

Taxonomy matrix of skull base repair techniques to guide data collection

Category	Direct repair/reconstruction						Supportive	
Sub-category	Dural Closure	Dural replacement	Vascularised flap	Graft	Tissue glue	Other	Nasal packing	Buttress
Technique	Sutures	Durarepair®	Pedicled Nasal Flap (e.g. nasoseptal)	<i>a) Synthetic grafts:</i>	Evicel®	<i>a) Haemostatic agents:</i>	Bismuth-Soaked Ribbon Gauze	Bone
	Clips	Duragen™	Others	Spongestan™	Tisseal®	Surgiflo®	Foley Catheter	Titanium Mesh
	Others	Durafoam®		Tachosil®	Adherus®	Flowseal®	Nasopore®	Polyethylene (e.g. Medpor®)
		Endogenous tissue (eg. fascia lata)		Gelfoam®	Duraseal®	b) Others	Merocel®	Others
		Others		Others	Others			
				<i>b) Tissue grafts:</i>				
				Fat				
				Mucosa				
Others								

Transsphenoidal approach

Figure 1

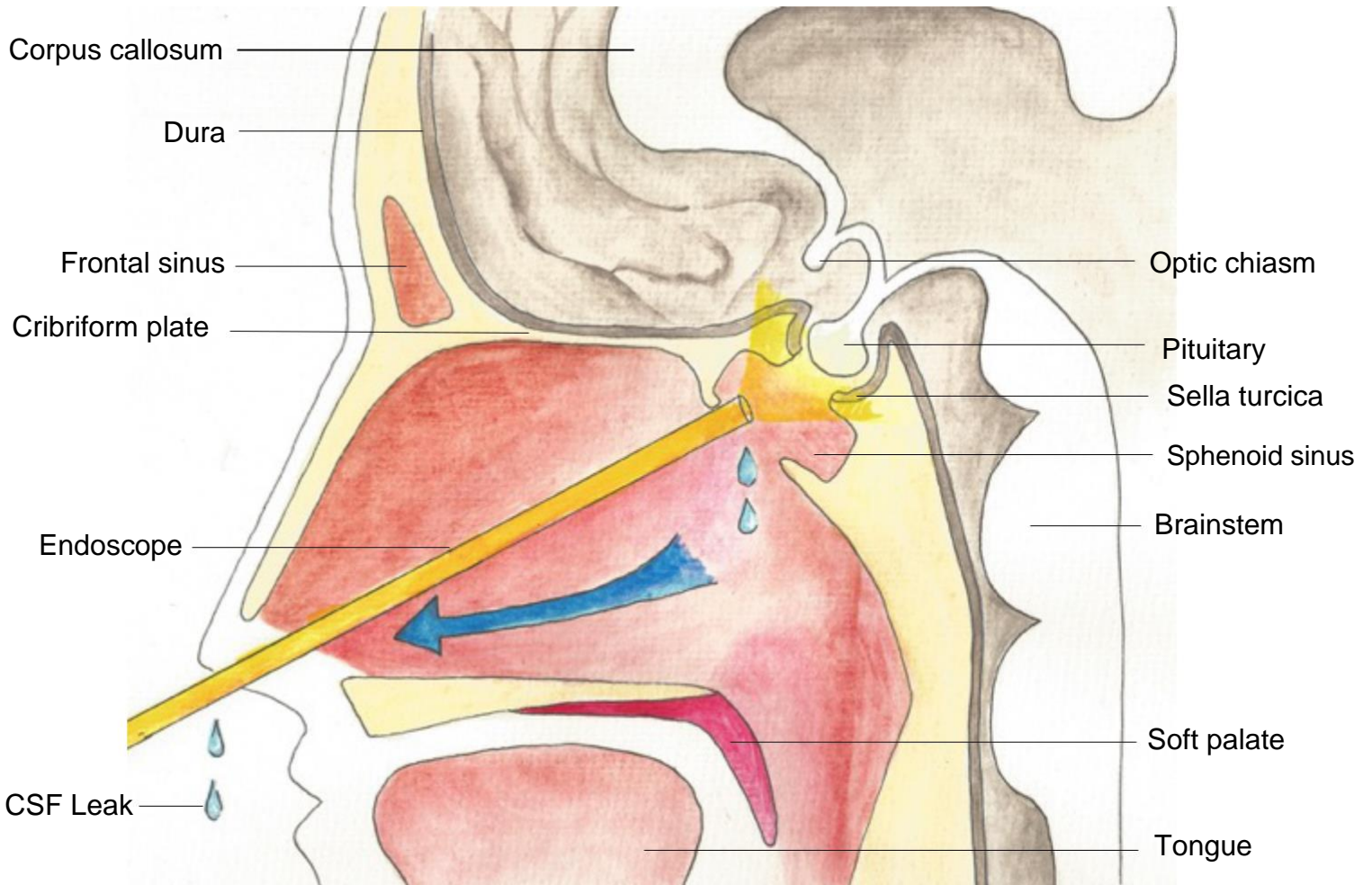


Figure 1: This image illustrates a transsphenoidal approach (TSA) to the anterior skull base repair. This approach is defined by its purpose of accessing the sella turcica through the sphenoid bone.

