Too Late to Ignore

One hundred case journeys in head, neck, skull base and ear surgery

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About this book

Most surgical atlases show the textbook case. This book shows the other one: the cancer that was ignored or deferred, the disease left behind after chemoradiation, the child whose nose was blocked, the ear that kept discharging, and the operation that followed.

Every chapter is one patient, or a small group of patients treated by the same operation, documented in the author's own operative videos and photographs. The reconstructions are those available to a surgeon working in a district or regional centre: the pectoralis major, the submental, nasolabial and submandibular gland flaps, the forehead flap, and the stomach brought to the neck with a general surgeon alongside. Four chapters are cadaveric dissections from the endoscopic skull base fellowship and are included as the anatomy behind the live cases.

HOW EACH CHAPTER IS ARRANGED

1. **Clinical presentation** — how the patient came, as recorded.
2. **Author's perspective** — why this operation was chosen.
3. **Approach** — the access and the plan.
4. **Operative steps** — numbered, with the operative sequence shown as a diagram.
5. **Operative record** — the frames and photographs in surgical order.
6. **Schematic** — the anatomy or geometry on which the operation depends.
7. **Challenges and how they were addressed.**
8. **Teaching points** — each explained.
9. **Case summary** and **references**.

Captions in quotation marks are the author's own on-screen labels from the operative videos. All patients gave consent for the use of their images in teaching and publication. Faces are excluded or the eyes are masked, and names, dates and hospital numbers have been removed. Literature was retrieved from PubMed; DOIs are given with each reference.

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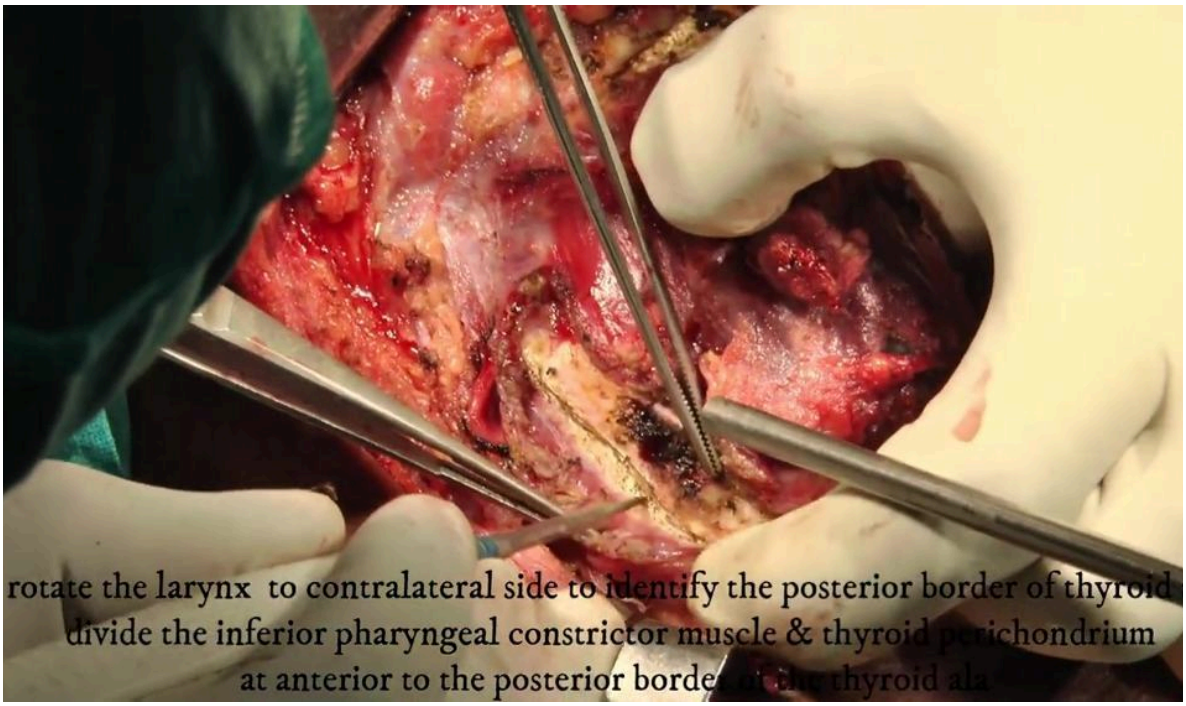
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PART I

Larynx and pharynx

Laryngectomy in its forms, and the ways a pharynx is closed, patched or replaced.

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2 Taking the cartilage, keeping the voice
3 Very little pharynx left
4 Closing the tube
5 The muscle that fills the gap
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01

The dry field

Advanced carcinoma of the larynx

Total laryngectomy with stepwise vascular control

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Advanced laryngeal carcinoma not suitable for organ preservation is treated by total laryngectomy. The operation recorded here was filmed to demonstrate a laryngectomy in which almost no blood is lost.

AUTHOR'S PERSPECTIVE

> Every significant bleeding point in a total laryngectomy is a named vessel: the superior laryngeal pedicle, the superior and inferior thyroid vessels and the anterior jugular veins. Identifying and ligating each before it is divided converts the operation into a sequence of controlled steps and removes the need for transfusion, which matters in elderly, anaemic and previously irradiated patients.

APPROACH

An apron incision gives access to the larynx, both necks and the stoma site. The larynx is freed from below upwards and laterally before the pharynx is entered, so that the mucosal phase is short and clean.

OPERATIVE STEPS

1. Incise the investing layer of deep cervical fascia along the anterior border of the sternocleidomastoid.
2. Divide the omohyoid where it crosses the internal jugular vein and open the plane lateral to the strap muscles.
3. Dissect the superior pole of the thyroid; identify and ligate the superior laryngeal artery before division.
4. Divide the thyroid isthmus; reflect the lobe laterally off the trachea, cricoid and inferior constrictor.
5. Divide the suprahyoid muscles along the upper border of the hyoid body.
6. Rotate the larynx; divide the inferior constrictor and thyroid perichondrium at the posterior border; identify the recurrent laryngeal nerve at the cricothyroid region.
7. Transect the trachea between rings with the posterior wall longer than the anterior; enter the pharynx and incise the post-cricoid mucosa transversely.
8. Deliver the specimen and close the pharynx.

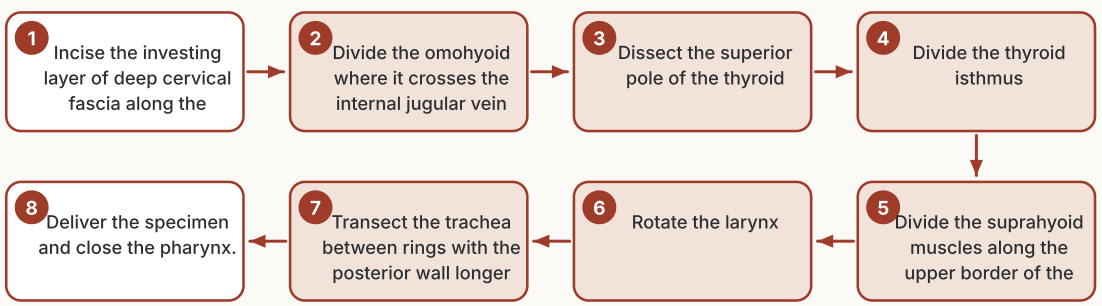
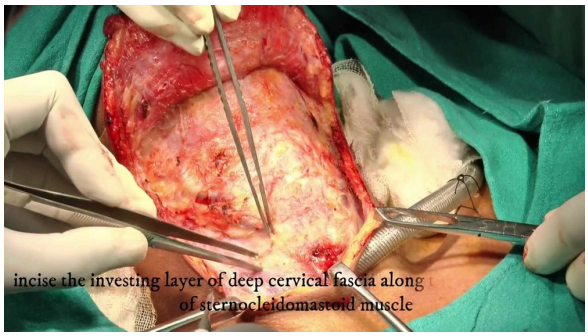
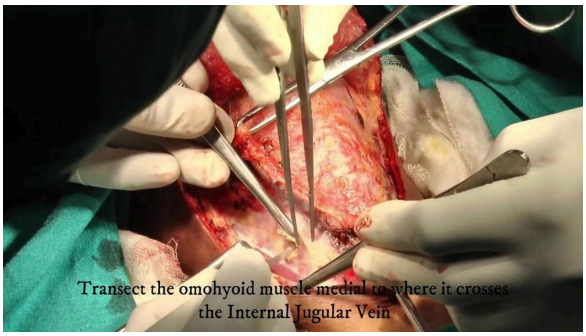


Figure 1.A Operative sequence.

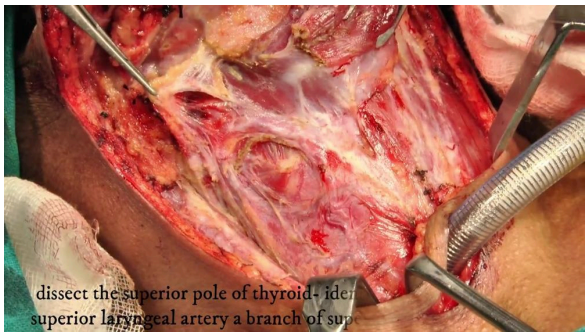
OPERATIVE RECORD



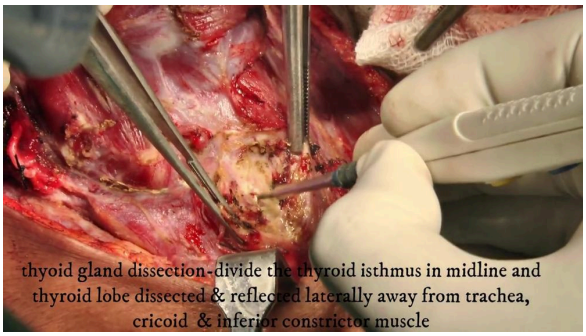
1.1 "Incise the investing layer of deep cervical fascia along the sternocleidomastoid." Video 0:29



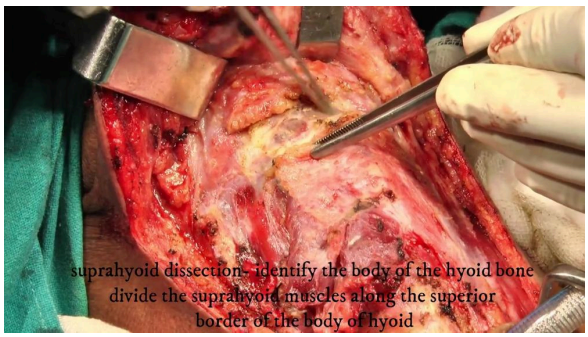
1.2 "Transect the omohyoid medial to where it crosses the internal jugular vein." Video 2:25



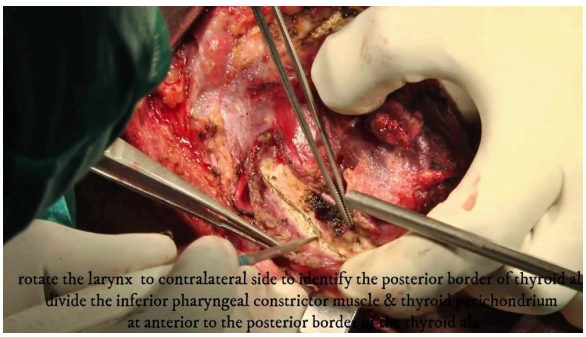
1.3 "Dissect the superior pole of thyroid: identify and ligate the superior laryngeal artery." Video 5:20



1.4 "Thyroid isthmus divided in the midline; lobe dissected and reflected laterally away from trachea, cricoid and inferior constrictor." Video 8:15



1.5 "Suprahyoid dissection: divide the suprahyoid muscles along the superior border of the body of the hyoid." Video 9:13



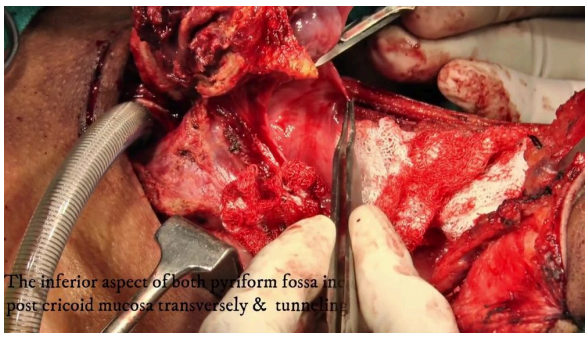
1.6 "Rotate the larynx to the contralateral side; divide the inferior constrictor and thyroid perichondrium at the posterior border." Video 10:12



1.7 "Dissection at the cricothyroid region: recurrent laryngeal nerve identified." Video 18:56



1.8 "Trachea transected between two tracheal rings; posterior wall should be longer than the anterior wall." Video 20:53



1.9 "The inferior aspect of both piriform fossae: post-cricoid mucosa incised transversely." Video 21:51



1.10 "The laryngeal specimen is delivered from the wound." Video 22:49

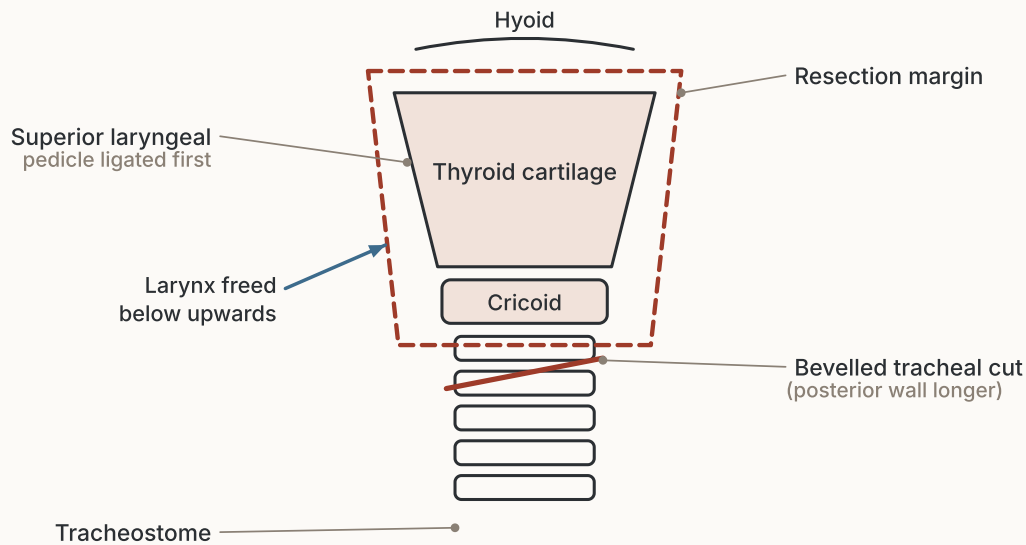


Figure 1.B Total laryngectomy: extent of resection and tracheostome.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Bleeding from the superior laryngeal pedicle during suprahyoid release	The pedicle is found and tied at the thyrohyoid membrane before the hyoid attachments are divided.
Venous oozing from the thyroid bed	The isthmus is divided between ligatures and the lobe is mobilised in the capsular plane.
Stoma stenosis	The trachea is cut obliquely, longer posteriorly, to create a wide elliptical tracheostome.

TEACHING POINTS

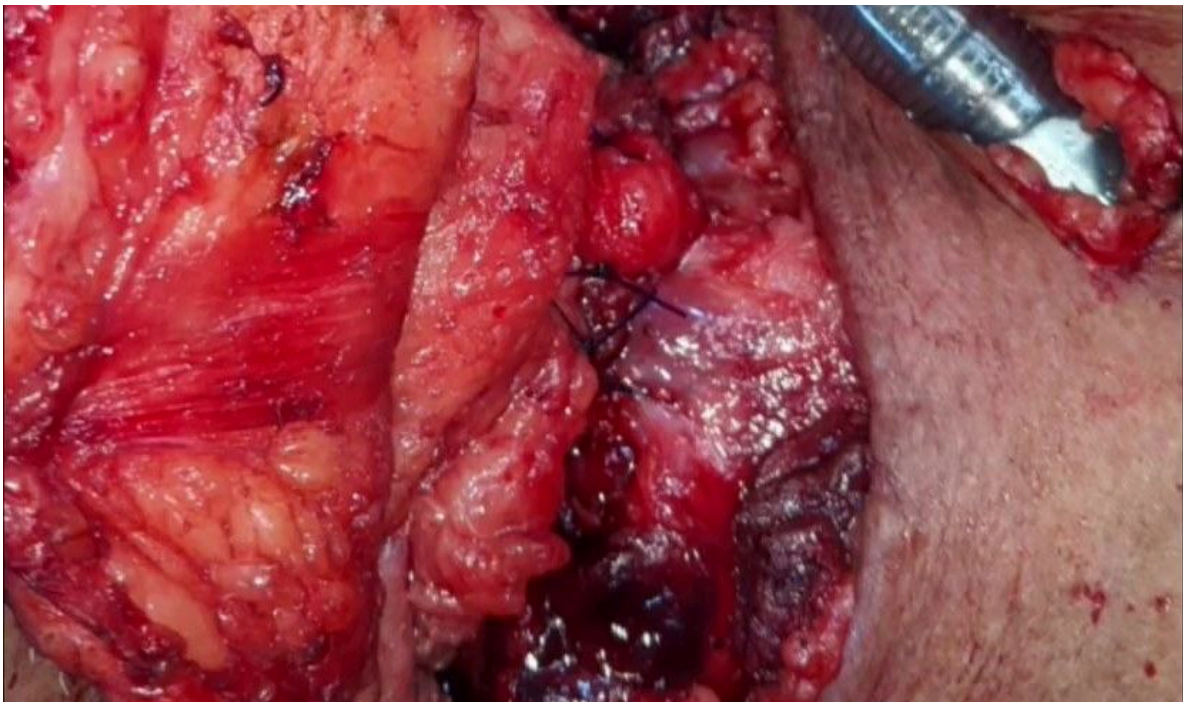
- **Ligate before you divide.** The superior laryngeal artery, superior thyroid artery and anterior jugular veins are tied in continuity before any division.
- **Bevel the trachea.** A posterior wall longer than the anterior gives an elliptical stoma that resists stenosis.
- **Correct anaemia before surgery.** Haemoglobin below 12.5 g/dL is an independent risk factor for pharyngocutaneous fistula.
- **Enter the pharynx away from the tumour.** Through the vallecula or post-cricoid region on the uninvolved side, under vision.

CASE SUMMARY

Total laryngectomy performed as a sequence of named-vessel ligations. The field remained dry throughout, the larynx was delivered intact, and the pharynx was closed primarily.

REFERENCES

1. Department of Veterans Affairs Laryngeal Cancer Study Group. Induction chemotherapy plus radiation compared with surgery plus radiation in patients with advanced laryngeal cancer. *N Engl J Med* 1991;324:1685–90. doi:10.1056/NEJM199106133242402
2. Wang M, Xun Y, Wang K, et al. Risk factors of pharyngocutaneous fistula after total laryngectomy: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2020;277:585–99. doi:10.1007/s00405-019-05718-9
3. Dedivitis RA, Aires FT, Cernea CR, Brandão LG. Pharyngocutaneous fistula after total laryngectomy: systematic review of risk factors. *Head Neck* 2015;37:1691–7. doi:10.1002/hed.23804



02

Taking the cartilage, keeping the voice

Carcinoma supraglottis and glottis, T4a N0, with anterior thyroid cartilage invasion

Supracricoid laryngectomy with cricohyoidopexy and bilateral selective neck dissection

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 62-year-old man presented with dysphagia and change of voice. Imaging and endoscopy showed a proliferative growth of the supraglottis and epiglottis extending into the glottic and paraglottic spaces, with both vocal folds involved anteriorly, anterior commissure involvement and anterior thyroid cartilage invasion. Both piriform fossae were free. Biopsy confirmed moderately differentiated squamous cell carcinoma.

AUTHOR'S PERSPECTIVE

> Cartilage invasion usually leads to total laryngectomy. In this patient both arytenoids were mobile, the cricoid was free and the posterior commissure was uninvolved. These are the conditions under which a supracricoid partial laryngectomy can remove the whole thyroid cartilage with both vocal folds and still preserve breathing, swallowing and voice without a permanent stoma.

APPROACH

The larynx is approached through an apron flap with bilateral selective neck dissection. The thyroid cartilage, both true and false folds and the epiglottis are removed; the cricoid is then fixed to the hyoid.

OPERATIVE STEPS

1. Release the sternohyoid from the hyoid bone and expose the laryngeal framework and upper trachea.
2. Perform an infrahyoid pharyngotomy and inspect the supraglottic tumour.
3. Complete the laryngeal cuts above the cricoid under direct vision of the vocal folds.
4. Make vertical cuts along the anterior surface of both arytenoids, preserving their vocal processes and the cricoid arch.
5. Pull each arytenoid forward with a suture to the cricoid to prevent posterior prolapse.
6. Pass three sutures around the cricoid arch and the hyoid body, one midline and two 0.5 cm paramedian, and tie with the neck flexed.
7. Suture the strap muscles to the hyoid to cover the pexy.

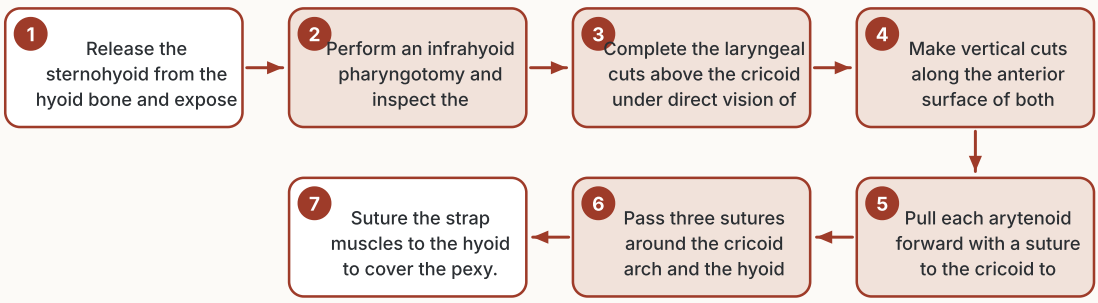
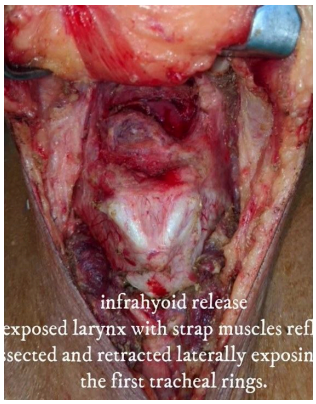


Figure 2.A Operative sequence.

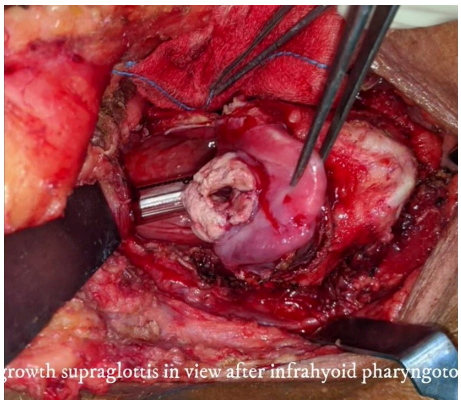
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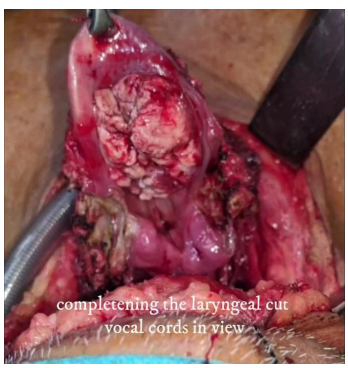
2.1 "Right side strap muscle (sternohyoid) cut off the hyoid bone." Video 0:25



2.2 "Infrahyoid release. Larynx exposed with strap muscles reflected; thyroid lobes retracted laterally, exposing the larynx and the first tracheal rings." Video 0:47



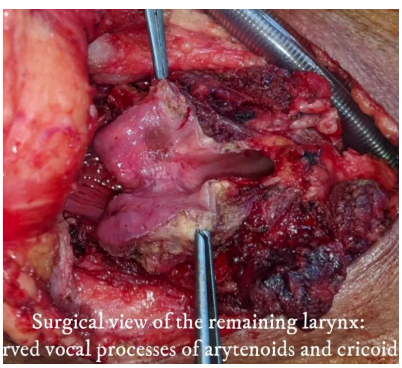
2.3 "Growth of the supraglottis in view after infrahyoid pharyngotomy." Video 0:59



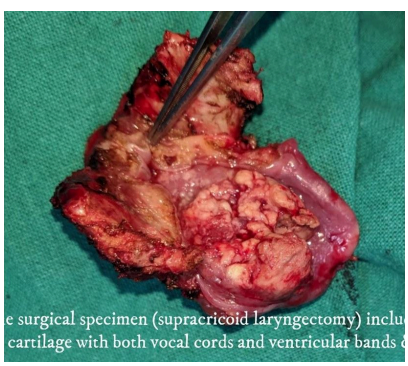
2.4 "Completing the laryngeal cut: vocal cords in view." Video 1:10



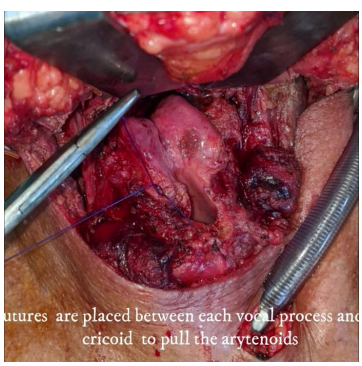
2.5 "Vertical cut made along the anterior surface of both arytenoids." Video 1:15



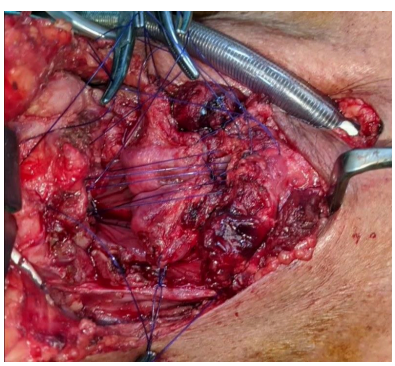
2.6 "The remaining larynx: preserved vocal processes of the arytenoids and the cricoid arch." Video 1:21



2.7 "The specimen (supracricoid laryngectomy) includes the thyroid cartilage with both vocal cords, ventricular bands and epiglottis." Video 1:27



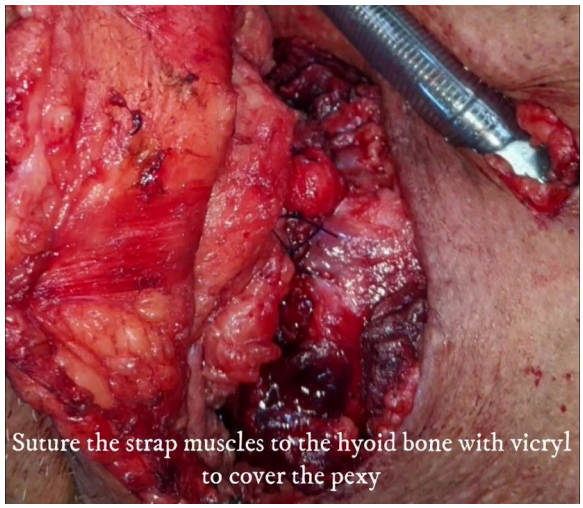
2.8 "Sutures placed between each vocal process and the cricoid to pull the arytenoids forward." Video 1:32



2.9 Cricohyoidopexy sutures passing around the cricoid arch and the hyoid. Video 1:49



2.10 "Pass three sutures around the cricoid arch and the body of the hyoid: one in the midline, two 0.5 cm either side." Video 1:55



2.11 "Suture the strap muscles to the hyoid bone with Vicryl to cover the pexy." Video 2:06

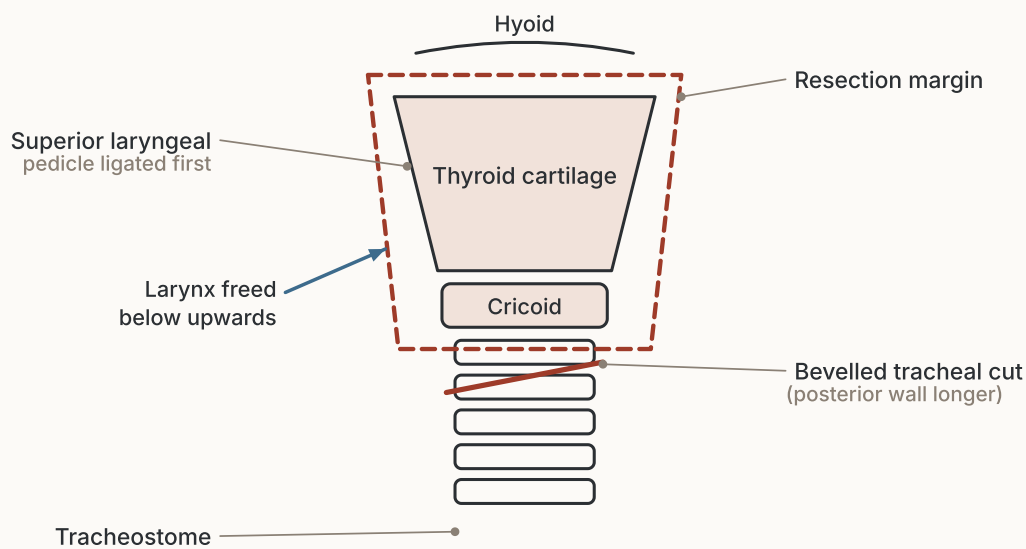


Figure 2.B Total laryngectomy: extent of resection and tracheostome.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Posterior collapse of the arytenoids and aspiration	Each arytenoid was anchored forward to the cricoid before the pexy was tied.
Tension on the cricohyoidopexy	The neck was flexed while the sutures were tied, and the strap muscles were used as a second layer.

TEACHING POINTS

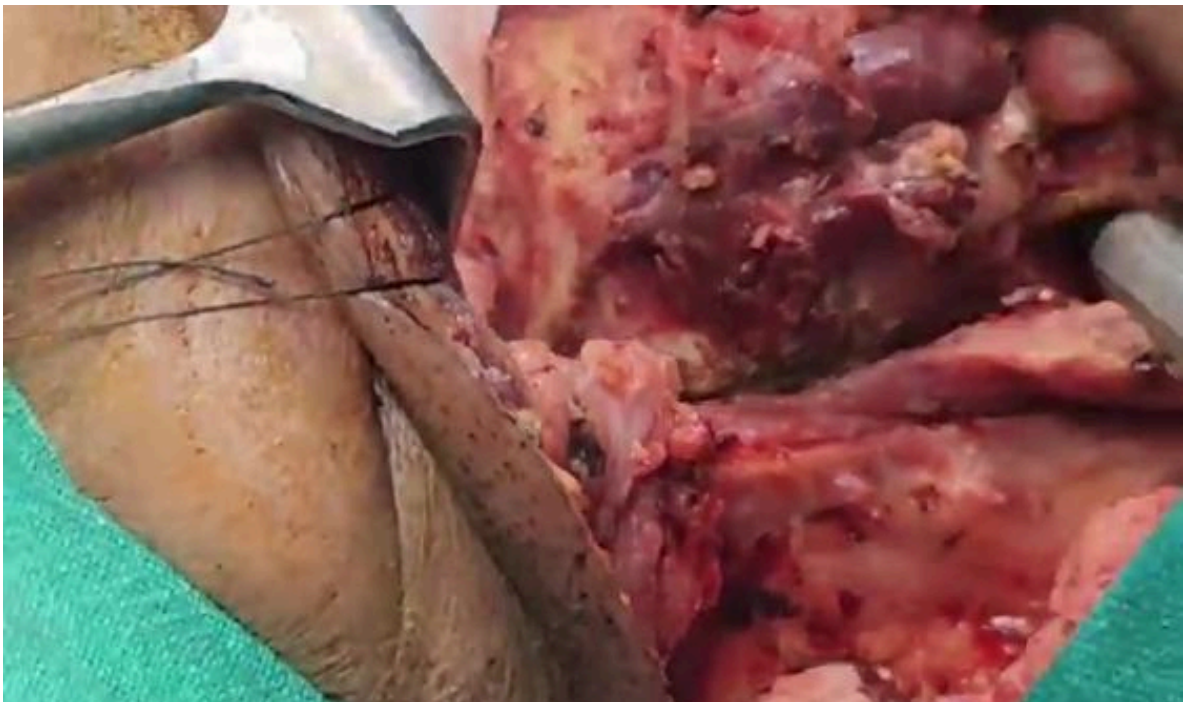
- **At least one mobile arytenoid is essential.** The arytenoid–tongue base sphincter is the new glottis.
- **The cricoid must be free.** Subglottic extension or cricoid invasion excludes the operation.
- **Lung function matters.** Aspiration in the early weeks is expected and must be tolerated.
- **Three pexy sutures, tied in flexion.** One midline and two paramedian sutures distribute tension around the cricoid arch.

CASE SUMMARY

Supracricoid laryngectomy with cricohyoidopexy for a T4a N0 supraglottic and glottic carcinoma with anterior cartilage invasion. The specimen contained the thyroid cartilage, both vocal folds, the ventricular bands and the epiglottis; the larynx was reconstructed without a permanent stoma.

REFERENCES

1. Laccourreye O, Brasnu D, Biacabe B, et al. Neo-adjuvant chemotherapy and supracricoid partial laryngectomy with cricohyoidopexy for advanced endolaryngeal carcinoma classified as T3–T4: 5-year oncologic results. *Head Neck* 1998;20:595–9.
2. Department of Veterans Affairs Laryngeal Cancer Study Group. Induction chemotherapy plus radiation compared with surgery plus radiation in patients with advanced laryngeal cancer. *N Engl J Med* 1991;324:1685–90. doi:10.1056/NEJM199106133242402



03

Very little pharynx left

Advanced laryngopharyngeal carcinoma with circumferential pharyngeal spread

Total laryngectomy with near-total pharyngectomy

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

When carcinoma of the larynx or hypopharynx spreads around the pharyngeal wall, the laryngectomy has to take most of the pharynx with it.

AUTHOR'S PERSPECTIVE

> The width of mucosa that remains after resection decides the reconstruction. A strip of 1.5 cm or more, measured relaxed, can be closed primarily; a narrower strip needs a flap. The plan for both possibilities is made before the pharynx is opened.

APPROACH

Wide field laryngectomy with the pharyngeal cuts placed around the tumour, keeping as much uninvolved mucosa as margins permit.

OPERATIVE STEPS

1. Mobilise the larynx and pharynx laterally with diathermy along the constrictors.
2. Develop the retropharyngeal plane behind the specimen.
3. Open the pharynx and define the extent of mucosal involvement.
4. Continue the mucosal cut around the tumour with clear margins.
5. Lift the specimen from the prevertebral fascia.
6. Complete the contralateral mucosal cuts and measure the remnant.

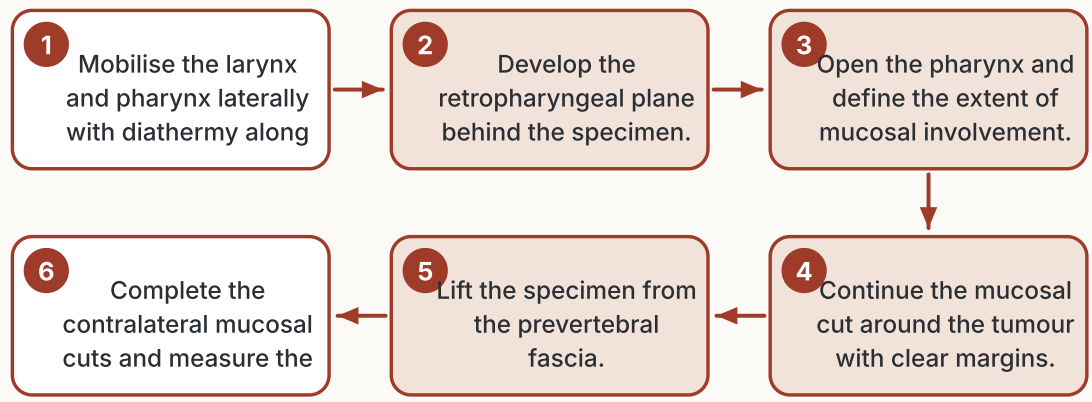
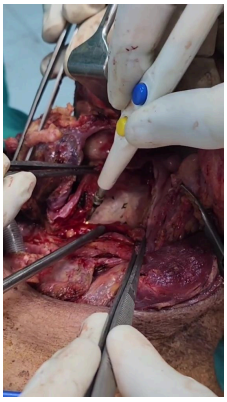


Figure 3.A Operative sequence.

OPERATIVE RECORD



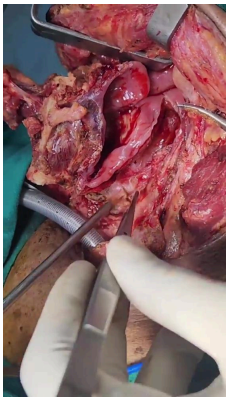
3.1 Lateral dissection along the laryngopharynx with diathermy. Video 0:09



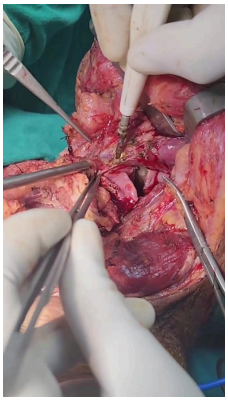
3.2 Deep plane developed behind the specimen. Video 0:22



3.3 Pharynx opened; the extent of the pharyngeal resection comes into view. Video 0:28



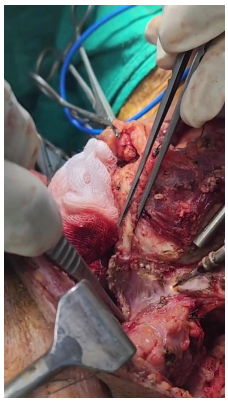
3.4 Specimen retracted to expose the pharyngeal cut. Video 0:35



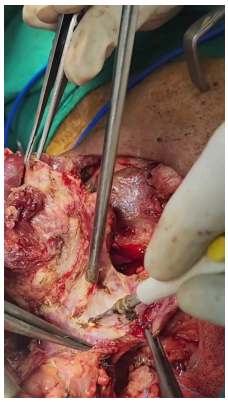
3.5 Mucosal cut continued around the tumour. Video 1:01



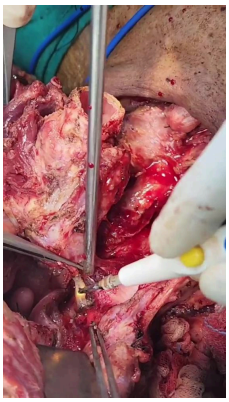
3.6 The specimen lifted from the bed. Video 1:33



3.7 Remaining pharyngeal mucosa and the prevertebral plane. Video 1:46



3.8 Final mucosal cuts on the opposite side. Video 1:58



3.9 The bed after the specimen is out: the mucosal remnant. Video 2:18



3.10 The remnant prepared for closure. Video 2:24

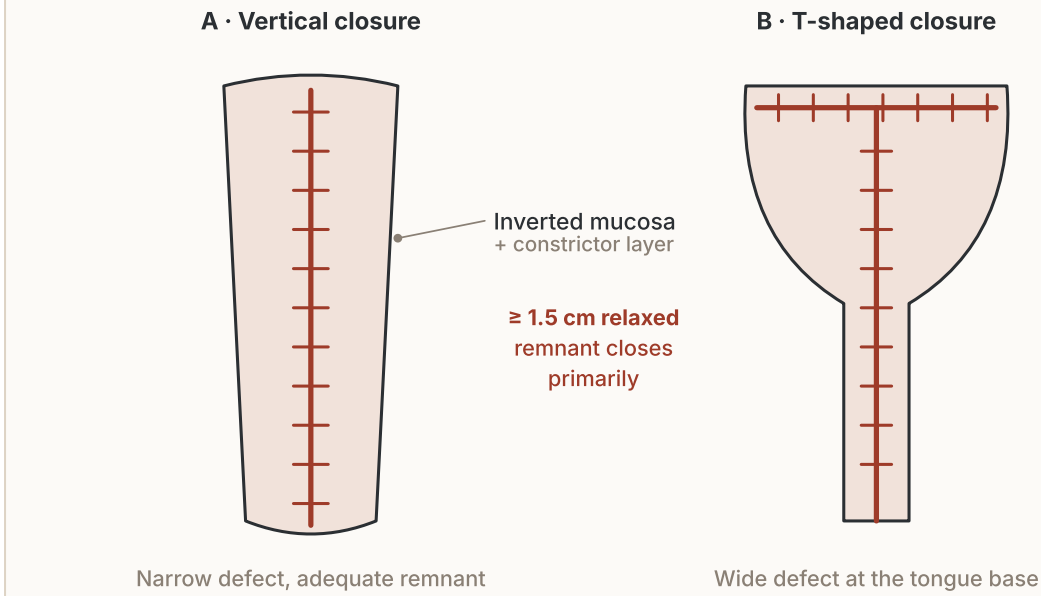


Figure 3.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Unpredictable mucosal extent	The pharynx was opened on the less involved side and the cuts planned under direct vision.
Narrow remnant	The remnant width was measured before deciding between primary closure and flap reconstruction.

TEACHING POINTS

- **Measure the remnant relaxed and stretched.** 1.5 cm relaxed (2.5 cm stretched) is enough for primary closure without long-term dysphagia.
- **Hypopharyngeal primaries carry more fistula risk.** Expect it and plan reinforcement.
- **Prevertebral fascia is the deep margin.** It is preserved unless invaded.

CASE SUMMARY

Total laryngectomy with near-total pharyngectomy for advanced laryngopharyngeal carcinoma, with the reconstruction chosen according to the measured mucosal remnant.

