

CSF Leak , Location Vs Size factors!

Shawkat Abdulrahman

Consultant Otolaryngologist

Rhinologist, Endoscopic Skull Base Surgeon

FRCSI, FACS



Skallebasis og bihulekirurgi – tilganger og komplikasjonshåndtering

4th -6th May 2026 OUS - Rikshospitalet



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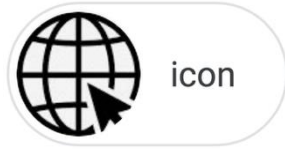
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www.TheEarNoseThroatDoctor.com

No Disclosure



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Mr.Shawkat Abdulrahman, The Ear Nose Throat Doctor



Instagram

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<https://www.tuh.ie/Consultants/Mr-Shawkat-Andulrahman.html>



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Iraq 2024



Iraq 2022



Italy 2011



If I have seen further,
it is by standing
on the shoulders of giants.

- ISAAC NEWTON

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2 years Surgical fellowship program RCSI



Dr.Dhaidan AlShamari-KSA

Dr.Ebrahim Almulla -Bahrain

Fellow Rhinoplasty ,Facial reconstructive surgery

Fellow Rhinology and Endoscopic sinus and skull base surgery

img@rcsi.com

<https://www.rcsi.com/surgery/education/surgical-fellowship-programme>

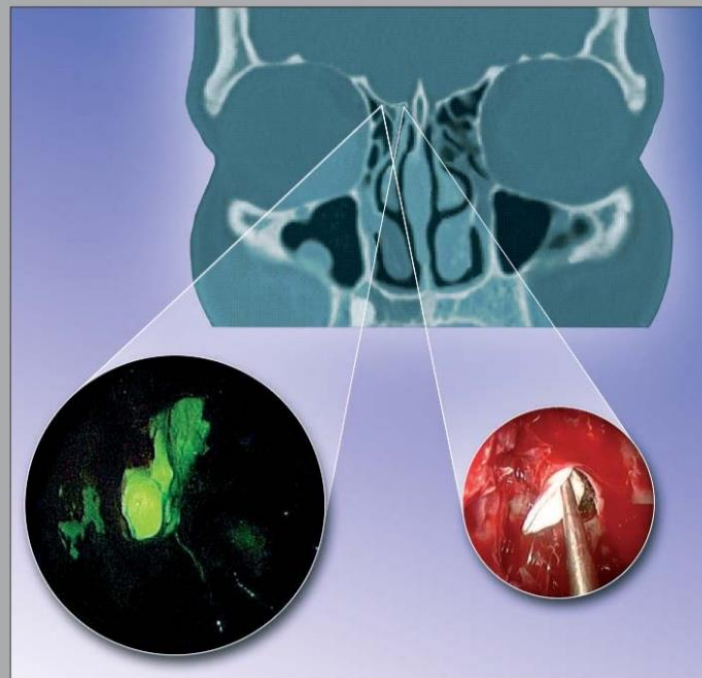


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ENDOSCOPIC SURGICAL MANAGEMENT OF CEREBROSPINAL FLUID RHINORRHEA



Paolo CASTELNUOVO, M.D.

Chairman of the Department of Otorhino-
laryngology at the University of Insubria,
Azienda Ospedaliera-Universitaria,
Ospedale di Circolo e Fondazione Macchi
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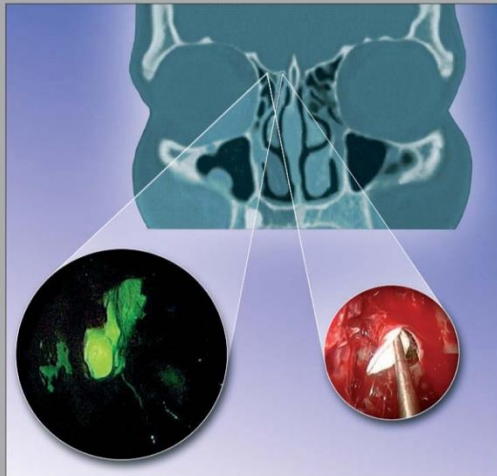


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ACCURATE STUDY OF THE DEFECT

DIAGNOSTIC WORK UP IN CSFL

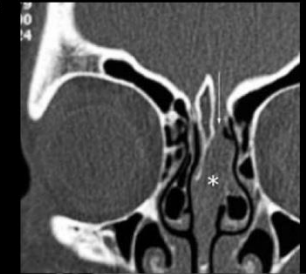


History and
physical examination



Biochemical tests
Beta-2-transferrin

Imaging
CT/MR



DIAGNOSIS ←



Fluorescein

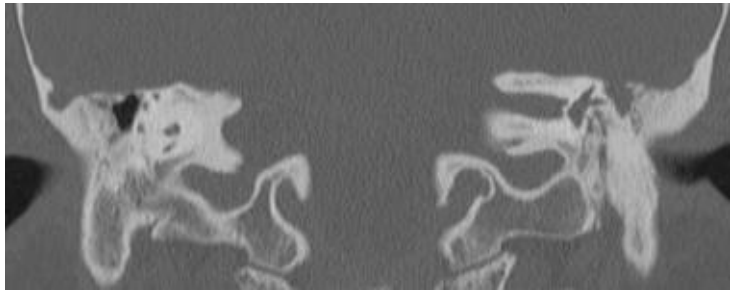
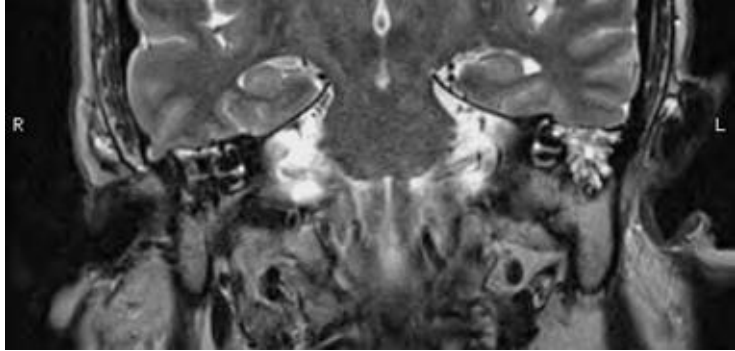


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RADIOLOGICAL INVESTIGATION: detection of the LESION' S SITE



Radiological preoperative
evaluation
study of all the

3 cranial fossae + petrous bone

MULTIPLE SITES

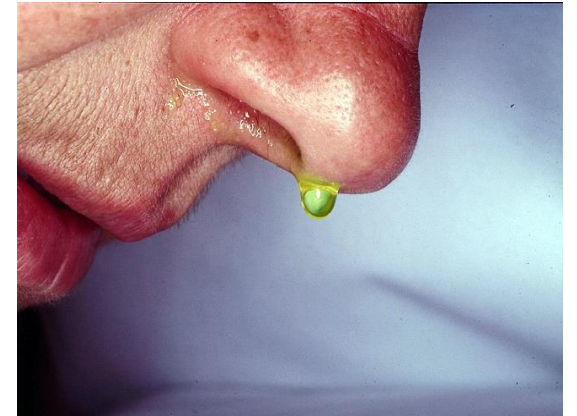
The analysis of CT and MR can lead us to a precise
location of the defect