Figure 2

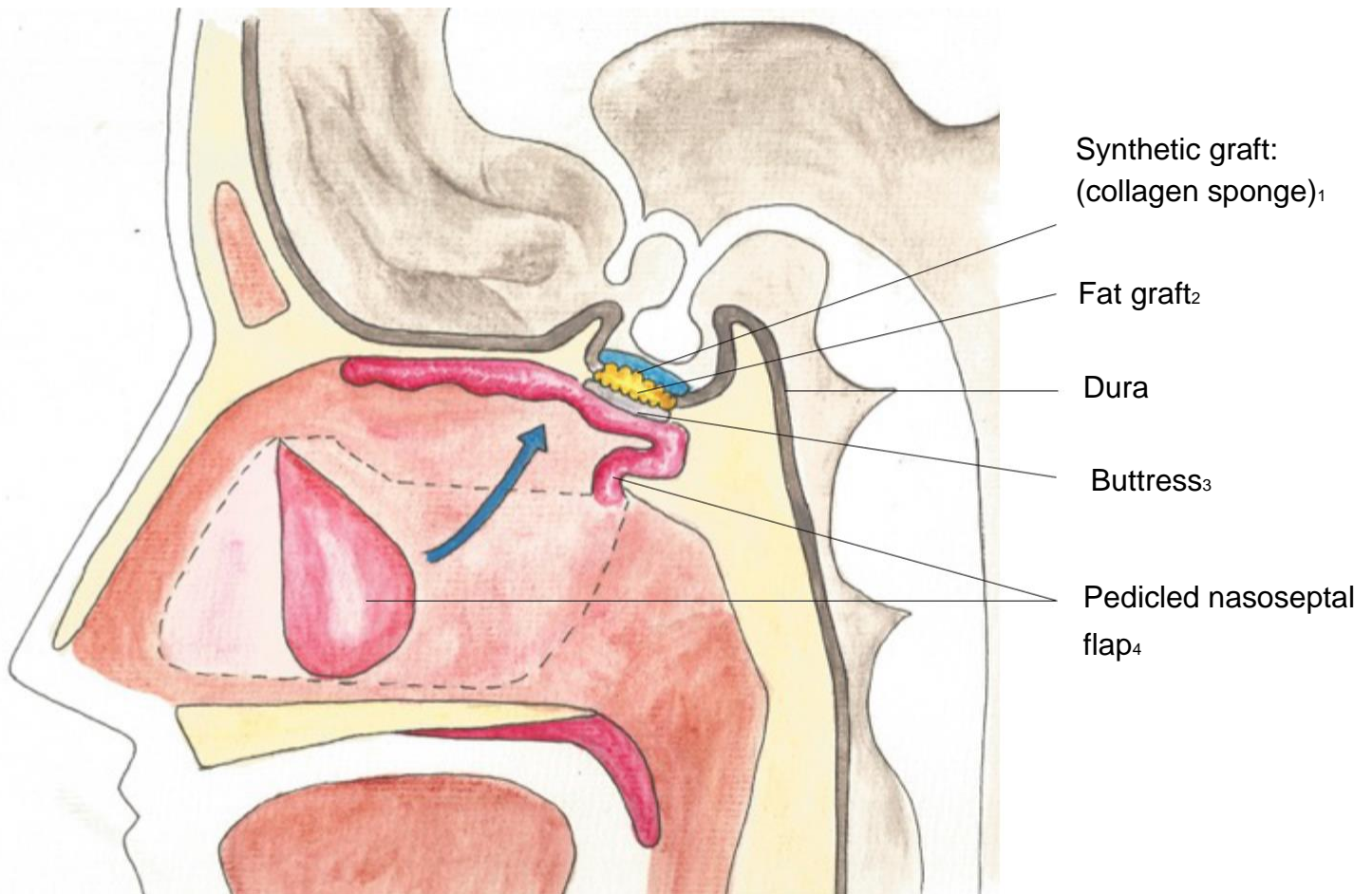


Figure 2: This image illustrates how the anterior skull base may be repaired following transphenoidal surgery.

1. A synthetic graft is synthetic material usually in the form of sheets (e.g. Tachosil) or sponges (e.g. collagen sponges), as seen here, which have been created as alternatives to traditional tissue grafts and thus avoid potential donor site morbidity.
2. A tissue graft is tissue that is moved from a donor site to a recipient site without its blood supply. For example fat is used in this image.
3. A buttress is material used to stabilize and support the skull base repair materials. A buttress can be composed of bone, titanium mesh, or polyethylene e.g. medpor.
4. A pedicled flap is tissue that is moved from a donor site to a recipient site with an intact vasculature. An example in the context of skull base repair is a nasoseptal flap.