REFERENCES

1. Hui Y, Wei WI, Yuen PW, Lam LK, Ho WK. Primary closure of pharyngeal remnant after total laryngectomy and partial pharyngectomy: how much residual mucosa is sufficient? *Laryngoscope* 1996;106:490–4. doi:10.1097/00005537-199604000-00018
2. Dedivitis RA, Aires FT, Cernea CR, Brandão LG. Pharyngocutaneous fistula after total laryngectomy: systematic review of risk factors. *Head Neck* 2015;37:1691–7. doi:10.1002/hed.23804



04

Closing the tube

Pharyngeal defect after total laryngectomy

Primary neopharyngeal closure with the Connell inverting suture

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

After total laryngectomy the pharynx is reconstructed as a tube. Where sufficient mucosa remains it is closed on itself over a feeding tube.

AUTHOR'S PERSPECTIVE

> The aim is mucosa meeting mucosa, inverted into the lumen, so that saliva cannot track into the neck. The Connell suture inverts the edges as it runs; a second layer of constrictor muscle relieves tension on the mucosal line.

APPROACH

Closure begins at the apex of the defect and proceeds towards the tongue base, over a nasogastric tube that calibrates the lumen.

OPERATIVE STEPS

1. Inspect the open pharynx and confirm adequate mucosa around the nasogastric tube.
2. Place the first sutures at the apex of the defect.
3. Run the Connell inverting suture along the mucosal edges.
4. Complete the mucosal layer over the tube.
5. Bring the constrictor muscle over the mucosal line as a second layer.
6. Test the closure before the neck is closed.

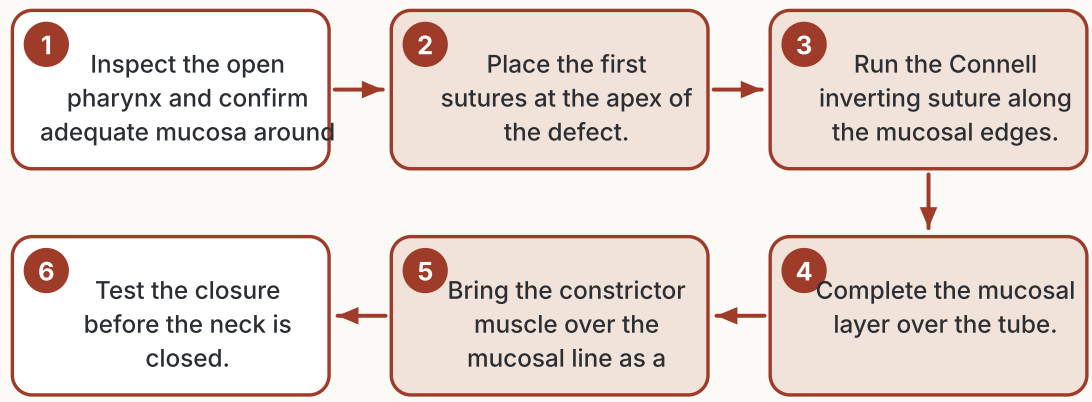
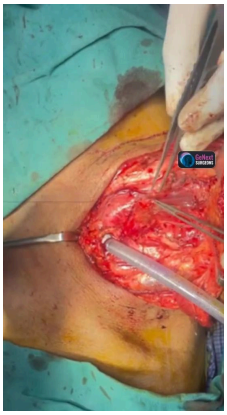


Figure 4.A Operative sequence.

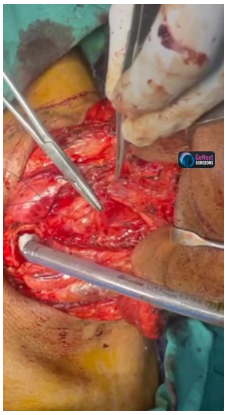
OPERATIVE RECORD



4.1 The open pharynx after laryngectomy, feeding tube in place. Video 0:13



4.2 First sutures placed at the apex of the defect. Video 0:32



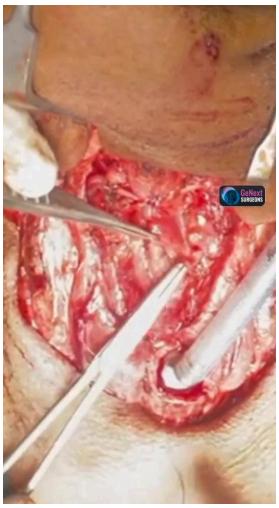
4.3 Connell suture running along the mucosal edges, inverting them. Video 1:18



4.4 Mucosal layer closed over the tube. Video 1:55



4.5 Second layer: constrictor muscle brought over the mucosal line. Video 2:50



4.6 Closure complete; the stoma lies below. Video 3:09

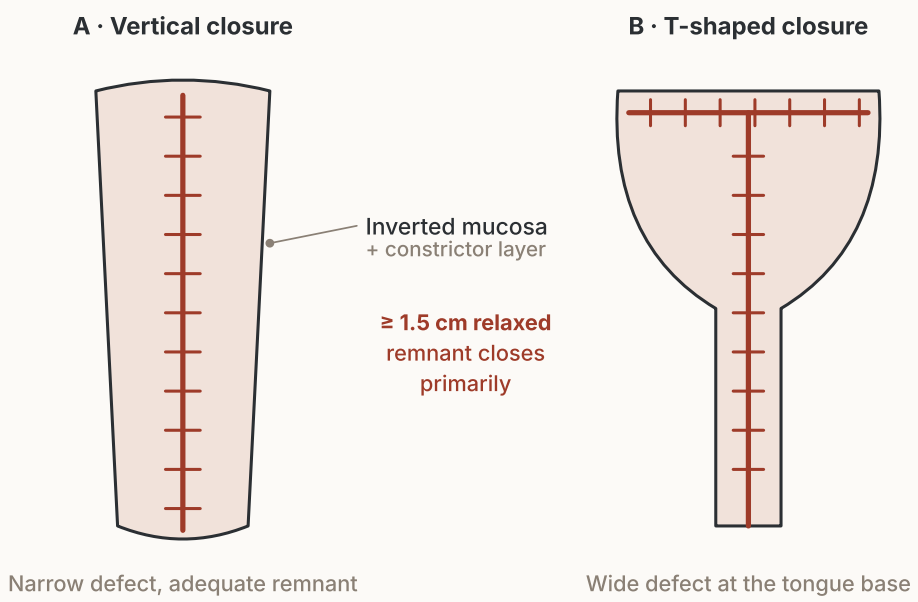


Figure 4.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Leak at the junction of the vertical and horizontal limbs	The apex stitch was placed first and the suture line was tested before skin closure.
Lumen narrowing	The closure was performed over a nasogastric tube.

TEACHING POINTS

- **Invert, never evert.** Mucosal edges turned into the lumen form the seal.
- **Calibrate the lumen.** Closure over a nasogastric tube prevents stricture.
- **Add a muscle layer.** Constrictor approximation reduces tension on the mucosal suture.
- **Test before closing.** Saline or air under pressure reveals a weak point while it can still be repaired.

CASE SUMMARY

Primary pharyngeal closure after total laryngectomy using an inverting Connell suture and a constrictor second layer.

REFERENCES

1. Wang M, Xun Y, Wang K, et al. Risk factors of pharyngocutaneous fistula after total laryngectomy: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2020;277:585–99. doi:10.1007/s00405-019-05718-9
2. Hui Y, Wei WI, Yuen PW, Lam LK, Ho WK. Primary closure of pharyngeal remnant after total laryngectomy and partial pharyngectomy: how much residual mucosa is sufficient? *Laryngoscope* 1996;106:490–4. doi:10.1097/00005537-199604000-00018



05

The muscle that fills the gap

Laryngeal carcinoma: recurrence and pharyngocutaneous fistula

Pectoralis major myocutaneous flap as onlay cover and as a tubed neopharynx

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Three situations are documented: a neopharynx closed primarily, a recurrent laryngeal carcinoma in which the pectoralis major flap was laid as a blanket cover, and a patient with a fistula in whom the skin paddle was tubed to form the pharynx. The fistula patient was followed for four years after reconstruction.

AUTHOR'S PERSPECTIVE

> The pectoralis major is the flap that is always available. Over a primary closure it brings unirradiated muscle; where the pharynx cannot be closed, its skin paddle can be tubed around a salivary bypass tube to restore continuity.

APPROACH

The flap is raised on the thoracoacromial pedicle, tunnelled over the clavicle and inset either as an onlay over the repair or as a tube.

OPERATIVE STEPS

1. Raise the pectoralis major myocutaneous flap with the skin paddle over the muscle.
2. Inset as a blanket cover over the pharyngeal repair in the recurrent case.
3. In the fistula case, tube the skin paddle around a salivary bypass tube.
4. Inset the tubed flap as the neopharynx and close over it.

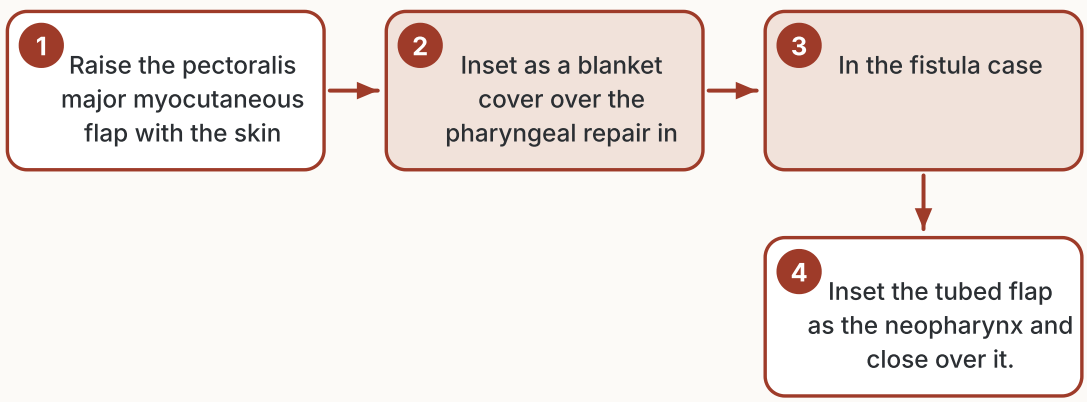
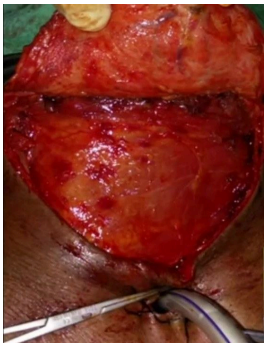


Figure 5.A Operative sequence.

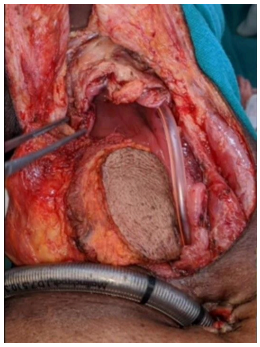
OPERATIVE RECORD



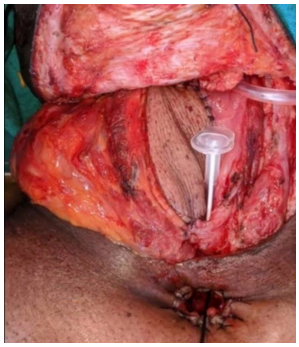
5.1 "Neopharynx reconstruction: primary closure." Video 0:12



5.2 Recurrent laryngeal carcinoma: the PMMC flap raised for a blanket cover. Video 0:22



5.3 Recurrent laryngeal carcinoma: PMMC flap blanket cover, skin paddle in the defect. Video 0:32



5.4 Flap inset over the repair, salivary drain in place. Video 0:37



5.5 "Tubed PMMC, salivary bypass tube." Video 0:48



5.6 Tubed PMMC inset as the neopharynx. Video 0:53



5.7 "Laryngeal cancer with fistula." Video 1:08



5.8 "During surgery": closure over the flap. Video 1:13



5.9 "Before surgery, 4 years back": laryngeal cancer with fistula, nasogastric tube in place. Video 1:03



5.10 Healed neck with the tracheostome. Video 0:58



5.11 "Post surgery, 4 years." Video 1:18

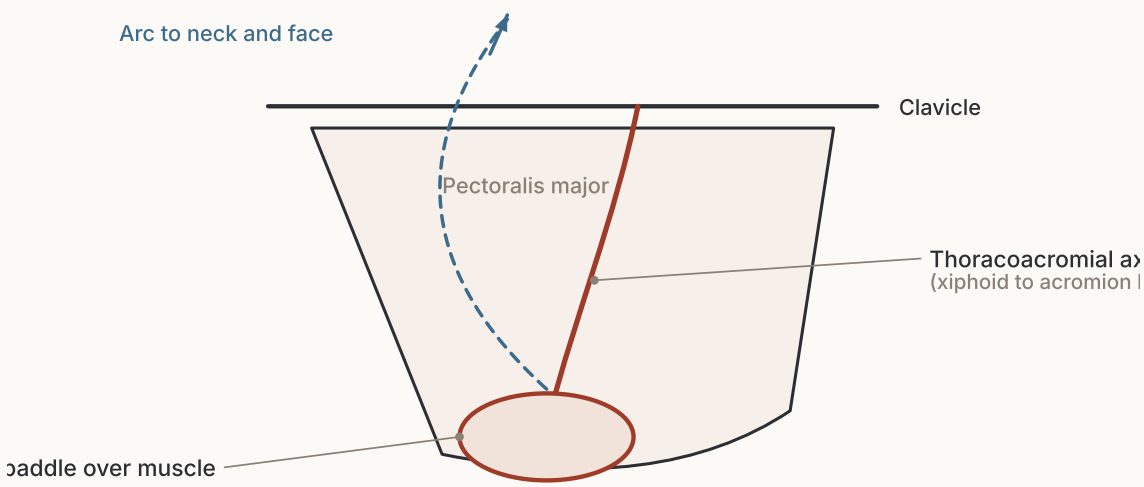


Figure 5.B Pectoralis major myocutaneous flap: design and arc of rotation.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Irradiated tissue with poor healing	Healthy muscle from outside the radiation field was brought over the pharyngeal repair.
A pharyngeal gap too large to close	The skin paddle was tubed around a salivary bypass tube.

TEACHING POINTS

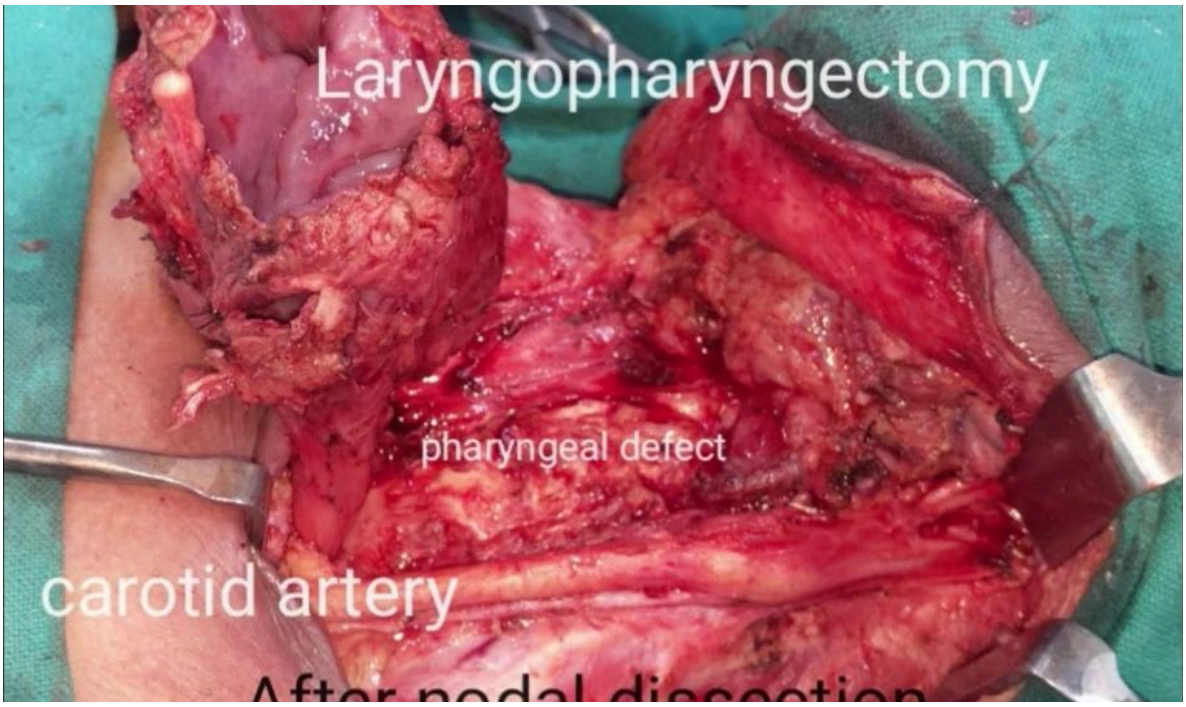
- **The onlay flap shortens fistula healing.** Even where it does not always lower the fistula rate.
- **Tube around a bypass tube.** The stent holds the lumen while the suture lines heal.
- **Design the paddle over the muscle.** Skin beyond the lower muscle border has a poor blood supply.
- **Warn about the shoulder.** Pectoralis harvest weakens adduction and may limit movement.

CASE SUMMARY

Three uses of the pectoralis major flap in pharyngeal reconstruction, including a tubed neopharynx for a fistula, with the patient followed to four years.

REFERENCES

1. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.
2. Sharma S, Chaukar DA, Laskar SG, et al. Role of the pectoralis major myofascial flap in preventing pharyngocutaneous fistula following salvage laryngectomy. *J Laryngol Otol* 2016;130:860–4. doi:10.1017/S0022215116008501
3. Sittitrai P, Srivanitchapoom C, Reunmakkaew D. Prevention of pharyngocutaneous fistula in salvage total laryngectomy: role of the pectoralis major flap and peri-operative management. *J Laryngol Otol* 2018;132:246–51. doi:10.1017/S0022215118000178
4. Meulemans J, Demarsin H, Debacker J, et al. Functional outcomes and complications after salvage total laryngectomy for residual, recurrent and second primary squamous cell carcinoma of the larynx and hypopharynx. *Front Oncol* 2020;10:1390. doi:10.3389/fonc.2020.01390



06

The fourth opinion

Carcinoma of the post-cricoid region; residual locoregional disease after chemoradiation, deferred from multiple centres

Total laryngopharyngo-oesophagectomy, total thyroidectomy, bilateral neck dissection and gastric pull-up

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The patient reached this centre with a tracheostomy in place and residual disease in the post-cricoid region and neck after chemoradiation. Several centres had seen him and deferred surgery.

AUTHOR'S PERSPECTIVE

> Residual disease after chemoradiation is a salvage situation, but not a hopeless one. With extension towards the cervical oesophagus, the whole pharyngo-oesophageal segment was removed and the stomach brought to the neck, which needs only one anastomosis and avoids a microvascular procedure in an irradiated field.

APPROACH

A combined cervical and abdominal operation with the gastrointestinal surgeon: laryngopharyngectomy and bilateral neck dissection from above, transhiatal oesophagectomy and gastric mobilisation from below.

OPERATIVE STEPS

1. Mobilise the laryngopharynx with the sternocleidomastoid retracted.
2. Perform total laryngopharyngectomy with total thyroidectomy.
3. Complete left radical neck dissection, clearing nodal disease off the carotid.
4. Complete right selective neck dissection.
5. Deliver the gastric pull-up into the neck.
6. Perform the pharyngo-gastric anastomosis.

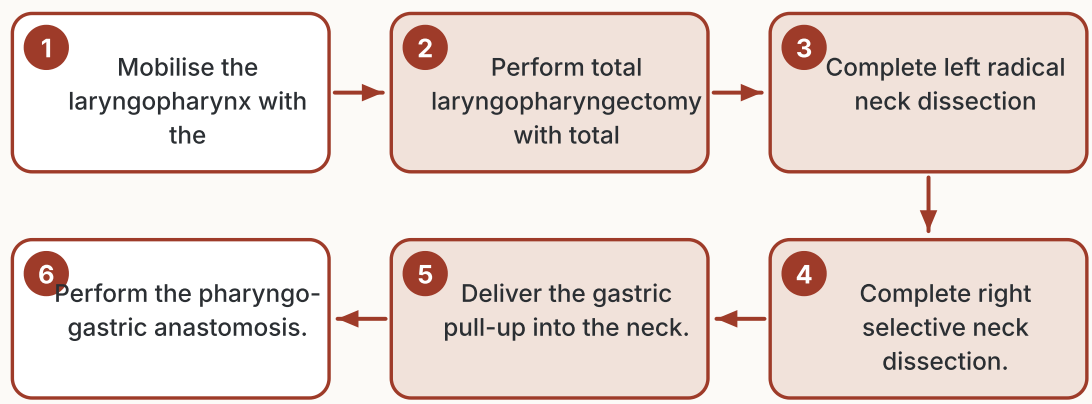
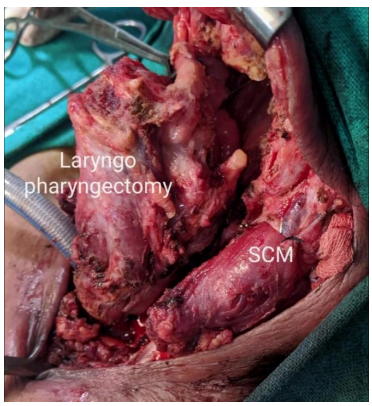
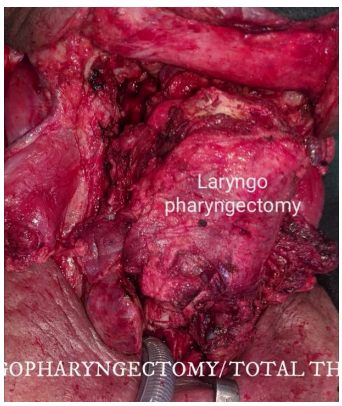


Figure 6.A Operative sequence.

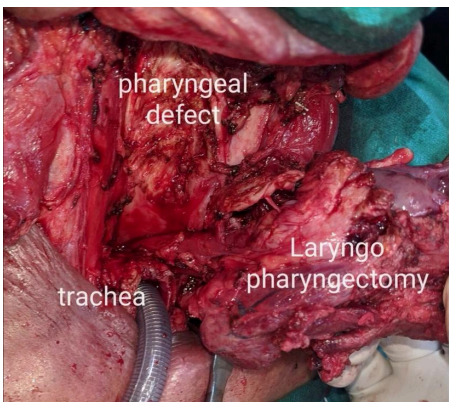
OPERATIVE RECORD



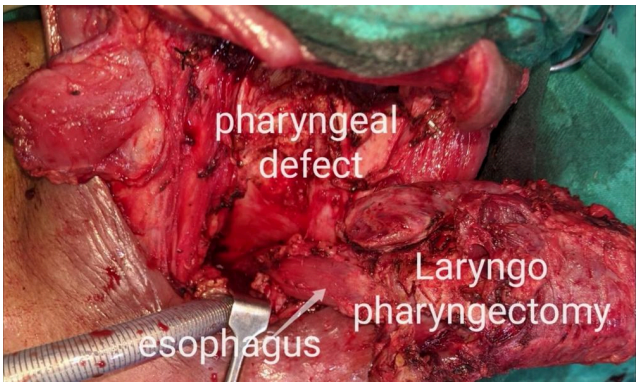
6.1 Laryngopharyngectomy mobilised; sternocleidomastoid retracted. 0:22



6.2 Total laryngopharyngectomy with total thyroidectomy. 0:28



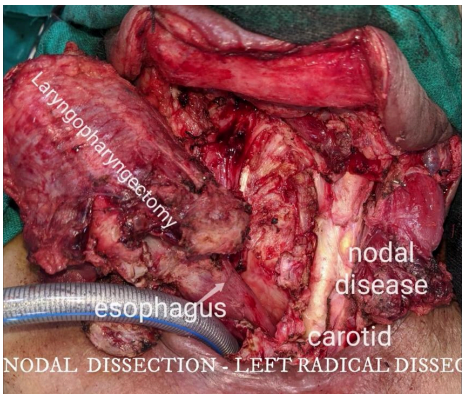
6.3 Pharyngeal defect above, trachea below. 0:33



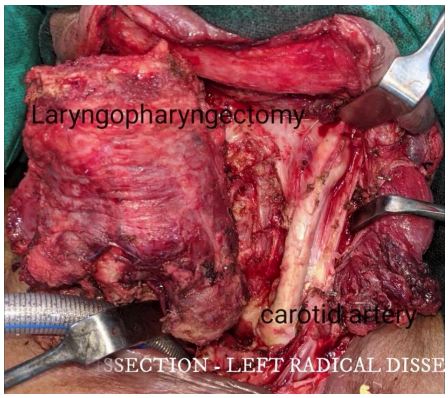
6.4 Pharyngeal defect, oesophagus and the laryngopharyngectomy specimen. 0:38



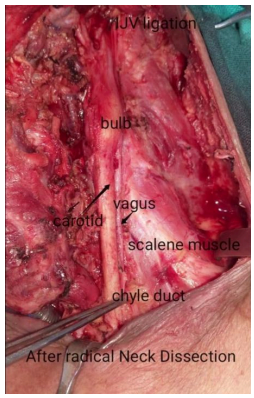
6.5 The same field from a lower angle. 0:43



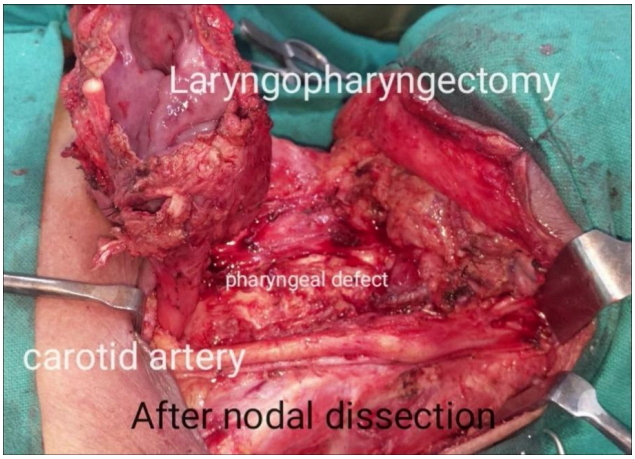
6.6 Left radical neck dissection: nodal disease against the carotid. 0:53



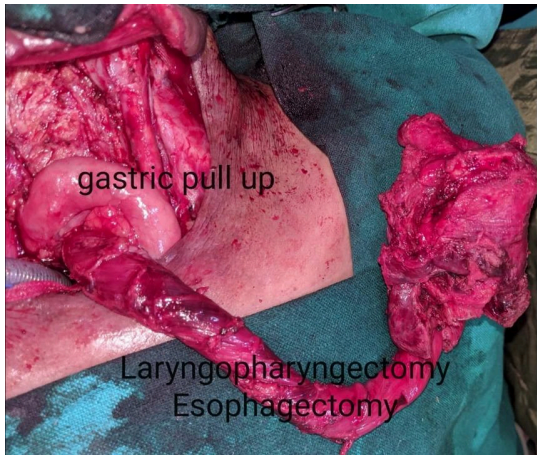
6.7 Carotid artery cleared during the left radical dissection. 1:03



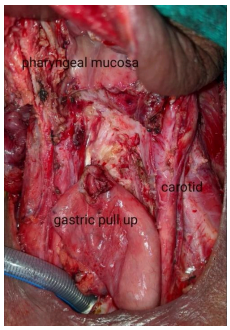
6.8 After radical neck dissection, structures labelled on the frame. 1:08



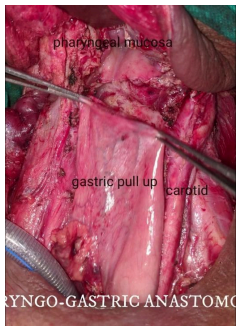
6.9 After nodal dissection: carotid artery and pharyngeal defect, specimen still attached. 1:13



6.10 Gastric pull-up delivered into the neck. 1:19



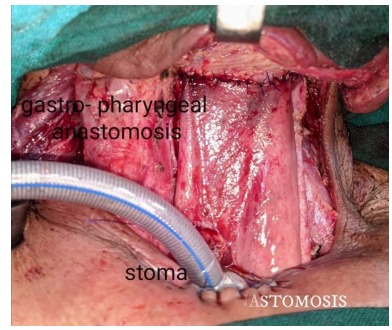
6.11 Pharyngeal mucosa, gastric pull-up and carotid before the anastomosis. 1:29



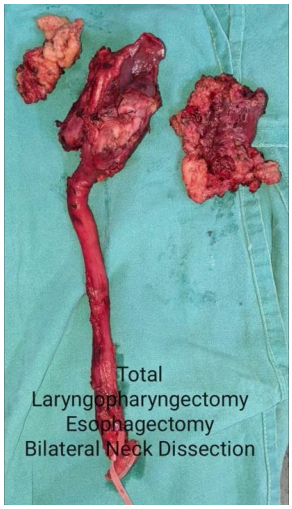
6.12 Pharyngo-gastric anastomosis. 1:39



6.13 Gastro-pharyngeal anastomosis completed. 1:49



6.14 Final field: gastro-pharyngeal anastomosis above, tracheostoma below. 1:54



6.15 Specimen: total laryngopharyngo-oesophagectomy with bilateral neck dissection. 1:24

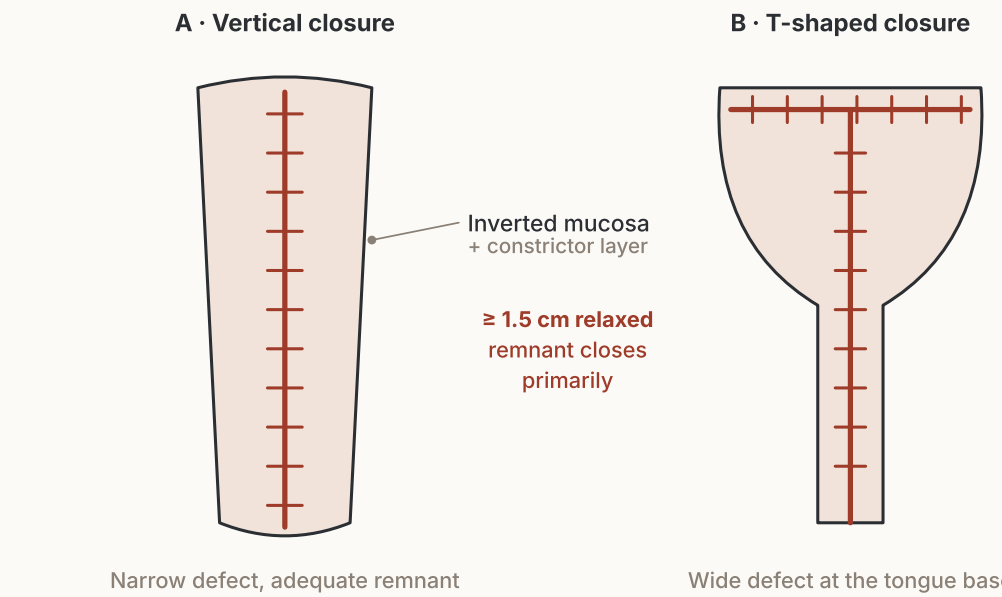


Figure 6.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Previously irradiated neck	A reconstruction with its own blood supply from outside the field (the stomach) was used.
Disease against the carotid	The carotid was cleared under direct vision during the radical neck dissection.
A long cervical anastomosis	The stomach was fully mobilised so that the anastomosis lay without tension.

TEACHING POINTS

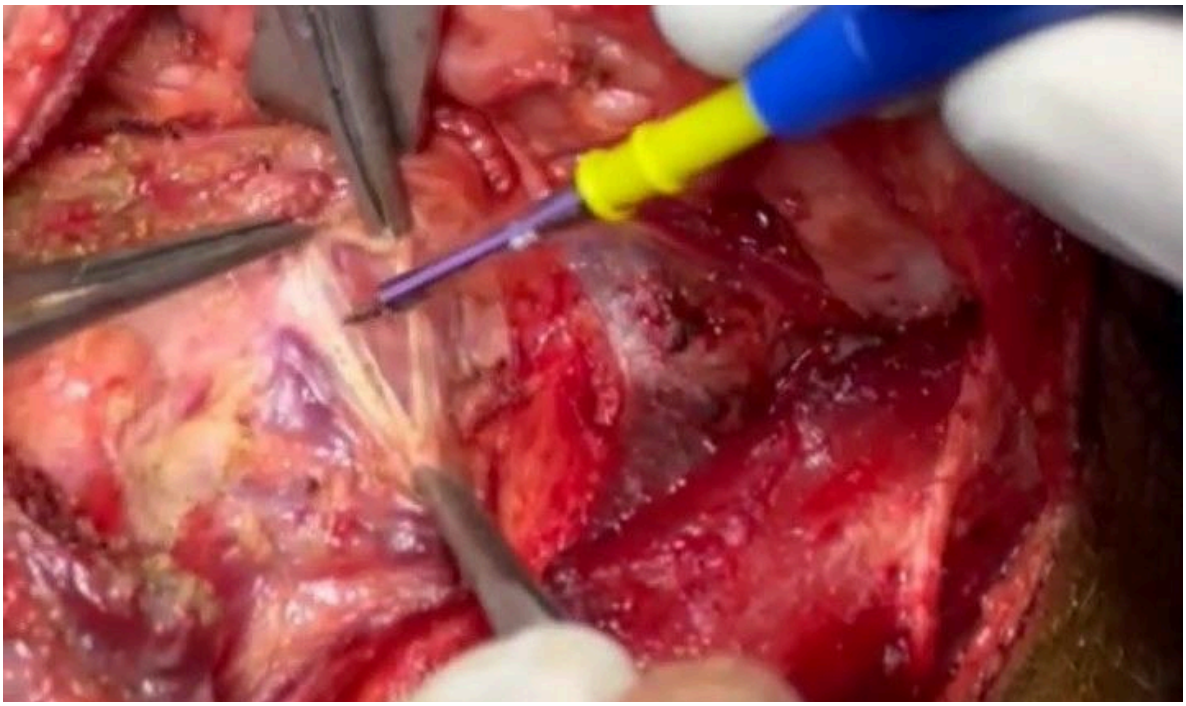
- **Define the lower margin.** Oesophageal extension favours gastric transposition over a free jejunal graft.
- **Two teams, one operation.** Transhiatal mobilisation by the gastrointestinal surgeon shortens operating time.
- **The higher the anastomosis, the higher the fistula risk.** Oropharyngeal extension raises the anastomosis.
- **Salvage surgery has high morbidity but worthwhile function.** Most patients regain oral intake.

CASE SUMMARY

Salvage total laryngopharyngo-oesophagectomy with bilateral neck dissection and gastric pull-up for residual post-cricoid carcinoma after chemoradiation, in a patient previously deferred by several centres.

REFERENCES

1. Watanabe M, Baba Y, Yoshida N, et al. Modified gastric pull-up reconstructions following pharyngolaryngectomy with total esophagectomy. *Dis Esophagus* 2014;27:255–61. doi:10.1111/dote.12086
2. Meulemans J, Demarsin H, Debacker J, et al. Functional outcomes and complications after salvage total laryngectomy for residual, recurrent and second primary squamous cell carcinoma of the larynx and hypopharynx. *Front Oncol* 2020;10:1390. doi:10.3389/fonc.2020.01390



07

Through the side door

Carcinoma of the posterior pharyngeal wall (hypopharynx)

Wide excision through a lateral pharyngotomy, primary closure, bilateral selective neck dissection (II–IV)

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A tumour confined to the posterior pharyngeal wall can be removed without sacrificing the larynx.

AUTHOR'S PERSPECTIVE

> The larynx was not involved, so a laryngectomy would have removed a normal organ. A lateral pharyngotomy gives direct access to the posterior wall; the defect was small enough to close primarily.

APPROACH

Lateral pharyngotomy behind the thyroid lamina, preserving the superior laryngeal nerve, with bilateral selective neck dissection.

OPERATIVE STEPS

1. Expose the lateral pharyngeal wall through the neck.
2. Incise the pharynx with needle-tip diathermy away from the tumour.
3. Develop the mucosal margin around the tumour.
4. Excise along the posterior wall on the prevertebral fascia.
5. Free the specimen and inspect the defect.
6. Close the posterior pharyngeal wall defect primarily.

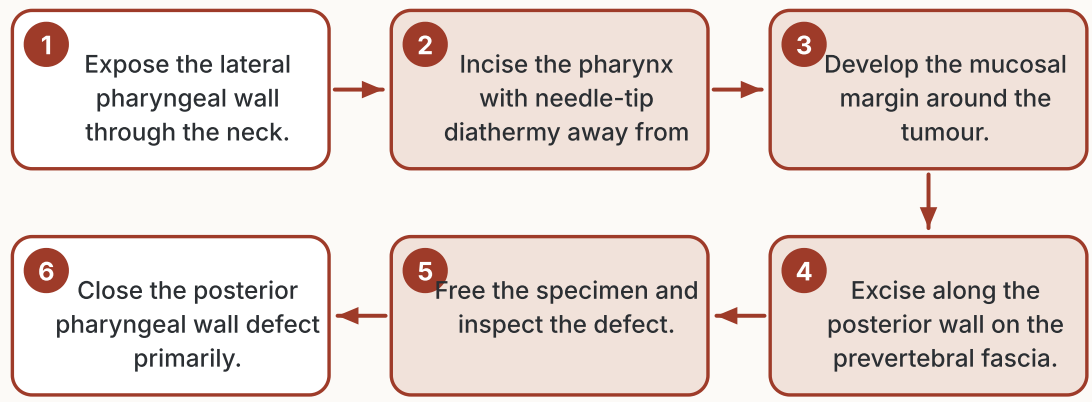


Figure 7.A Operative sequence.

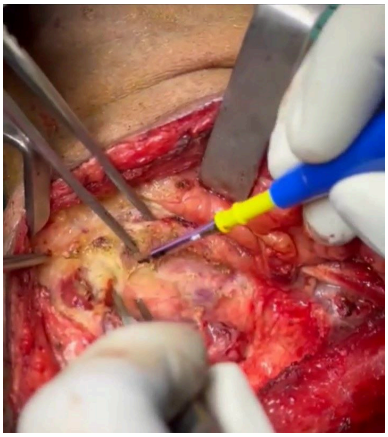
OPERATIVE RECORD



7.1 The lateral pharyngotomy approach exposed. Video 0:03



7.2 Pharyngeal wall incised with the needle-tip diathermy. Video 0:23



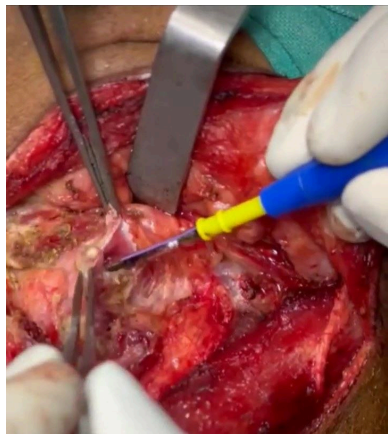
7.3 Mucosal margin developed around the tumour. Video 0:43



7.4 Excision continued along the posterior wall. Video 1:04



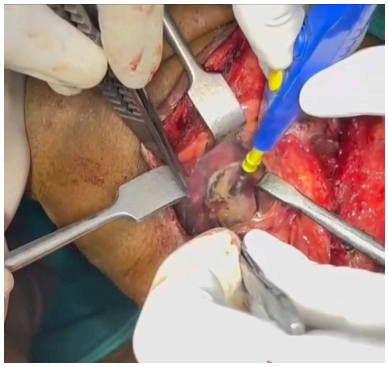
7.5 Deep margin on the prevertebral fascia. Video 1:24



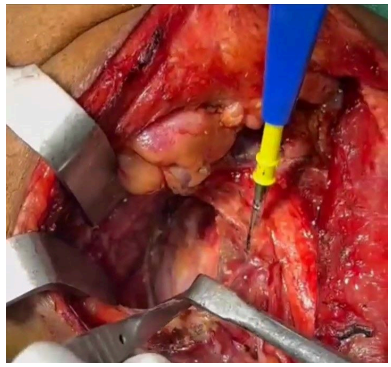
7.6 Specimen freed. Video 1:44



7.7 The defect in the posterior pharyngeal wall. Video 2:04



7.8 Closure begins. Video 2:11



7.9 “PPW defect primary closed”: final field. Video 2:25

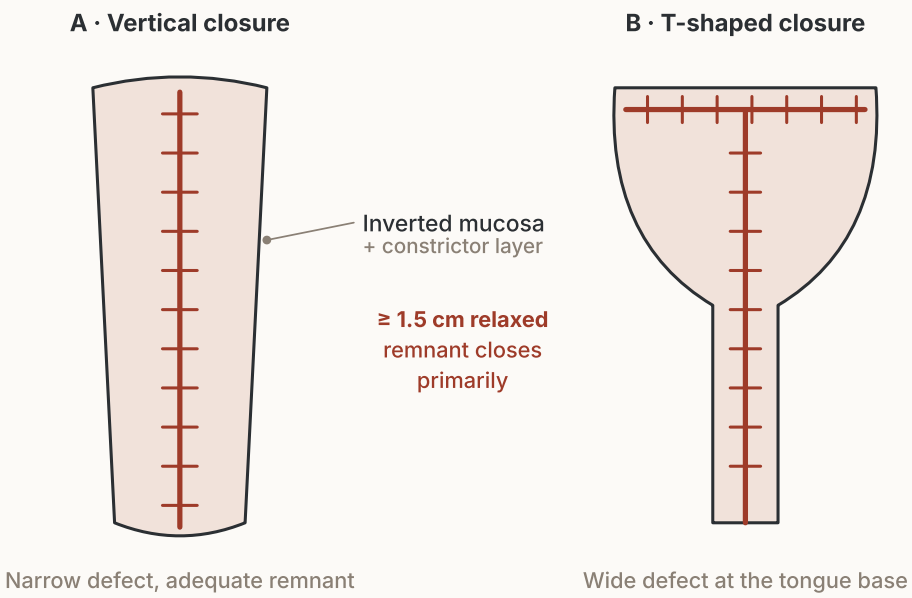


Figure 7.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Limited view of the posterior wall	The pharyngotomy was placed laterally behind the thyroid lamina for a direct line of sight.
Preservation of swallowing	The superior laryngeal nerve was preserved and the defect closed without tension.