Reconstruction techniques in cranial base surgery

PRINCIPLE REMARKS

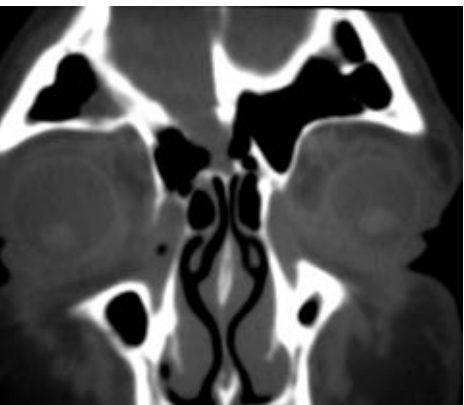
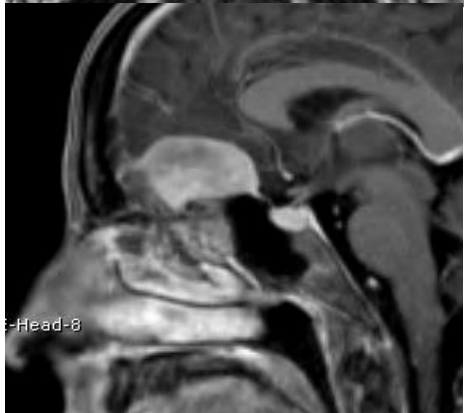
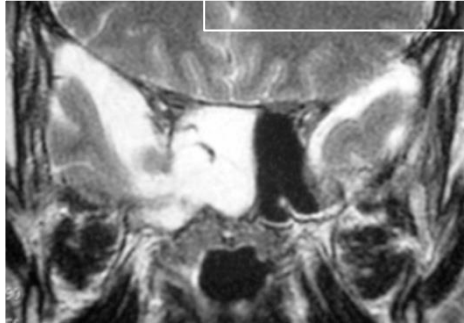
- ① The efficacy of any surgical procedure on skull base for defect, tumours or malformations is determined as well by **the ability to repair the resulting defect**
- ② The **overall goals of reconstruction are similar** independently of the employed technique (traditional open surgery vs endoscopic expanded approaches)



- separation of the cranial cavity from the sinonasal tract (in order to prevent postoperative cerebrospinal fluid leaks, pneumocephalus and intracranial infections, such as ascending bacterial meningitis and abscesses)
- protection of neurovascular structures (against desiccation and infection)
- preservation or restoration of cosmesis
- preservation or rehabilitation of function
- avoidance of dead spaces



PLANNING THE RECONSTRUCTION



FACTORS TO CONSIDER:

- **BIOLOGY OF THE PATHOLOGY TREATED**

Margin of resections, structures involved, successive treatment

- **SITE OF THE DEFECT**

ACF, MCF ; PCF

- **AVAILABILITY OF MATERIALS**

Local flaps, external flaps, local grafts

- **PATIENT'S COMORBIDITIES**

Obese, OSAS



SKULL BASE RECONSTRUCTION

Factors that may affect outcomes



MATERIALS & TECHNIQUE

SIZE

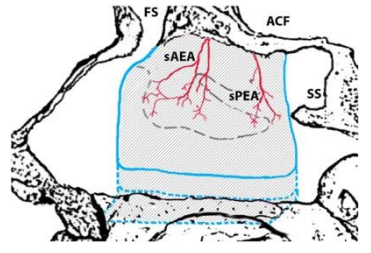
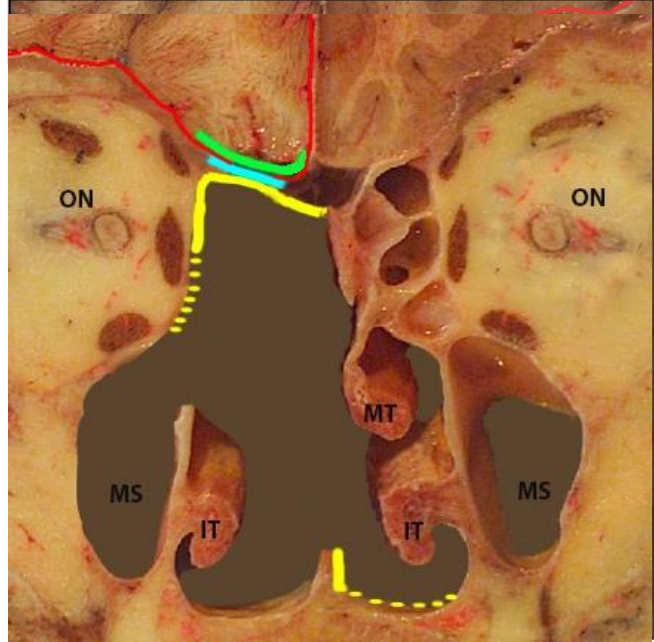
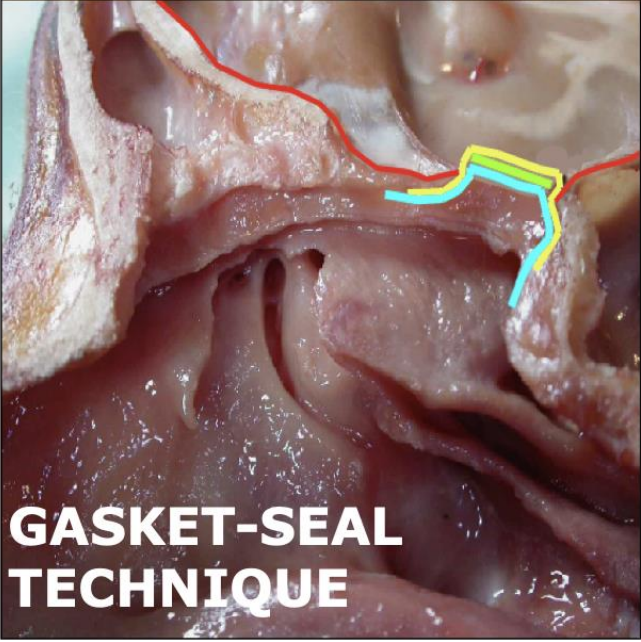
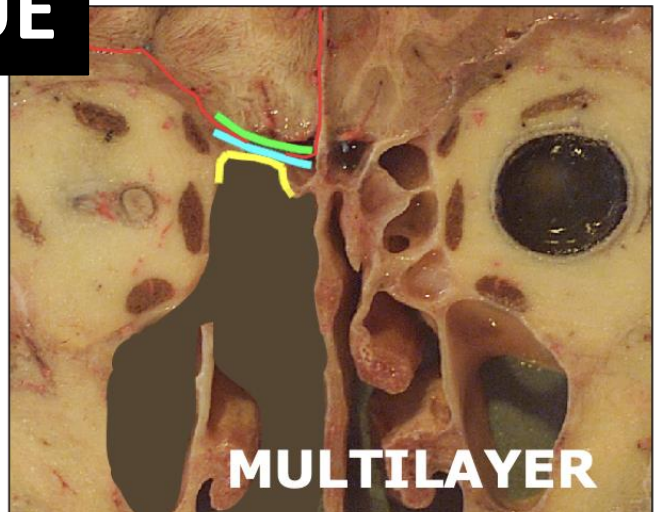
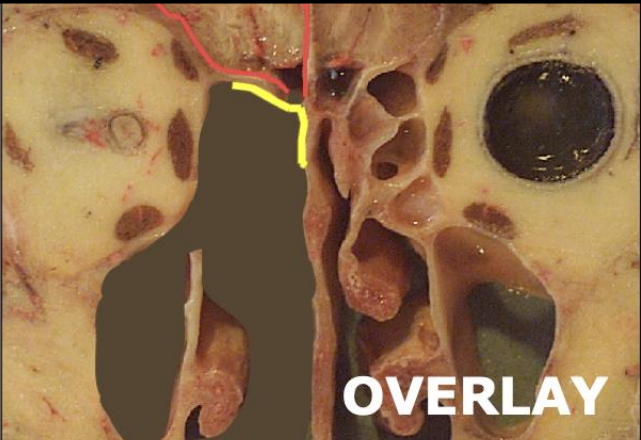
SITE

POST-OP MANAGEMENT



MATERIALS & TECHNIQUE

OPTIONS: free grafting techniques



The Laryngoscope
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Rhinological and Otological Society, Inc.