Figure 3

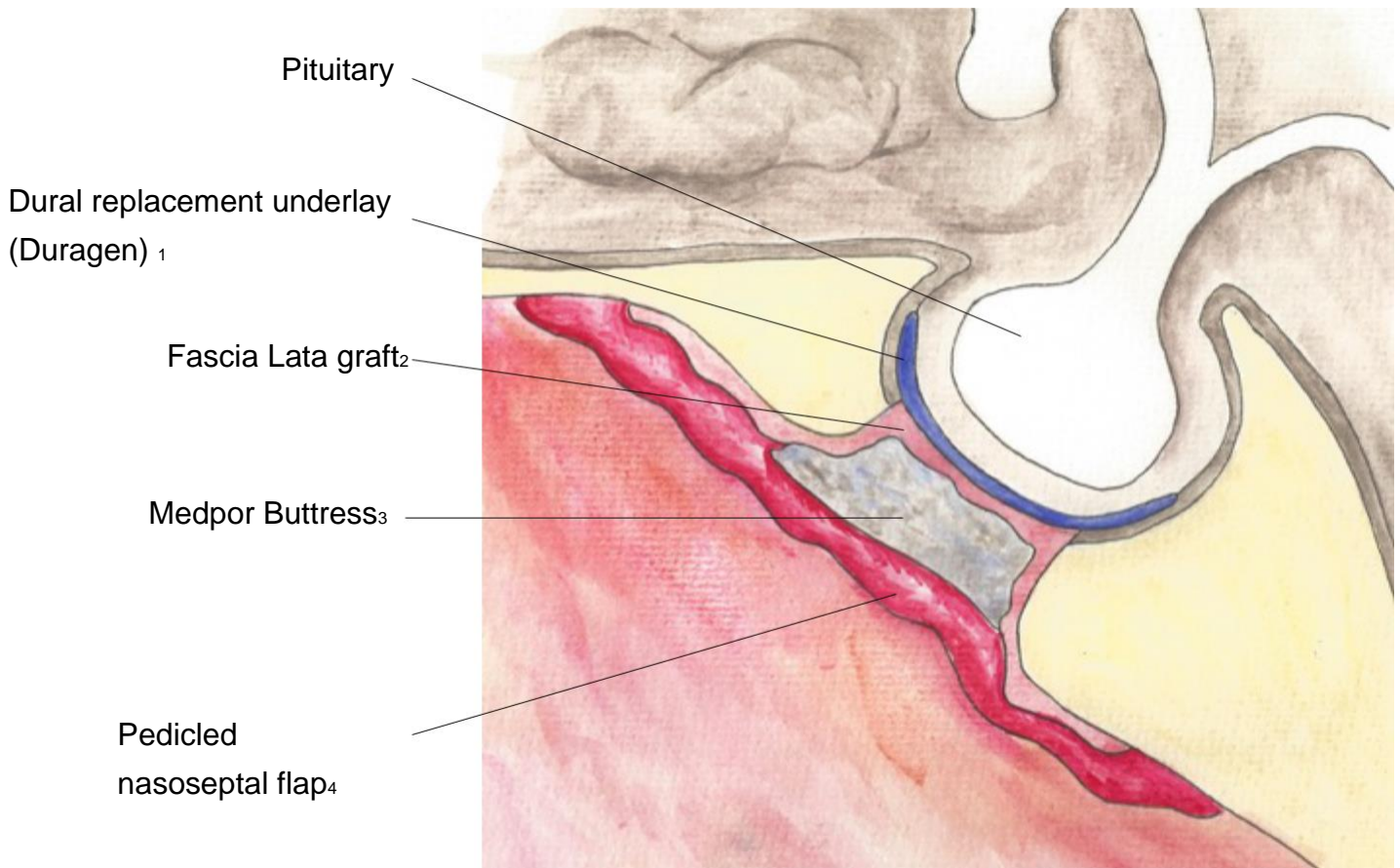


Figure 3: This image illustrates another method by which the anterior skull base may be repaired following transphenoidal surgery. The gasket seal technique is demonstrated in this image. This refers to the use of an overlay graft that is countersunk into the skull base defect with a rigid buttress to create a watertight seal against the bony margins of the defect.

1. Dural replacement is a substitute material used specifically to reconstruct the dura - bridging gaps and adding structural integrity. This material can be endogenous tissue (eg nasal mucosa) or synthetic (eg. Duragen). The replacement may either be placed such that it bridges the gap beneath the dura (underlay), as seen in this image, or over the dura (overlay – see Figure 5).