TEACHING POINTS

- **Preserve the superior laryngeal nerves.** Sensation of the supraglottis protects against aspiration.
- **The prevertebral fascia is the deep margin.** It is taken only if invaded.
- **Retropharyngeal nodes belong to this subsite.** They are assessed on imaging.

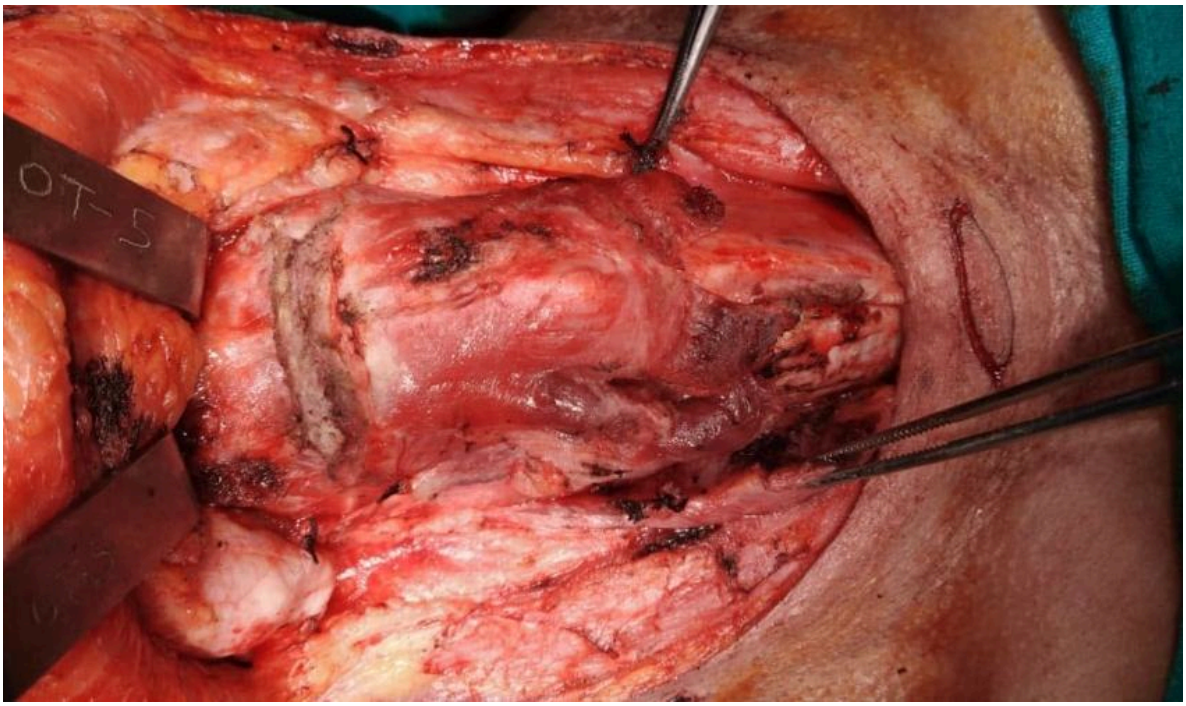
CASE SUMMARY

Larynx-preserving excision of a posterior pharyngeal wall carcinoma through a lateral pharyngotomy with primary closure and bilateral neck dissection.

REFERENCES

1. Spiro RH, Kelly J, Vega AL, Harrison LB, Strong EW. Squamous carcinoma of the posterior pharyngeal wall. *Am J Surg* 1990;160:420–3. doi:10.1016/s0002-9610(05)80557-4

2. Başaran B, Ünsaler S. Carcinoma of the posterior wall of the hypopharynx: surgical treatment with larynx preservation. *Braz J Otorhinolaryngol* 2022;88:174–80. doi:10.1016/j.bjorl.2020.05.013



08

The apron flap

Laryngeal carcinoma requiring total laryngectomy and neck dissection

Apron incision, total laryngectomy and neck dissection

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record documents the exposure for laryngectomy with neck dissection through a superiorly based apron flap.

AUTHOR'S PERSPECTIVE

> An apron incision gives a single exposure of the larynx, both neck dissections and the stoma, and keeps the tracheostome separate from the main wound, which reduces the risk of contamination of the neck by secretions.

APPROACH

The apron incision runs from mastoid to mastoid across the lower neck, with a subplatysmal flap raised superiorly to the hyoid.

OPERATIVE STEPS

1. Mark the apron incision with the stoma site placed below it.
2. Raise a superiorly based subplatysmal flap to expose the larynx and strap muscles.
3. Obtain full midline exposure of the laryngeal framework.
4. Clear the carotid sheath during neck dissection.
5. Skeletonise the vessels and identify the nerves before the specimen is delivered.

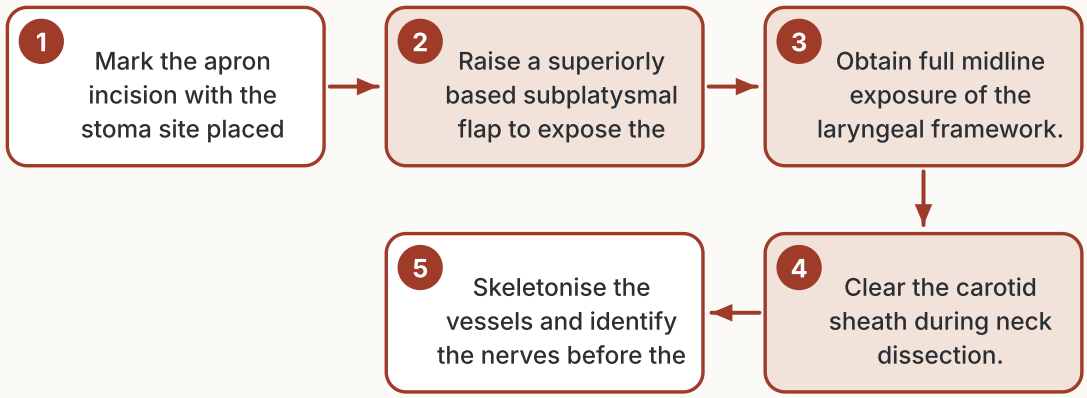
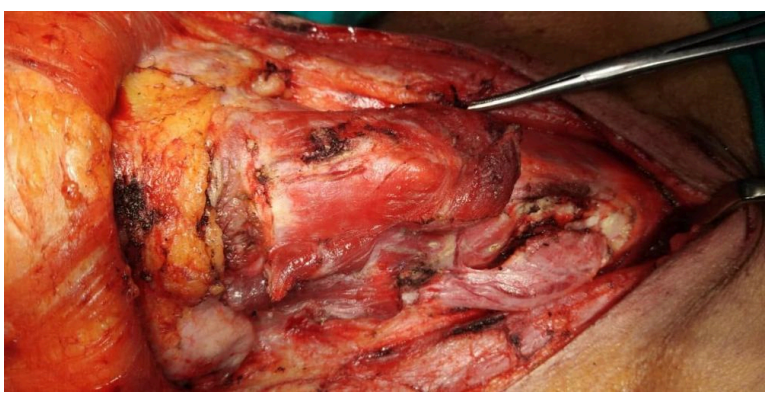


Figure 8.A Operative sequence.

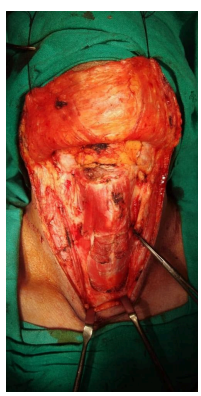
OPERATIVE RECORD



8.1 Neck dissection: cleared carotid sheath and strap muscles with forceps.



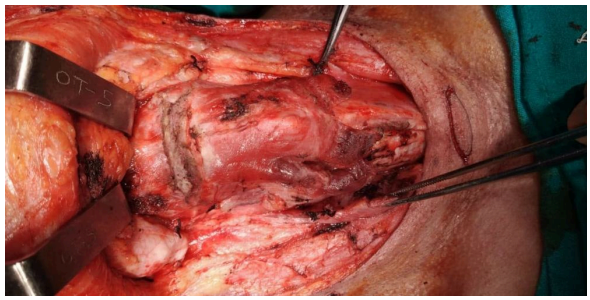
8.2 Apron flap raised, larynx and strap muscles exposed (vertical view).



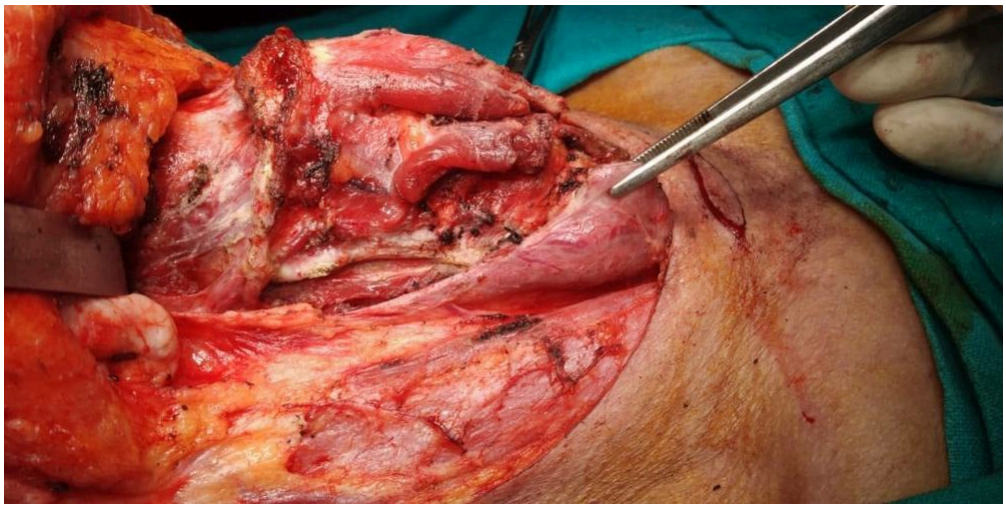
8.3 Apron flap raised, full midline neck exposure for laryngectomy.



8.4 Apron incision with superiorly based subplatysmal flap.



8.5 Neck dissection: carotid sheath with retractors.



8.6 Neck dissection: vessels skeletonised, forceps on nerve/vessel.

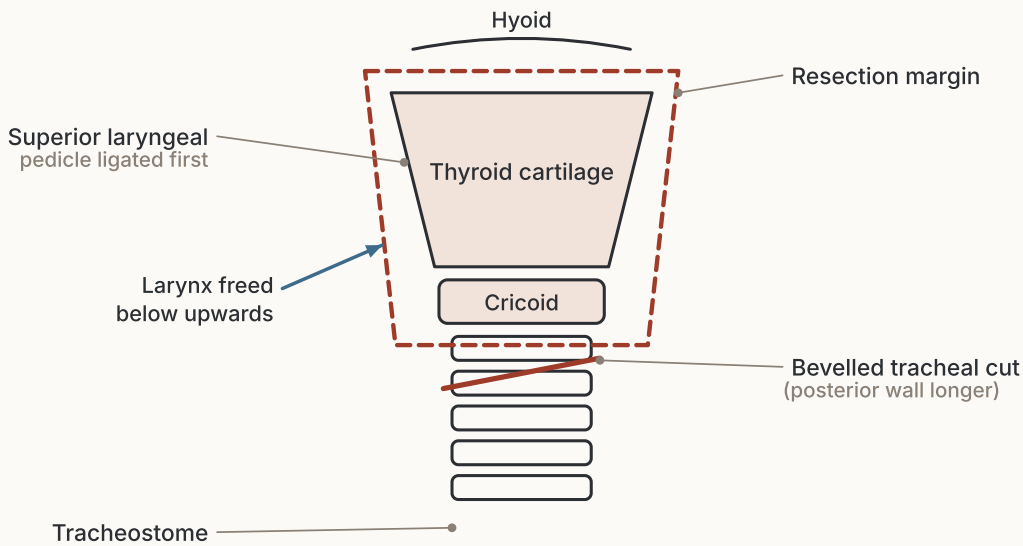


Figure 8.B Total laryngectomy: extent of resection and tracheostome.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Contamination of the neck from the stoma	The stoma was sited separately below the apron incision.
Flap viability in irradiated skin	The flap was raised in the subplatysmal plane to preserve its blood supply.

TEACHING POINTS

- **Subplatysmal plane.** The platysma carries the flap's blood supply.
- **Keep the stoma separate.** A bridge of skin between stoma and incision protects the neck.
- **Avoid a trifurcation over the carotid.** A T-junction over the vessels risks breakdown and exposure.

CASE SUMMARY

Total laryngectomy with neck dissection through an apron flap, with full midline exposure and a separate tracheostome.

REFERENCES

1. Department of Veterans Affairs Laryngeal Cancer Study Group. Induction chemotherapy plus radiation compared with surgery plus radiation in patients with advanced laryngeal cancer. *N Engl J Med* 1991;324:1685–90. doi:10.1056/NEJM199106133242402
2. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536



09

Two layers to a watertight pharynx

Pharyngeal defect after total laryngectomy

Multilayer vertical pharyngeal closure

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This sequence records the closure of the pharynx after total laryngectomy, from the first mucosal sutures to the completed second layer.

AUTHOR'S PERSPECTIVE

> The configuration of the closure follows the shape of the defect. A vertical closure suits a narrow defect without tension; T-shaped closure is used when the defect is wide at the tongue base. Whatever the configuration, the second constrictor layer protects the mucosal line.

APPROACH

Interrupted inverting mucosal sutures in a vertical line, followed by a continuous constrictor layer.

OPERATIVE STEPS

1. Place interrupted mucosal sutures along the pharyngeal defect.
2. Complete the neopharynx in a vertical line.
3. Close the constrictor muscle over the mucosal suture line.
4. Inspect the multilayer closure before skin closure.

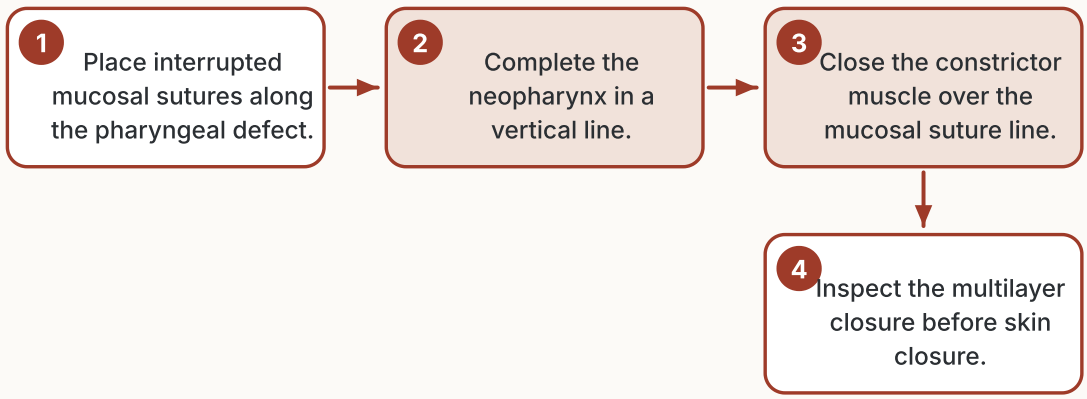
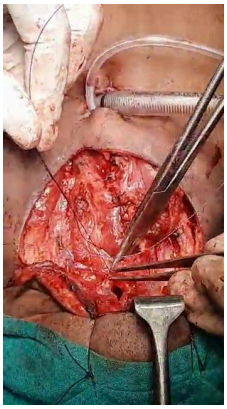


Figure 9.A Operative sequence.

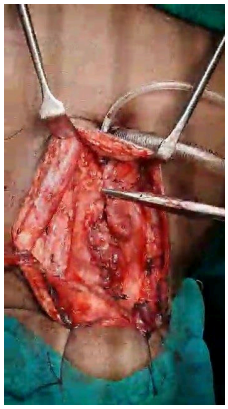
OPERATIVE RECORD



9.1 Interrupted mucosal suturing of pharyngeal defect with needle holder (laryngectomy closure).



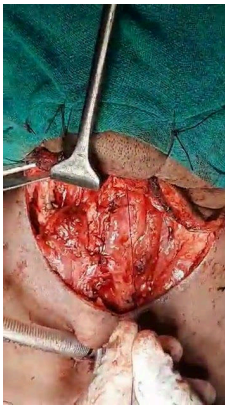
9.2 Completed pharyngeal repair (vertical suture line) after laryngectomy with tracheostomy tube above.



9.3 Second-layer constrictor closure over pharyngeal suture line, clear view.



9.4 Pharyngeal closure after total laryngectomy: neopharynx sutured, tracheostome tube above, superior view.



9.5 Neopharynx closure complete, second layer sutures visible, retractor on upper flap.



9.6 Final multilayer pharyngeal closure with retractors.

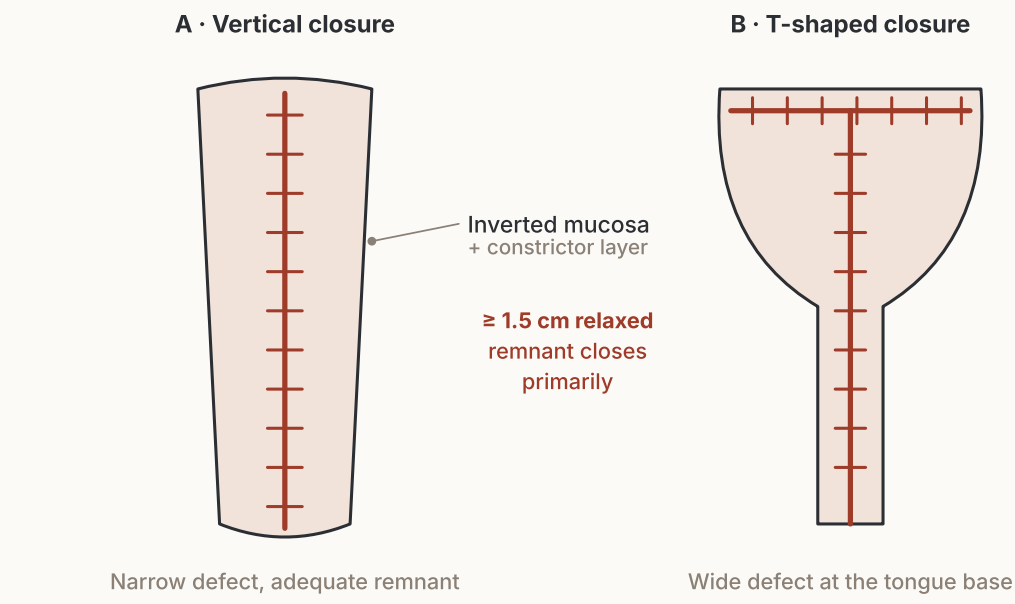


Figure 9.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Tension at the tongue base	The configuration of closure was matched to the shape of the defect.
A single weak layer	The constrictors were approximated over the mucosal line as a second layer.

TEACHING POINTS

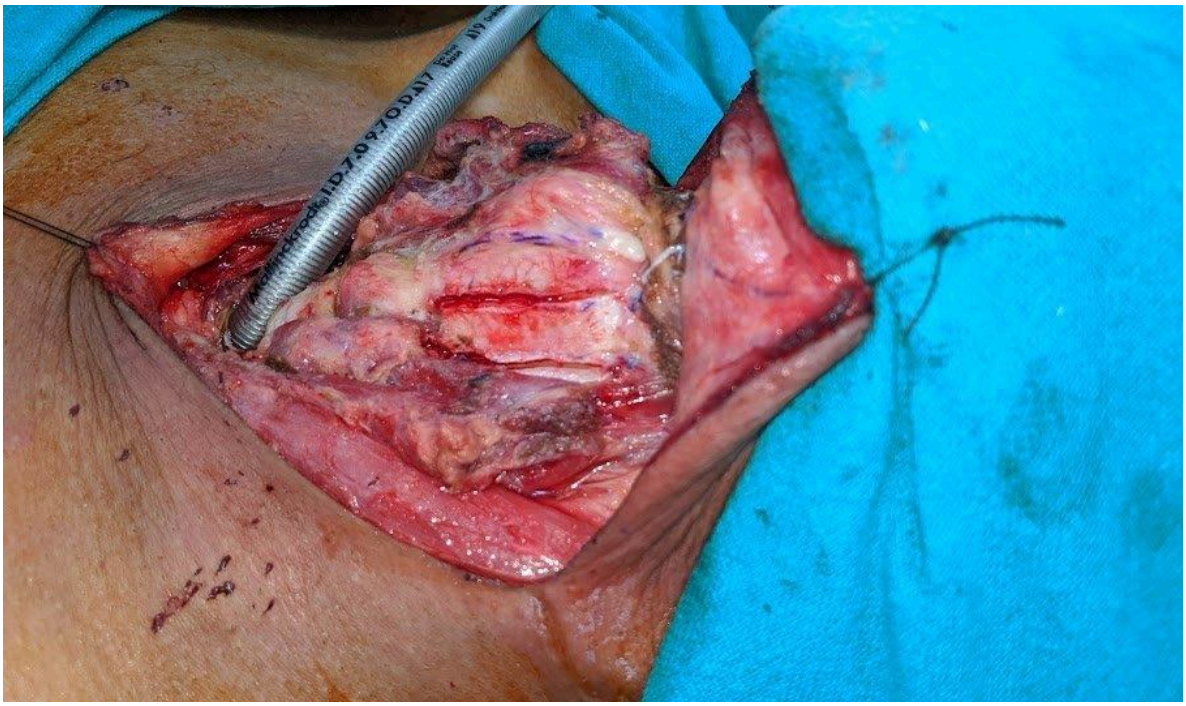
- **Choose vertical or T according to the defect.** The closure that gives the least tension is the right one.
- **Use absorbable suture for the mucosa.** And keep knots in the lumen when using interrupted inverting stitches.
- **Two layers reduce fistula.** The muscle layer takes tension off the mucosa.

CASE SUMMARY

Multilayer vertical closure of the pharynx after total laryngectomy with a constrictor second layer.

REFERENCES

1. Dedivitis RA, Aires FT, Cernea CR, Brandão LG. Pharyngocutaneous fistula after total laryngectomy: systematic review of risk factors. *Head Neck* 2015;37:1691–7. doi:10.1002/hed.23804
2. Hui Y, Wei WI, Yuen PW, Lam LK, Ho WK. Primary closure of pharyngeal remnant after total laryngectomy and partial pharyngectomy: how much residual mucosa is sufficient? *Laryngoscope* 1996;106:490–4. doi:10.1097/00005537-199604000-00018



10

The stoma that breathes

Laryngopharyngeal carcinoma

Total laryngectomy with partial pharyngectomy and formation of the tracheostome

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This case documents the pharyngeal defect after laryngectomy and the construction of the tracheostome below the apron flap.

AUTHOR'S PERSPECTIVE

> A laryngectomy patient breathes for life through the stoma. Its size and shape determine comfort, crusting and the ability to fit a voice prosthesis, so the stoma is constructed as carefully as the tumour is removed.

APPROACH

The trachea is brought out through a separate skin opening below the apron flap and sutured skin to mucosa.

OPERATIVE STEPS

1. Raise the midline neck flap to expose the larynx.
2. Resect the larynx with the involved pharynx; insert a nasogastric tube.
3. Excise a disc of skin for the stoma below the apron incision.
4. Bevel the trachea and suture skin to tracheal mucosa with half-mattress sutures.
5. Complete the neck dissection.

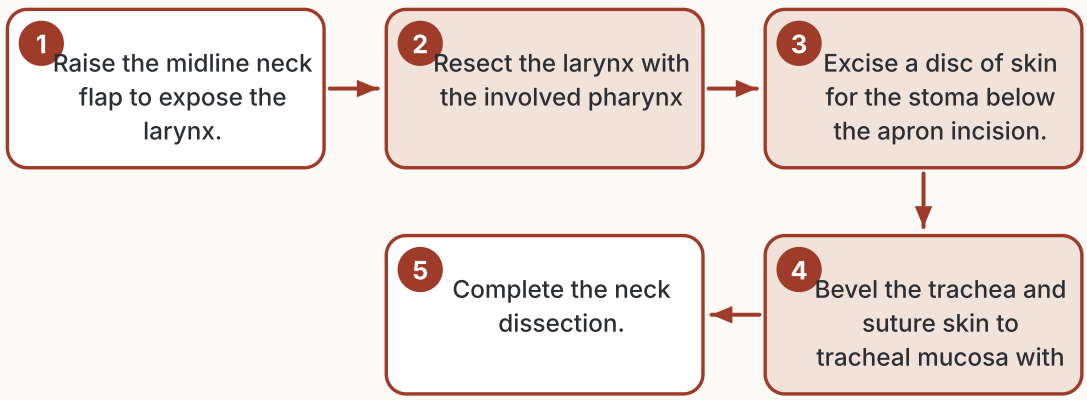
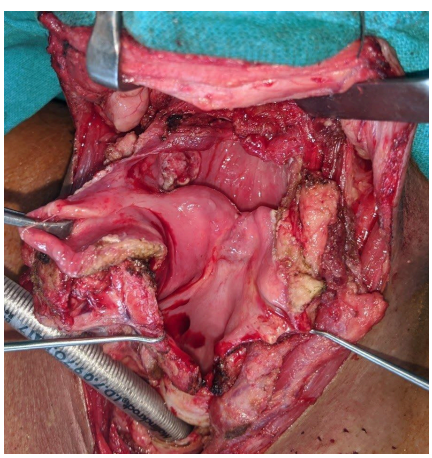


Figure 10.A Operative sequence.

OPERATIVE RECORD



10.1 Pharyngeal mucosal defect after laryngectomy, retractors.



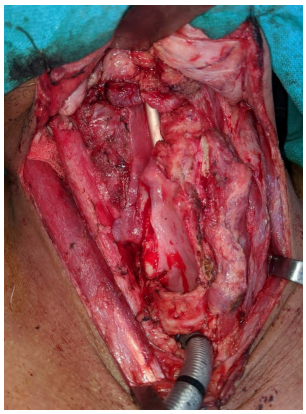
10.2 Apron flap with tracheostoma formed below.



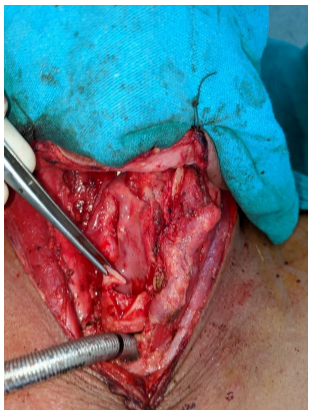
10.3 Midline neck flap raised exposing larynx with retractors.



10.4 Neck exposure with tumour mass and haemostat.



10.5 Laryngectomy field: post-cricoid/pharynx with nasogastric tube.



10.6 Neck dissection with vessels and suction.

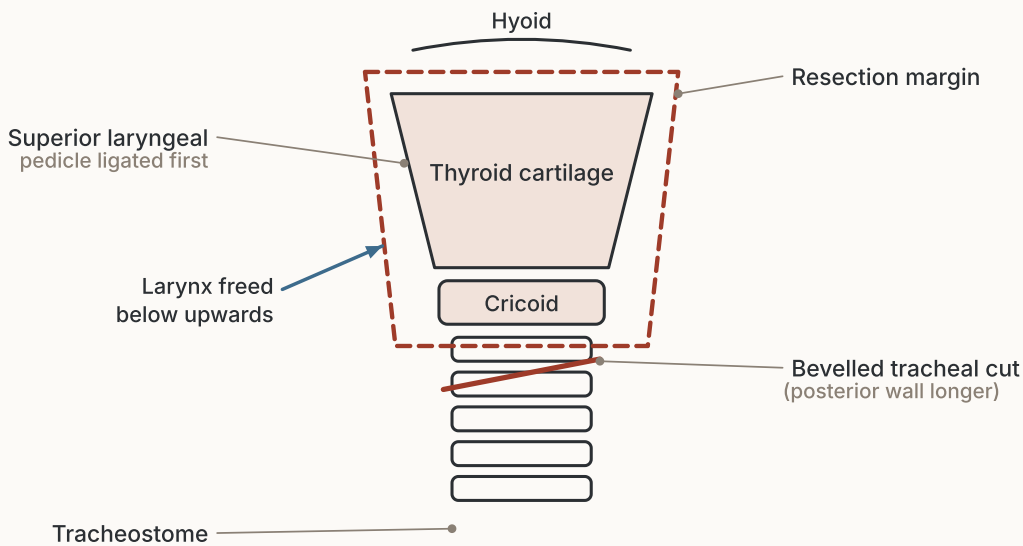


Figure 10.B Total laryngectomy: extent of resection and tracheostome.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Stomal stenosis	A circular skin disc was excised and the trachea bevelled to widen the opening.
Crusting at the stoma	Skin was sutured directly to mucosa so that no raw cartilage was left exposed.

TEACHING POINTS

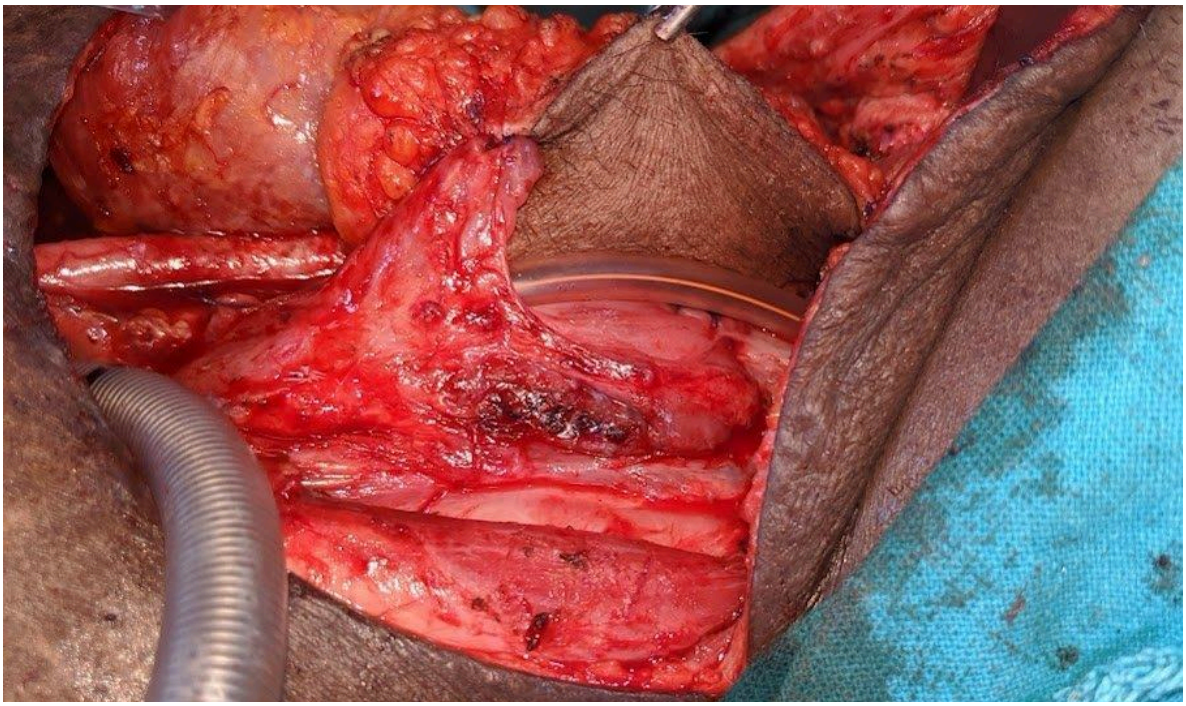
- **Suture skin to mucosa.** Exposed cartilage granulates and narrows the stoma.
- **Divide the sternal heads of sternocleidomastoid if needed.** This flattens the stoma and reduces stenosis.
- **Plan for voice restoration.** A stoma that will accept a prosthesis is part of the operation.

CASE SUMMARY

Total laryngectomy with partial pharyngectomy and a carefully constructed tracheostome sited below the apron flap.

REFERENCES

1. Tay RX, Sim NHS, Hwee J, Lim MY, Ng HW. Tracheostomal stenosis 10 years after total laryngectomy managed with bilateral advancement flap stomaplasty: a case report. *J Surg Case Rep* 2026;2026(4):rjag310. doi:10.1093/jscr/rjag310
2. Department of Veterans Affairs Laryngeal Cancer Study Group. Induction chemotherapy plus radiation compared with surgery plus radiation in patients with advanced laryngeal cancer. *N Engl J Med* 1991;324:1685–90. doi:10.1056/NEJM199106133242402



11

A patch for the pharynx

Laryngopharyngeal carcinoma with a pharyngeal defect too wide to close

Total laryngectomy with partial pharyngectomy, neck dissection and myocutaneous flap patch

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This case records a laryngopharyngectomy in which the remaining pharynx was too narrow for primary closure and the defect was patched with a myocutaneous flap.

AUTHOR'S PERSPECTIVE

> When the mucosal remnant is too narrow to tube on itself, closing it under tension invites stricture and fistula. A skin paddle inlaid as a patch widens the neopharynx and brings healthy tissue to the suture line.

APPROACH

The flap skin paddle is sutured to the mucosal edges as an inlay patch over a nasogastric tube.

OPERATIVE STEPS

1. Deliver the larynx from the field.
2. Open the specimen to confirm the extent of tumour.
3. Clear the posterior triangle and carotid sheath.
4. Inset the myocutaneous skin paddle into the pharyngeal defect over the nasogastric tube.
5. Cover the reconstruction and the exposed vessels with the flap muscle.

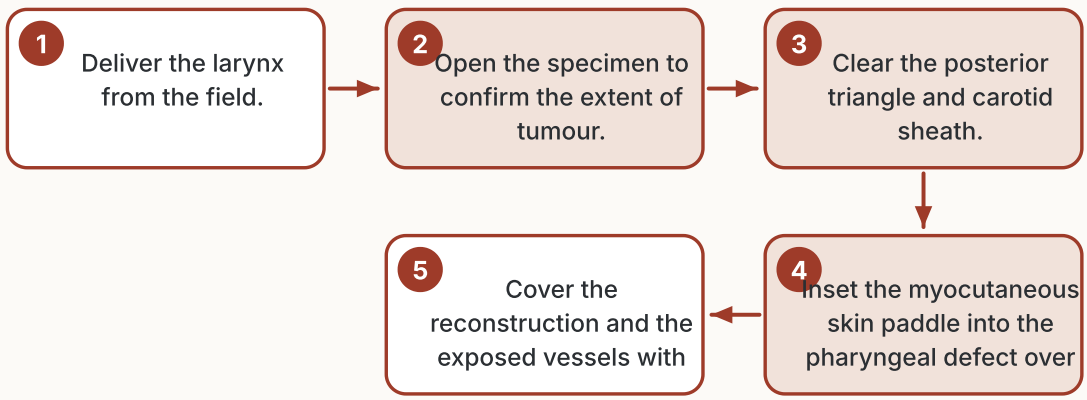
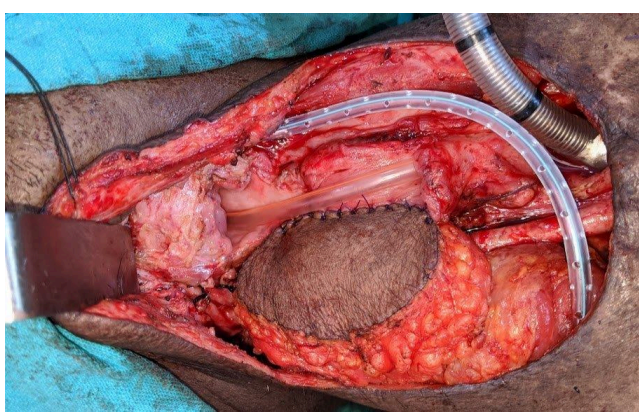


Figure 11.A Operative sequence.

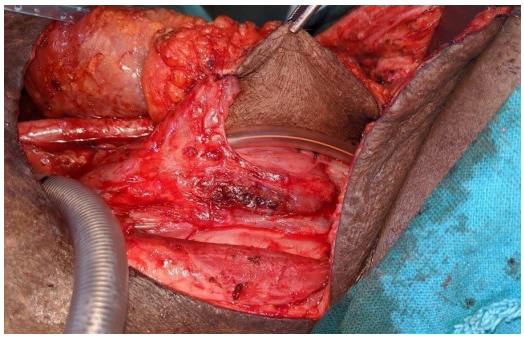
OPERATIVE RECORD



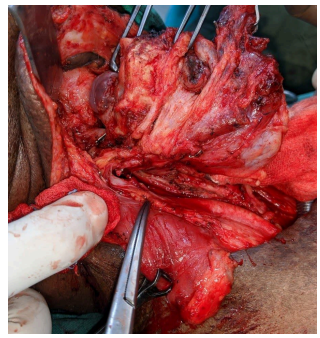
11.1 Neck dissection: cleared posterior triangle and carotid sheath.



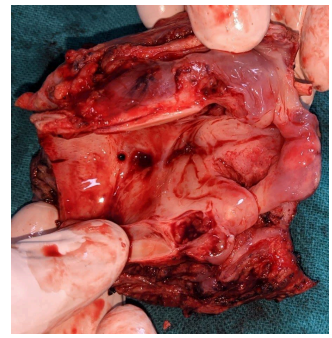
11.2 Myocutaneous flap skin paddle inset into pharyngeal defect, NG tube visible.



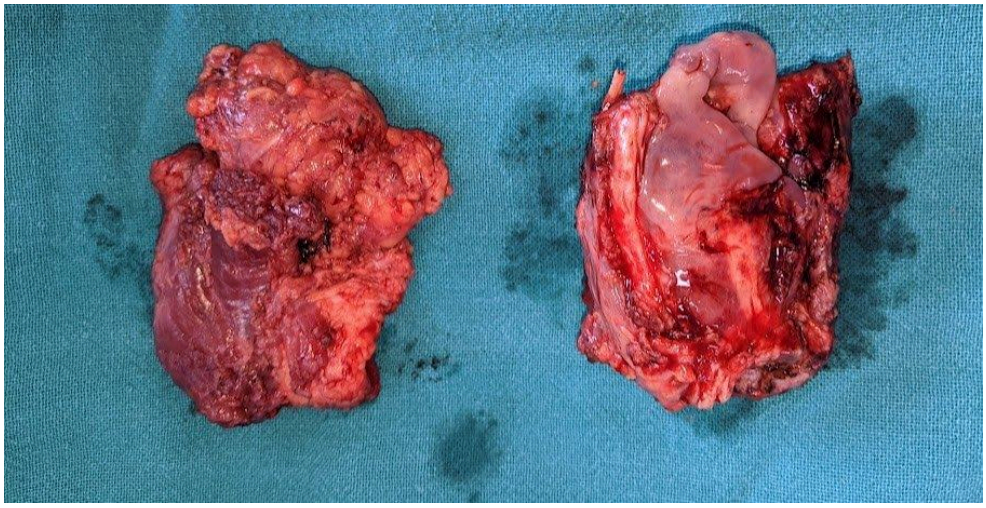
11.3 Flap reconstruction of pharynx with neck vessels exposed.



11.4 Laryngectomy: larynx being delivered from field with haemostats.



11.5 Specimen: opened laryngectomy held in hands showing tumour.



11.6 Specimens: laryngopharyngeal resection pieces.

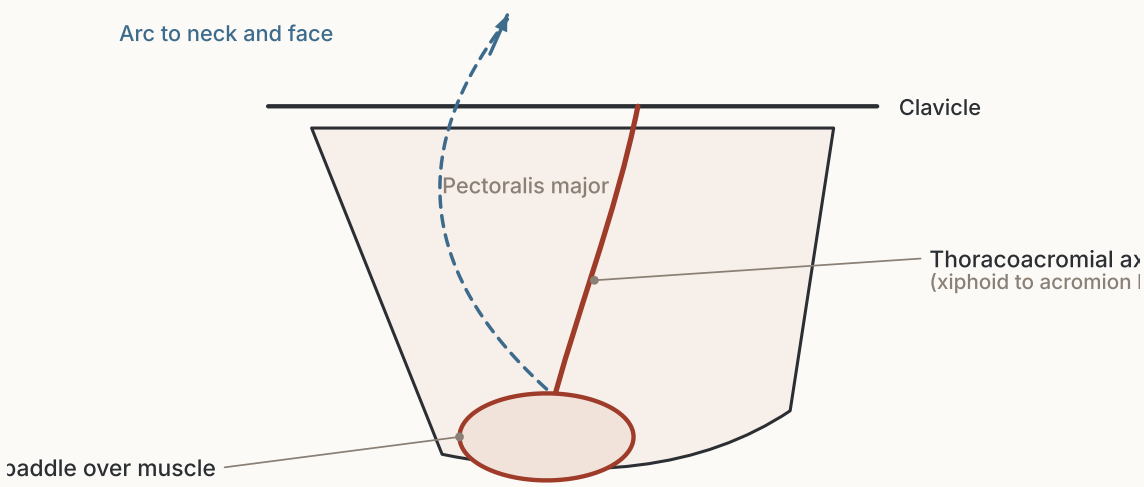


Figure 11.B Pectoralis major myocutaneous flap: design and arc of rotation.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Stricture from a narrow remnant	A skin patch widened the neopharynx instead of forcing primary closure.
Exposed great vessels	The muscle of the flap covered the carotid after neck dissection.