A Novel Reconstructive Technique After Endoscopic Expanded Endonasal Approaches: Vascular Pedicle Nasoseptal Flap

Gustavo Hadad, MD; Luis Bassagasteguy, MD; Ricardo L. Carrau, MD; Juan C. Mataza, MD; Amin Kassam, MD; Carl H. Snyderman, MD; Arlan Mintz, MSc, MD

ACTA otorhinolaryngologica ita lica 2016;36:1-5; doi: 10.14639/0392-100X-748

Septal flip flap for anterior skull base reconstruction after endoscopic resection of sinonasal cancers: preliminary outcomes

P. Battaglia, M. Turri-Zanoni, F. De Bernardi, P. Dehghani Mobaraki, A. Karligiotis, F. Leone, P. Castelnuovo.



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SKULL BASE RECONSTRUCTION

Factors that may affect outcomes



MATERIALS & TECHNIQUE

SIZE

SITE

POST-OP MANAGEMENT



SIZE

Original Research—Skull Base Surgery

Risk Factors for Cerebrospinal Leak after Endoscopic Skull Base Reconstruction with Nasoseptal Flap

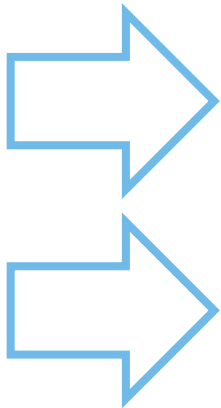
Calvin L. Gruss^{1,2}, Mohammed Al Komser, MD²,
Manish K. Aghi, MD³, Steven D. Pletcher, MD²,
Andrew N. Goldberg, MD², Michael McDermott, MD², and
Ivan H. El-Sayed, MD²



Otolaryngology—
Head and Neck Surgery
2014, Vol. 151(3) 516–521
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Surgery Foundation 2014
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DOI: 10.1177/0194599814536688
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SAGE

- 121 patients
- Skull base reconstruction with NSF
- 10 (8.2%) failures

The odds of having a flap failure after **central skull base surgery (sella & clivus)** was nearly 6 times higher than in the anterior skull base surgery



Dural **defect size > 2.0 cm²** in the central skull base strongly correlated with the risk of flap failure

Defects less than 2.0 cm² did not show statistical significance with regard to location.



SIZE

Endoscopic Endonasal Reconstruction of Anterior Skull Base Defects: What Factors Really Affect the Outcomes?

Mario Turri-Zanoni^{1,4}, Jacopo Zocchi¹, Alessia Lambertoni¹, Marta Giovannardi³, Apostolos Karligkiotis¹, Paolo Battaglia^{1,4}, Davide Locatelli^{2,4}, Paolo Castelnovo^{1,4}



Univariate Logistic Regression showing the impact of the year of surgery on the ASB reconstruction failure, stratifying the patients' cohort according to the defect size.

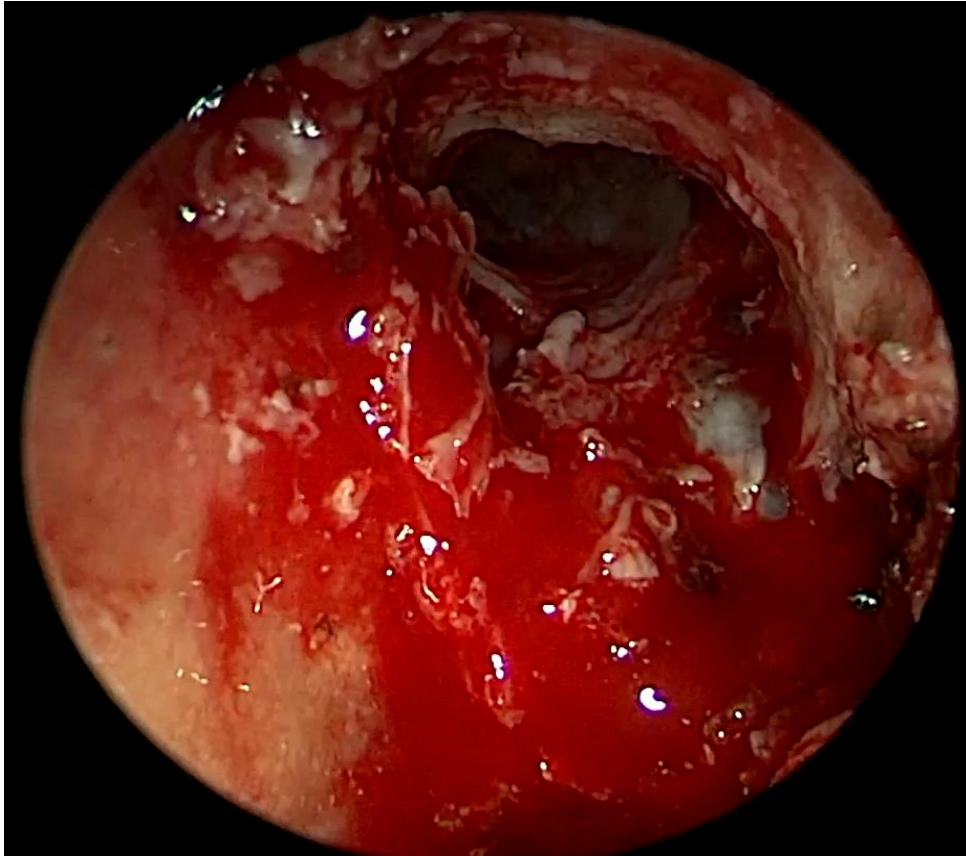
- ✓ <math><1\text{cm}^2</math> 243 patients
- ✓ $1\text{-}2\text{cm}^2$ 70 patients
- ✓ $2\text{-}6\text{cm}^2$ 44 patients
- ✓ $>6\text{cm}^2$ 156 patients

Risk factors	No.	Odds Ratio	95% Confidence Interval	p-value
Size > 6 cm ²	156	0.72	0.53-0.99	.04*
Size 2-6 cm ²	44	0.57	0.32-1.02	.06
Size 1-2 cm ²	70	1.03	0.84-1.26	.74
Size <1 cm ²	243	0.80	0.68-0.94	.006*

