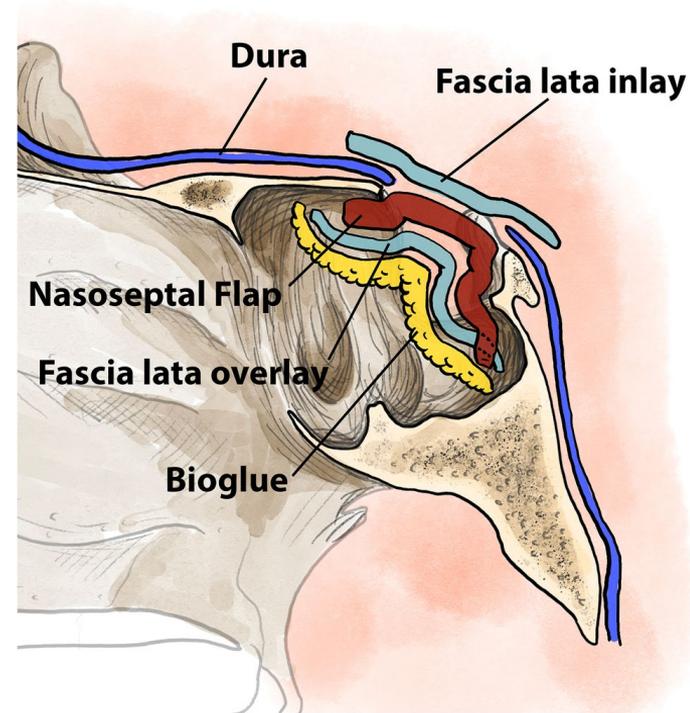
Reconstruction Methods

Skull base defects are reconstructed using various methods:

- Single layer tissue graft
- Synthetic biomaterial
- Vascularized nasal tissue flap

The vascularized nasal tissue flap was not commonly used when the ICD-10-PCS code set was originally designed.

Literature says these flaps came into use in 2006 and are in common use today.



Identification of Reconstruction Layers

Underlay (also called inlay) – Layer larger than the opening, placed on the **intracranial side** of the defect on top of the dura and under the bone. Body part = Dura Mater

- Free fat, fascia or cartilage graft (autografts)
- Acellular dermal matrix (Alloderm)
- Biosynthetic dural replacement products (DuraGen or Durepair)

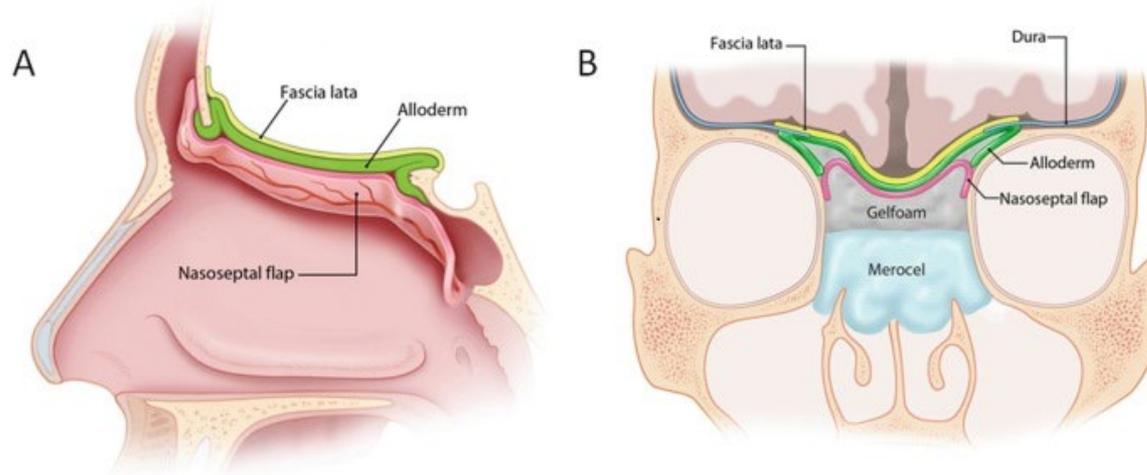
Onlay (also called overlay) – Layer larger than the opening, applied to the **nasal side** of the defect. Body part = Specific Bone