TEACHING POINTS

- **Patch or tube.** A partial defect is patched; a circumferential defect needs a tube.
- **Protect the carotid.** The muscle component covers the vessels in the dissected neck.
- **Suture the paddle to mucosa in one layer with inverted edges.** Then reinforce with muscle.

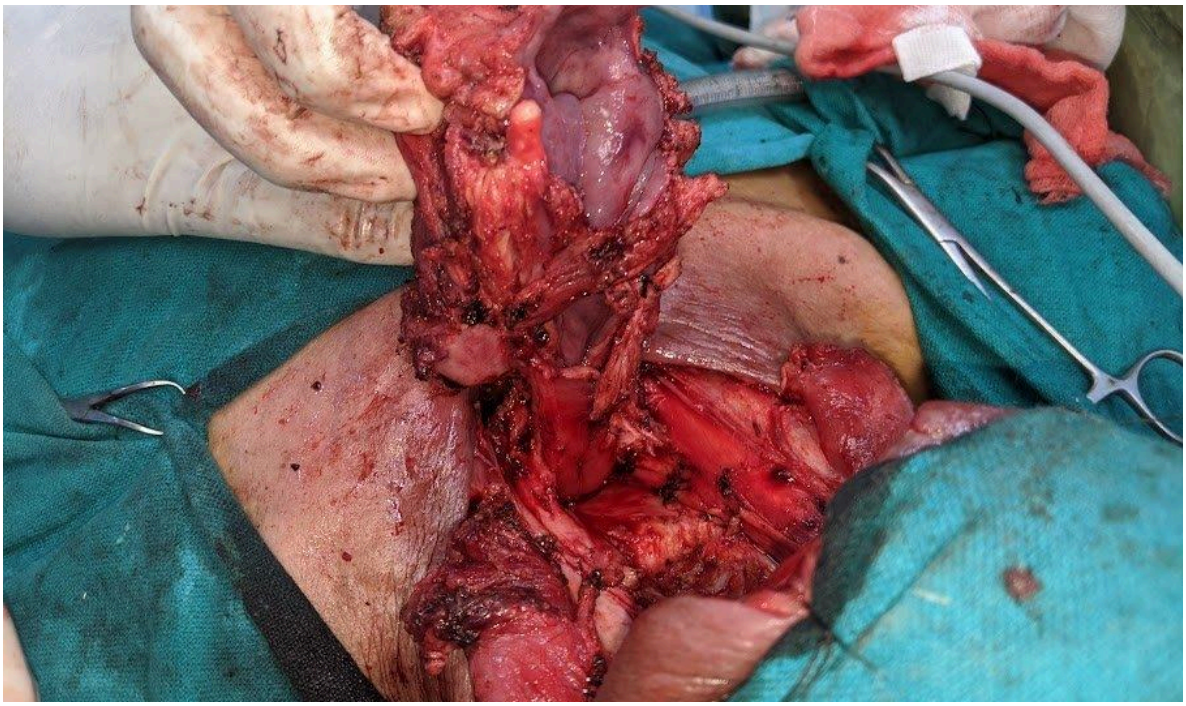
CASE SUMMARY

Laryngopharyngectomy with myocutaneous flap patch reconstruction of a pharyngeal defect too wide for primary closure.

REFERENCES

1. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.

2. Hui Y, Wei WI, Yuen PW, Lam LK, Ho WK. Primary closure of pharyngeal remnant after total laryngectomy and partial pharyngectomy: how much residual mucosa is sufficient? *Laryngoscope* 1996;106:490–4. doi:10.1097/00005537-199604000-00018



12

Out from the prevertebral plane

Laryngopharyngeal carcinoma

Laryngopharyngectomy with primary pharyngeal closure

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This case shows the larynx elevated from the prevertebral plane and the pharyngeal defect before closure.

AUTHOR'S PERSPECTIVE

> The retropharyngeal space is the natural plane of dissection behind the pharynx. The prevertebral fascia forms the deep margin; if tumour is fixed to it, the lesion is usually unresectable for cure.

APPROACH

The specimen is lifted forward off the prevertebral fascia after the lateral attachments have been divided.

OPERATIVE STEPS

1. Mobilise the larynx and pharynx laterally.

2. Elevate the specimen from the prevertebral plane.
3. Keep the specimen pedicled while the mucosal cuts are completed.
4. Inspect the pharyngeal defect around the nasogastric tube.
5. Close the pharynx primarily.

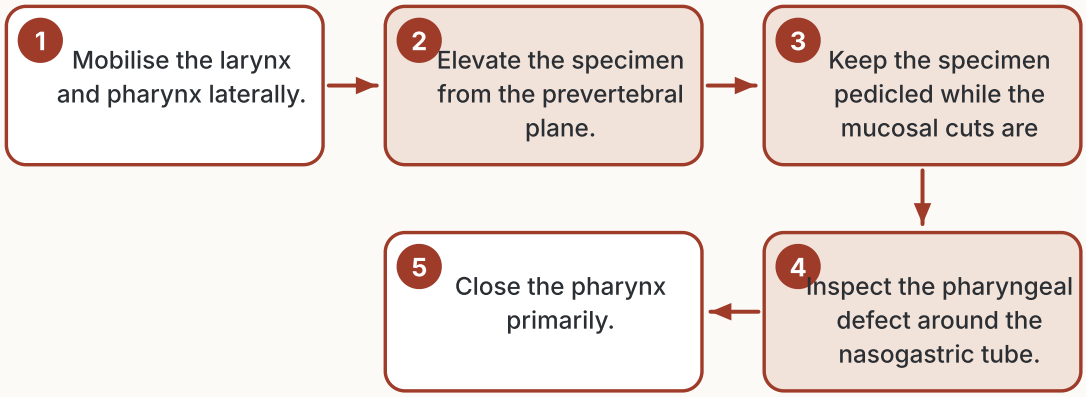
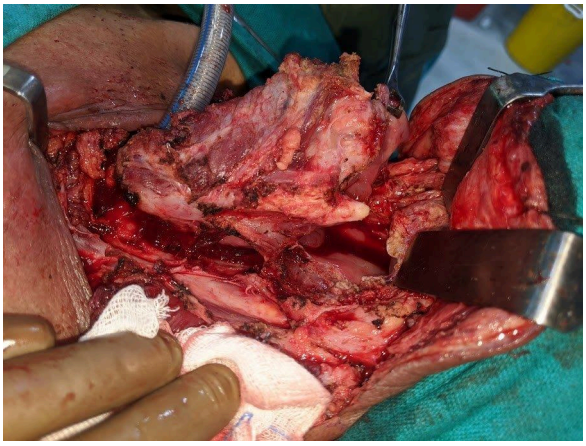


Figure 12.A Operative sequence.

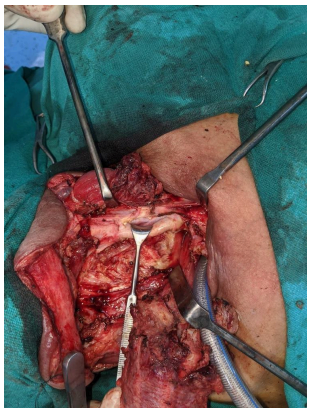
OPERATIVE RECORD



12.1 Larynx delivered from neck showing laryngeal inlet.



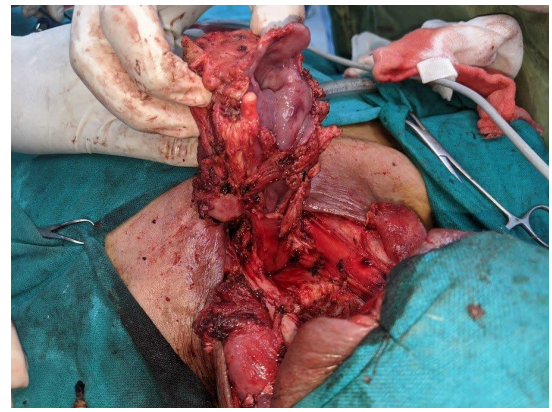
12.2 Laryngectomy: larynx elevated from pre-vertebral plane.



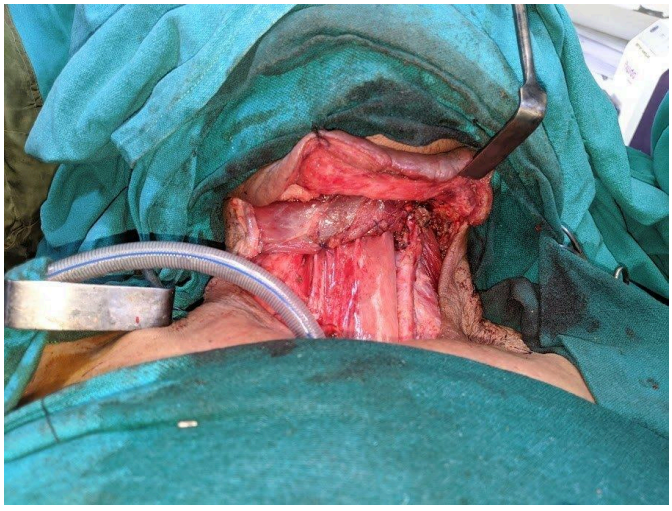
12.3 Pharyngeal defect with NG tube after laryngectomy.



12.4 Pharyngeal closure/flap tube in neck.



12.5 Laryngopharyngectomy specimen pedicled in field.



12.6 Pharyngeal closure completed, field before skin closure.

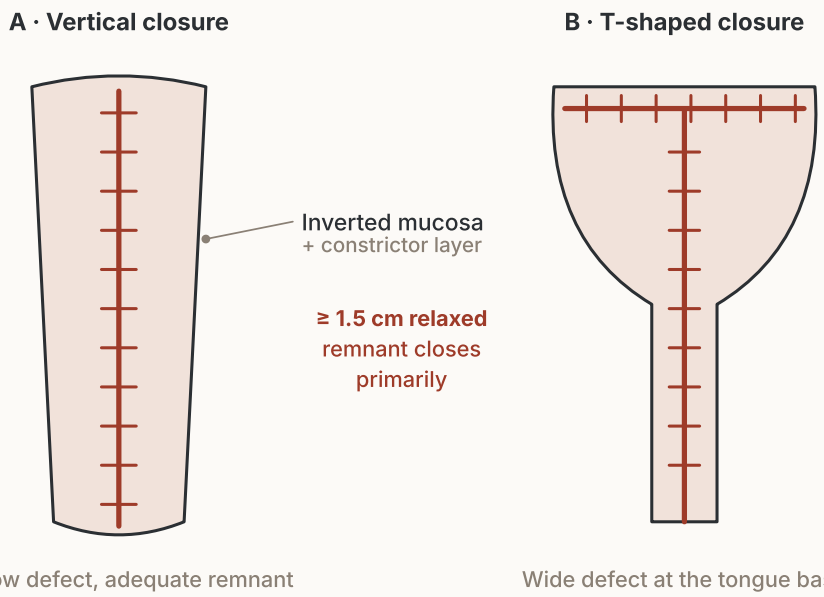


Figure 12.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Fixation to the prevertebral fascia	Mobility on the prevertebral plane was assessed before the pharynx was opened.
Margin assessment	The specimen was kept pedicled while the mucosal cuts were made under direct vision.

TEACHING POINTS

- **The prevertebral fascia is a barrier.** Fixation to it signals advanced disease.
- **Assess mobility before committing.** A fixed tumour changes the plan.
- **Close only what closes without tension.** The remnant width decides.

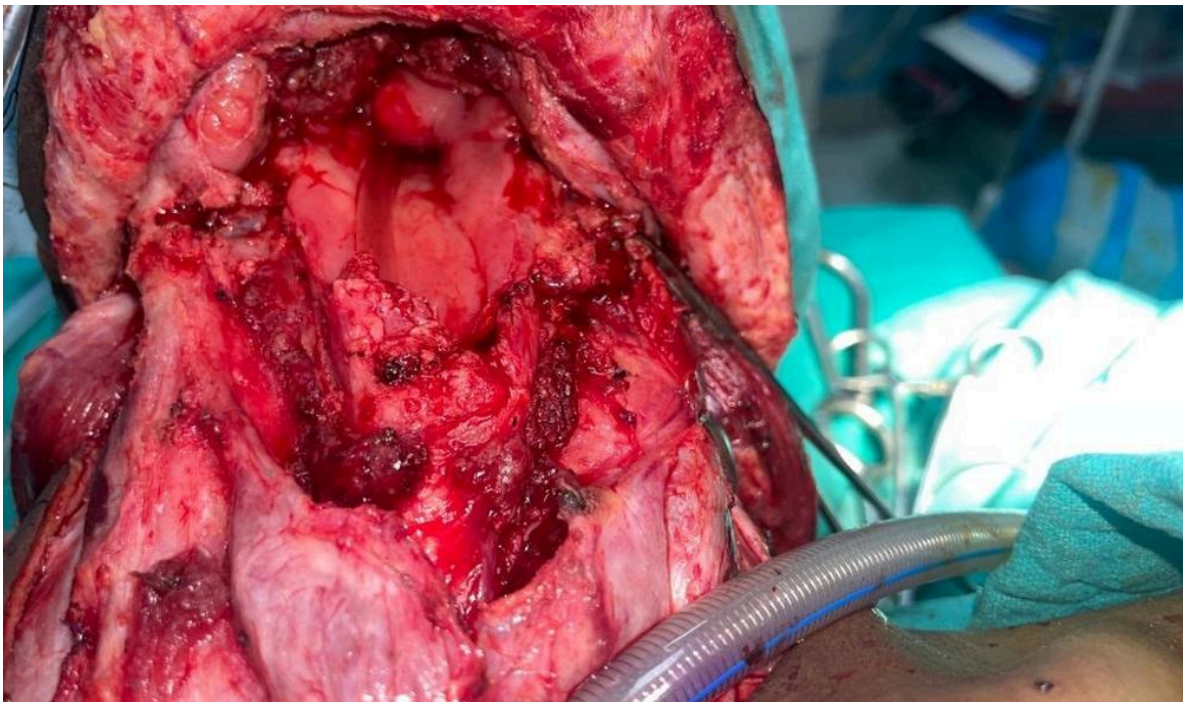
CASE SUMMARY

Laryngopharyngectomy with elevation off the prevertebral fascia and primary closure.

REFERENCES

1. Hui Y, Wei WI, Yuen PW, Lam LK, Ho WK. Primary closure of pharyngeal remnant after total laryngectomy and partial pharyngectomy: how much residual mucosa is sufficient? *Laryngoscope* 1996;106:490–4. doi:10.1097/00005537-199604000-00018

2. Wang M, Xun Y, Wang K, et al. Risk factors of pharyngocutaneous fistula after total laryngectomy: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2020;277:585–99. doi:10.1007/s00405-019-05718-9



13

Both necks and the larynx

Laryngeal carcinoma with nodal risk on both sides

Total laryngectomy with bilateral neck dissection

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the laryngectomy specimen with both neck dissections, and the opened larynx showing the endolaryngeal tumour.

AUTHOR'S PERSPECTIVE

> Supraglottic and transglottic tumours drain to both sides of the neck. Bilateral dissection of levels II to IV, with the central compartment for subglottic spread, is the standard when the neck is at risk.

APPROACH

Apron flap, total laryngectomy and bilateral selective neck dissections removed with the specimen.

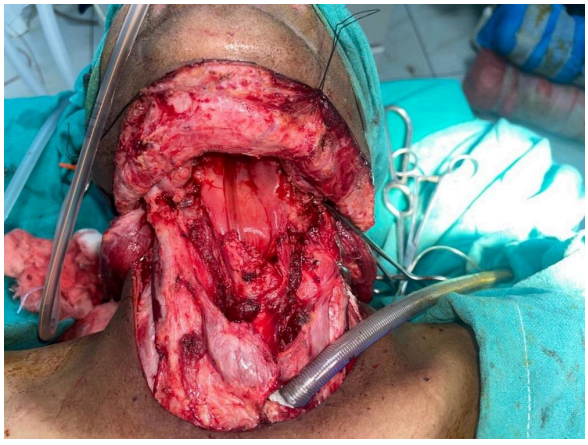
OPERATIVE STEPS

1. Raise the apron flap and open the pharynx.
2. Inspect the pharyngeal defect after total laryngectomy.
3. Deliver the larynx with both neck dissections.
4. Open the specimen to display the endolaryngeal tumour from behind.

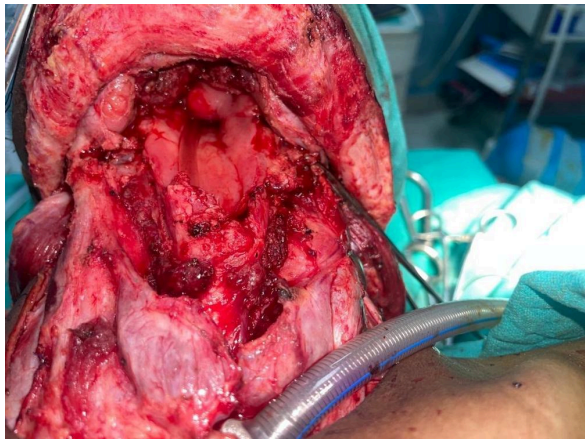


Figure 13.A Operative sequence.

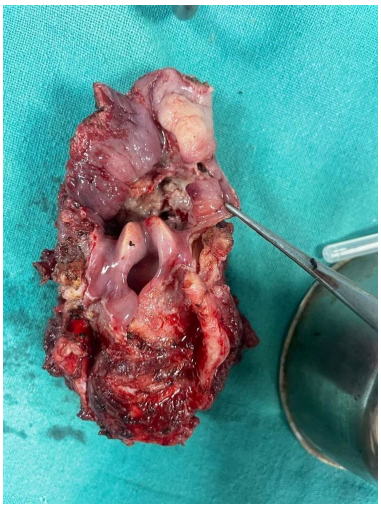
OPERATIVE RECORD



13.1 Laryngectomy: apron flap with pharynx open and NG tube.



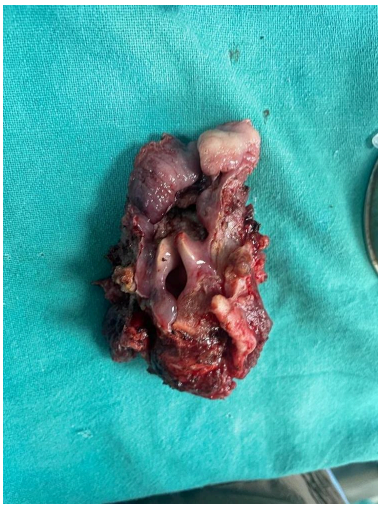
13.2 Pharyngeal defect after total laryngectomy.



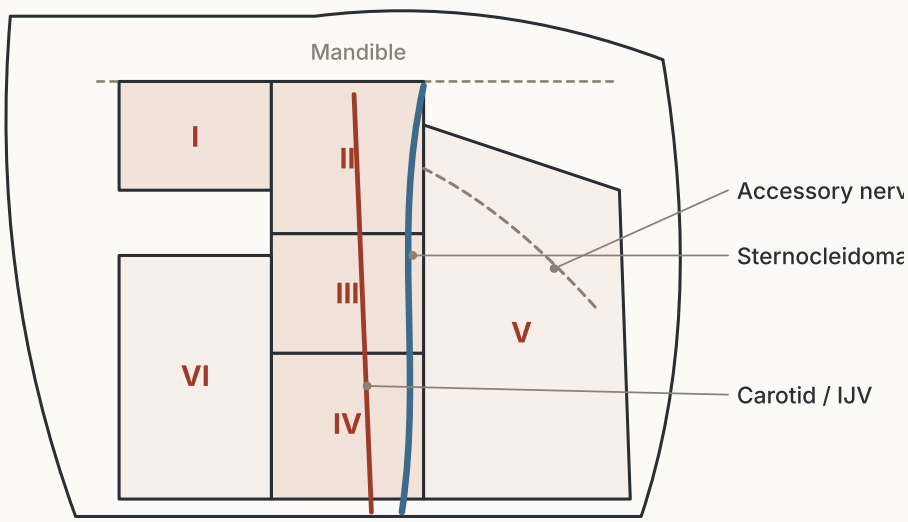
13.3 Specimen: opened larynx showing endolaryngeal tumour.



13.4 Specimens: laryngectomy with bilateral neck dissections, forceps.



13.5 Specimen: laryngectomy, posterior view opened.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 13.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Bilateral nodal risk	Both necks were dissected at the levels draining the larynx.
Specimen orientation for pathology	The neck dissections were labelled by side and level.

TEACHING POINTS

- **Supraglottic tumours spread bilaterally.** Even when the tumour is lateralised.
- **Levels II–IV are the core.** Level VI is added for subglottic or hypopharyngeal extension.
- **Label by level.** Pathology by level guides adjuvant treatment.

CASE SUMMARY

Total laryngectomy with bilateral neck dissection, with the opened specimen showing the endolaryngeal tumour.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536
2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646



14

The pharynx opened wide

Hypopharyngeal carcinoma

Laryngopharyngectomy with bilateral neck dissection

PART I · LARYNX AND PHARYNX

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This case records a large pharyngeal and laryngeal tumour exposed through the neck, the resulting pharyngeal defect, and the laryngopharyngectomy specimen with both neck dissections.

AUTHOR'S PERSPECTIVE

> Hypopharyngeal cancer presents late, often with nodal disease, and spreads submucosally beyond what is visible. Wide mucosal margins and bilateral neck dissection are needed.

APPROACH

Wide field laryngopharyngectomy with the carotid sheaths exposed and both necks dissected.

OPERATIVE STEPS

1. Open the pharynx and expose the tumour.
2. Define the pharyngeal defect with the carotid sheath in view.
3. Deliver the laryngopharyngectomy specimen.
4. Display the specimen from below, through the tracheal lumen.
5. Inspect the oropharynx transorally after closure.

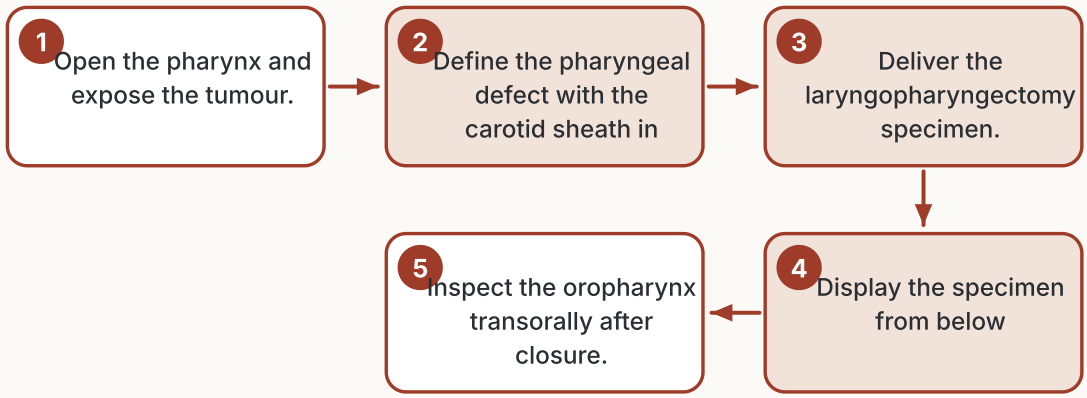
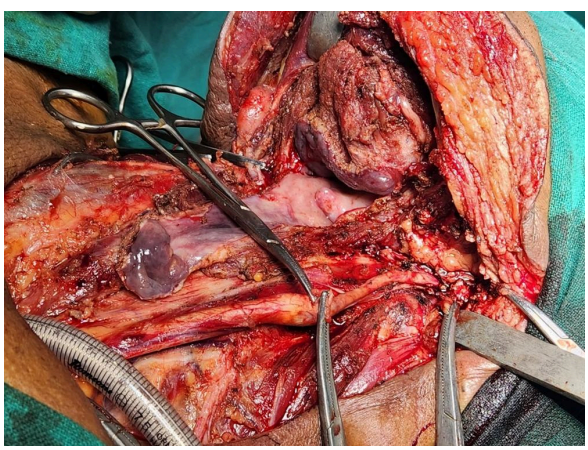
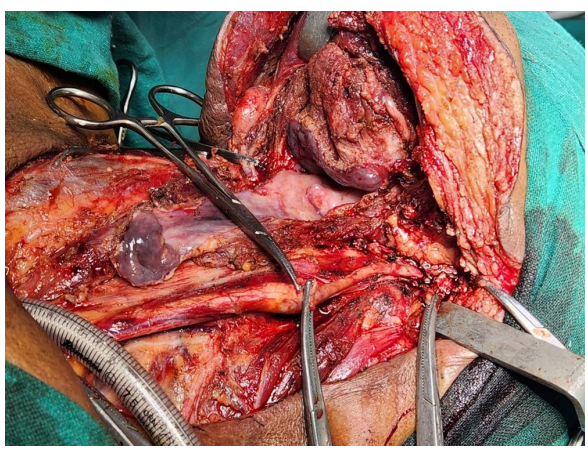


Figure 14.A Operative sequence.

OPERATIVE RECORD



14.1 Neck exposure with pharynx opened, large pharyngeal/laryngeal tumour.



14.2 Pharyngeal defect exposure with haemostats, carotid sheath visible.



14.3 Specimen: laryngopharyngectomy viewed from below (trachea lumen).



14.4 Specimen: laryngopharyngectomy with bilateral neck dissections.



14.5 Transoral view with mouth gag: sutured oropharynx/palate.

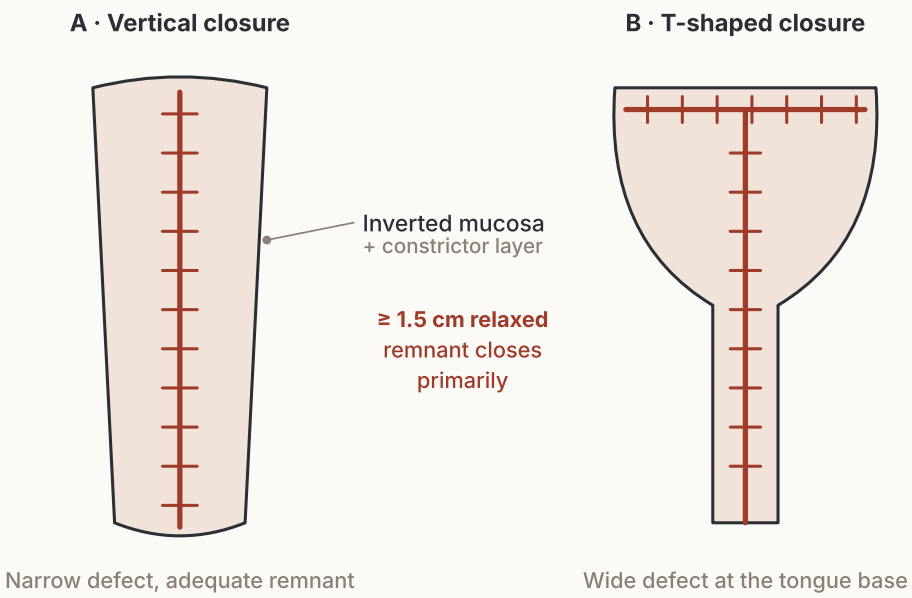


Figure 14.B Pharyngeal closure after laryngectomy.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Submucosal spread	Mucosal margins were taken wide of the visible tumour.
Proximity of the carotid	The carotid sheath was kept in view throughout the pharyngeal resection.

TEACHING POINTS

- **Hypopharyngeal cancer spreads submucosally.** Margins are wider than for laryngeal tumours.
- **Most patients have nodal disease at presentation.** The neck is treated on both sides.
- **Fistula risk is higher than after laryngectomy alone.** Plan reinforcement.

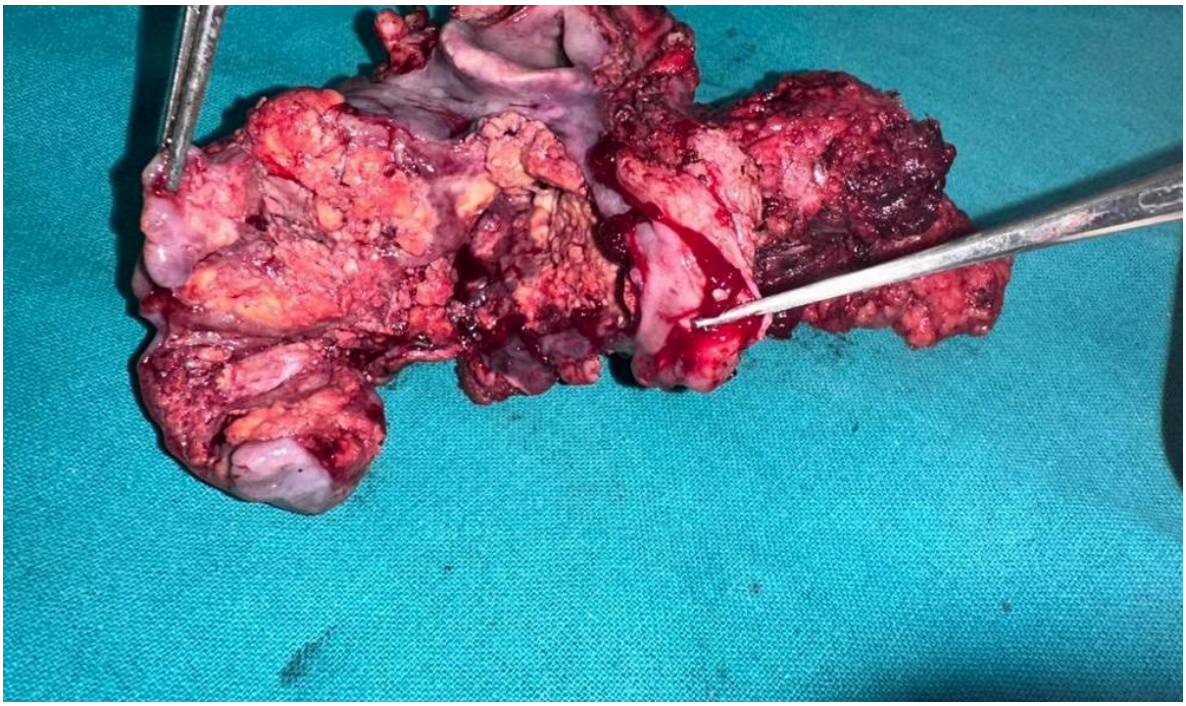
CASE SUMMARY

Laryngopharyngectomy with bilateral neck dissection for hypopharyngeal carcinoma.

REFERENCES

1. Dedivitis RA, Aires FT, Cernea CR, Brandão LG. Pharyngocutaneous fistula after total laryngectomy: systematic review of risk factors. *Head Neck* 2015;37:1691–7. doi:10.1002/hed.23804

2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646



15

Larynx and mouth together

Advanced carcinoma involving the tongue base and larynx

Composite laryngopharyngeal and oral resection through a lip split

PART I · LARYNX AND PHARYNX Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a composite resection in progress through a lip-split approach and the specimen containing laryngopharynx, oral tissue and nodes.

AUTHOR'S PERSPECTIVE

> When disease crosses from the tongue base into the larynx, neither a laryngectomy nor an oral resection alone clears it. A combined resection through the neck and a lip-split approach removes the disease in one piece.

APPROACH

Lip split for access to the oral cavity and oropharynx, combined with laryngectomy through the neck.

OPERATIVE STEPS

1. Split the lip and expose the oral cavity.
2. Carry the resection through the tongue base into the pharynx.
3. Complete the laryngectomy and deliver the composite specimen.
4. Inspect the lumen and margins of the specimen.

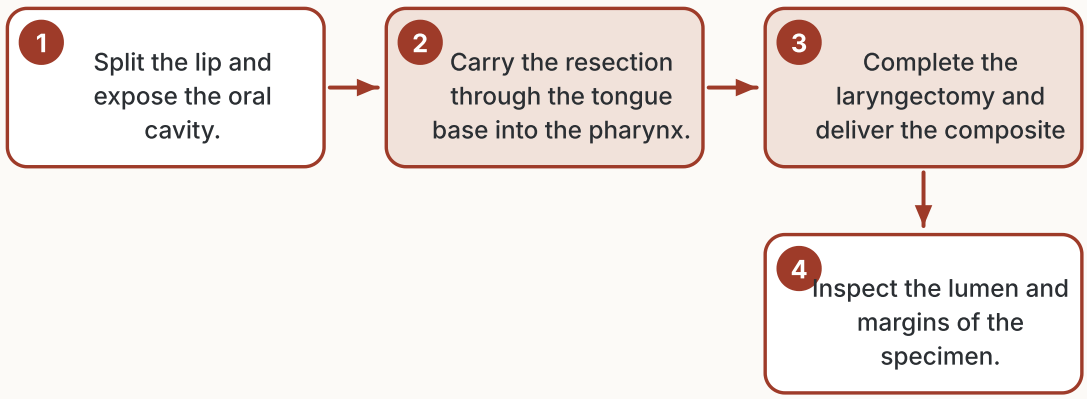
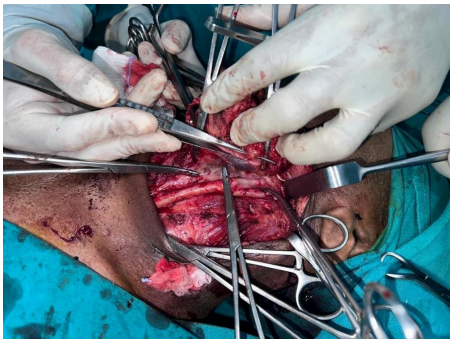
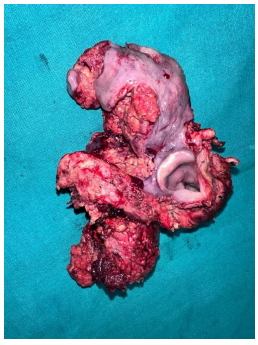


Figure 15.A Operative sequence.

OPERATIVE RECORD



15.1 Composite resection in progress via lip-split with haemostats.



15.2 Specimen: composite laryngopharyngeal/oral resection with nodes.



15.3 Specimen with forceps pointing to tumour/margin.



15.4 Specimen: laryngeal/hypopharyngeal resection showing lumen.

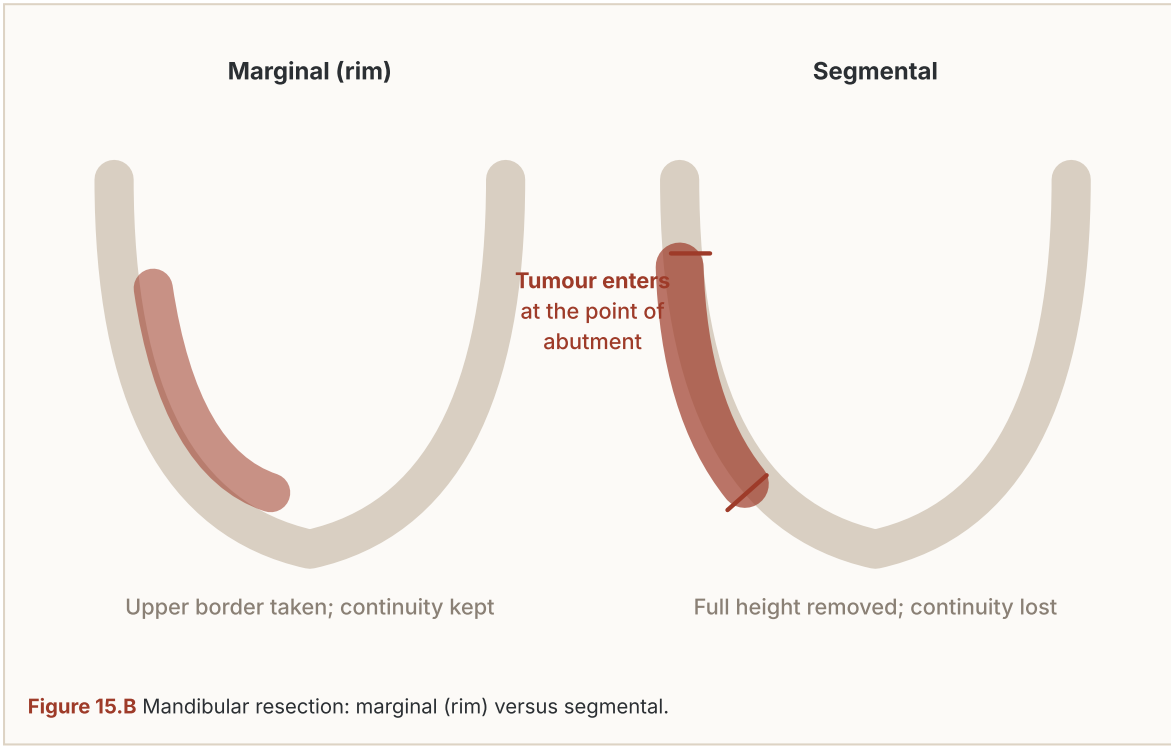


Figure 15.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Exposure of the tongue base	A lip split gave direct access from above.
A large composite defect	Reconstruction was planned for the combined oral and pharyngeal defect.

TEACHING POINTS

- **Tongue base involvement changes everything.** Swallowing rehabilitation becomes the main challenge.
- **Orient the specimen.** Margins in three regions must be identified for pathology.
- **Reconstruct with bulk.** The tongue base needs volume to restore swallowing.

CASE SUMMARY

Composite laryngopharyngeal and oral resection through a lip split for tumour crossing the tongue base.

REFERENCES

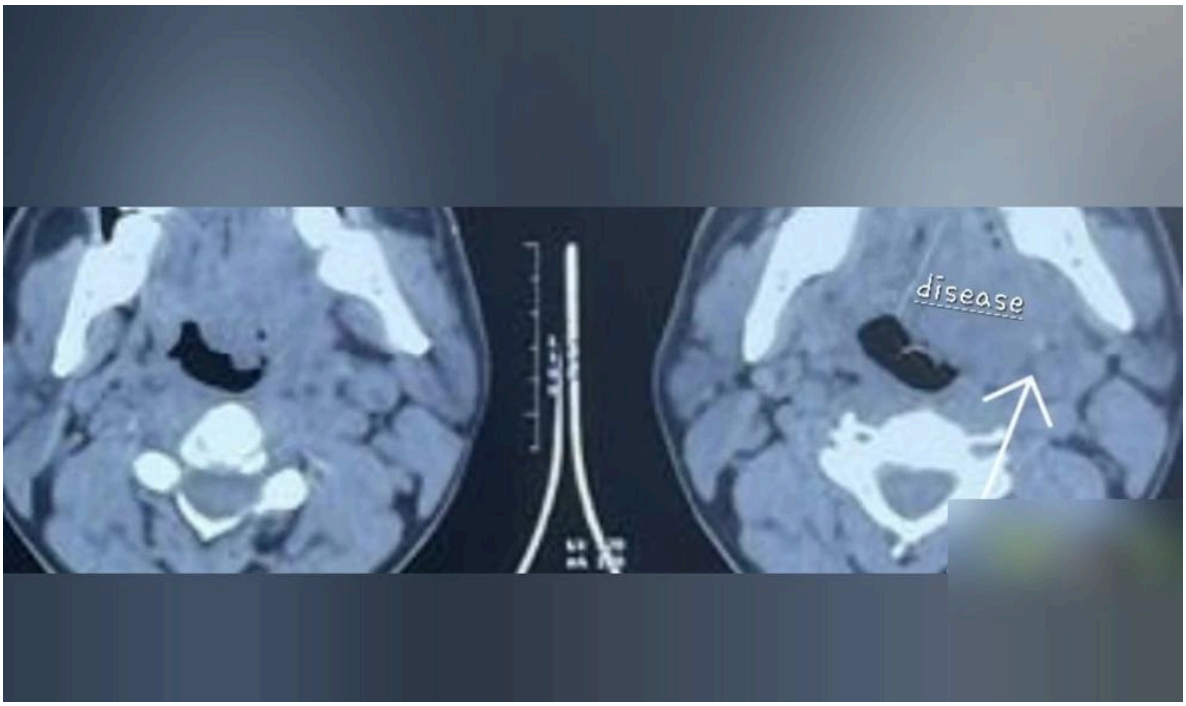
1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062
2. Dedivitis RA, Aires FT, Cernea CR, Brandão LG. Pharyngocutaneous fistula after total laryngectomy: systematic review of risk factors. *Head Neck* 2015;37:1691–7. doi:10.1002/hed.23804

PART II

Oral cavity

The jaw, cheek, tongue and floor of mouth, and the flaps from next door that close them.

16 The jaw that had to go
17 No cut on the face
18 The gland that became a lining
19 Skin from under the chin
20 Five mouths, one flap
21 The lateral tongue
22 The mass in level Ib
23 Through the mouth
24 Floor of mouth to mandible
25 The cheek flap
26 The fungating cheek
27 Two nasolabial flaps for one floor of mouth
28 The mandibular swing
29 Pulled through
30 A forearm for the cheek



16

The jaw that had to go

Carcinoma of the retromolar trigone, T4 N2b, extending to tongue base, tonsil and palate

Composite bite resection with segmental mandibulectomy, near-total glossectomy, radical tonsillectomy, radical neck dissection and PMMC reconstruction

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

An advanced jaw tumour arose at the retromolar trigone and extended into the base of tongue, tonsillar fossa and palate, with nodal disease.

AUTHOR'S PERSPECTIVE

> Only one operation clears disease of this extent: the mandible, most of the tongue and the tonsillar fossa removed in one block with the neck. Where free-flap reconstruction is not available, the pectoralis major gives reliable bulk to the oral and oropharyngeal defect.

APPROACH

Lower cheek and neck access with segmental mandibulectomy, dissection up to the jugular foramen and en bloc delivery with the neck.