Experience improve success



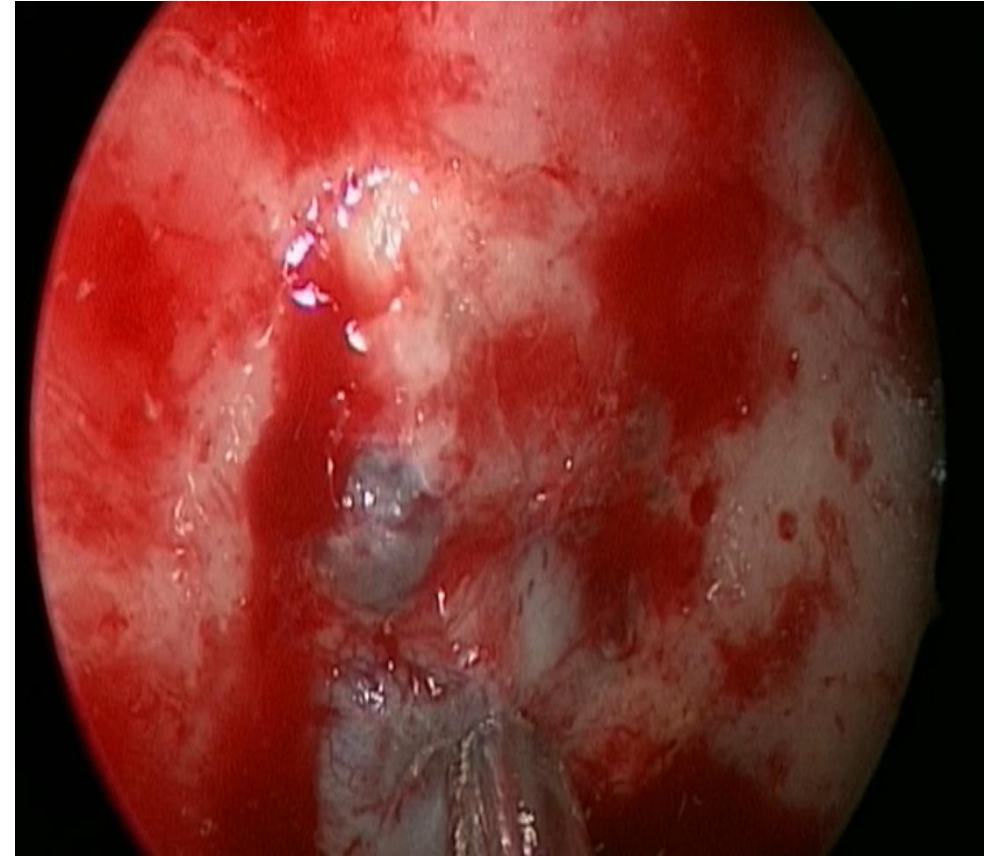
DOES THE SIZE MATTERS?



Large defect of ACF:
Repair with free grafts

LOW-FLOW LEAKS

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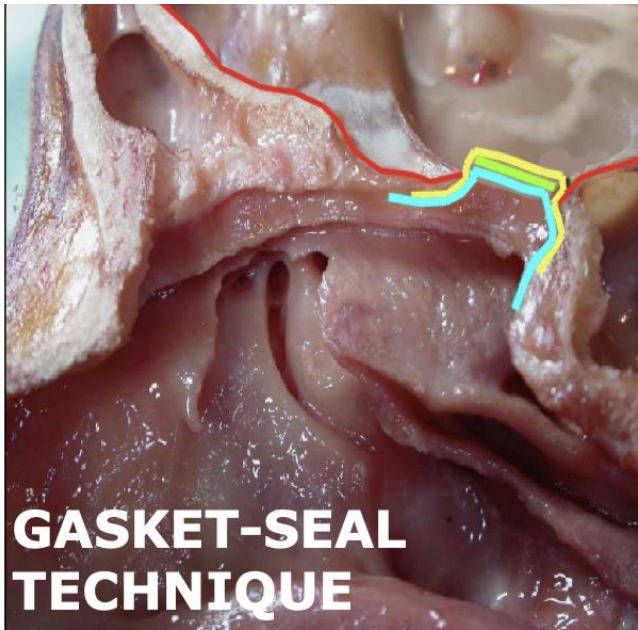


Small defect of PCF:
Repair with vascularized flap

HIGH-FLOW LEAKS



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Systematic Review

Endoscopic Reconstruction of Surgically Created Skull Base Defects: A Systematic Review

Ethan Soudry, MD¹, Justin H. Turner, MD, PhD²,
Jayakar V. Nayak, MD, PhD¹, and Peter H. Hwang, MD¹

22 studies
673 patients

Overall success of 91.5%
Overall Failures: 8.5% (57 of 673)

SIZE

In cases with **high-flow leaks**: improved outcomes with **vascularized repairs** as leak rates of 82% and 94% were found with free grafts/synthetic materials and vascularized repairs, respectively.



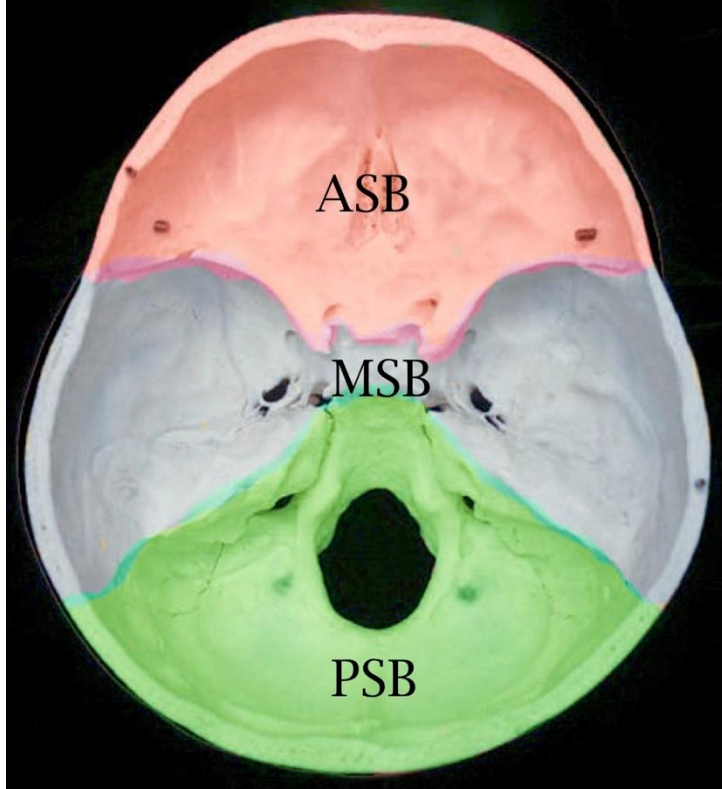
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High flow increase failure risk