2. Another example of a tissue graft, this time using Fascia Lata.

3. Buttress again demonstrated, creating a watertight seal against the bony margins of the defect.

4. Another example of a pedicled nasoseptal flap moved from donor site with intact vasculature.

Transcribriform approach

Figure 4

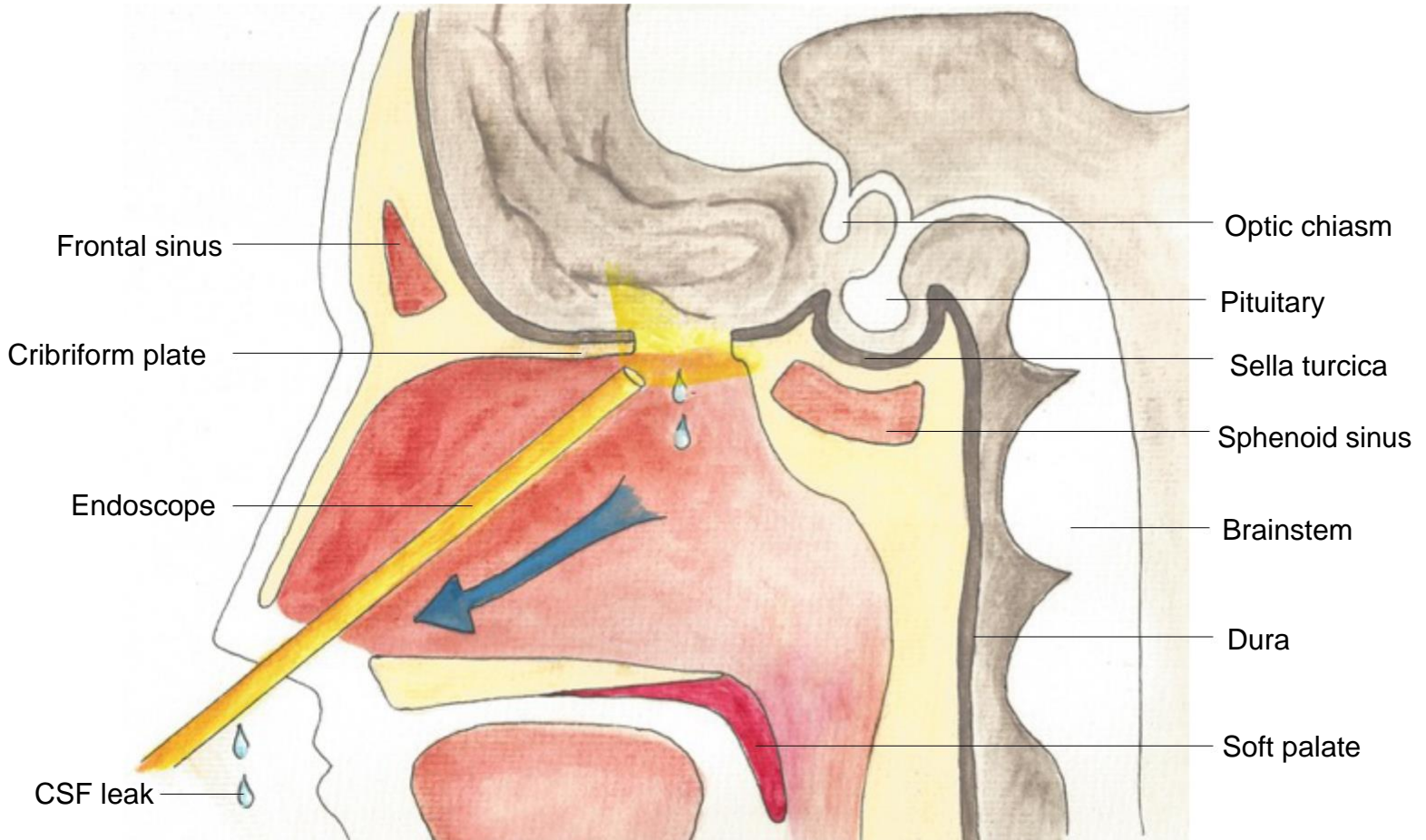


Figure 4: A transcribriform approach, commonly used to access olfactory groove meningiomas, for example.