OPERATIVE STEPS

1. Define palatal disease, tongue and the mandibulectomy line.
2. Dissect the neck: submandibular gland, internal jugular vein and spinal accessory nerve.
3. Divide the masseter and display the epiglottis, internal carotid and internal jugular vein.
4. Dissect up to the jugular foramen.
5. Mobilise and deliver the composite block.
6. Preserve the internal carotid and internal jugular vein; ligate the external carotid.
7. Reconstruct the oral and oropharyngeal defect with a pectoralis major myocutaneous flap.

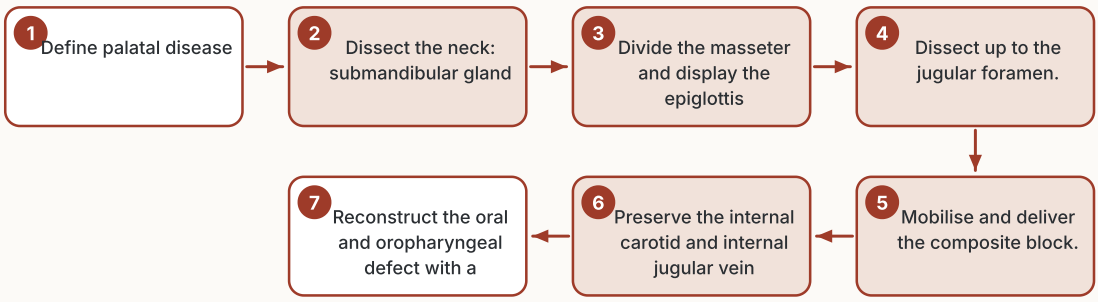
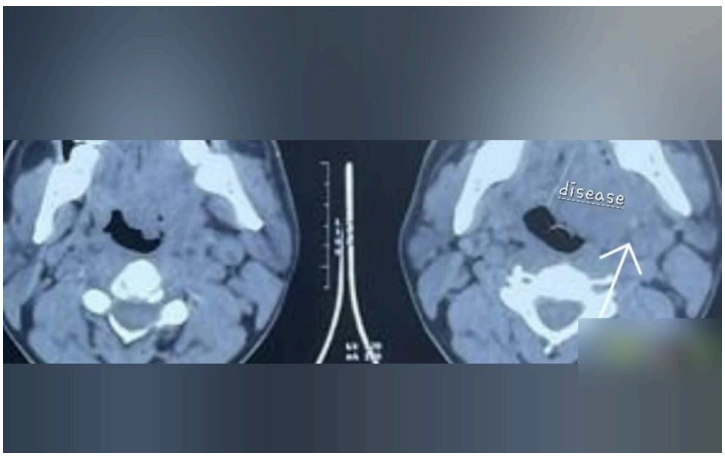
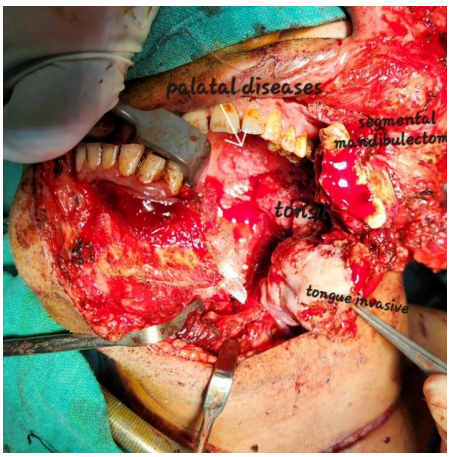


Figure 16.A Operative sequence.

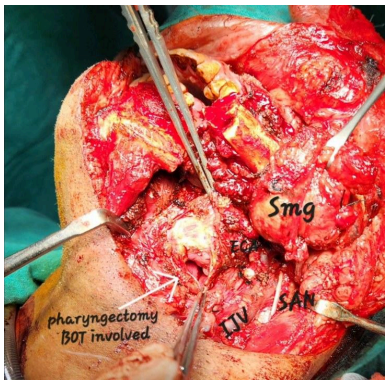
OPERATIVE RECORD



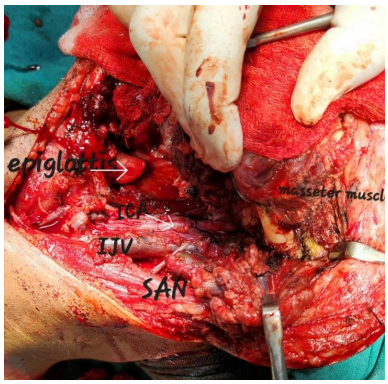
16.1 Axial CT: disease marked, ICA labelled. Patient details blurred. Video 0:19



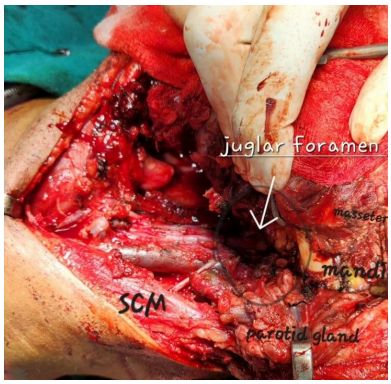
16.2 Palatal disease, tongue and the segmental mandibulectomy line, as labelled. Video 0:25



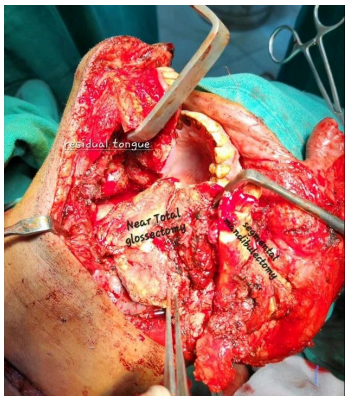
16.3 Submandibular gland, IJV and spinal accessory nerve; pharyngectomy with base of tongue involved. Video 0:36



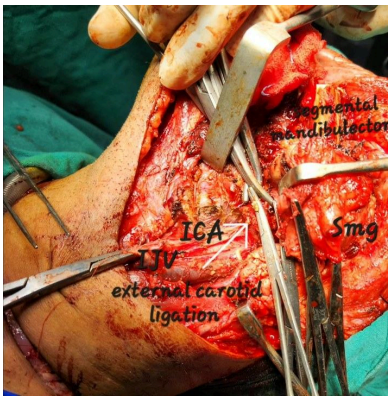
16.4 Epiglottis, ICA, IJV and SAN in view; masseter muscle divided. Video 0:47



16.5 Dissection up to the jugular foramen; SCM, mandible and parotid labelled. Video 0:53



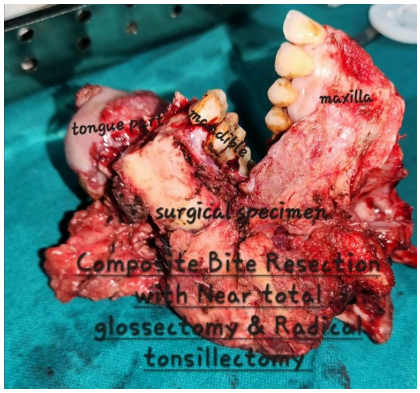
16.6 The block mobilised before delivery. Video 1:04



16.7 ICA and IJV preserved; external carotid ligated. Video 1:49



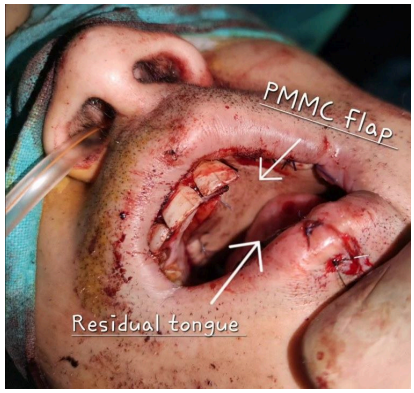
16.8 "Composite resection with radical tonsillectomy and near-total glossectomy." Video 1:21



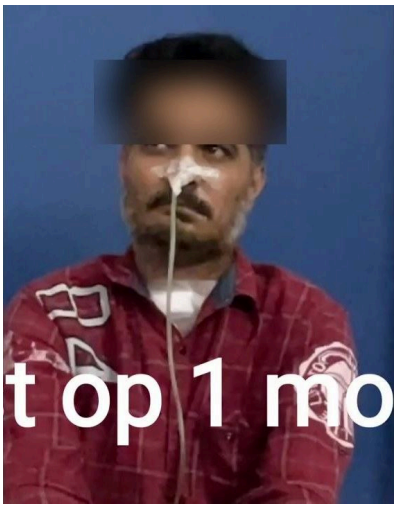
16.9 "Surgical specimen: composite bite resection with near-total glossectomy and radical tonsillectomy." Tongue, mandible and maxilla labelled. Video 1:27



16.10 "Oral and oropharyngeal defect: PMMC flap reconstruction." Video 1:55



16.11 PMMC flap in the oral cavity beside the residual tongue, as labelled. Video 2:01



16.12 "Post op 1 month." Video 2:06

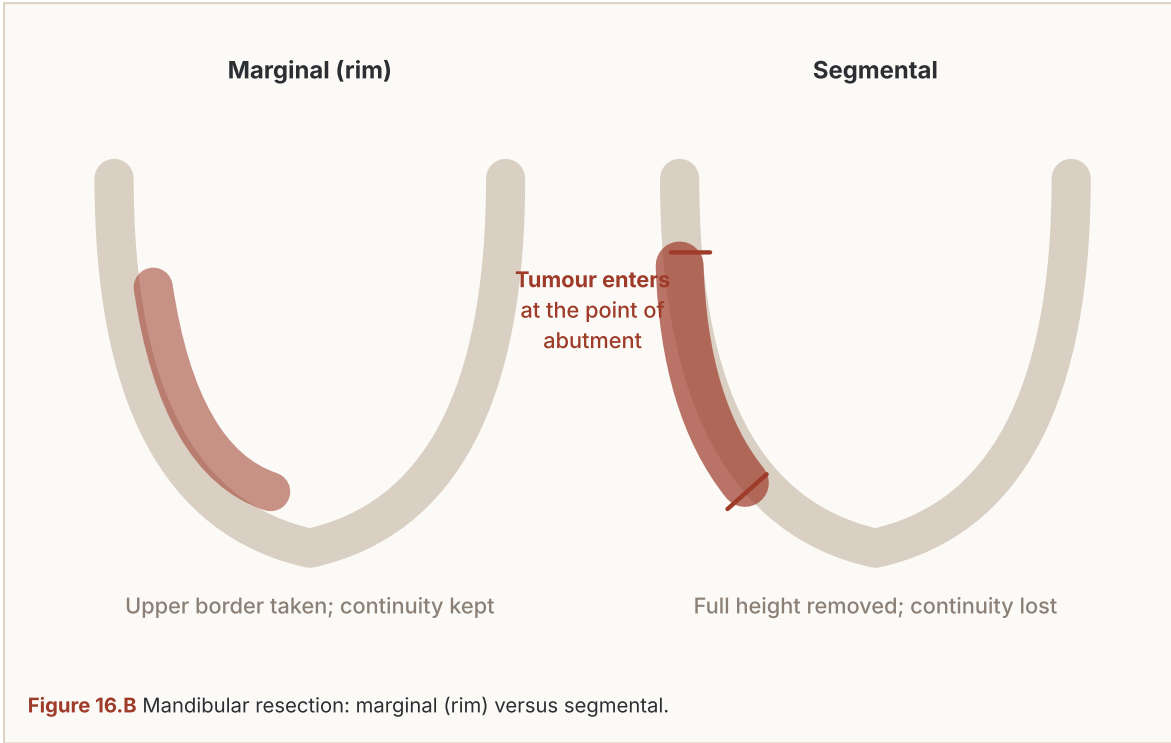


Figure 16.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Extension towards the skull base	Dissection was carried to the jugular foramen with the internal carotid in view.
A large composite defect	A pectoralis major flap provided bulk to the oral cavity and oropharynx.

TEACHING POINTS

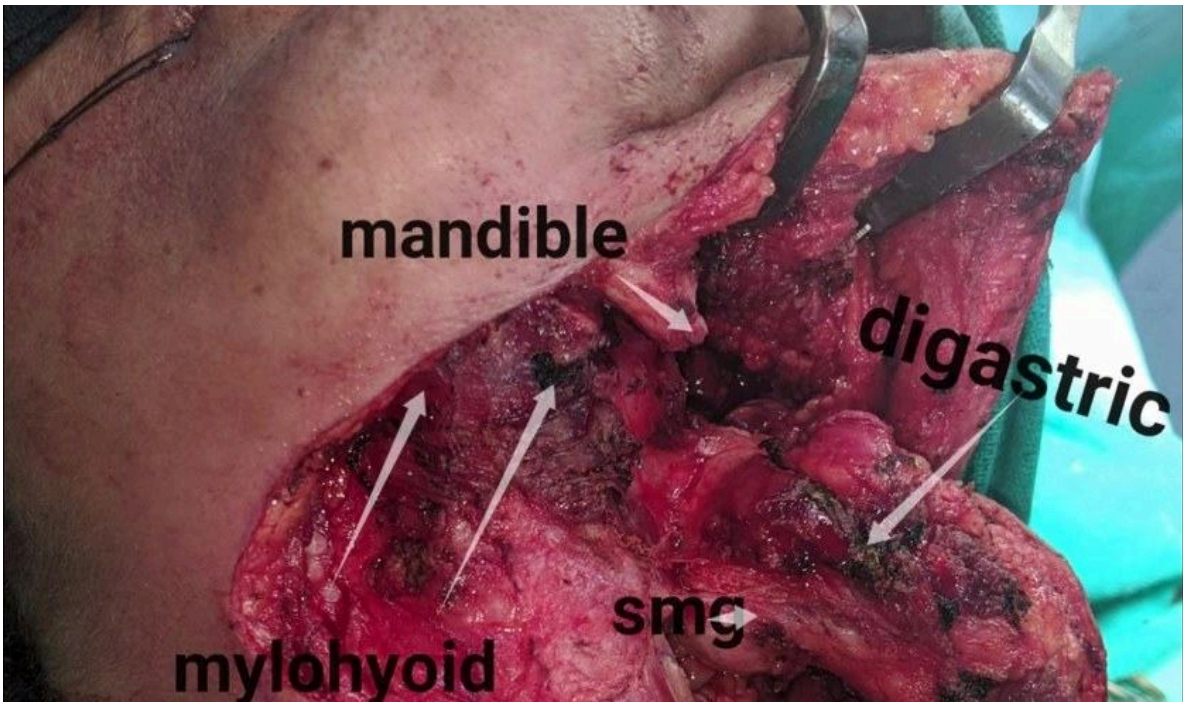
- **Tumour enters bone at the point of abutment.** Assume entry below the occlusal ridge when planning cuts.
- **Infiltrative bone invasion needs segmental resection.** Rim resection is for superficial erosion only.
- **Extranodal extension or positive margins call for chemoradiation.** Postoperative cisplatin improves locoregional control.

CASE SUMMARY

Composite bite resection with near-total glossectomy and radical tonsillectomy for T4 N2b retromolar carcinoma, reconstructed with a pectoralis major flap; the patient was reviewed at one month.

REFERENCES

1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062
2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646
3. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.



17

No cut on the face

Carcinoma of the left lower alveolus, T4 N0

Wide excision with segmental mandibulectomy through a combined transoral and transcervical approach, neck dissection and submental artery island flap

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A left lower alveolar carcinoma invaded the mandible.

AUTHOR'S PERSPECTIVE

> Segmental mandibulectomy can be performed without a lip split. A single horizontal neck incision serves both the neck dissection and the resection, and the submental artery island flap is harvested in the same field, avoiding a facial scar.

APPROACH

Transoral mucosal cuts combined with transcervical bone cuts and level I dissection preserving the submental pedicle.

OPERATIVE STEPS

1. Excise the lesion intraorally with margins.
2. Complete the segmental mandibulectomy from the neck.
3. Mark the submental artery island flap.
4. Elevate the flap with the digastric, preserving the pedicle during level Ia/Ib clearance.
5. Inset the flap into the intraoral defect.

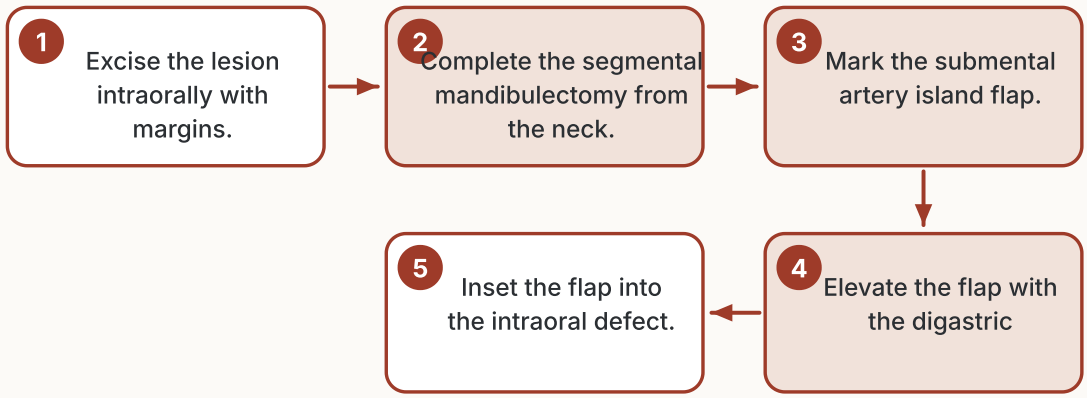
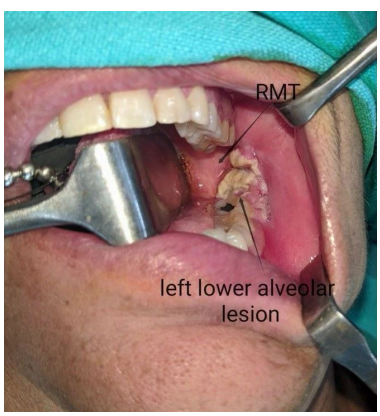


Figure 17.A Operative sequence.

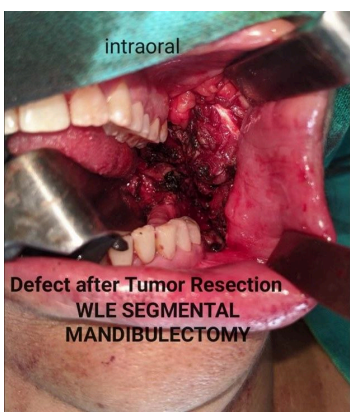
OPERATIVE RECORD



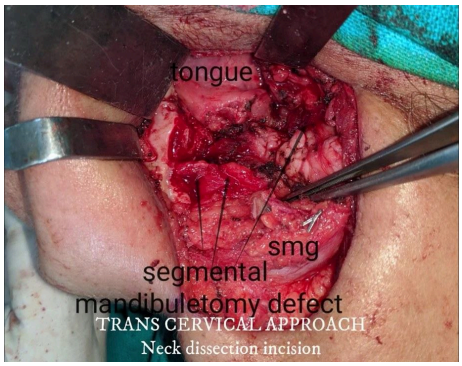
17.1 "Left lower alveolar lesion", retromolar trigone marked. Video 0:07



17.2 "Wide local excision of the lesion. No facial incision." Video 0:12



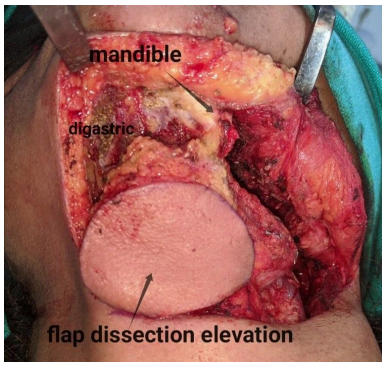
17.3 "Intraoral: defect after tumour resection, WLE segmental mandibulectomy." Video 0:17



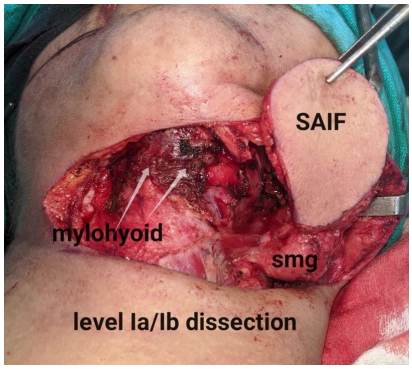
17.4 "Segmental mandibulectomy defect. Trans-cervical approach, neck dissection incision." Tongue and SMG labelled. Video 0:22



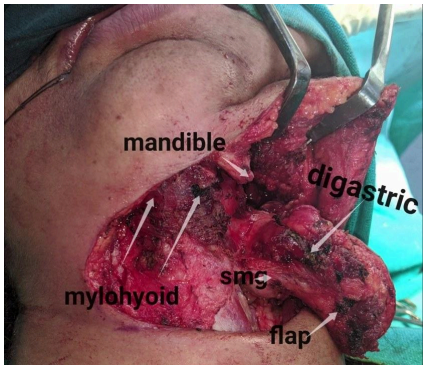
17.5 "Submental artery island flap: flap marking." Video 0:32



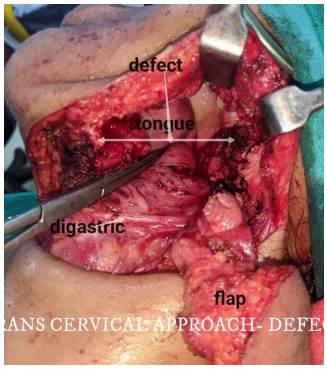
17.6 "Flap dissection, elevation." Mandible and digastric labelled. Video 0:37



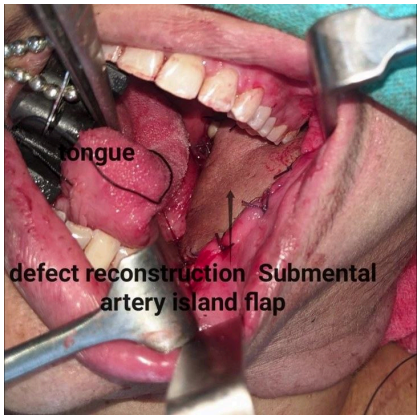
17.7 "Level Ia/Ib dissection." SAIF, mylohyoid and SMG labelled. Video 0:48



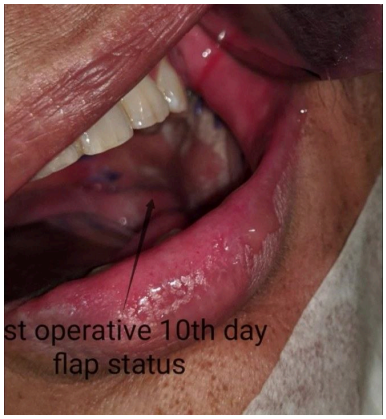
17.8 Flap on its pedicle beside mandible, digastric and mylohyoid. Video 0:58



17.9 "Trans-cervical approach: defect." Tongue, digastric and flap labelled. Video 1:08



17.10 "Defect reconstruction: submental artery island flap." Video 1:13



17.11 "Post-operative 10th day: flap status." Video 1:18



17.12 "Post-operative 3 weeks follow-up." Video 1:23

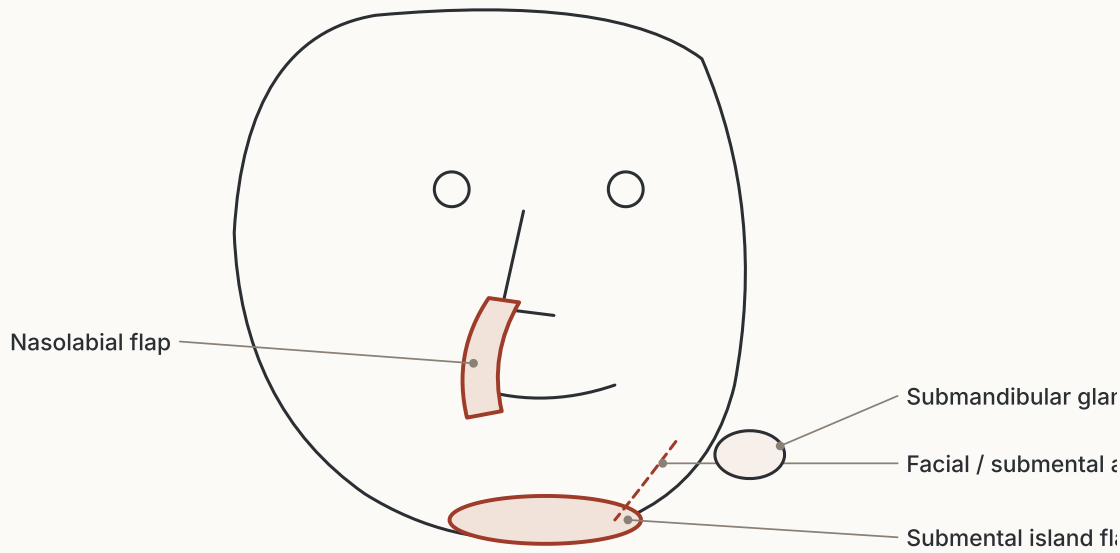


Figure 17.B Local and regional flaps for the oral cavity.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Avoiding a facial incision	The resection was completed through a combined transoral and transcervical route.
Oncological safety of the submental flap	Level I was cleared meticulously around the pedicle in a node-negative neck.

TEACHING POINTS

- **The submental flap shares level I.** Use it only in a clinically node-negative neck.
- **Keep the anterior digastric with the flap.** It protects the perforators.
- **Pinch test the donor site.** The paddle must close primarily.

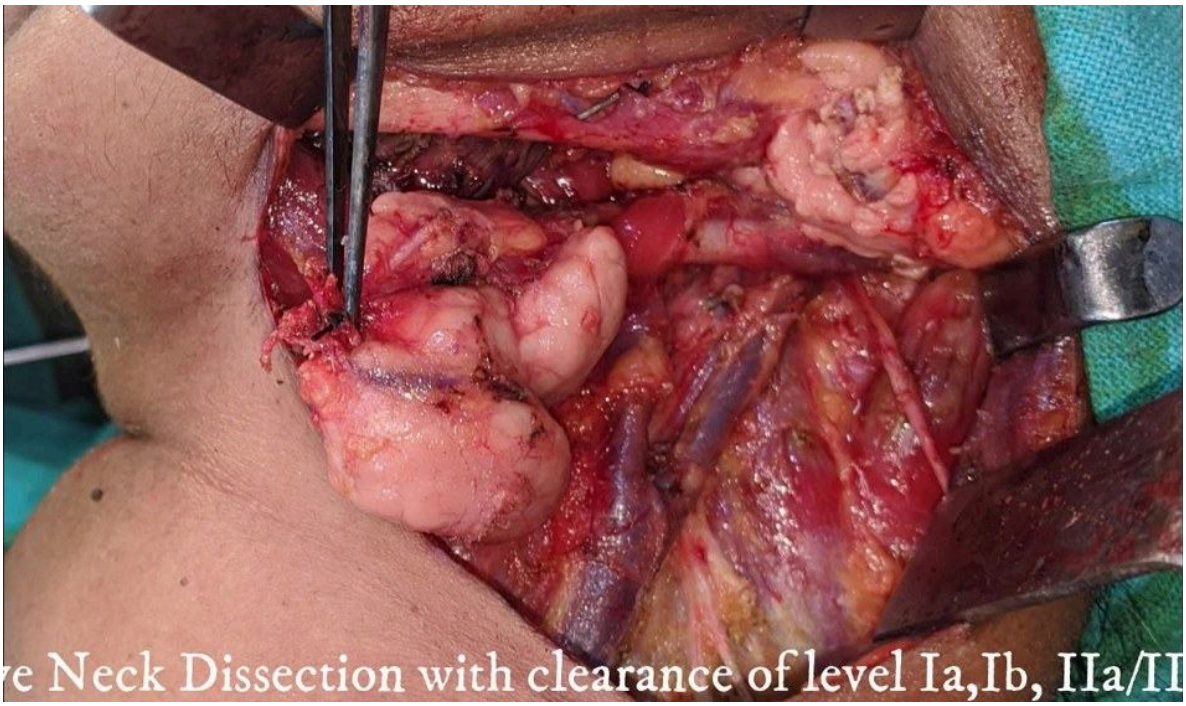
CASE SUMMARY

Segmental mandibulectomy for a T4 N0 lower alveolar carcinoma through a transoral–transcervical approach with submental island flap reconstruction; the flap was healthy at 10 days and 3 weeks.

REFERENCES

1. Martin D, Pascal JF, Baudet J, et al. The submental island flap: a new donor site. Anatomy and clinical applications as a free or pedicled flap. *Plast Reconstr Surg* 1993;92:867–73.

2. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007



18

The gland that became a lining

Squamous cell carcinoma, left buccal mucosa, posterior aspect, T2 N0, in a 48-year-old woman

Wide excision with marginal mandibulectomy and upper alveolectomy, selective neck dissection (I–III) and submandibular gland flap

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 48-year-old woman had a non-healing ulcer of the left cheek of about 3 × 2.5 cm, reaching the upper and lower gingivobuccal sulci. The mandible and upper alveolus were free of tumour.

AUTHOR'S PERSPECTIVE

> In a node-negative neck the submandibular gland can be preserved on its facial pedicle and transposed into the mouth. It fills the buccal defect, mucosalises quickly and carries no hair or external scar.

APPROACH

Intraoral wide excision with marginal mandibulectomy, selective neck dissection preserving the gland on the facial vessels, and transposition beneath the mylohyoid.

OPERATIVE STEPS

1. Excise the lesion intraorally with safe margins, marginal mandibulectomy and upper alveolectomy.
2. Clear levels Ia and Ib, preserving the submandibular gland.
3. Divide the facial vessels distally, preserving the marginal mandibular nerve.
4. Clear levels IIa, IIb and III, preserving the internal jugular vein, accessory nerve and sternocleidomastoid.
5. Transpose the gland on its facial pedicle beneath the mylohyoid into the oral cavity.
6. Inset the gland in the buccal defect.

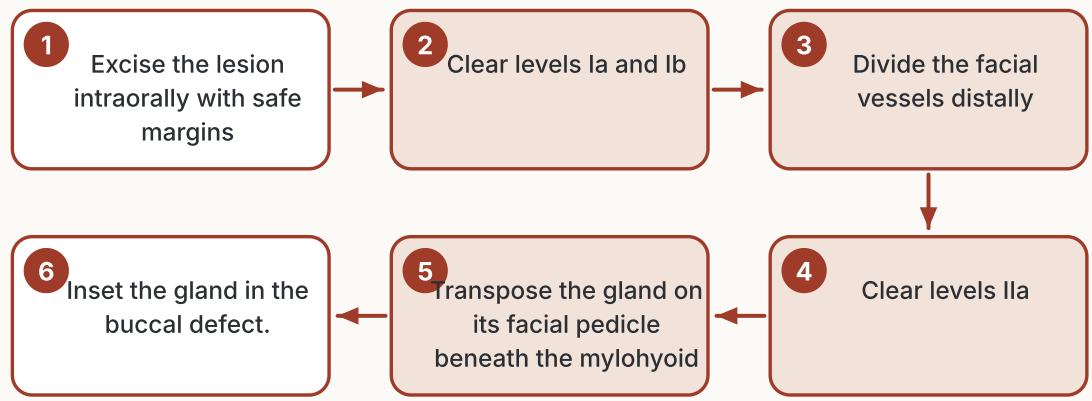


Figure 18.A Operative sequence.

OPERATIVE RECORD



18.1 "Ulcerative lesion, left buccal mucosa, posterior aspect, reaching upper and lower gingivobuccal sulcus; mandible and maxilla free." Video 0:17



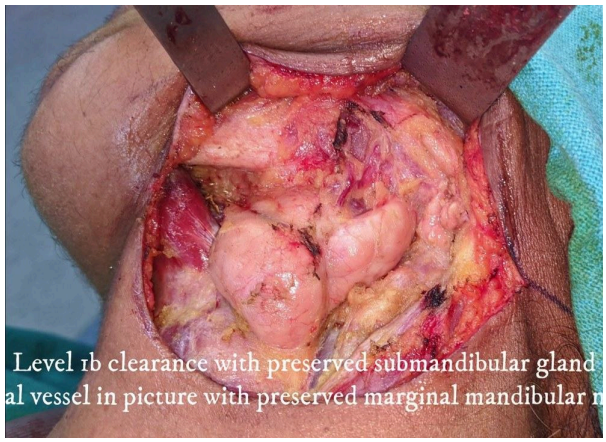
18.2 "Intraorally wide local excision of the lesion with safe margins." Video 0:22



18.3 "Specimen: wide local excision along with marginal mandibulectomy and upper alveolectomy." Video 0:32



18.4 "Selective neck dissection, level Ia and Ib clearance; submandibular gland in view." Video 0:37



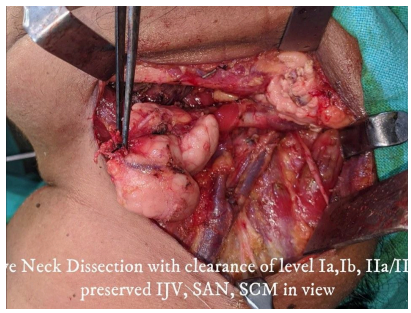
18.5 "Level Ib clearance with preserved submandibular gland"; facial vessel and marginal mandibular nerve in view. Video 0:42



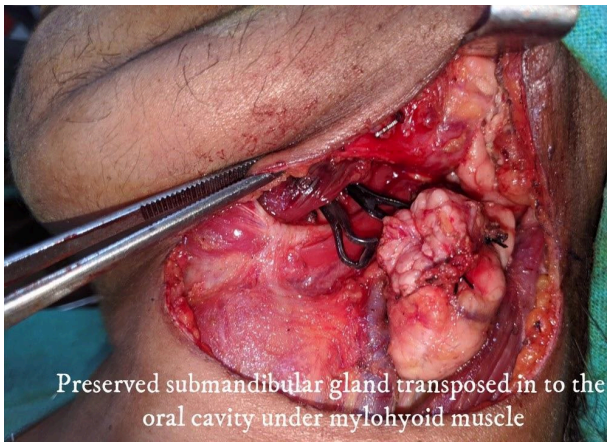
18.6 "Facial vessel dissected and cut at the distal end, with preserved marginal mandibular nerve." Video 0:47



18.7 "Preserved submandibular gland with facial pedicle; hypoglossal nerve above the digastric." Video 0:57



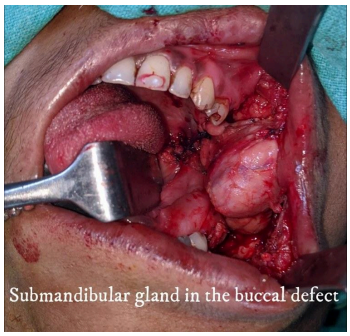
18.8 "Selective neck dissection with clearance of levels Ia, Ib, IIa/IIb and III; IJV, SAN, SCM preserved." Video 1:02



18.9 "Preserved submandibular gland transposed into the oral cavity under the mylohyoid." Video 1:07



18.10 "After transposition of the submandibular gland, pedicle in view above the posterior belly of digastric." Video 1:12



18.11 "Submandibular gland in the buccal defect." Video 1:17



18.12 "Defect reconstruction, SMG flap: immediately post-operative." Video 1:32



18.13 "Post-operative flap outcome, 7th day: mucosalisation." Video 1:42

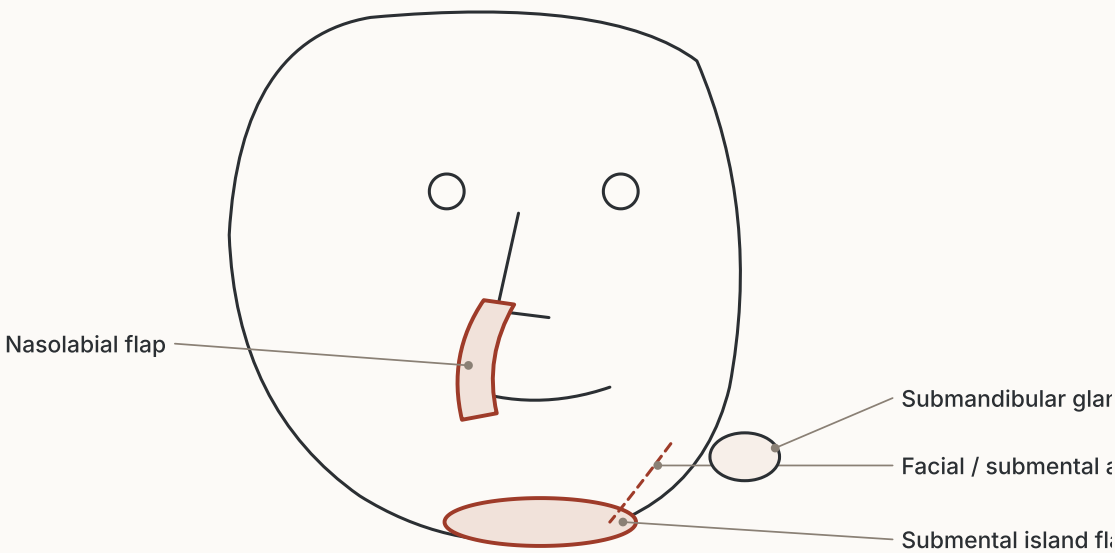


Figure 18.B Local and regional flaps for the oral cavity.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Oncological safety of preserving the gland	The flap was used only in a node-negative neck with complete level I clearance.
Reach to the posterior buccal mucosa	The gland was passed beneath the mylohyoid on its facial pedicle.

TEACHING POINTS

- **Use only in N0 necks.** The gland lies in level Ib.

- **Preserve the facial artery and vein to the gland.** Ligate distally.
- **Expect mucosalisation in 1–2 weeks.** The gland looks raw at first.

CASE SUMMARY

Wide excision of a T2 N0 buccal carcinoma with marginal mandibulectomy and selective neck dissection, reconstructed with a pedicled submandibular gland flap that mucosalised by the seventh day, with no facial scar.

REFERENCES

1. Al-Aroomi MA, Feng Y, Chen J, et al. Comparing outcomes of pedicled submandibular gland flap and submental artery perforator flap in oral cavity reconstruction. *Head Neck* 2025;47:3213–20. doi:10.1002/hed.28229
2. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007



19

Skin from under the chin

Carcinoma of the right buccal mucosa, T2 N0

Wide excision, selective neck dissection and submental artery island flap

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

An ulceroproliferative growth of the right buccal mucosa was staged T2 N0.

AUTHOR'S PERSPECTIVE

> The submental artery island flap is raised within the field of the neck dissection and gives more skin than the submandibular gland flap for a larger buccal defect.

APPROACH

Wide local excision, level I dissection preserving the submental vessels, flap elevation and transposition into the mouth.

OPERATIVE STEPS

1. Excise the growth with margins.
2. Mark the submental artery island flap.
3. Dissect level Ib preserving the submental pedicle.
4. Elevate the flap with the digastric during level Ia dissection.
5. Ligate the facial vessels distal to the submental origin.
6. Transpose the flap into the oral cavity and close the donor site primarily.

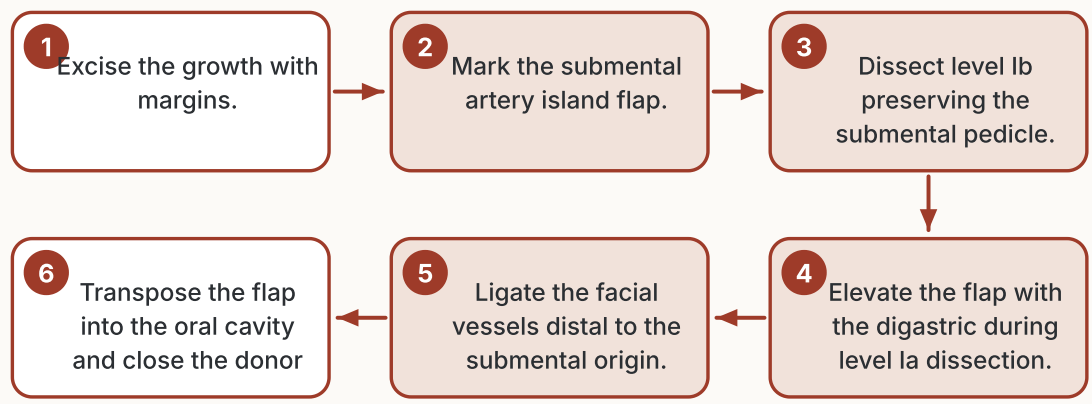
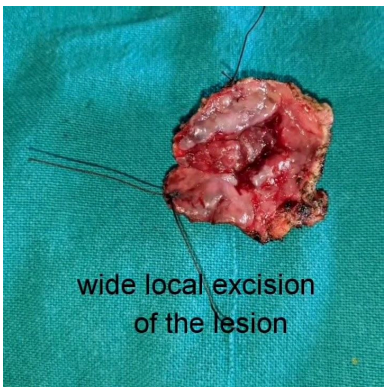


Figure 19.A Operative sequence.