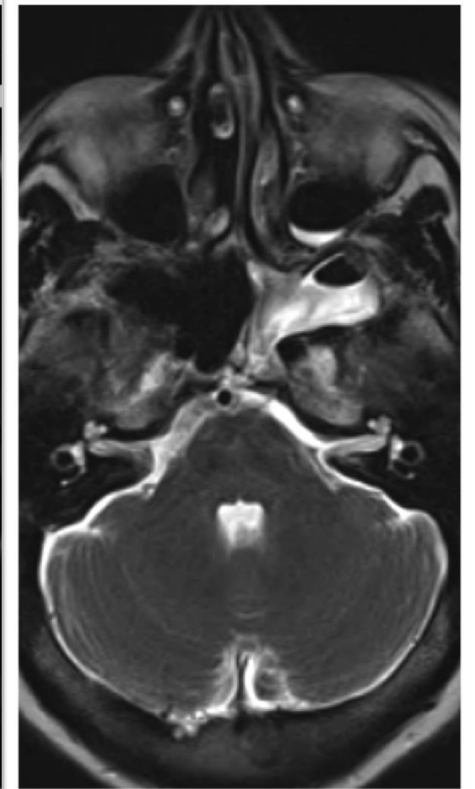
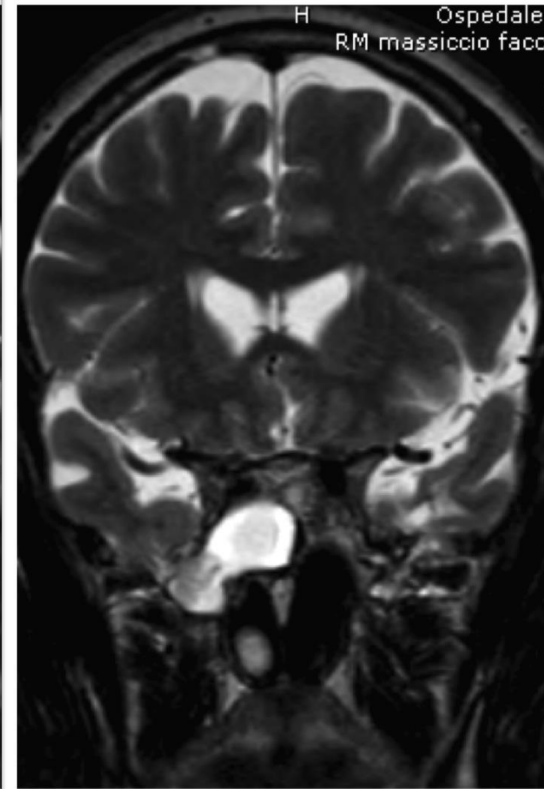
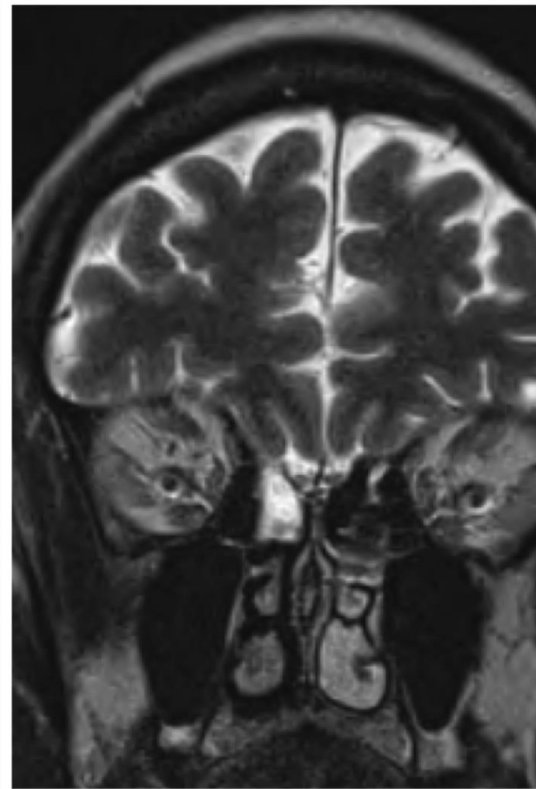


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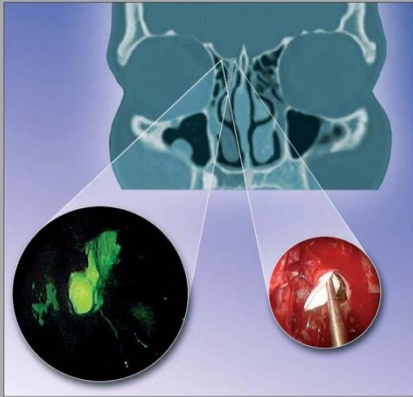


ANATOMICAL-MECHANICAL FACTORS



PREREQUISITES:

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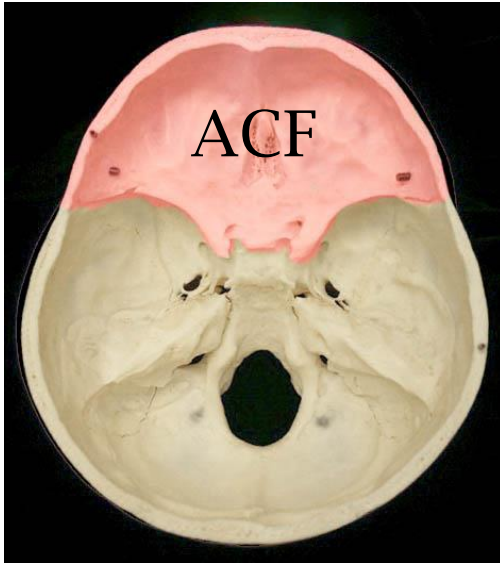
Head of Neuroendoscopy, Neurosurgery Clinic at the University of Pavia, "S. Matteo" General Hospital, Pavia, Italy

- Appropriate EXPOSURE of the defect
- UNDERMINING of the dural margins of the defect
- SMOOTHEN the edges of the defect to get a tensioactive effect for the graft/flap
- METICULOUS management of the tissue integration
- DEDICATED surgical team for reconstruction



ANTERIOR CRANIAL FOSSA

Consider:

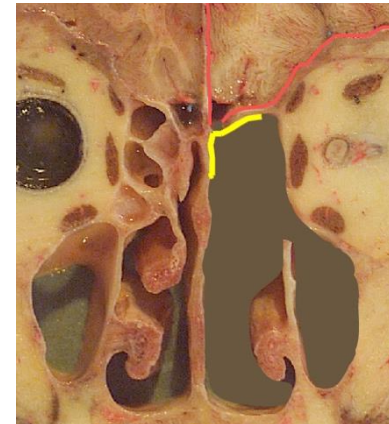
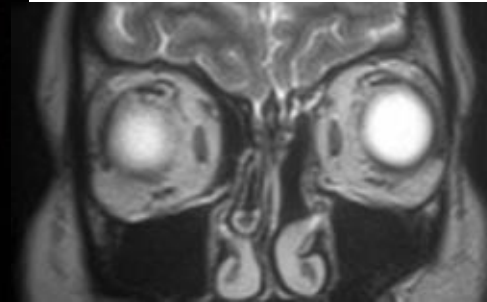
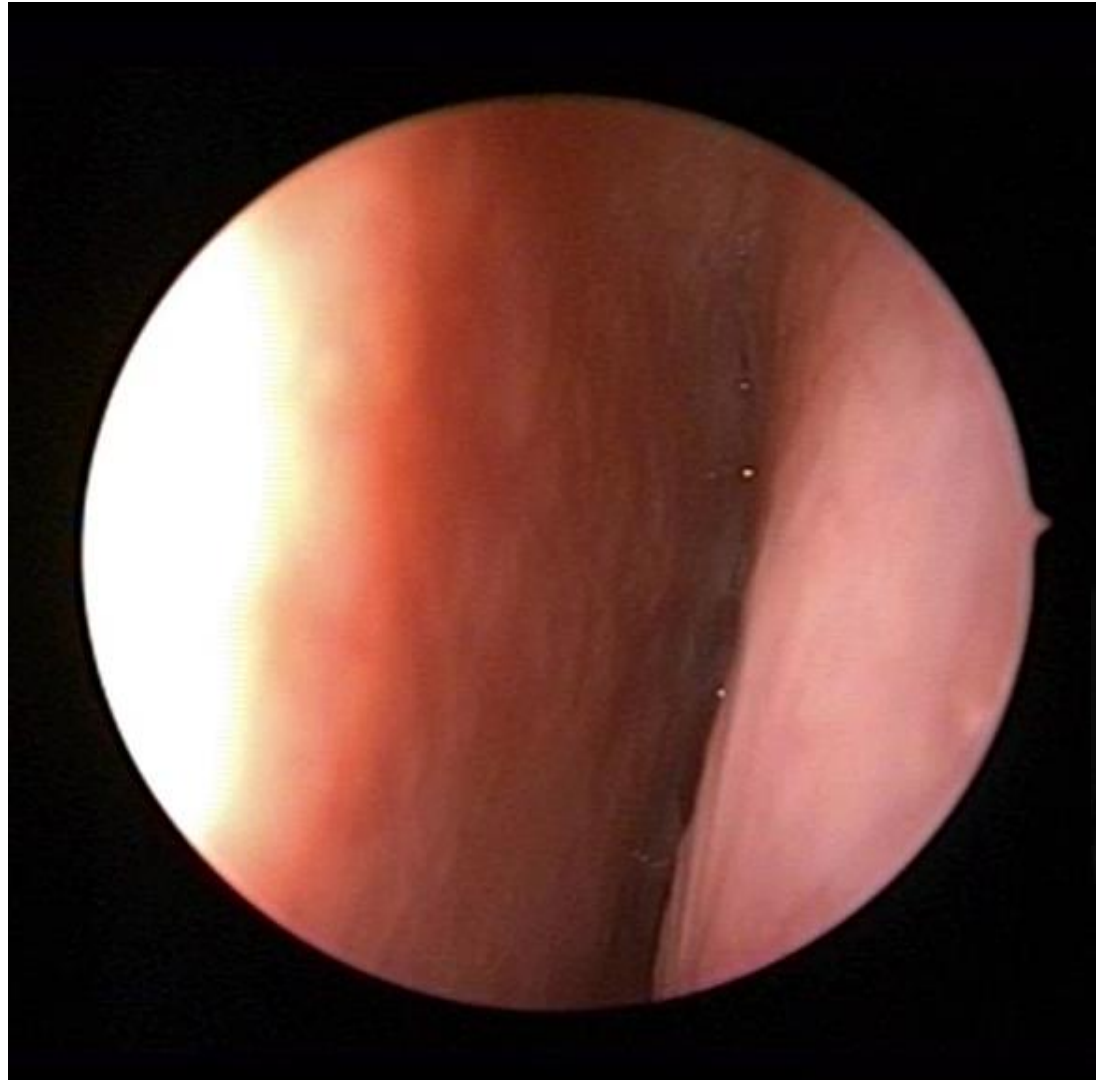
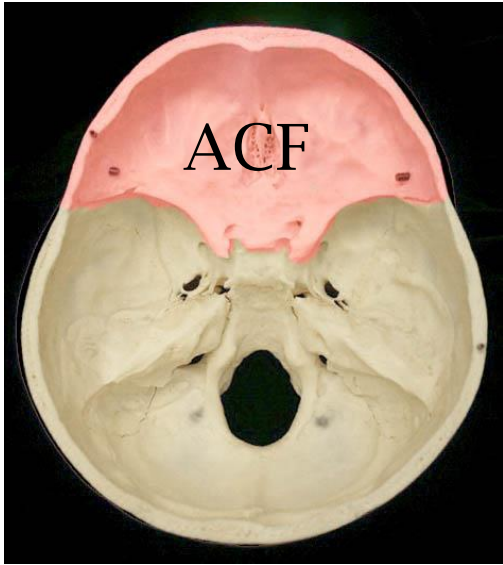