- Free bone, fascia or mucosa graft (autografts)
- Acellular dermal matrix (Alloderm)
- Vascular pedicle flap of nasal tissue

Modified onlay graft – Tucking a folded double layer **between dura and bone**, folding the graft edge on the outer aspect of the bony margins of the defect. Body parts = Both

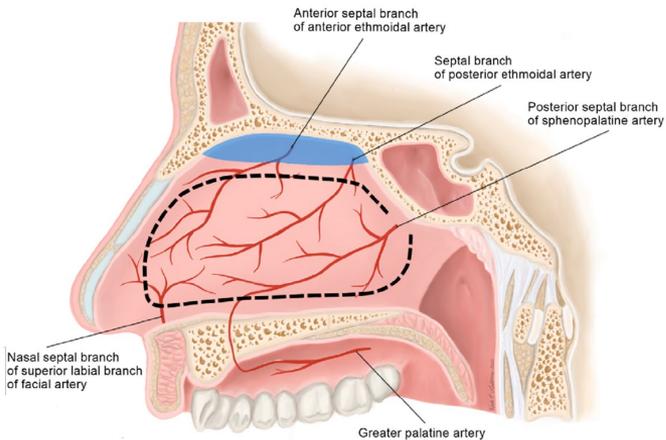
Combination Reconstruction Method

Various combinations of these methods are used for the best results. This is called the multi-layer sandwich method. Shown here is a fascia graft (yellow underlay), acellular dermal matrix [Alloderm] (green modified onlay), and a vascularized nasoseptal flap (pink flap overlay), shown in two different views.



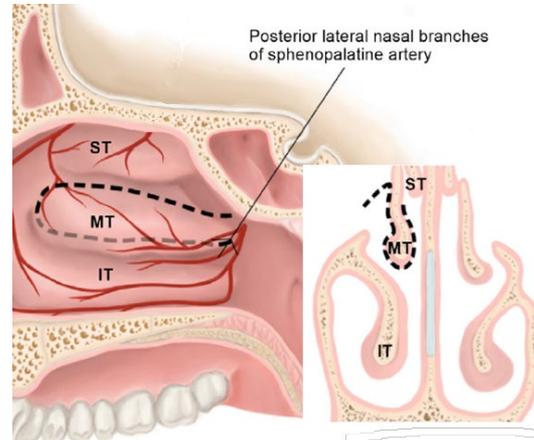
Three Most Common Nasal Tissue Flaps

Nasoseptal Flap



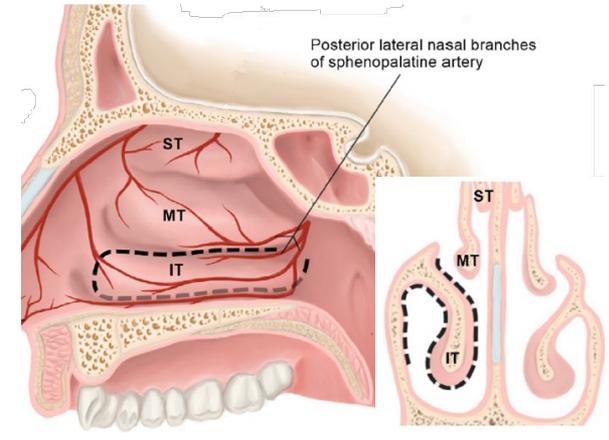
Gutierrez et al. 2020

Middle Turbinate Flap



Gutierrez et al. 2020

Inferior Turbinate Flap



Gutierrez et al. 2020

Basic Steps

1

Development of Vascularized Flap

Incision made with electrocautery while preserving vascular supply to selected flap site

2

Arrangement of Flap

Vascularized flap turned with mucosal side out and correctly positioned over defect opening

3

Placement of Transfer Flap

Flap secured as an overlay, on top of any other layers of reconstructive graft material