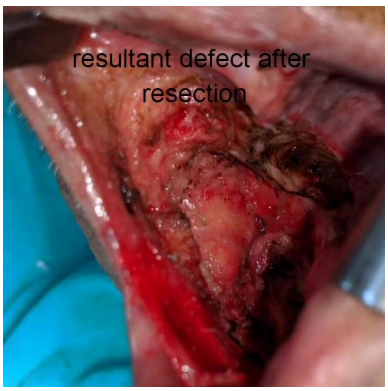
OPERATIVE RECORD



19.1 "Ulcero-proliferative growth, right buccal mucosa, T2 N0." Video 0:07



19.2 "Wide local excision of the lesion." Video 0:12



19.3 "Resultant defect after resection." Video 0:17



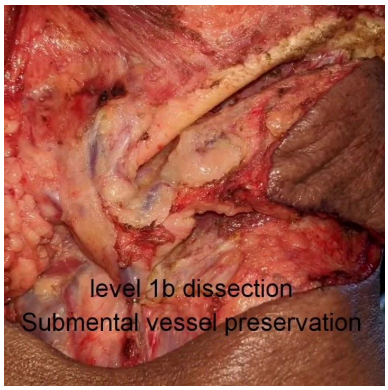
19.4 "Marked submental artery island flap." Video 0:23



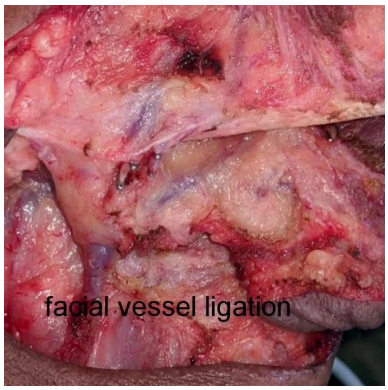
19.5 "Dissection level Ib with preservation of the submental pedicle." Video 0:28



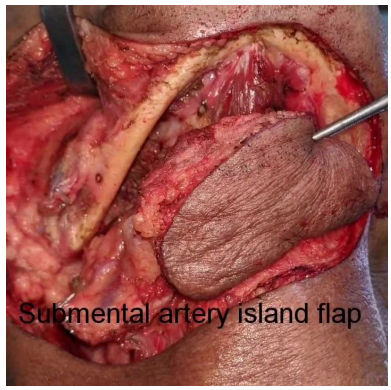
19.6 "Level Ia dissection, flap elevation, digastric muscle." Video 0:33



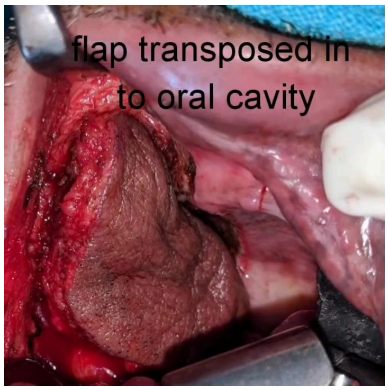
19.7 "Level Ib dissection: submental vessel preservation." Video 0:38



19.8 "Facial vessel ligation." Video 0:48



19.9 "Submental artery island flap" raised on its pedicle. Video 0:58



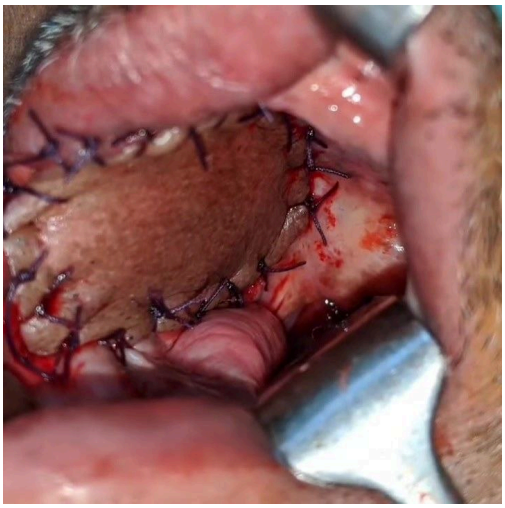
19.10 "Flap transposed into the oral cavity." Video 1:04



19.11 "Defect reconstruction: SAIF." Video 1:09



19.12 "Donor site closed primarily." Video 1:14



19.13 Flap inset in the buccal defect. Video 1:19

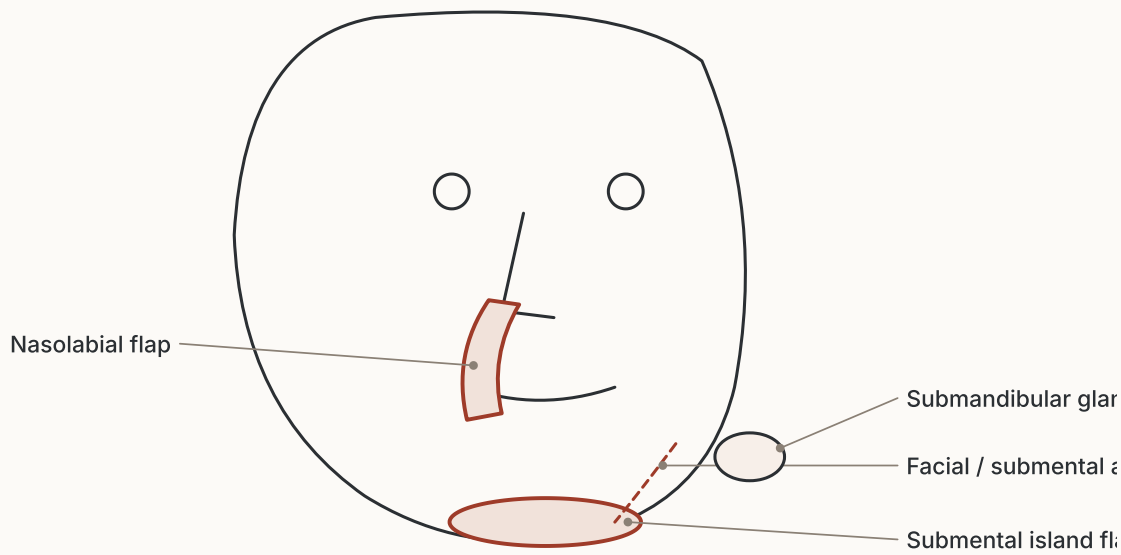


Figure 19.B Local and regional flaps for the oral cavity.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Pedicle injury during level I clearance	The submental vessels were dissected under vision before the lymphatic tissue was removed.
Hair-bearing skin in the mouth	The paddle was designed in the least hair-bearing area of the submental skin.

TEACHING POINTS

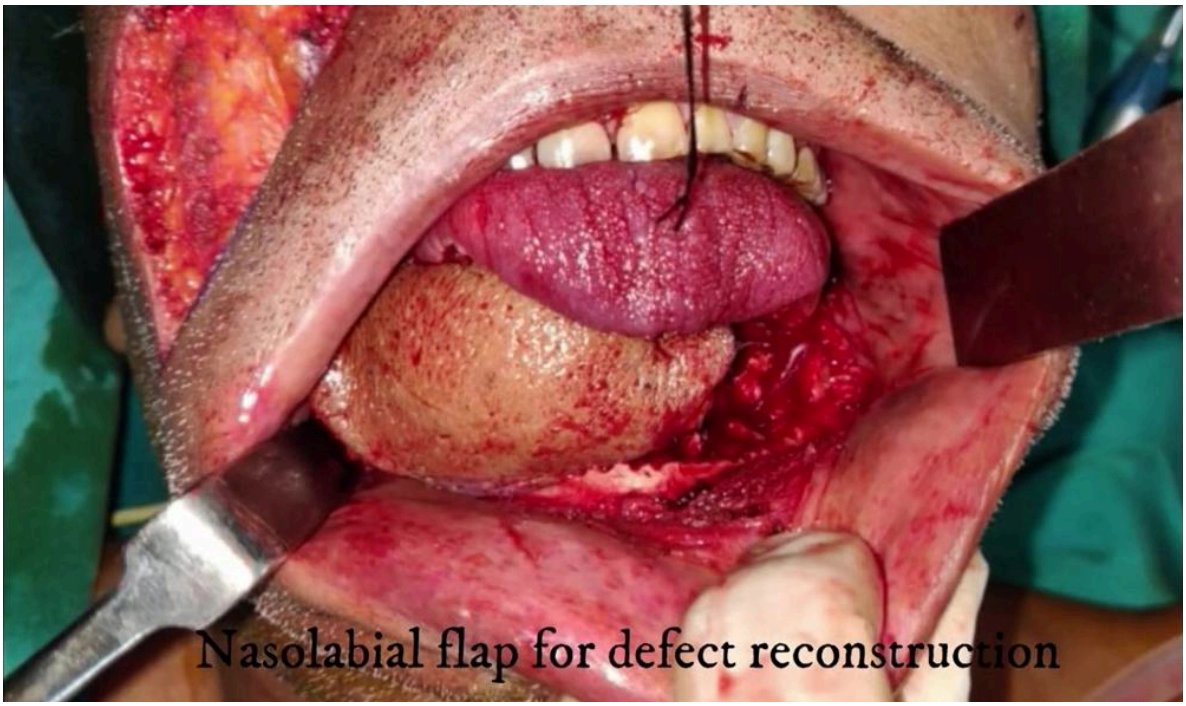
- **The pedicle is up to 8 cm long.** Enough to reach the buccal mucosa and palate.
- **Hair growth is the main drawback in men.** Counsel before surgery.
- **Preserve the marginal mandibular nerve.** It runs superficial to the facial vessels.

CASE SUMMARY

Wide excision of a T2 N0 buccal carcinoma reconstructed with a submental artery island flap, with primary donor closure.

REFERENCES

1. Martin D, Pascal JF, Baudet J, et al. The submental island flap: a new donor site. Anatomy and clinical applications as a free or pedicled flap. *Plast Reconstr Surg* 1993;92:867–73.
2. Al-Aroomi MA, Feng Y, Chen J, et al. Comparing outcomes of pedicled submandibular gland flap and submental artery perforator flap in oral cavity reconstruction. *Head Neck* 2025;47:3213–20. doi:10.1002/hed.28229



20

Five mouths, one flap

Carcinoma of the lip, commissure, floor of mouth and tongue in five patients

Nasolabial flap reconstruction: bilateral, unilateral, staged and island

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Five patients are presented: a 68-year-old woman with a verrucous upper lip lesion; a verrucous lesion of the left commissure; carcinoma of the left floor of mouth and lower alveolus; a 48-year-old man with T2 N0 anterior floor-of-mouth carcinoma abutting the inner table; and a growth of the right lateral tongue.

AUTHOR'S PERSPECTIVE

> The nasolabial flap reaches the lip, commissure, floor of mouth and tongue from tissue next door. It is chosen when the defect is small to medium and a free flap would add more morbidity than benefit.

APPROACH

Inferiorly based flaps for the floor of mouth, bilateral flaps for the upper lip, and an island flap on the facial artery for the tongue.

OPERATIVE STEPS

1. Excise each lesion with margins (WLE; marginal mandibulectomy and partial glossectomy where needed).
2. Raise the nasolabial flap along the cheek–lip crease.
3. Tunnel the flap into the floor of mouth or rotate it into the lip.
4. Divide the pedicle at four weeks in staged flaps.
5. Use an island flap on the facial artery for the hemiglossectomy defect.

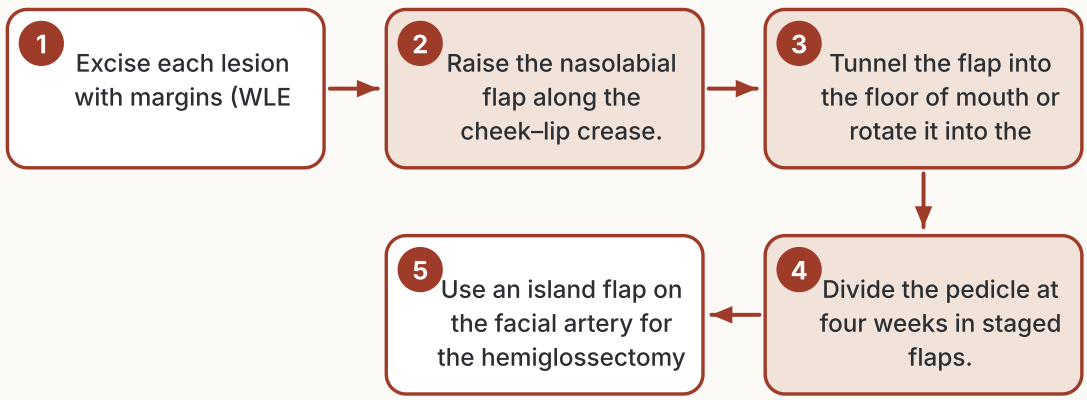


Figure 20.A Operative sequence.

OPERATIVE RECORD



20.1 Case 1: "verrucous lesion", upper lip. Video 0:17



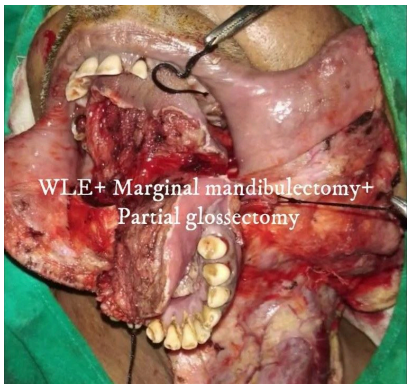
20.2 Case 1: "bilateral nasolabial flap." Video 0:29



20.3 Case 2: “verrucous lesion, left oral commissure.” Video 1:05



20.4 Case 3: “carcinoma left side floor of mouth, lower alveolus.” Video 1:40



20.5 Case 3: “WLE + marginal mandibulectomy + partial glossectomy.” Video 1:52



20.6 Case 3: nasolabial flap to defect reconstruction. Video 2:16



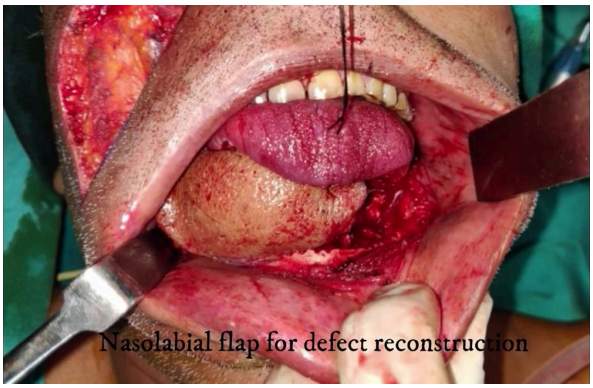
20.7 Case 4: “WLE + marginal mandibulectomy + partial glossectomy.” Video 2:51



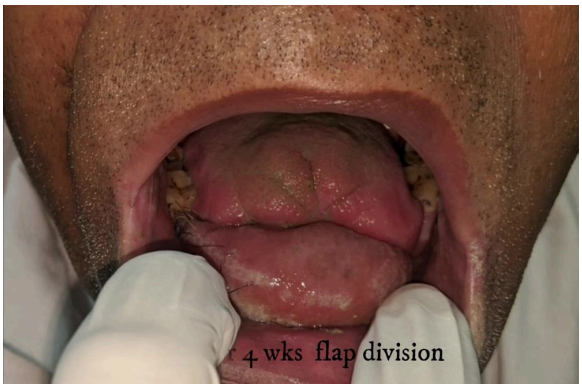
20.8 Case 4: “Specimen: WLE + marginal mandibulectomy + partial glossectomy.” Video 3:15



20.9 Case 4: nasolabial flap raised. Video 3:27



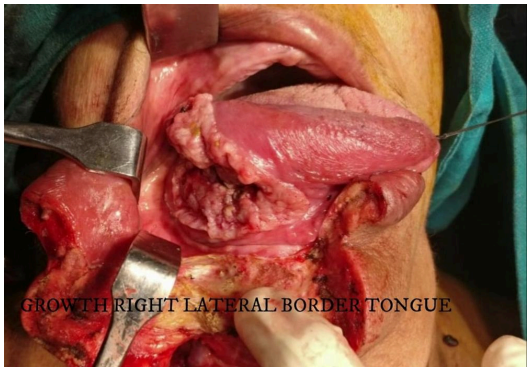
20.10 Case 4: “nasolabial flap for defect reconstruction.” Video 3:38



20.11 Case 4: “4 weeks: flap division.” Video 3:50



20.12 Case 3: flap inset in the floor of mouth. Video 2:27



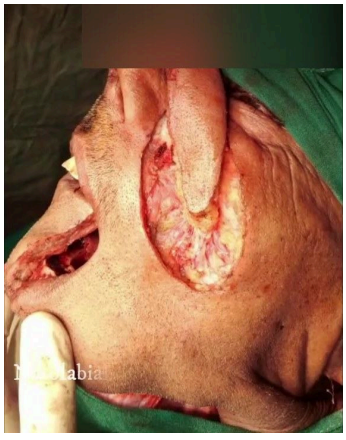
20.13 Case 5: “growth, right lateral border of tongue.” Video 4:02



20.14 Case 5: “nasolabial flap for hemiglossectomy defect reconstruction”; facial artery labelled. Video 4:26



20.15 Case 2: “nasolabial flap for defect reconstruction”, commissure lesion. Video 1:16



20.16 Nasolabial flap raised and turned in. Video 2:04



20.17 Case 5: “nasolabial island flap marked, raised.” Video 4:14



20.18 Case 1: "post-operative 10th day follow-up" after bilateral nasolabial flaps. Video 0:41



20.19 Case 5: post-operative reconstruction of the hemiglossectomy defect. Video 4:38

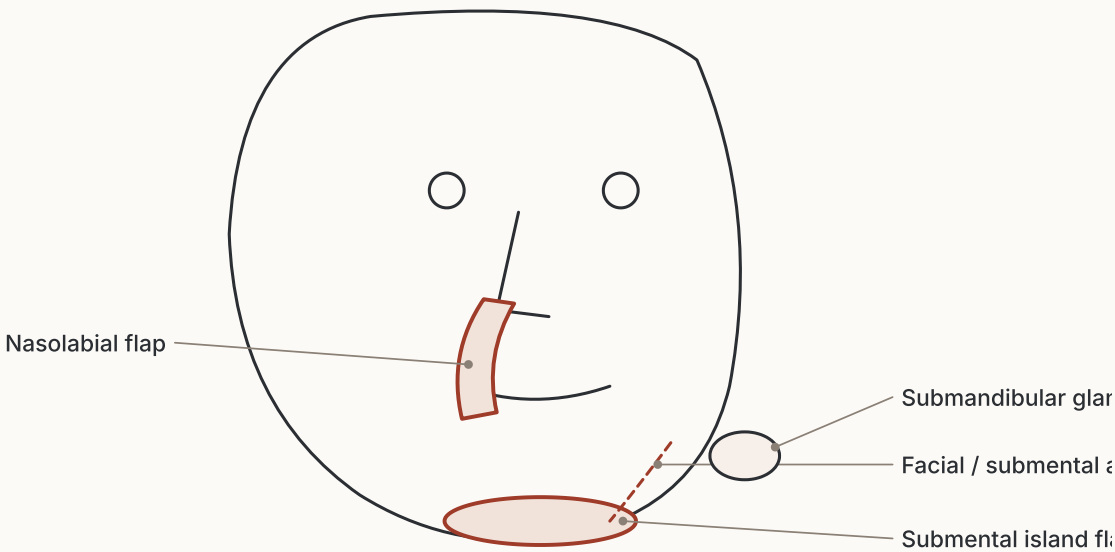


Figure 20.B Local and regional flaps for the oral cavity.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Reaching the floor of mouth	The flap was tunnelled through the cheek above the mandible.
A pedicle bridging the occlusion	Staged flaps were divided at four weeks.

TEACHING POINTS

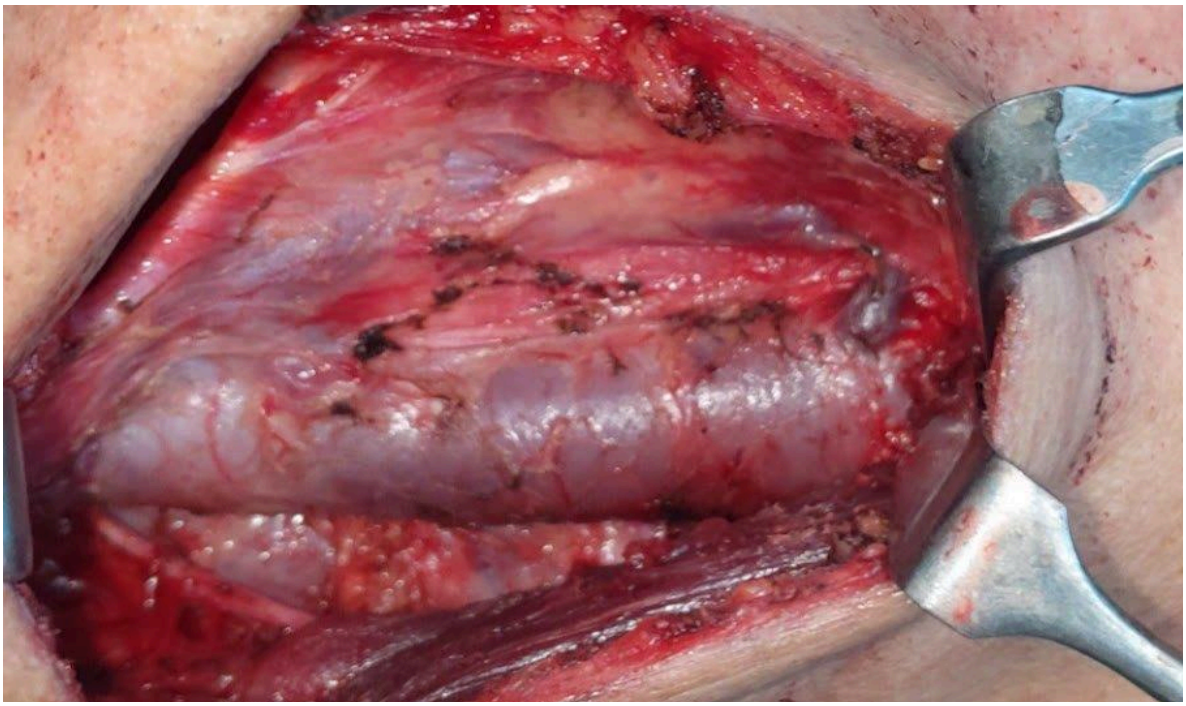
- **Inferiorly based for floor of mouth and lower lip.** Superiorly based for upper lip and nose.
- **Necrosis is uncommon.** Pooled necrosis is about 3%.
- **The island version avoids a second stage.** The facial artery carries it.

CASE SUMMARY

Nasolabial flap reconstruction in five patients with lip, commissure, floor-of-mouth and tongue defects, including bilateral, staged and island designs.

REFERENCES

1. Maglitto F, Scocca V, Salzano G, et al. Nasolabial flap in oncologic oral cavity reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2026. doi:10.1002/lary.70910



21

The lateral tongue

Carcinoma of the lateral border of the tongue

Partial glossectomy with orientation of the specimen and neck dissection

PART II · ORAL CAVITY Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows an ulcer of the lateral tongue held with a traction suture, the oriented partial glossectomy specimen and the defect, with the completed neck dissection.

AUTHOR'S PERSPECTIVE

> Depth of invasion, not surface size, predicts nodal spread in tongue cancer. Tongue tumours deeper than a few millimetres carry a significant risk of occult nodes, so an elective neck dissection accompanies the resection.

APPROACH

Transoral partial glossectomy with a 1 cm margin in three dimensions, traction suture for control, and ipsilateral neck dissection.

OPERATIVE STEPS

1. Place a traction suture through the tongue tip for control.
2. Mark a 1 cm margin around the ulcer.
3. Excise the lesion with a deep margin through muscle.
4. Orient the specimen with a suture for pathology.
5. Complete the neck dissection, exposing the internal jugular vein and carotid sheath.

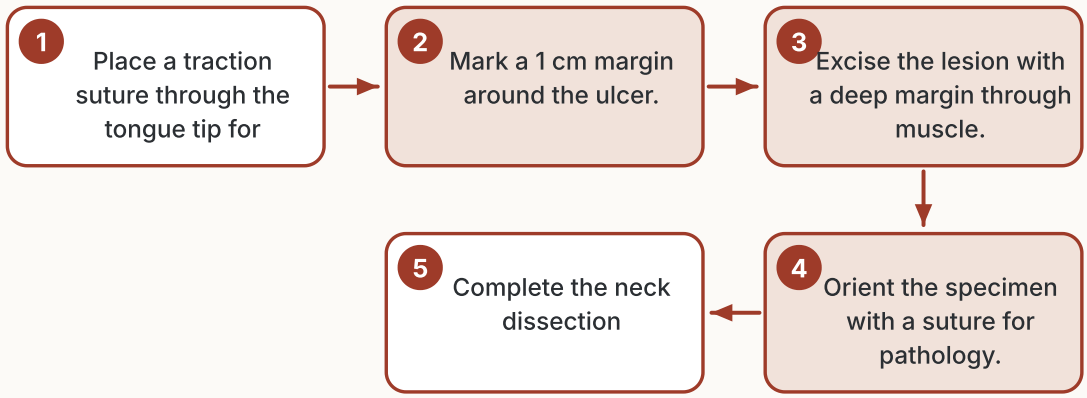
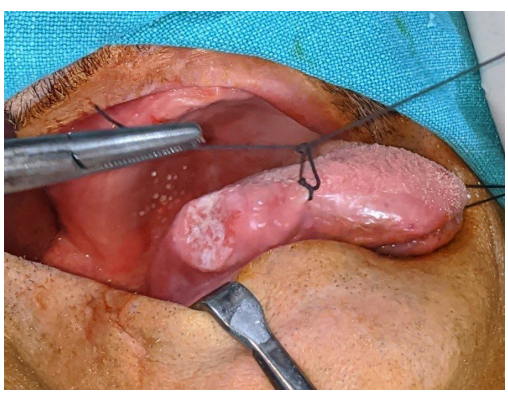


Figure 21.A Operative sequence.

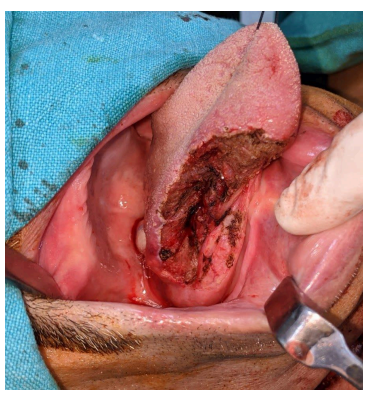
OPERATIVE RECORD



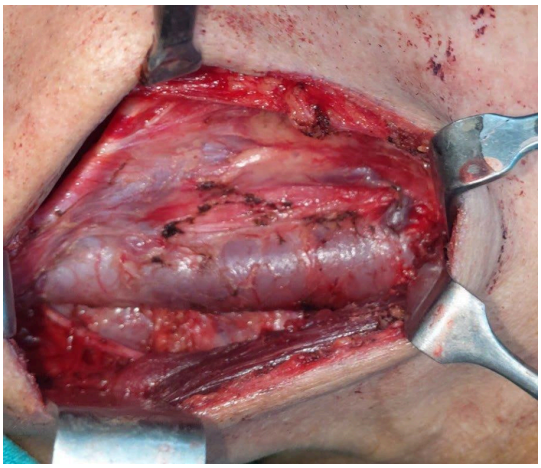
21.1 Lateral tongue ulcer with traction suture and retractor, close view.



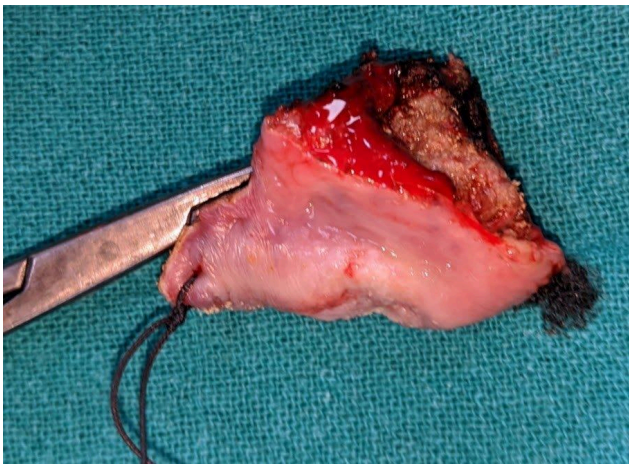
21.2 Tongue lateral border lesion with traction suture, mouth retracted.



21.3 Glossectomy defect of lateral tongue after excision.



21.4 Completed neck dissection: internal jugular vein and carotid sheath exposed.



21.5 Specimen: partial glossectomy with orientation suture.

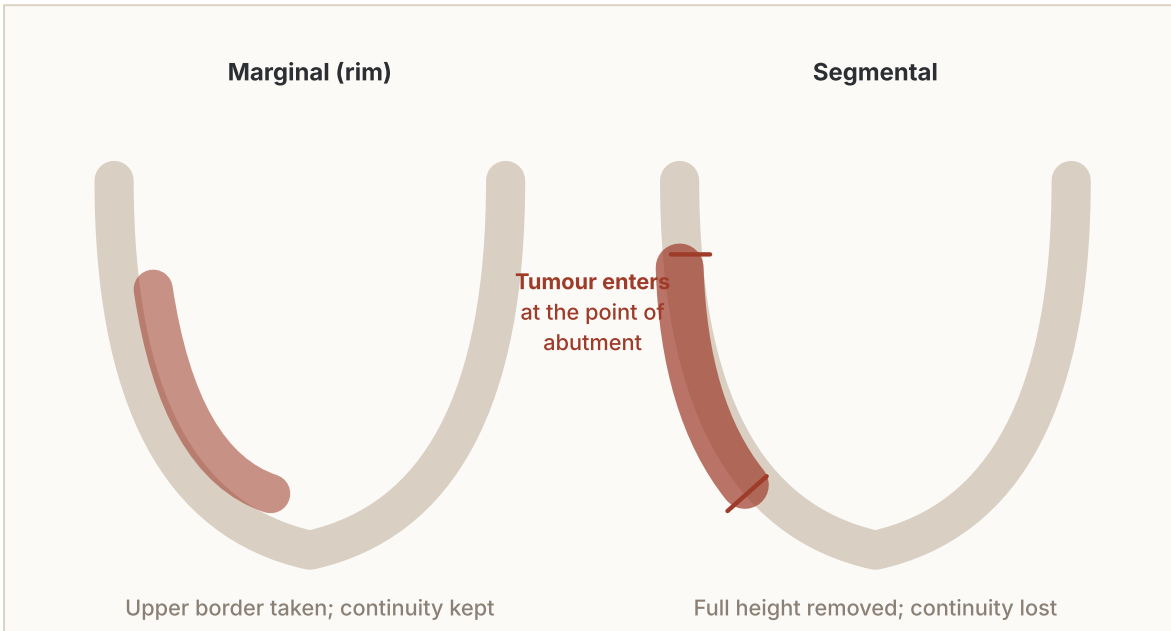


Figure 21.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Tongue mobility during excision	A traction suture held the tongue forward.
Deep margin	Palpation guided the deep cut, which was taken through muscle.

TEACHING POINTS

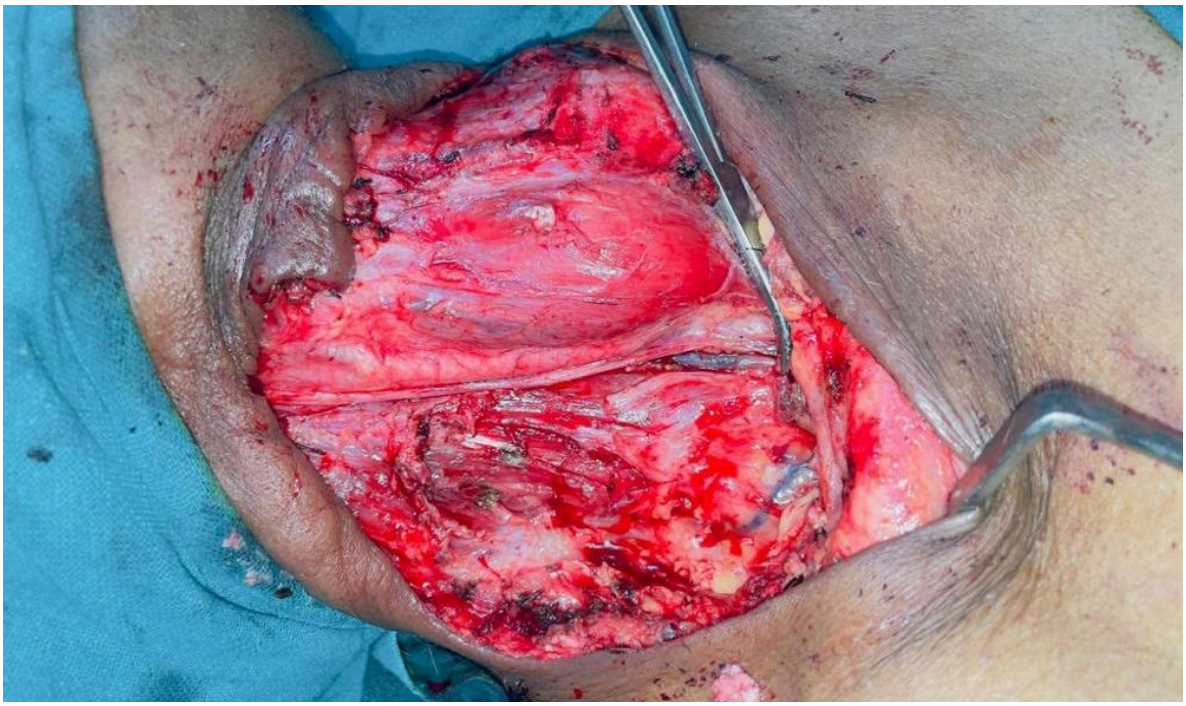
- **Depth of invasion drives the neck.** It is part of the T stage.
- **Margins of 1 cm in three dimensions.** The deep margin is the one most often close.
- **Orient the specimen.** The pathologist needs to know which edge is which.

CASE SUMMARY

Partial glossectomy with an oriented specimen and neck dissection for carcinoma of the lateral tongue.

REFERENCES

1. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007



22

The mass in level Ib

Oral cavity carcinoma with nodal disease in level Ib

Composite oral resection with neck dissection including the submandibular gland

PART II · ORAL CAVITY Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the submandibular gland and nodal mass elevated in level Ib, the cleared neck, and the oral and neck specimens.

AUTHOR'S PERSPECTIVE

> Level Ib is the first echelon for most oral cavity cancers. When nodes are present there, the submandibular gland is removed with the level, and the dissection continues down the jugular chain.

APPROACH

Neck dissection beginning at level I, mobilising the gland and mass with the facial vessels ligated, then down levels II–IV.

OPERATIVE STEPS

1. Elevate the submandibular gland and nodal mass, exposing the vessels.
2. Dissect levels I and II with retraction of the mandible.
3. Clear the field to the sternocleidomastoid and carotid sheath.
4. Deliver the composite oral resection with the neck dissection.

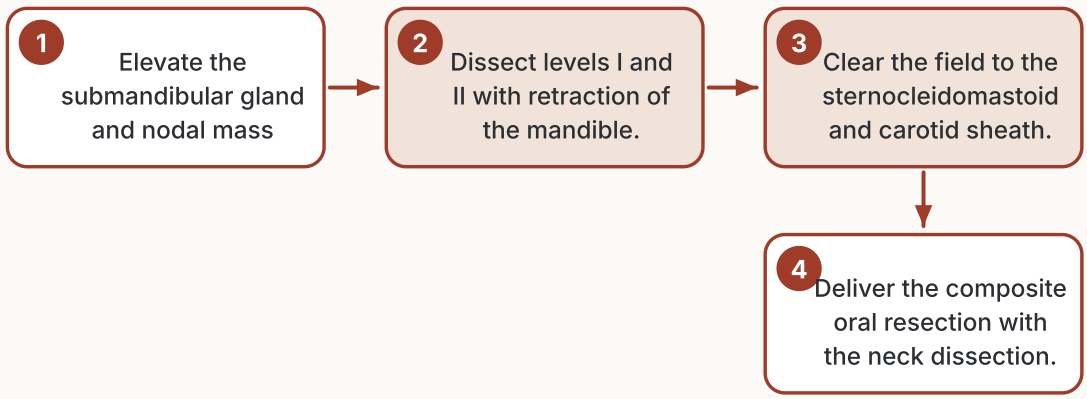
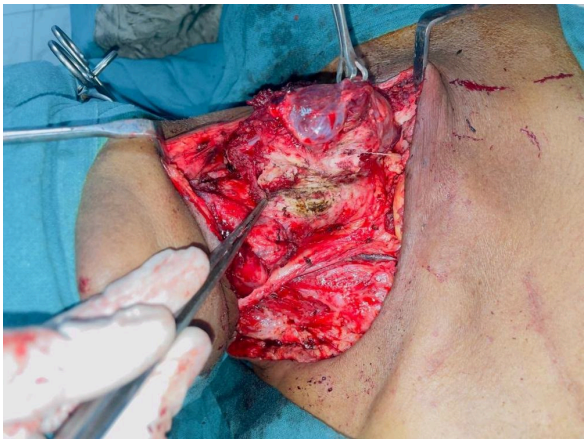
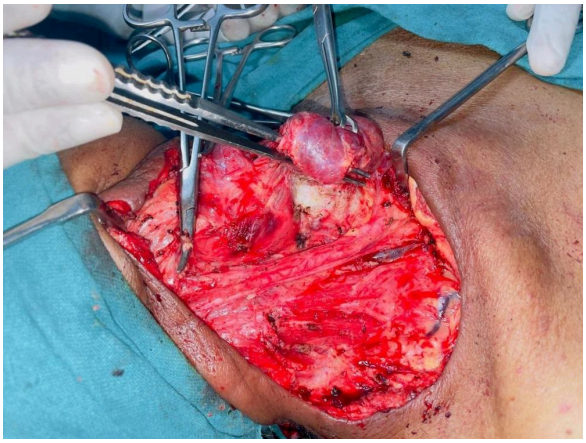


Figure 22.A Operative sequence.

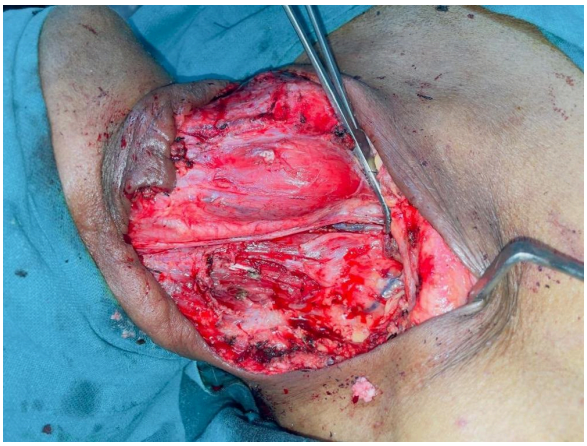
OPERATIVE RECORD



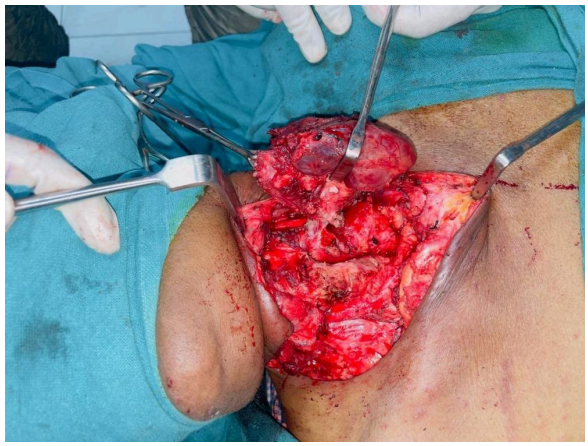
22.1 Neck dissection: submandibular gland and mass elevated, vessels exposed.



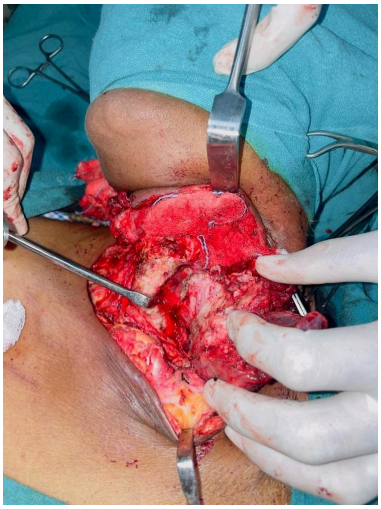
22.2 Neck dissection: cleared field with SCM and carotid sheath.



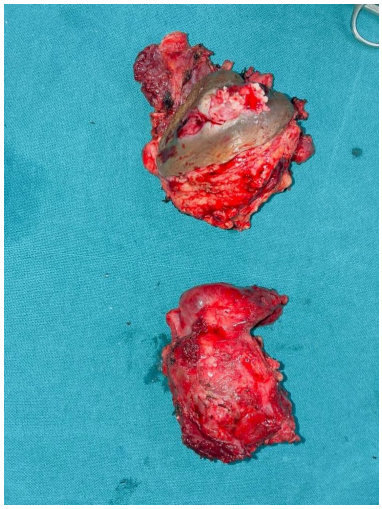
22.3 Neck dissection: complete field after clearance, SCM retracted.



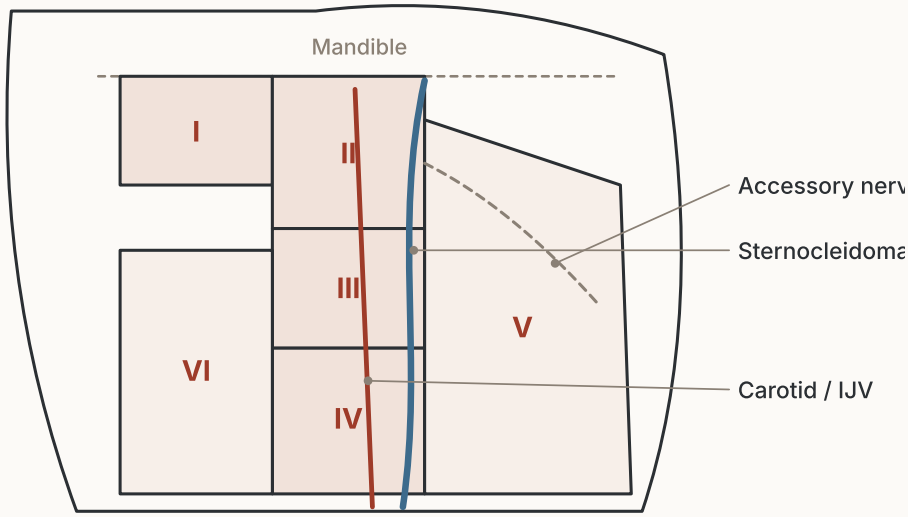
22.4 Neck dissection with tumour mass and haemostats.