- the **epidural detachment is easy**
- the **ethmoidal roof** offers the possibility of both lateral and posterior detachment
- the **olfactory fissure** is an **exception** in this case because it is impossible to detach the epidural plane (olfactory foramen) without tearing the dura itself (for this reason, the overlay technique is applied here)



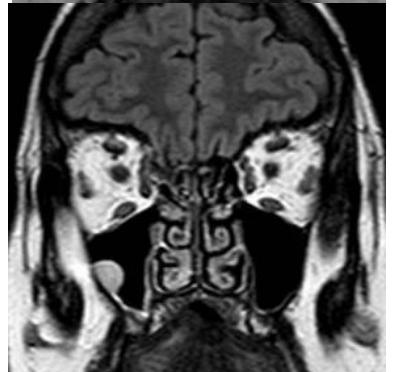
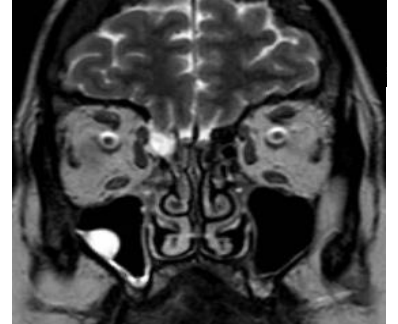
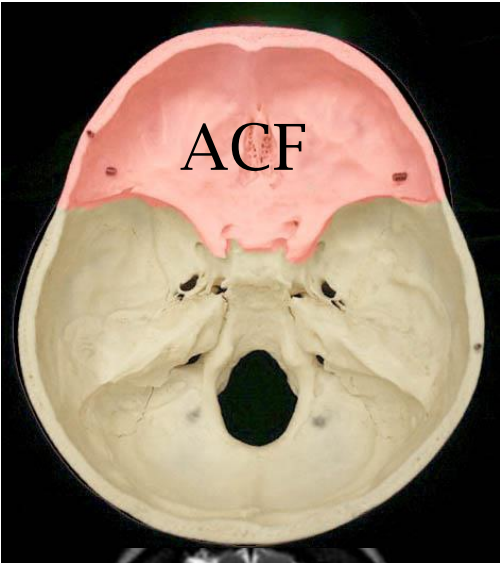
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Left olfactory cleft meningoencephalocele



SITE

Right ethmoidal roof CSF leak



POST

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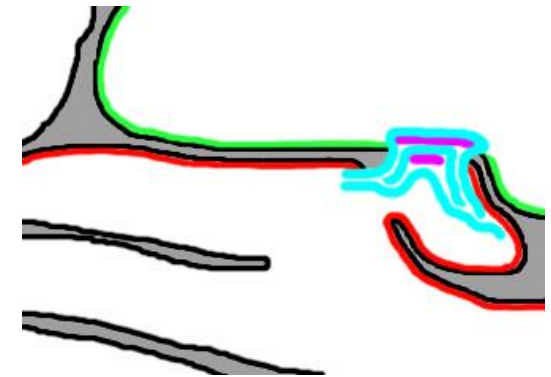
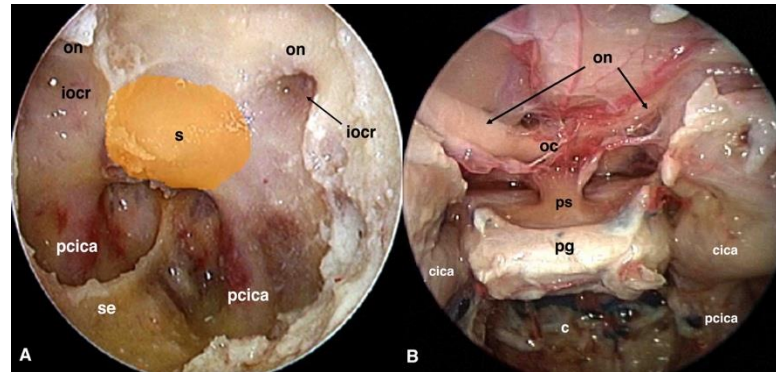
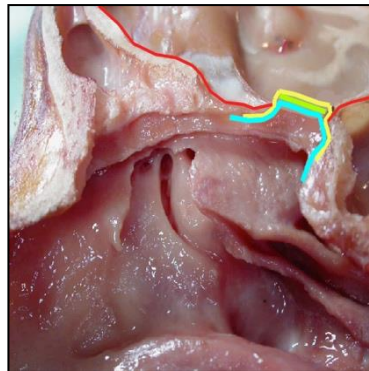


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MIDDLE CRANIAL FOSSA

- consider the presence of the **optic nerve**, the **chiasm** that is vascularised by **the small arterial branches of the superior hypophyseal artery** (the visual field can be harmed through even the slightest damage), the **hypophyseal peduncle** (functional damage can result from minor trauma or manoeuvres) and the **internal carotid artery**
- epidural detachment must be handled very gently or even avoided, using the **Gasket-seal** closure technique