Figure 5

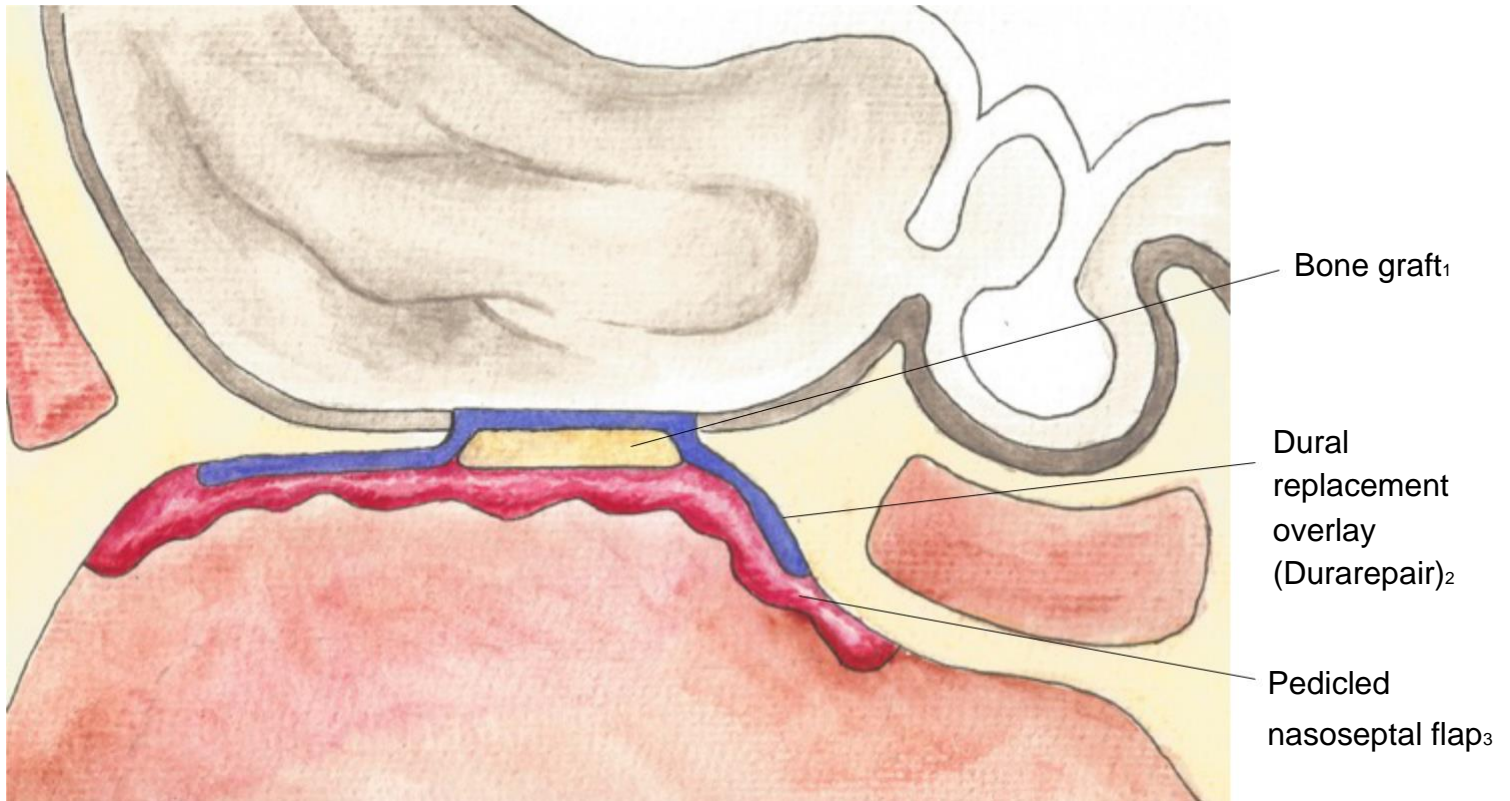


Figure 5: This illustration demonstrates how the cribriform plate defect can be repaired. This is another example of the gasket seal technique, where an overlay graft is countersunk into the skull base defect with a rigid buttress (demonstrated here as a bone graft) to create a watertight seal against the bony margins of the defect

1. Bone is used here as an endogenous graft.
2. A substitute material called Durarepair is used here to reconstruct the dura, however in this repair it is used as an overlay, as compared with Figure 3.
3. A pedicled nasoseptal flap is used as a vascularised flap.