22.5 Neck dissection: dissection of level I-II with retractors.



22.6 Specimens: composite oral resection and neck dissection.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 22.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Nodal mass adherent to the gland	The gland was taken with the mass.
Marginal mandibular nerve	The nerve was preserved by ligating the facial vessels low.

TEACHING POINTS

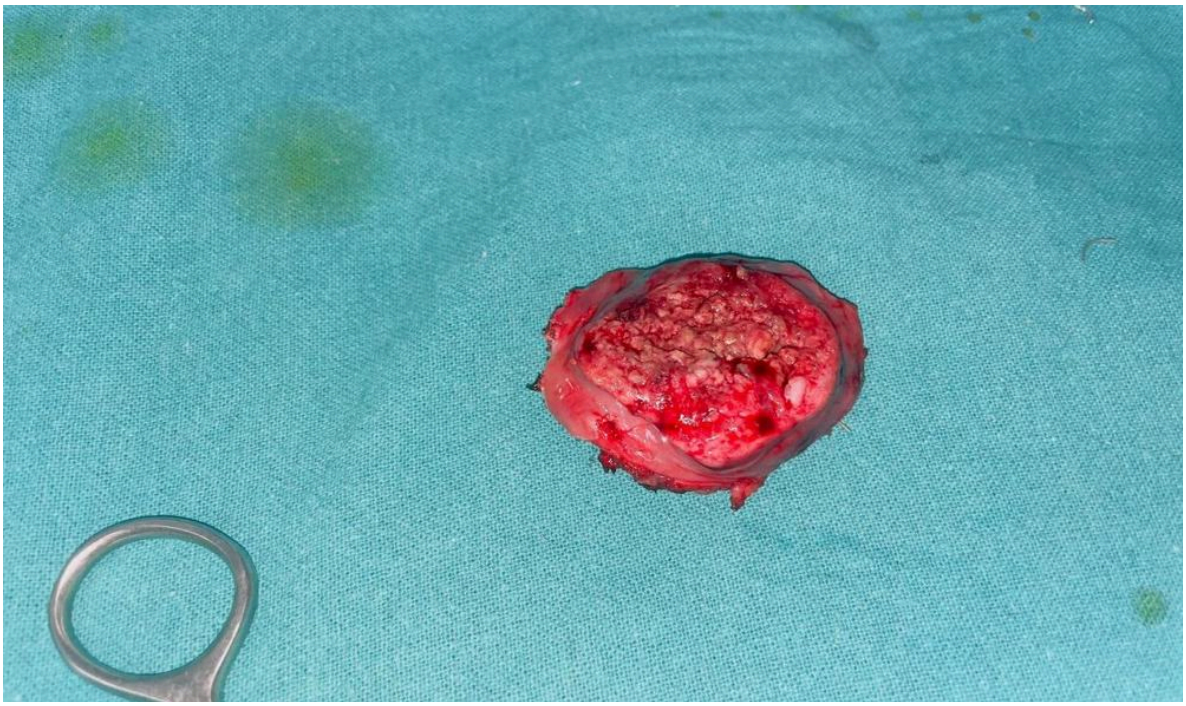
- **Level Ib is the sentinel area for the oral cavity.** It is cleared in every oral neck dissection.
- **Take the gland when nodes are in level Ib.** Preserving it is only for N0 necks.
- **Ligate the facial vessels low.** The marginal mandibular nerve is lifted out of harm.

CASE SUMMARY

Composite oral resection with neck dissection for oral cancer with level Ib nodal disease.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536
2. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007



23

Through the mouth

Carcinoma of the buccal mucosa

Transoral wide excision with neck dissection

PART II · ORAL CAVITY Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the transoral excision of a buccal mucosal tumour and the specimens laid out by level.

AUTHOR'S PERSPECTIVE

> A buccal tumour without bone or skin involvement can be excised transorally. The resection is widened to include the buccinator where the tumour is deep, and the neck is addressed in the same sitting.

APPROACH

Transoral excision under retraction with margins of 1 cm, preserving the parotid duct where possible.

OPERATIVE STEPS

1. Retract the cheek and mark margins around the tumour.
2. Excise the buccal mucosa and underlying tissue through the mouth.
3. Deliver the specimen and inspect the mucosal surface.
4. Lay out the oral tumour and neck dissection specimens by level.

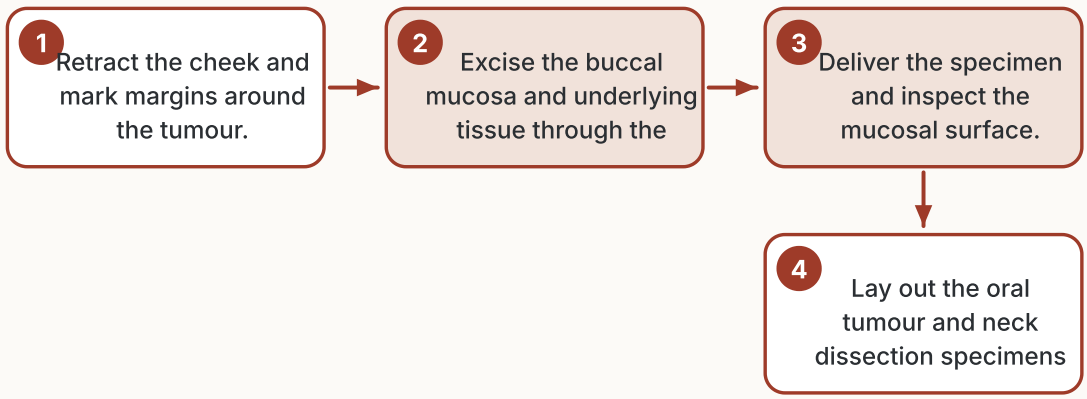
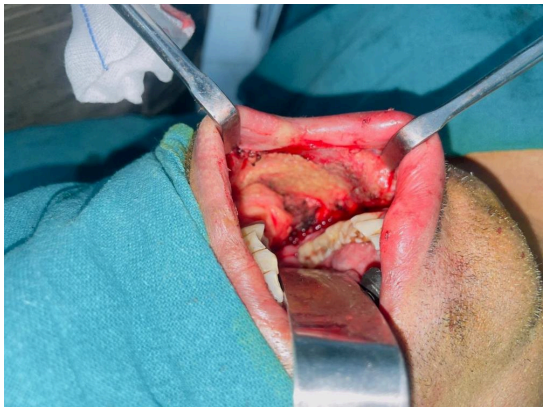


Figure 23.A Operative sequence.

OPERATIVE RECORD



23.1 Intraoral excision of buccal mucosal tumour with retractors.



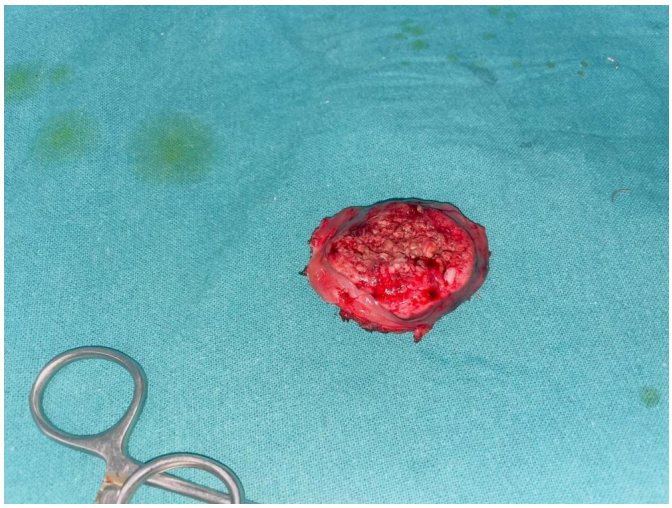
23.2 Wide excision of buccal mucosa/cheek through mouth with haemostats.



23.3 Specimen: buccal mucosal tumour, mucosal surface.



23.4 Specimens: oral tumour and neck dissection levels laid out.



23.5 Specimen: oral tumour with forceps.

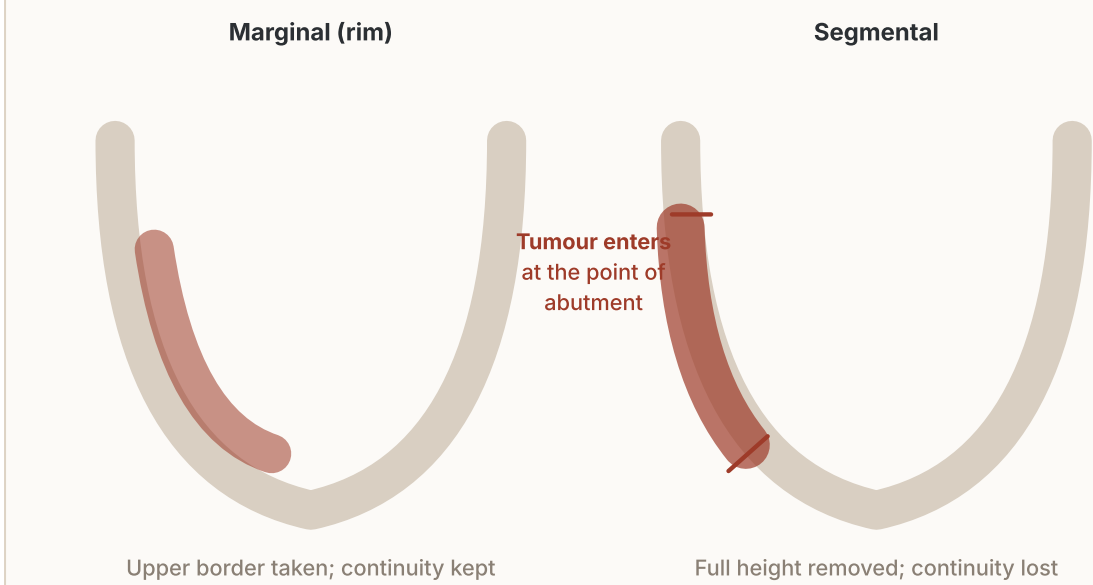


Figure 23.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Limited mouth opening	Retractors were placed to give access to the posterior extent.
Depth in the cheek	The buccinator was included in the deep margin.

TEACHING POINTS

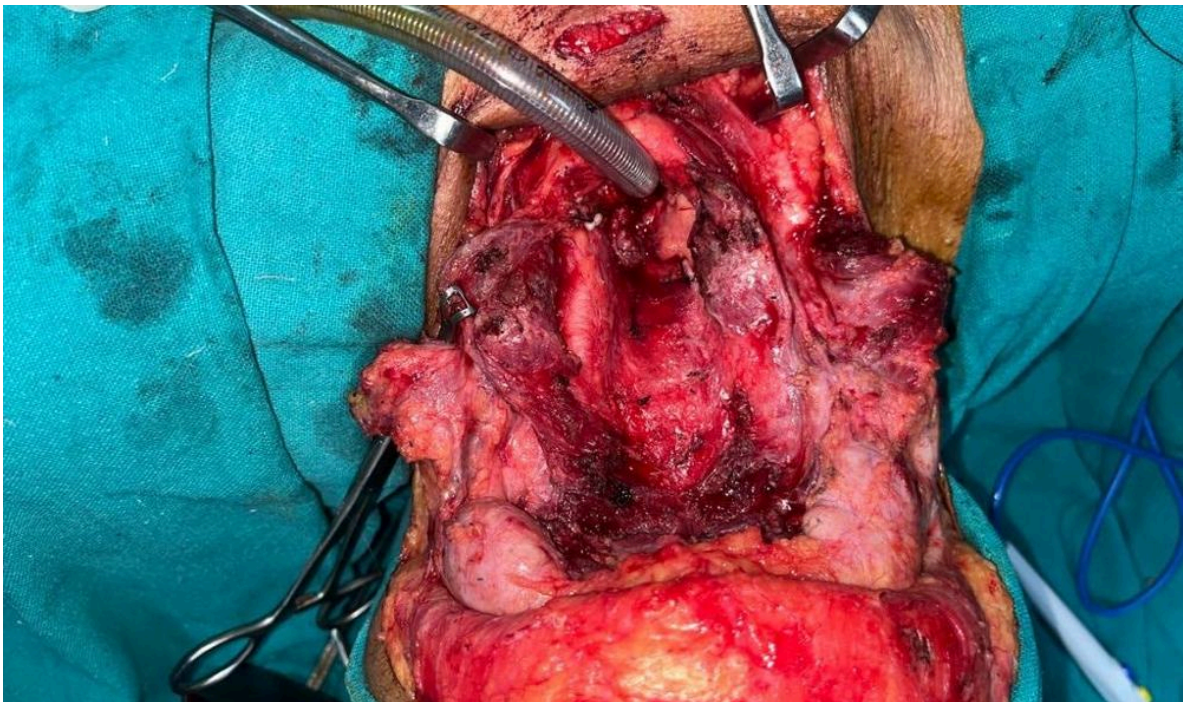
- **Trismus suggests masticator space involvement.** It changes the resection.
- **Include the buccinator for deeper tumours.** The deep margin matters most.
- **Elective neck dissection for early oral cancer.** Survival is better than watchful waiting.

CASE SUMMARY

Transoral wide excision of a buccal mucosal carcinoma with neck dissection and specimens oriented by level.

REFERENCES

1. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007
2. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062



24

Floor of mouth to mandible

Carcinoma of the floor of mouth invading the mandible

Composite floor-of-mouth and mandibular resection

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the composite resection of the floor of mouth and mandible and the resulting oral and neck defect.

AUTHOR'S PERSPECTIVE

> Floor-of-mouth tumours reach the lingual cortex of the mandible early. Where the cortex is invaded, a segment of mandible is taken in continuity with the floor of mouth and neck.

APPROACH

Composite resection in continuity with the neck dissection, with the lingual nerve and submandibular duct taken with the specimen where involved.

OPERATIVE STEPS

1. Resect the floor of mouth with the adjacent mandible.
2. Control vessels with multiple haemostats along the resection.
3. Inspect the wide composite field after specimen removal.
4. Plan reconstruction of the oral and neck defect.

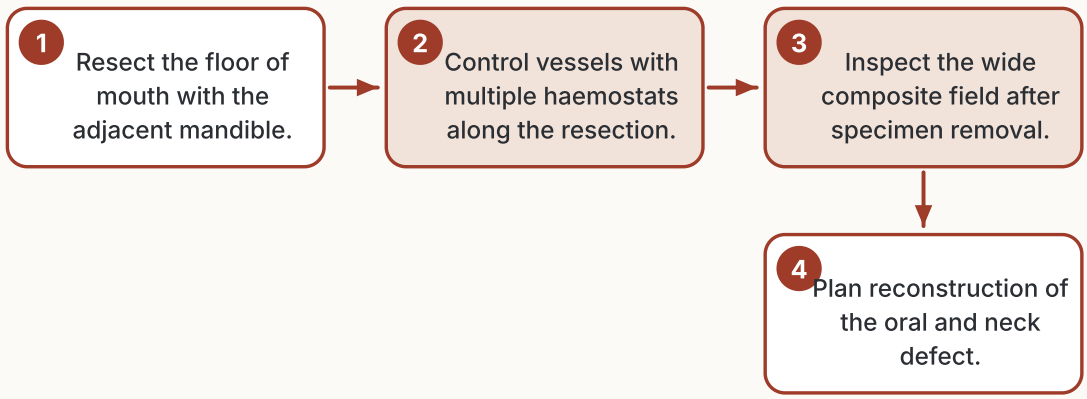
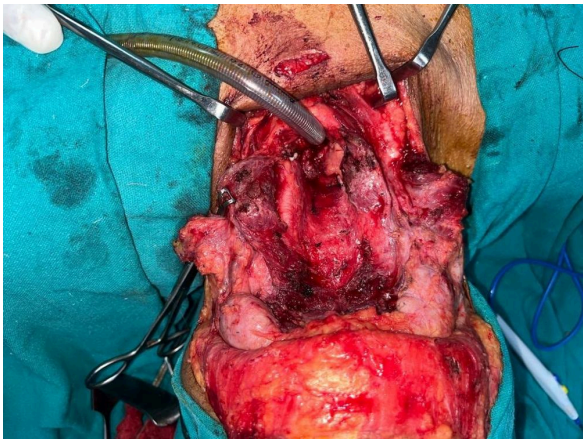


Figure 24.A Operative sequence.

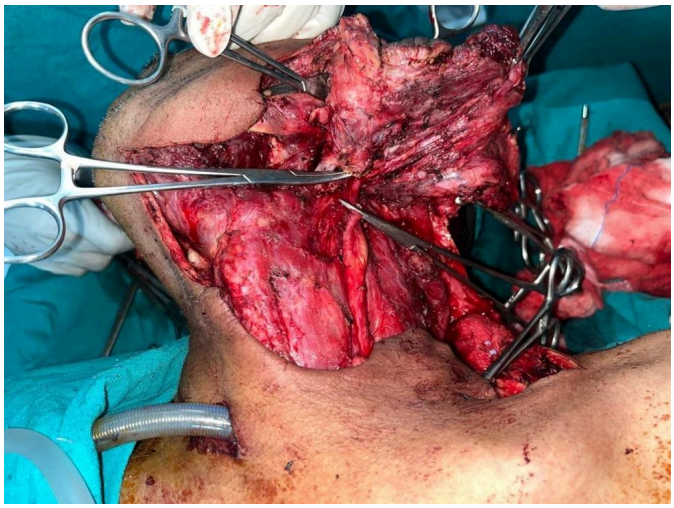
OPERATIVE RECORD



24.1 Composite resection: mandible and floor of mouth with multiple haemostats.



24.2 Composite oral/neck defect with mandible exposed.



24.3 Wide composite resection field (mandible/neck) after specimen removal.

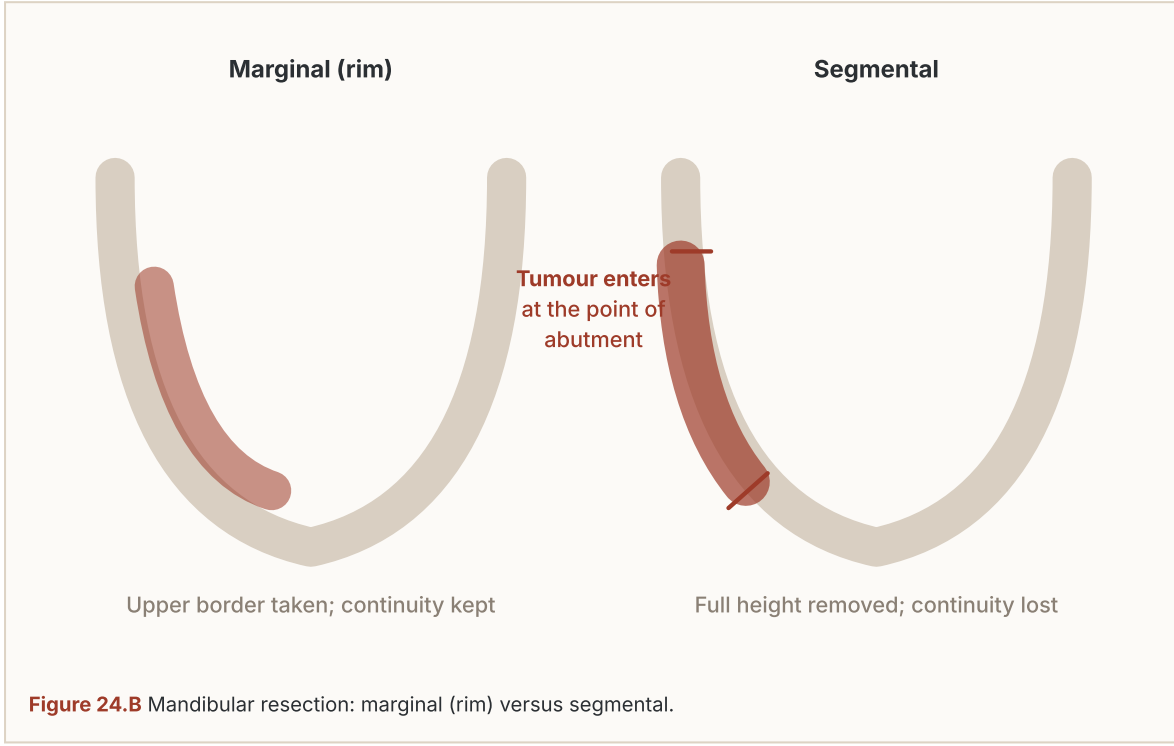


Figure 24.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Mandibular invasion from the lingual side	The mandible was included in continuity.
A through-and-through communication with the neck	The defect was closed with vascularised tissue.

TEACHING POINTS

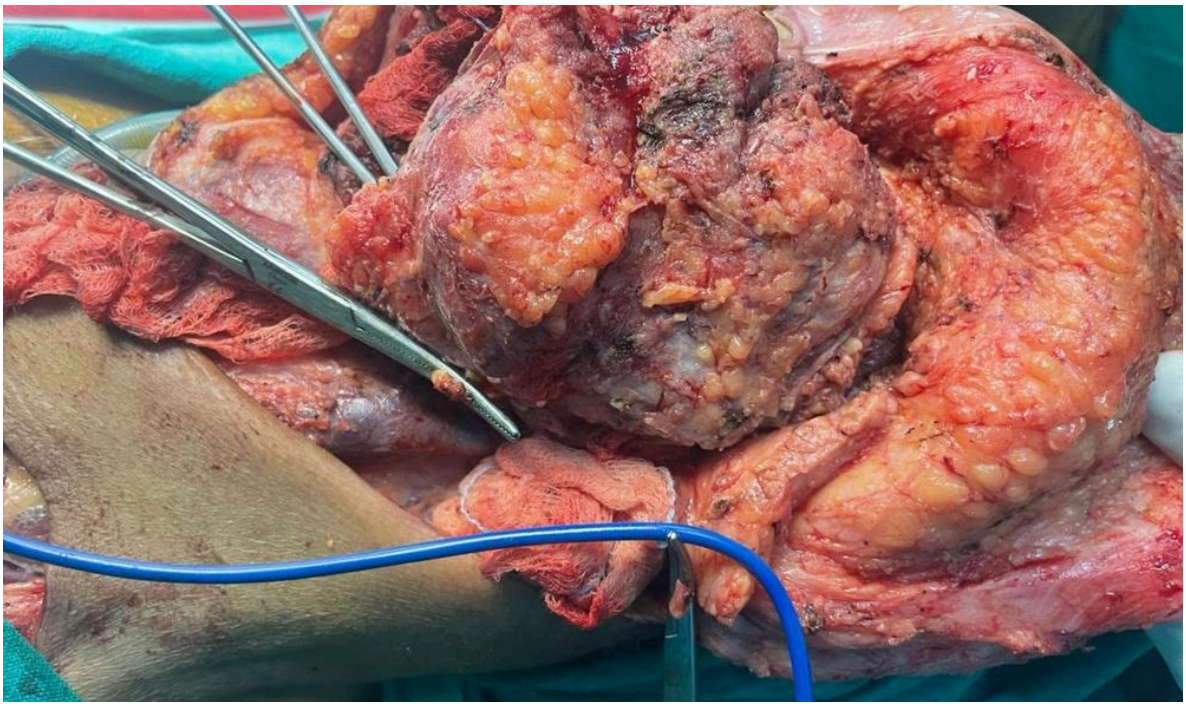
- **Floor-of-mouth tumours abut the lingual cortex.** Imaging and palpation decide rim versus segment.
- **The lingual nerve and Wharton's duct run in the field.** Involved structures go with the specimen.
- **Seal the mouth from the neck.** Salivary contamination of the neck causes infection and fistula.

CASE SUMMARY

Composite resection of floor of mouth and mandible for carcinoma invading the lingual cortex.

REFERENCES

1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062
2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646



25

The cheek flap

Advanced oral carcinoma invading the mandible

Segmental mandibulectomy through a cheek flap

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the cheek flap reflected, the tumour separated from the mandible and the composite specimen with teeth.

AUTHOR'S PERSPECTIVE

> A cheek flap gives wide access to the lateral mandible and buccal space. Once a segment of mandible is removed, the reconstruction must address both bone and soft tissue, or the face and occlusion will collapse.

APPROACH

Lower lip split and cheek flap reflected laterally, segmental mandibulectomy, specimen delivered with the neck.

OPERATIVE STEPS

1. Expose the tumour by reflecting the cheek flap.
2. Separate the tumour from adjacent tissue with haemostats.
3. Perform the segmental mandibulectomy.
4. Deliver the composite specimen with teeth.

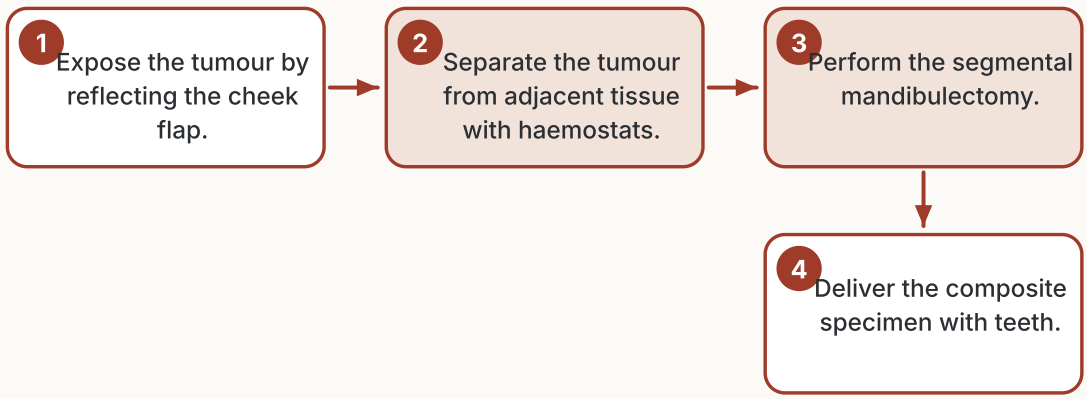
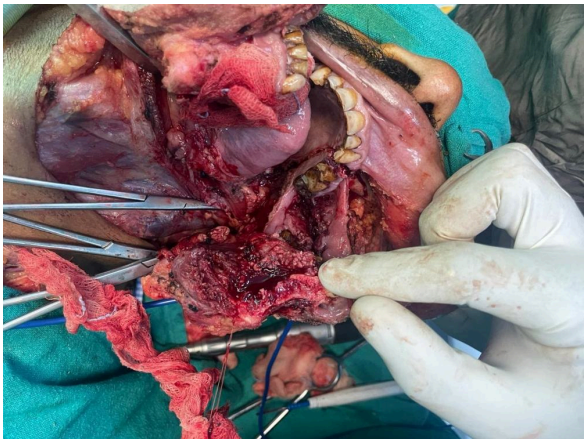
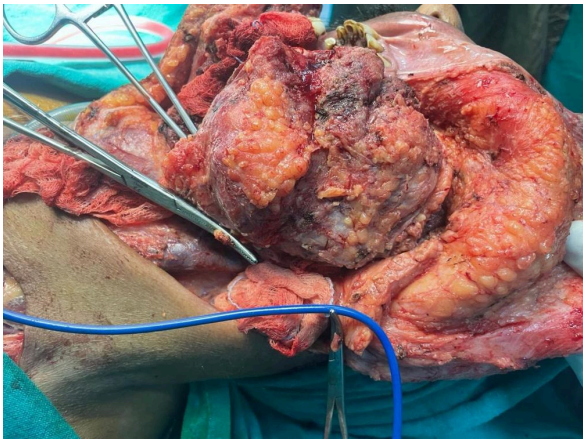


Figure 25.A Operative sequence.

OPERATIVE RECORD



25.1 Cheek flap reflected, mandibular resection with haemostats.



25.2 Large composite oral/cheek tumour exposed with cheek flap.



25.3 Composite resection: tumour separated from mandible with haemostats.



25.4 Composite specimen with teeth (segmental mandibulectomy) held up.

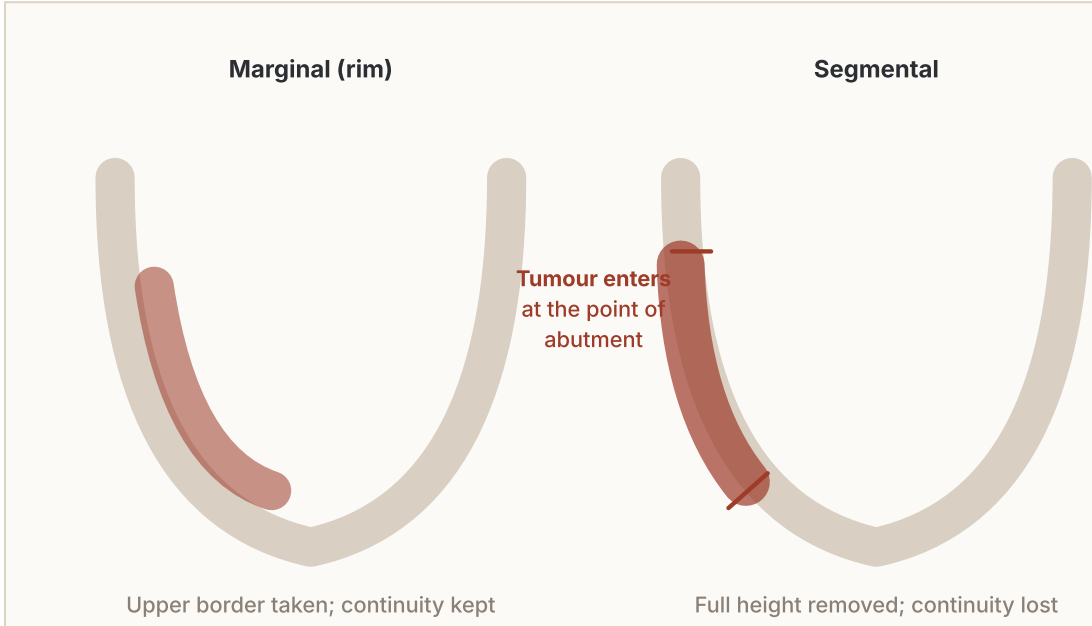


Figure 25.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Access to the posterior body and ramus	A cheek flap gave direct exposure.
Loss of mandibular continuity	Reconstruction options were considered according to the defect.

TEACHING POINTS

- **Lateral segmental defects are tolerated better than anterior ones.** The anterior arch must be reconstructed.
- **Plate alone fails under soft tissue.** It needs well-vascularised cover.
- **Bony reconstruction restores occlusion.** A fibula free flap is the standard where available.

CASE SUMMARY

Segmental mandibulectomy for advanced oral carcinoma through a cheek flap.

REFERENCES

1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



26

The fungating cheek

Oral carcinoma involving the cheek skin and both jaws

Composite cheek, maxillary and mandibular resection

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a large fungating oral and cheek tumour mobilised, the composite resection exposure and the specimen with bone.

AUTHOR'S PERSPECTIVE

> When oral cancer reaches the skin, the skin goes with the specimen. The result is a through-and-through defect, which needs both lining and cover.

APPROACH

Excision of the skin island with the tumour, cheek flap raised around it, resection of involved maxilla and mandible.

OPERATIVE STEPS

1. Mobilise the fungating tumour before excision.
2. Expose the maxillary and mandibular parts of the composite resection under the cheek flap.
3. Excise the tumour with the involved skin and bone.
4. Inspect the composite defect.
5. Deliver the composite specimen.

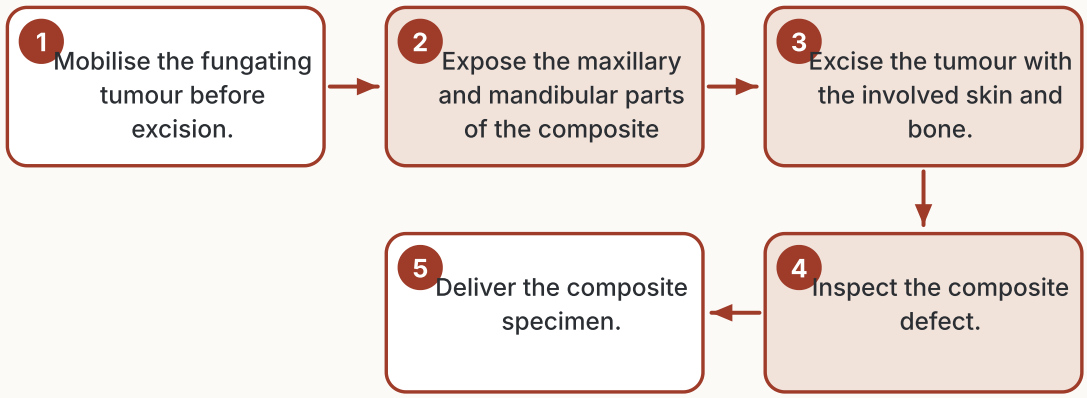


Figure 26.A Operative sequence.

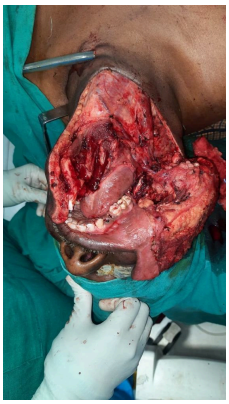
OPERATIVE RECORD



26.1 Large fungating oral/cheek tumour mobilised before excision.



26.2 Cheek flap and maxillary/mandibular composite resection exposure.



26.3 Composite cheek/oral defect after excision, flap retracted.



26.4 Facial flap raised over composite resection (side view).



26.5 Specimen: composite resection with bone.

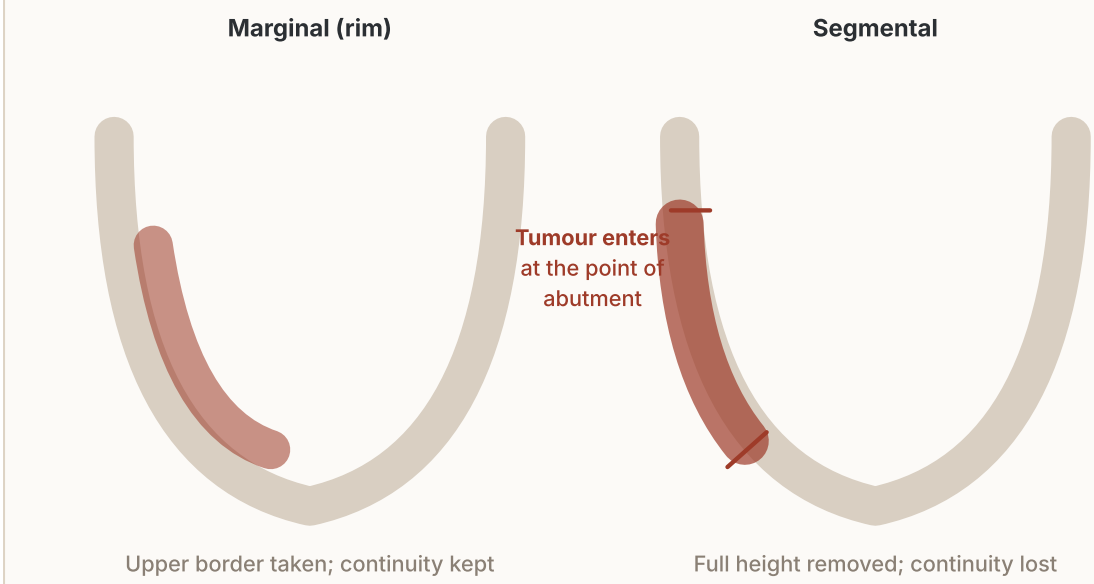


Figure 26.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Skin involvement	The involved skin was excised with the tumour.
A through-and-through defect	Reconstruction for both lining and cover was planned.

TEACHING POINTS

- **Skin involvement means T4 disease.** The skin is resected, not shaved.

- **Two surfaces need reconstruction.** Lining and skin cover.
- **Folded flaps provide both.** A large pectoralis or free flap can be folded.

CASE SUMMARY

Composite resection of a fungating oral carcinoma involving cheek skin, maxilla and mandible.

REFERENCES

1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



27

Two nasolabial flaps for one floor of mouth

Carcinoma of the anterior floor of mouth and mandibular alveolus

Anterior segmental mandibulectomy with bilateral nasolabial flaps

PART II · ORAL CAVITY Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the anterior floor-of-mouth and alveolar carcinoma, the specimen of the anterior mandible with teeth, and bilateral nasolabial flaps outlined and raised.

AUTHOR'S PERSPECTIVE

> Anterior floor-of-mouth tumours often invade the anterior mandible. The anterior floor of mouth is then reconstructed with flaps from both sides, so that the tongue is not tethered.

APPROACH

Anterior segmental mandibulectomy, with bilateral inferiorly based nasolabial flaps tunnelled into the floor of mouth.

OPERATIVE STEPS

1. Expose the anterior floor-of-mouth and alveolar carcinoma.
2. Resect the anterior mandible with the tumour.
3. Mark the nasolabial flaps on both cheeks.
4. Raise both flaps and tunnel them into the anterior floor of mouth.
5. Inset the flaps to re-line the floor of mouth.

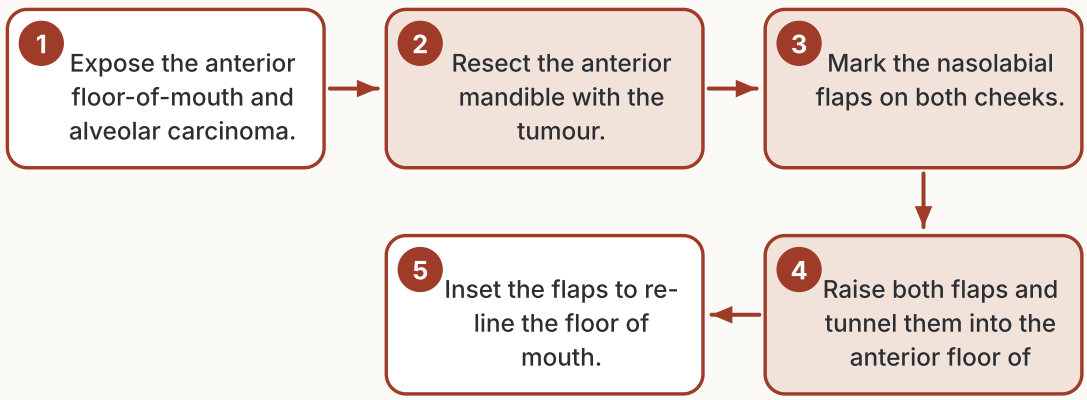


Figure 27.A Operative sequence.

OPERATIVE RECORD



27.1 Anterior floor-of-mouth/alveolar lesion, mouth retracted under GA.



27.2 Oral lesion exposed with cheek retractors, lateral view.



27.3 Anterior mandibular alveolus/floor of mouth carcinoma exposed with retractors.



27.4 Nasolabial flap outlined on cheek.



27.5 Bilateral nasolabial flaps raised for anterior floor-of-mouth defect.



27.6 Specimen: segmental anterior mandible with teeth and tumour.

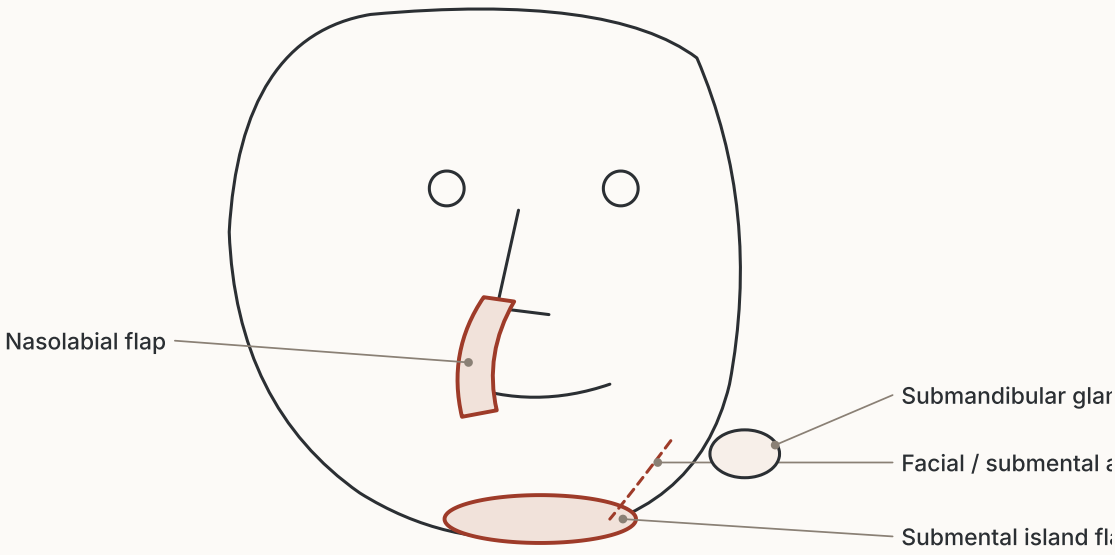


Figure 27.B Local and regional flaps for the oral cavity.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Loss of the anterior arch	Reconstruction was planned to prevent collapse of the chin.
Tethering of the tongue	The floor of mouth was re-lined with skin from both cheeks.