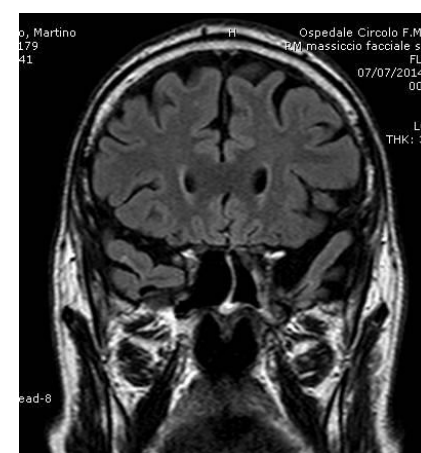
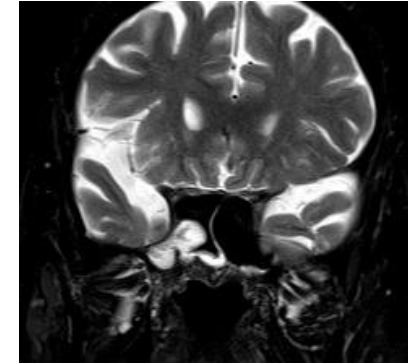
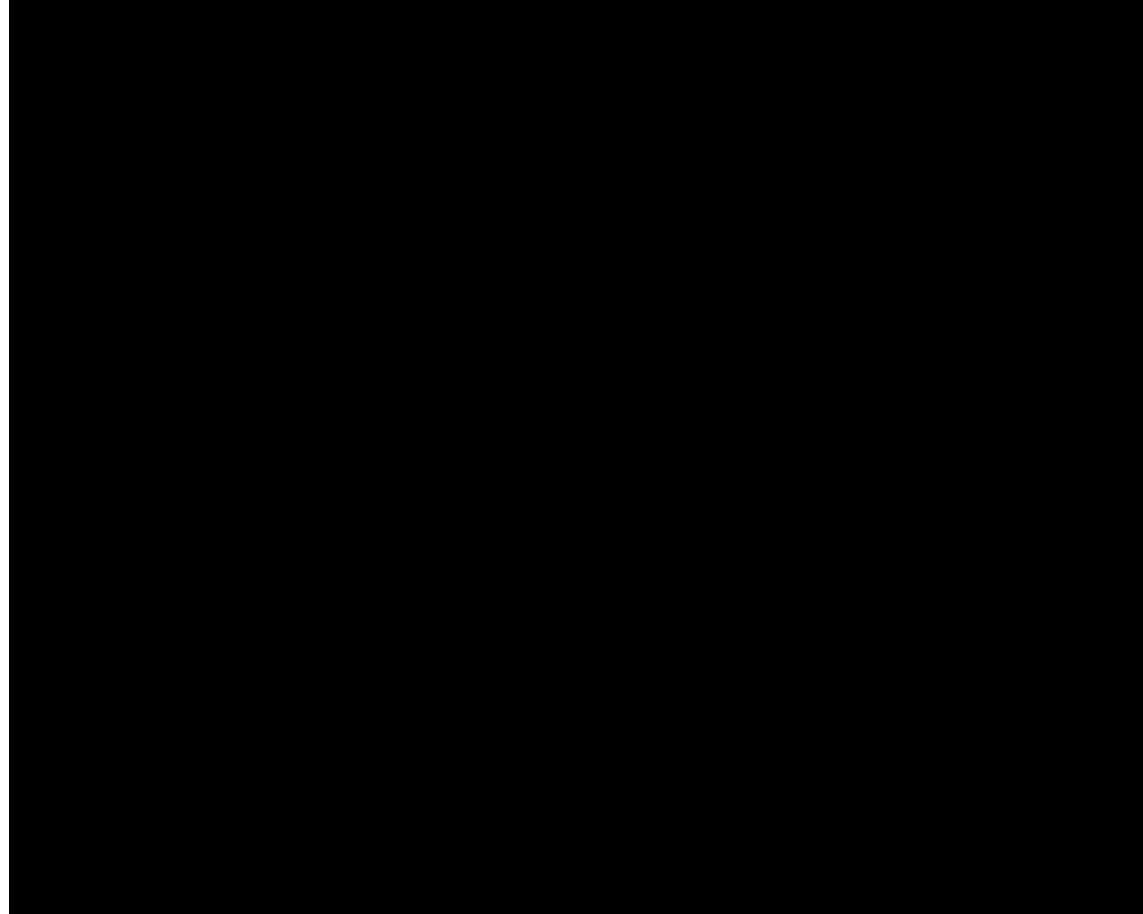


CHALLENGING TO POSITION AN INLAY GRAFT



SITE

Right lateral recess meningoencephalocele Trans-ethmoid-pterygoid approach

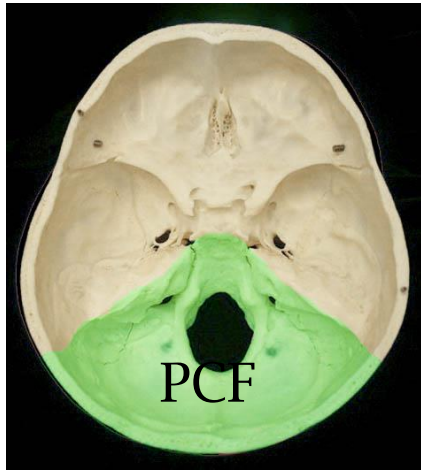


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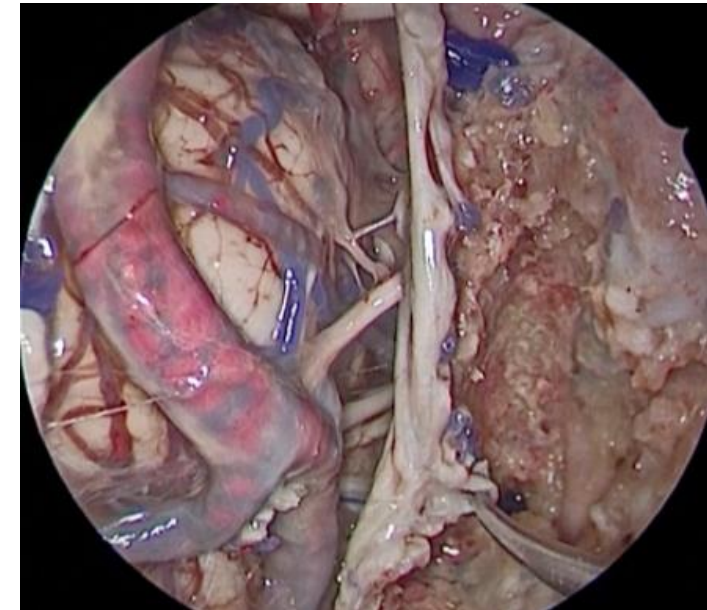
POSTERIOR CRANIAL FOSSA