Figure 6

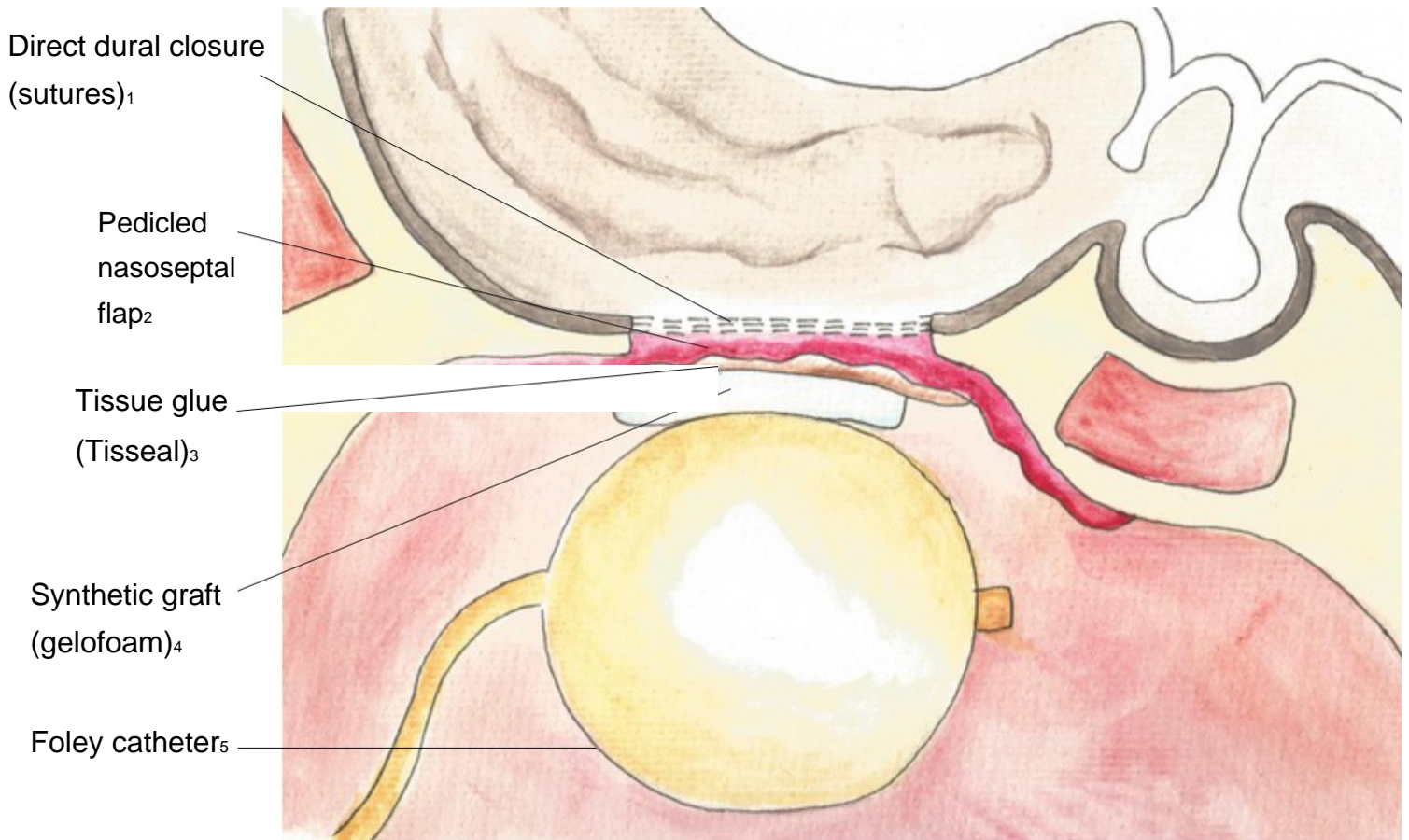


Figure 6: This image illustrates another method of anterior skull base repair.

1. Direct dural closure is where separated sections of dura are approximated back together - for example by using sutures - such that total or near-total apposition is achieved.

2. A nasoseptal flap is used here, which is an example of a vascularized flap taken from a donor site.

3. Tissue glue is a liquid monomer, which rapidly polymerizes on contact with living tissues to form a hard-acrylic plastic. An example is Tisseal.

4. Gelofoam is utilized here as a synthetic graft.

5. Nasal packing may be used following repair. This refers to using a material to occupy a nasal space and provide structural support through its local pressure effects. They can also be coated with substances (eg. bismuth) to augment particular qualities (eg. haemostasis). Here, a Foley catheter is used as a nasal packing device.