Detailed Procedural Steps

1. The skull base defect is identified as the source of a CSF leak.
2. Nasal mucosa is decongested by placement of Afrin pledgets.
3. The incision lines are planned for the desired flap, based on a branch of the sphenopalatine artery inside the nose.
4. The flap is incised with electrocautery on three sides and raised as a pedicle from the source. It is tucked into the nasopharynx or maxillary sinus until needed later in the procedure.
5. When ready, the flap is retrieved and turned with the mucosal side out to prevent mucocele production.
6. The flap is positioned as an overlay, over other reconstruction layers used on the defect.
7. The flap is secured in place with cellulose strips, Gelfoam, nasal tampon, bioabsorbable packing or balloon catheter.

Documentation of Transferred Nasal Tissue

The following terms and abbreviations may be found in the operative report to describe the tissue being transferred:

| Nasal Tissue for Transfer | Name/Abbreviation |
|-------------------------------------|---|
| Nasal Septum | Nasoseptal Flap; NSF |
| Middle turbinate | Middle Turbinate Flap; MTF |
| Inferior turbinate (posterior) | Posterior Pedicled Inferior Turbinate Flap; PPITF |
| Inferior turbinate (anterior) | Anterior Inferior Turbinate Flap; AITF |
| Nasal wall, posterior, lateral wall | Carrau-Hadad; C-H Flap |
| Nasal wall, anteriorly based | Hadad-Bassagasteguy 2; HB2 Flap |

Outpatient or Inpatient?

Skull base reconstruction is typically an inpatient procedure due to the length of the surgery, the use of two surgical teams and the length of monitored recovery time.

This procedure is rarely performed as an outpatient procedure, even if performed to reconstruct a spontaneous cerebrospinal fluid leak.

Diagnoses Associated With Procedure

- G96.00 Cerebrospinal fluid leak, unspecified
- G96.01 Cranial cerebrospinal fluid leak, spontaneous
- G96.08 Other cranial cerebrospinal fluid leak
(includes postoperative and traumatic leak)
- G96.198 Other disorders of meninges, not elsewhere classified
- Q01.0 Frontal encephalocele
- Q01.1 Nasofrontal encephalocele
- Q01.2 Occipital encephalocele
- Q01.8 Encephalocele of other sites

Plus, any cranial diagnosis requiring an endoscopic transnasal skull base procedure

Transfer of Nasal Tissue Unavailable

None of the nasal tissue flaps that have been discussed can be coded as a transfer procedure due to the lack of a Transfer table in the ICD-10-PCS Ear, Nose and Sinus body system.

These nasal tissue flaps are still connected and are not a device. Therefore, we are requesting the addition of codes to describe the transfer of three body parts (nasal septum, nasal turbinate, and the nasal mucosa and soft tissue body parts) to allow the most specific code assignment.

Resources

- Campbell RG, Otto BA, Prevedello DM, Carrau RL. NeupsyKey Chapter 35, Middle and Inferior Turbinate Flaps <https://neupsykey.com/chapter-35-middle-and-inferior-turbinate-flaps/>
- Gutierrez WR, Bennion DM, Walsh JE, Owen SR. Vascular pedicled flaps for skull base defect reconstruction. *Laryngoscope Investigative Otolaryngology*. 2020;5:1029–1038. <https://onlinelibrary.wiley.com/doi/10.1002/lio2.471>
- Hadad G, Bassagasteguy L, Carrau RL, Mataza JC, Kassam A, Snyderman CH, Mintz A. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope*. 2006 Oct;116(10):1882-6. <https://pubmed.ncbi.nlm.nih.gov/17003708/>
- Liu, J.K., Spinazzi, E.F., Eloy, J.A., Couldwell, W.T. (2017). The Role of Endoscopic Transsphenoidal Surgery in the Management of Complex Lesions Involving the Skull Base. In: Laws, Jr, E.R., Cohen-Gadol, A.A., Schwartz, T.H., Sheehan, J.P. (eds) *Transsphenoidal Surgery*. Springer, Cham. https://doi.org/10.1007/978-3-319-56691-7_17