critical points

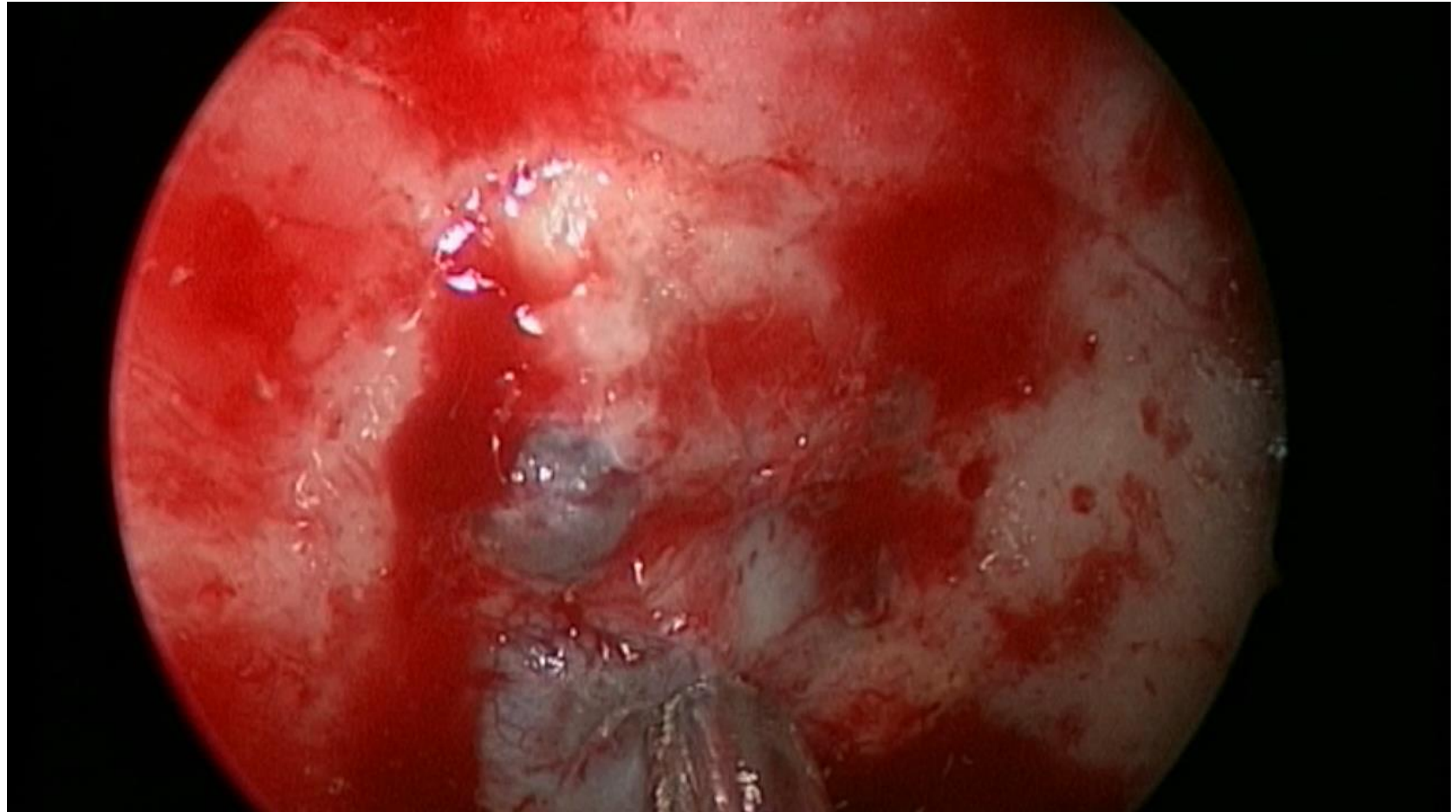
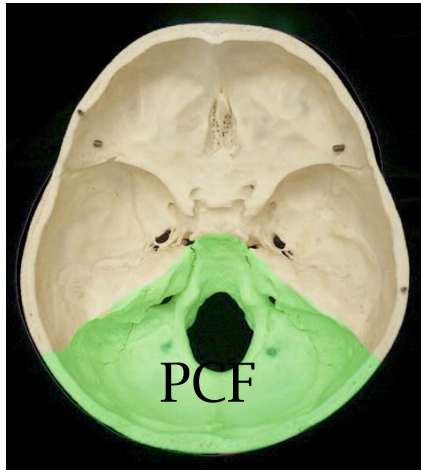
- ✓ **VI cranial nerve** passing the Dorello canal
- ✓ **the HIGH-FLOW CSF** pressure
- ✓ different spatial arrangement of the grafts because of the **force of gravity**



**combination of
Gasket-seal technique
+
septal pedicled flap**



SITE



SKULL BASE RECONSTRUCTION

Factors that may affect outcomes



MATERIALS & TECHNIQUE

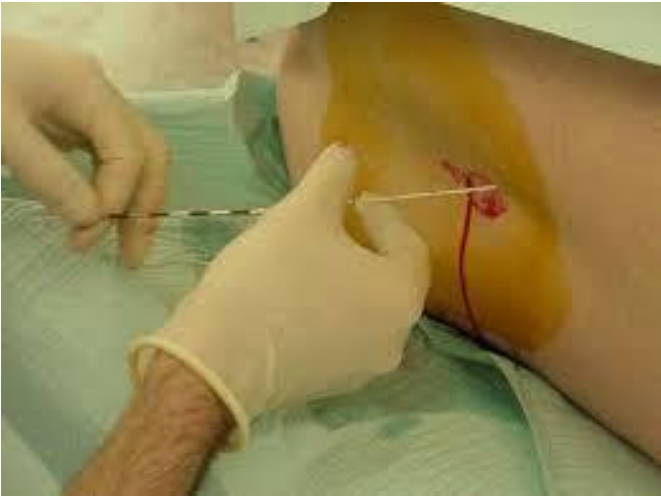
SIZE

SITE

POST-OP MANAGEMENT



POST-OP MANAGEMENT

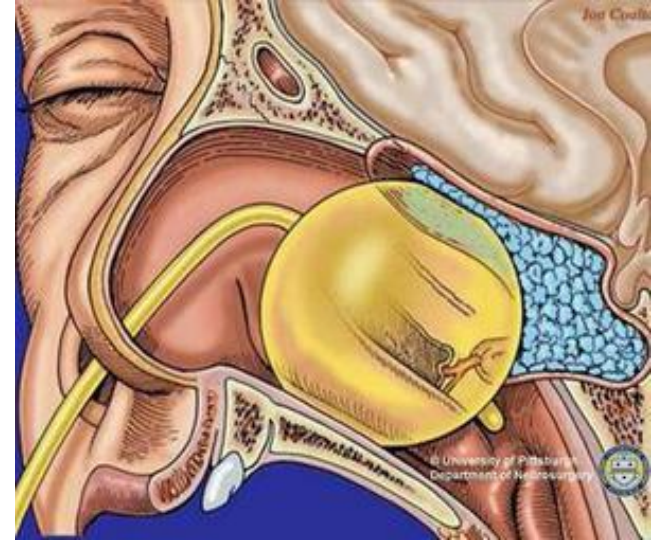


LUMBAR DRAIN :

Yes or not ?

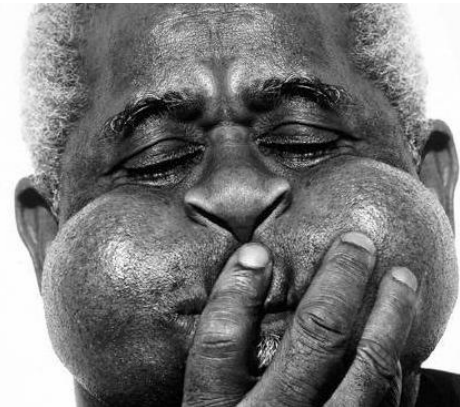
How many days ?

FOLEY BALOON CATHETER :
to buttress the reconstruction ?



BED REST AFTER SURGERY :

How many days?



THERE IS NO THE BEST TECHNIQUE

**SKULL BASE RECONSTRUCTION
SHOULD BE TAILORED TO YOUR PATIENT**

MATERIALS & TECHNIQUE

SIZE

SITE

POST-OP MANAGEMENT



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2024



2015



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SAVE THE DATE!

15th -19th Sept 2026



MMC
شارعی پزشکی میرسی
Mercy Medical City

5th RhinoSul Conference 9th Rhinology workshop

Rotana Hotel
17th -18th Sept

- Hybrid Advanced Fess-Skull Base Surgery workshop
15 -16 Sept 2026 MMC
- Rhinoplasty workshop 19 - 09 /2026 MMC





*thank
you*

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