TEACHING POINTS

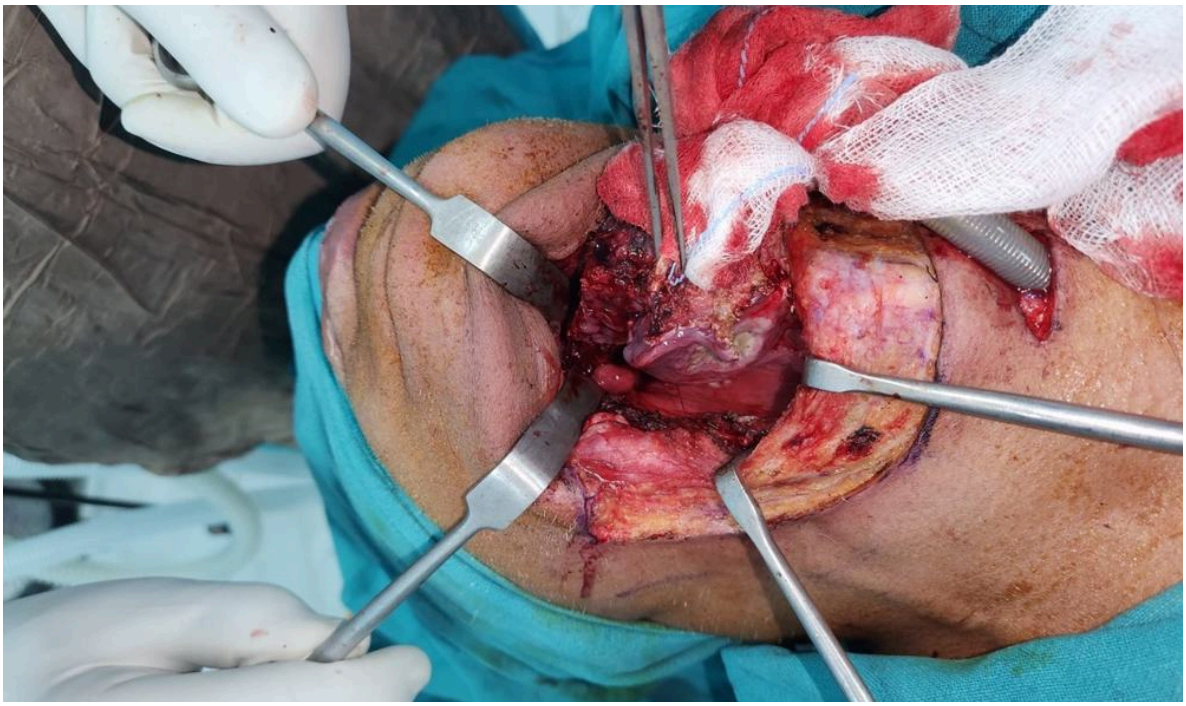
- **The anterior arch must be restored.** Otherwise the chin collapses.
- **Bilateral nasolabial flaps re-line the anterior floor.** Without tethering the tongue.
- **Protect the airway.** Loss of anterior support affects the tongue base.

CASE SUMMARY

Anterior segmental mandibulectomy for anterior floor-of-mouth carcinoma with bilateral nasolabial flap reconstruction.

REFERENCES

1. Maglitto F, Scocca V, Salzano G, et al. Nasolabial flap in oncologic oral cavity reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2026. doi:10.1002/lary.70910
2. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062



28

The mandibular swing

Oral cavity and oropharyngeal carcinoma

Lip-split paramedian mandibulotomy

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the lip-split mandibulotomy with the mandible swung laterally, exposing the tongue and floor of mouth, together with the neck dissection.

AUTHOR'S PERSPECTIVE

> Tumours of the posterior tongue, floor of mouth and oropharynx are difficult to see through the mouth. A paramedian mandibulotomy swings the mandible aside without removing it, giving wide access while preserving bone.

APPROACH

Lower lip split, paramedian osteotomy between the lateral incisor and canine, plates applied before the cut, and lateral swing of the hemimandible.

OPERATIVE STEPS

1. Raise the neck incision and flaps.
2. Split the lower lip and expose the anterior mandible.
3. Pre-plate and cut a paramedian osteotomy; swing the mandible laterally.
4. Expose and resect the tongue and floor-of-mouth tumour.
5. Complete the neck dissection; lay out the specimens.

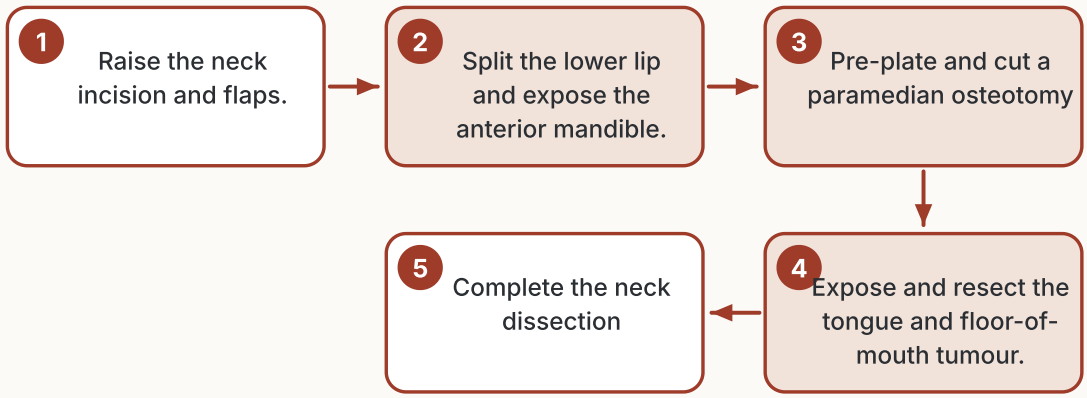
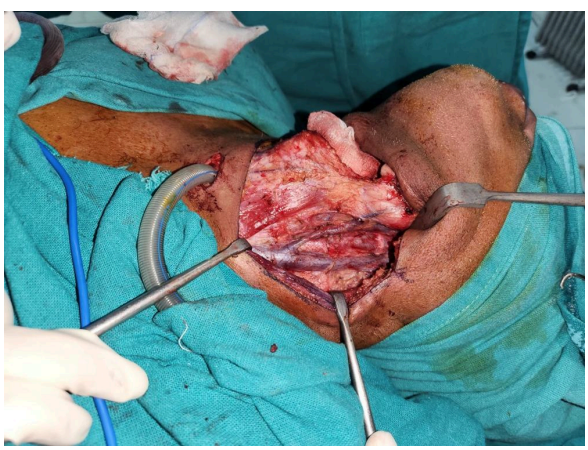
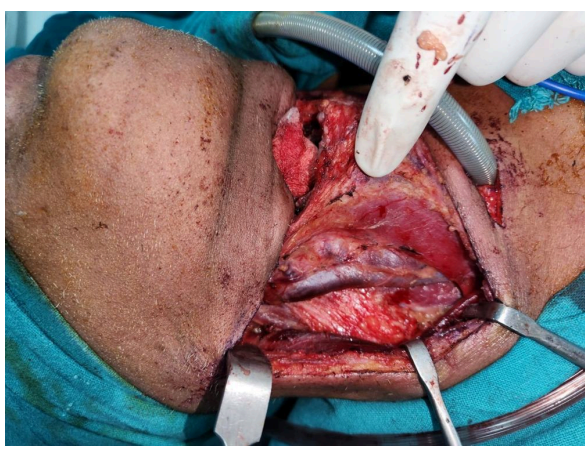


Figure 28.A Operative sequence.

OPERATIVE RECORD



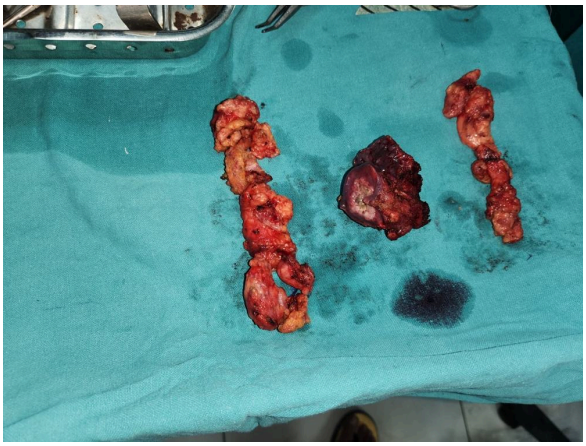
28.1 Neck/submandibular incision with flap and retractors.



28.2 Neck dissection field with retractors, SCM and vessels.



28.3 Mandibulotomy swing with tongue/floor-of-mouth exposure.



28.4 Specimens: neck dissection strips and primary tumour on drape.

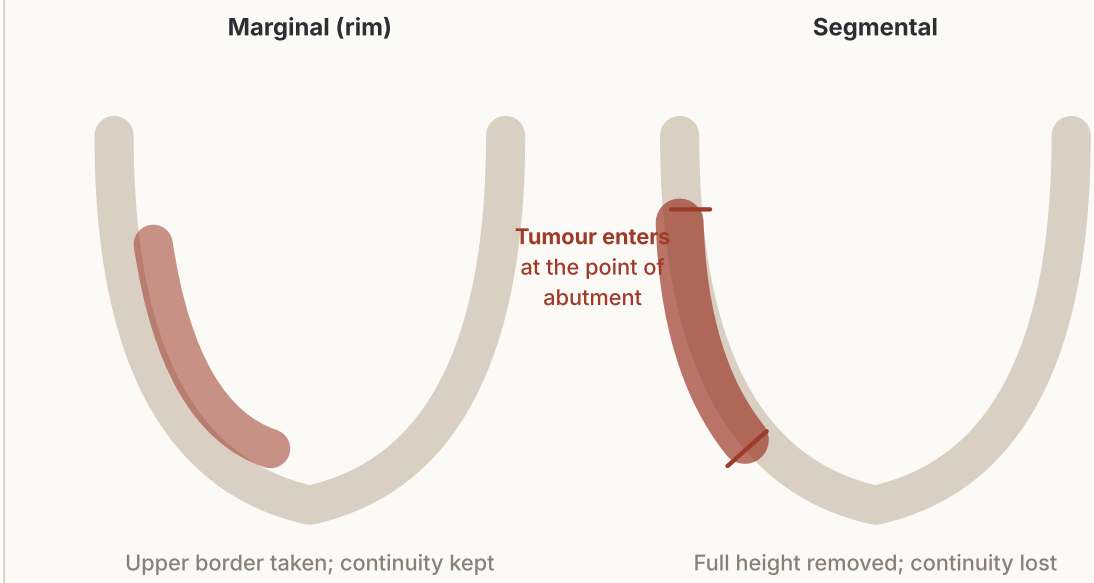


Figure 28.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Restoring occlusion after the osteotomy	Plates were contoured and drilled before the cut.
Mental nerve	A paramedian rather than lateral osteotomy preserves the inferior alveolar nerve.

TEACHING POINTS

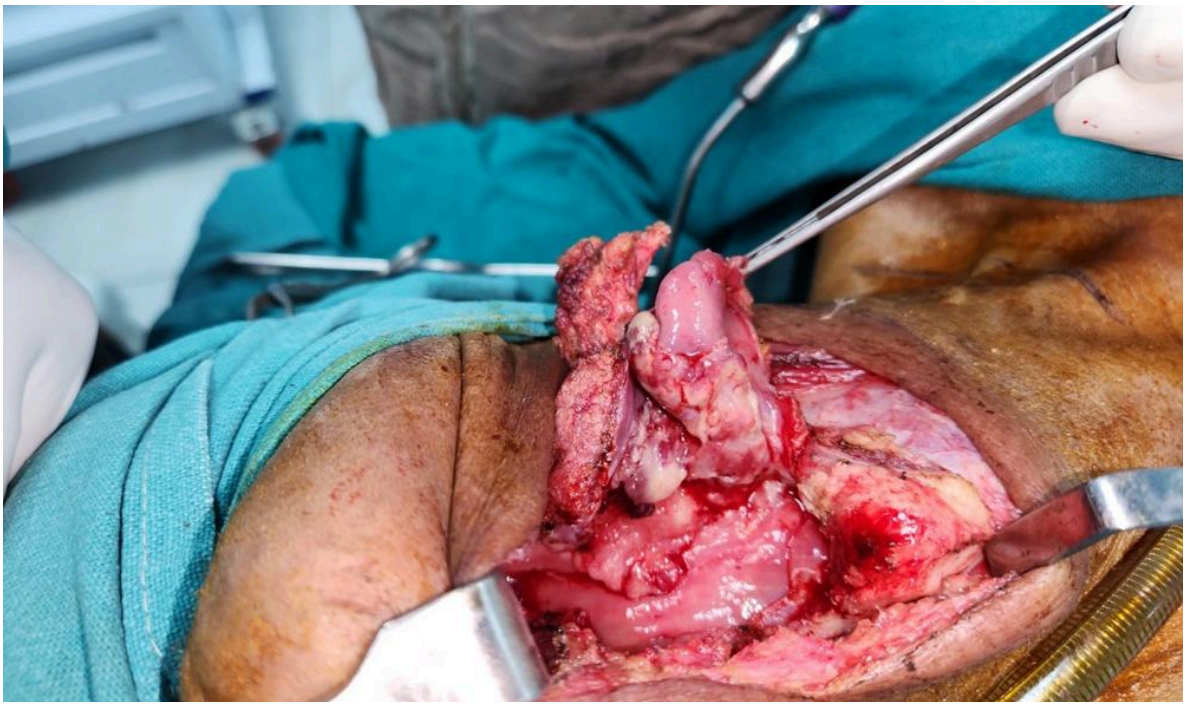
- **Paramedian, not midline or lateral.** Between lateral incisor and canine, avoiding tooth roots and the mental nerve.
- **Pre-plate before cutting.** Accurate reduction restores occlusion.
- **A step cut adds stability.** Useful where radiation is planned.

CASE SUMMARY

Lip-split paramedian mandibulotomy for access to tongue and floor-of-mouth carcinoma with neck dissection.

REFERENCES

1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062



29

Pulled through

Carcinoma of the tongue and floor of mouth

Pull-through composite resection

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the tongue and floor of mouth delivered into the neck and the composite specimen.

AUTHOR'S PERSPECTIVE

> The pull-through technique delivers the tongue and floor of mouth down into the neck once the floor of mouth has been released from the mandible, avoiding both a lip split and a mandibulotomy.

APPROACH

The floor of mouth is released along the lingual surface of the mandible and the specimen is delivered into the neck with the neck dissection.

OPERATIVE STEPS

1. Release the floor of mouth from the inner table of the mandible.
2. Deliver the tongue and floor of mouth into the neck.
3. Excise the tumour with diathermy under direct vision.
4. Deliver the composite tongue and floor-of-mouth specimen.

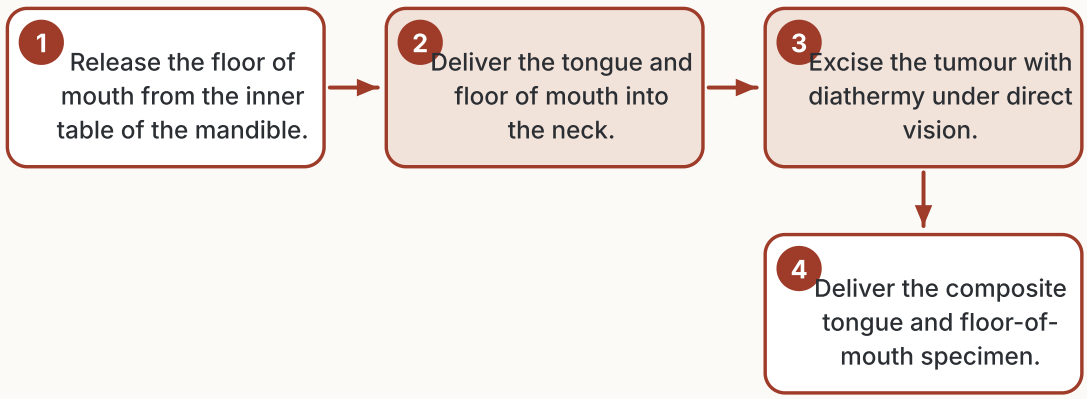
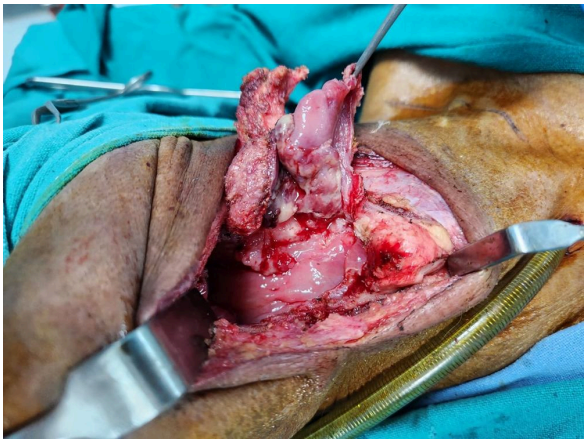
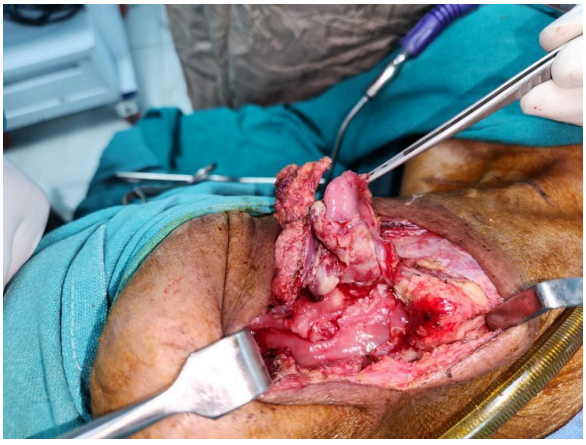


Figure 29.A Operative sequence.

OPERATIVE RECORD



29.1 Pull-through/composite oral resection: tongue/floor of mouth delivered into neck.



29.2 Composite oral tumour delivered with diathermy dissection.



29.3 Specimen: composite tongue/floor-of-mouth resection.

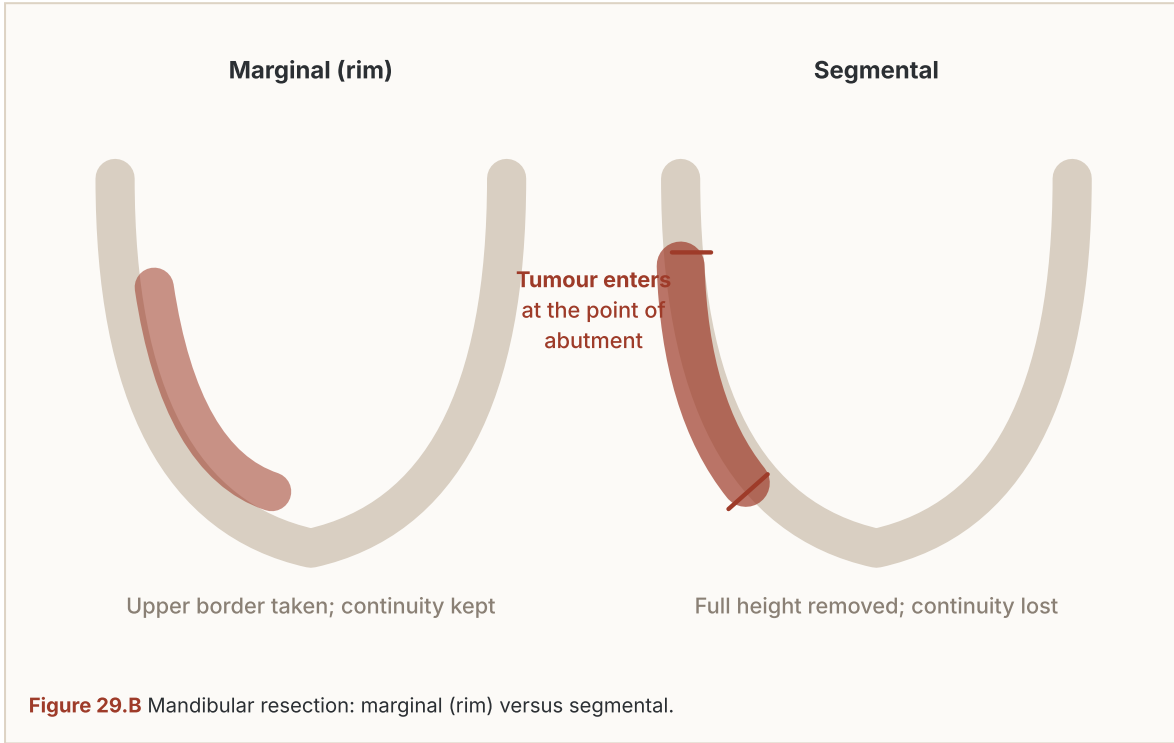


Figure 29.B Mandibular resection: marginal (rim) versus segmental.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Exposure without a lip split	The pull-through gave access from below.
Margin at the lingual mandible	Pull-through is used only where the mandible is not involved.

TEACHING POINTS

- **Pull-through needs a free mandible.** Tumour abutting bone needs rim or segmental resection.
- **Watch the lingual and hypoglossal nerves.** They run beneath the floor of mouth.
- **Reconstruct the floor of mouth.** To prevent tethering and fistula into the neck.

CASE SUMMARY

Pull-through resection of tongue and floor-of-mouth carcinoma without lip split or mandibulotomy.

REFERENCES

1. Brown JS, Lowe D, Kalavrezos N, et al. Patterns of invasion and routes of tumor entry into the mandible by oral squamous cell carcinoma. *Head Neck* 2002;24:370–83. doi:10.1002/hed.10062
2. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007



30

A forearm for the cheek

Through-and-through defect of the cheek after excision

Radial forearm free flap reconstruction

PART II · ORAL CAVITY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the through-and-through cheek defect communicating with the oral cavity, the forearm donor site after flap harvest, and the reconstructed face.

AUTHOR'S PERSPECTIVE

> A through-and-through cheek defect needs thin, pliable lining. The radial forearm free flap can be folded to supply both the lining and the cover from a single skin paddle.

APPROACH

Radial forearm free flap raised on the radial artery and venae comitantes, anastomosed to the facial vessels in the neck.

OPERATIVE STEPS

1. Define the through-and-through defect.
2. Raise the radial forearm flap after confirming hand perfusion.
3. Inset the flap to restore lining and cover.
4. Close or graft the forearm donor site.

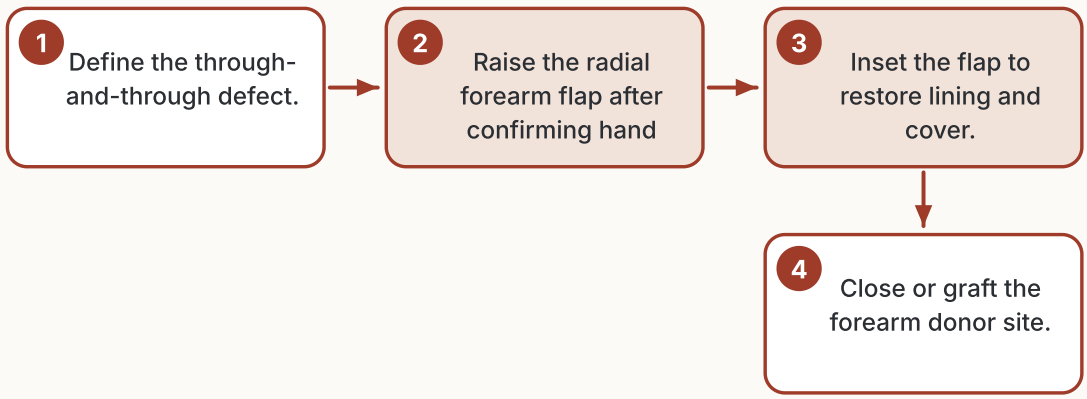


Figure 30.A Operative sequence.

OPERATIVE RECORD



30.1 Through-and-through cheek defect communicating with oral cavity.



30.2 Forearm donor site: raw area after radial forearm flap harvest.



30.3 Postoperative face with flap reconstruction and sutures.



30.4 Postop face/scalp with flap reconstruction sutured.

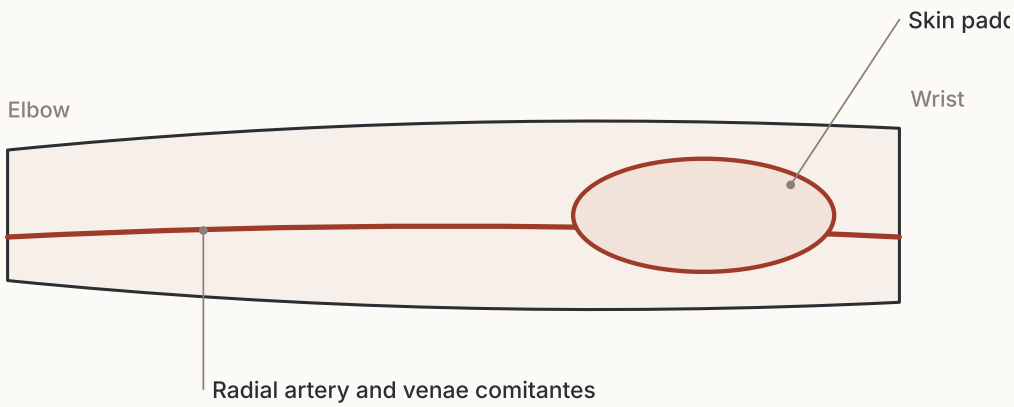


Figure 30.B Radial forearm free flap.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Two surfaces to restore	The flap was folded to line the mouth and cover the cheek.
Hand perfusion after radial artery harvest	An Allen test confirmed ulnar supply before harvest.

TEACHING POINTS

- **Check ulnar supply before harvest.** The Allen test is mandatory.
- **Thin and pliable.** Ideal for intraoral lining.
- **A folded flap gives lining and cover.** De-epithelialise the fold.

CASE SUMMARY

Radial forearm free flap reconstruction of a through-and-through cheek defect.

REFERENCES

1. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z

PART III

The neck

Nodes against the carotid and inside the jugular vein, leaks at the root of the neck, and the anatomy beneath it all.

31 Finding the carotid first

32 Keeping the vein open

33 Milk in the wound

34 A neck, slowly

35 Skeletonising the carotid

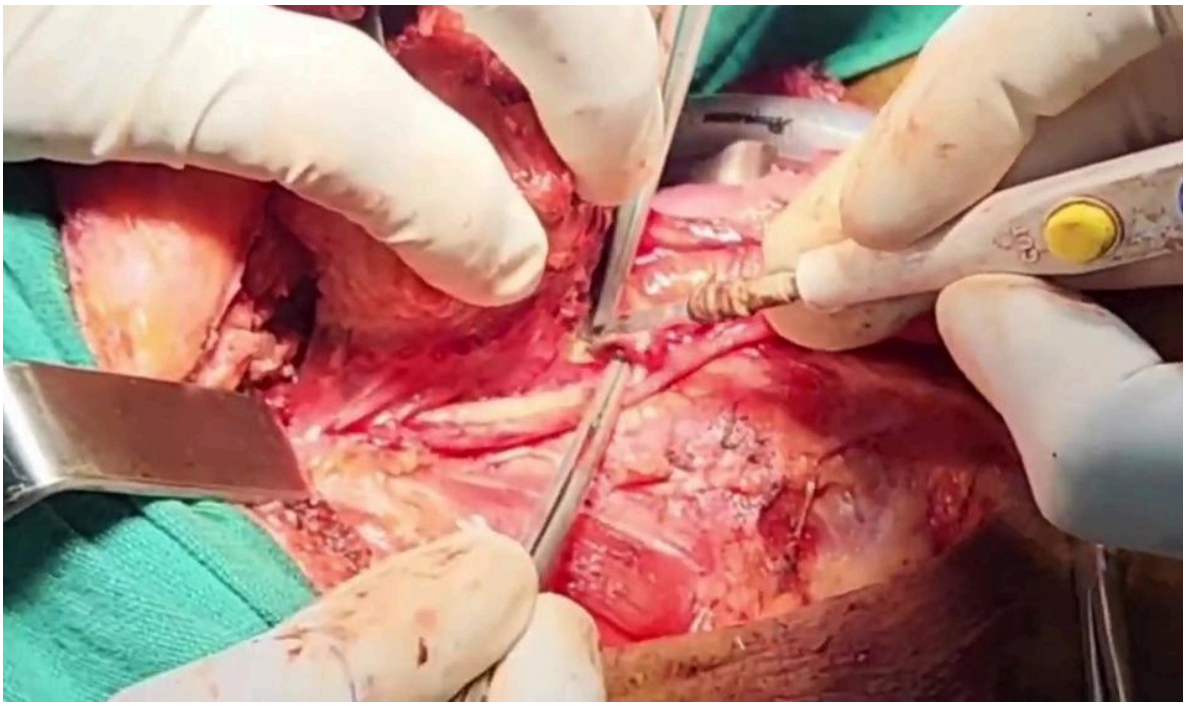
36 Peeling the fascia

37 The node that broke through the skin

38 The lobulated neck mass

39 The parapharyngeal mass

40 Nerves of the upper neck



31

Finding the carotid first

Metastatic nodal disease fixed towards the carotid sheath

Radical neck dissection with early delineation of the carotid artery

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A nodal mass in the lateral neck lay over the carotid sheath.

AUTHOR'S PERSPECTIVE

> When a node sits on the carotid, the safest dissection is the one that finds the common carotid below the disease and follows it upward. The artery is then never a surprise, and the decision on whether the node can be separated from the vessel is made with control already obtained.

APPROACH

Radical neck dissection beginning low in the neck, opening the carotid sheath below the disease and tracing the artery to the bifurcation.

OPERATIVE STEPS

1. Raise flaps and expose the nodal mass.
2. Open the carotid sheath below the disease.
3. Trace the common carotid artery upwards.
4. Dissect the nodal mass off the carotid wall in the subadventitial plane.
5. Free the specimen at the bifurcation and level II.
6. Deliver the specimen and inspect the bed.

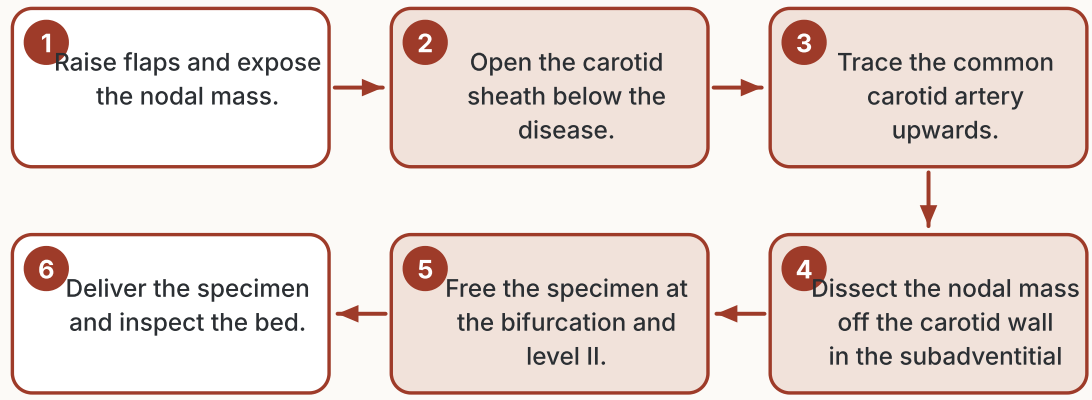
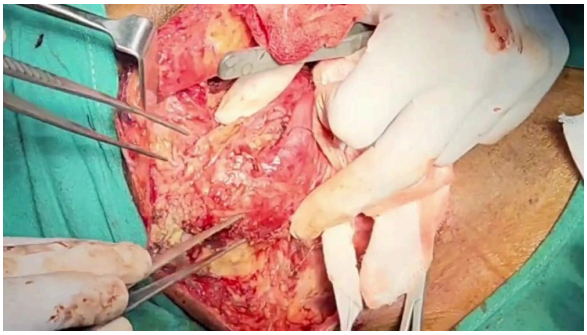
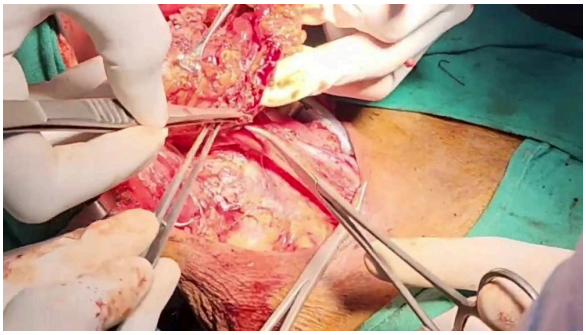


Figure 31.A Operative sequence.

OPERATIVE RECORD



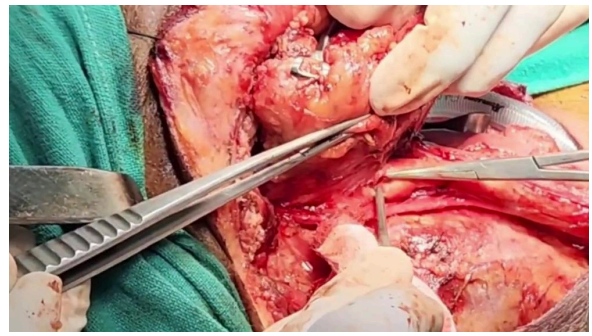
31.1 Flaps raised; the nodal mass in the lateral neck. Video 1:22



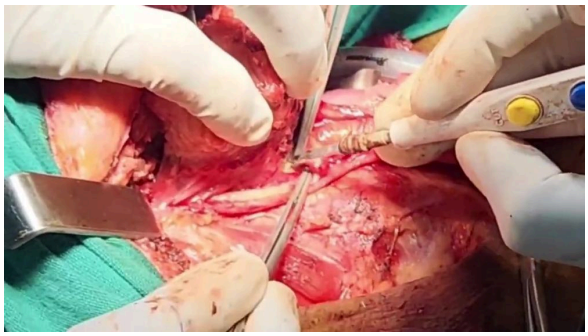
31.2 Lower neck: the carotid sheath opened below the disease. Video 3:21



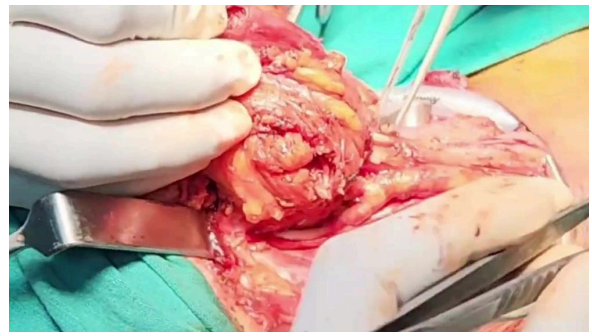
31.3 Common carotid traced upward along its length. Video 4:32



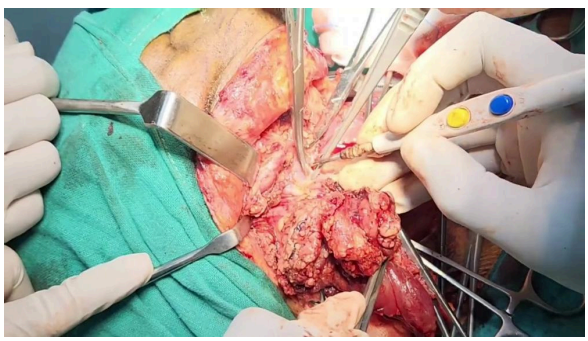
31.4 Nodal mass dissected off the carotid wall. Video 4:56



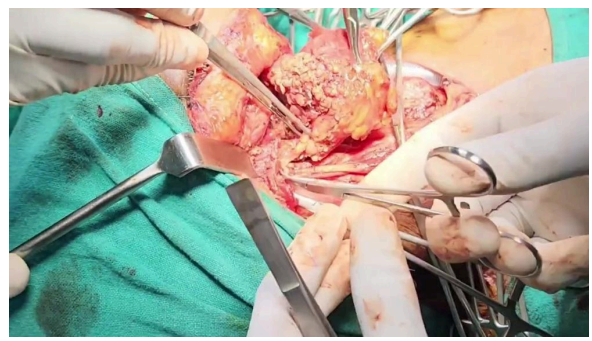
31.5 The carotid delineated beneath the mass. Video 5:43



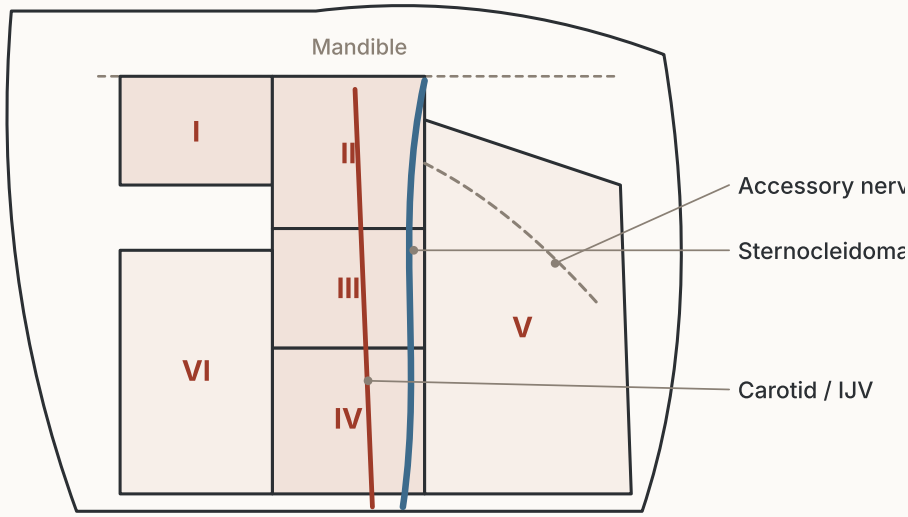
31.6 The specimen lifted away from the bifurcation. Video 6:07



31.7 Upper neck: the specimen freed at level II. Video 7:42



31.8 The neck after delivery of the specimen. Video 8:53



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 31.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Uncertain relation of the node to the artery	Proximal control was obtained before the node was approached.
Bleeding from the carotid wall	Dissection stayed outside the adventitia unless invasion was confirmed.

TEACHING POINTS

- **Proximal control first.** Find the common carotid below the disease.
- **Name the dissection by what is preserved.** The consensus classification avoids ambiguity.
- **Extranodal extension calls for chemoradiation.** Postoperative cisplatin improves locoregional control.

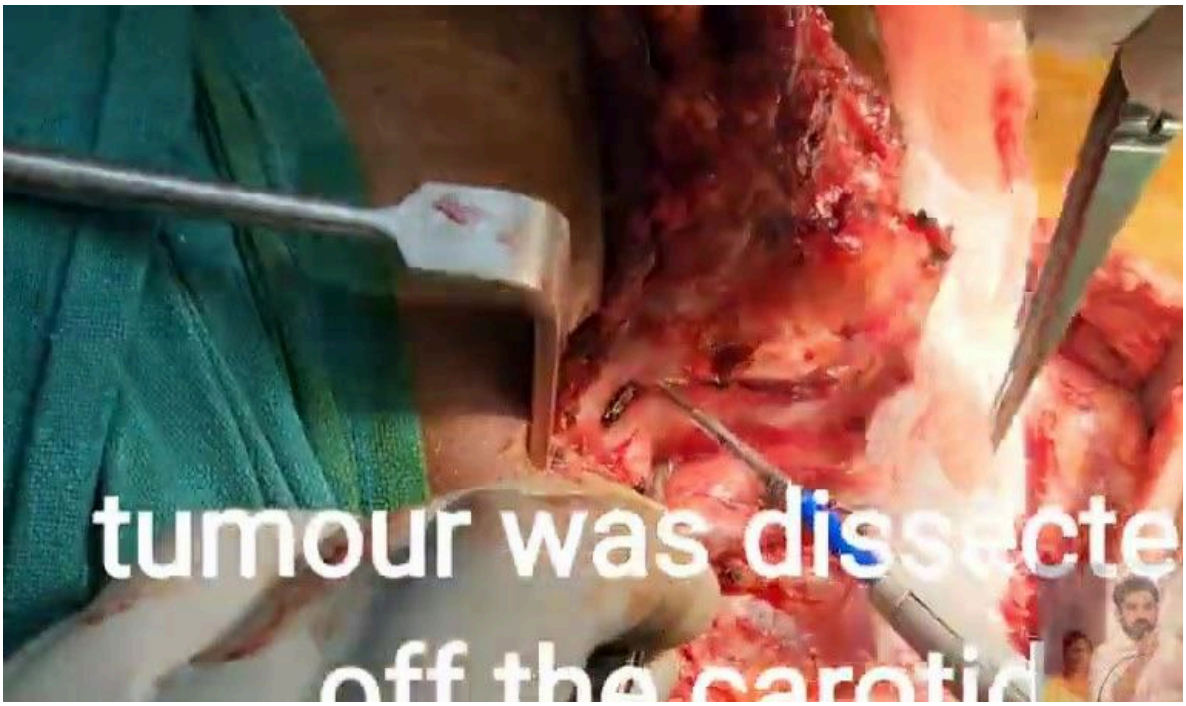
CASE SUMMARY

Radical neck dissection with early delineation of the carotid artery for a node fixed towards the carotid sheath.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536

2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646



32

Keeping the vein open

Nodal mass invading the medial wall of the internal jugular vein

Neck dissection with sleeve resection and reconstruction of the internal jugular vein

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A nodal mass invaded the medial wall of the internal jugular vein without encircling it, and was adherent to the carotid and submandibular gland.

AUTHOR'S PERSPECTIVE

> Ligating the vein would have been simpler, but preserving one internal jugular vein matters if the other side is ever dissected. The invaded wall was taken with the tumour and the remaining vein closed as a conduit, maintaining flow.

APPROACH

Neck dissection with isolation of the internal jugular vein above and below the mass, sleeve excision of the invaded wall and lateral venorrhaphy.

OPERATIVE STEPS

1. Expose the nodal mass beneath the sternocleidomastoid.
2. Dissect the internal jugular vein above and below the mass.
3. Identify the invaded medial wall.
4. Excise the invaded wall with the tumour.
5. Dissect the tumour off the carotid and the submandibular gland.
6. Reconstruct the vein as a conduit and confirm flow.

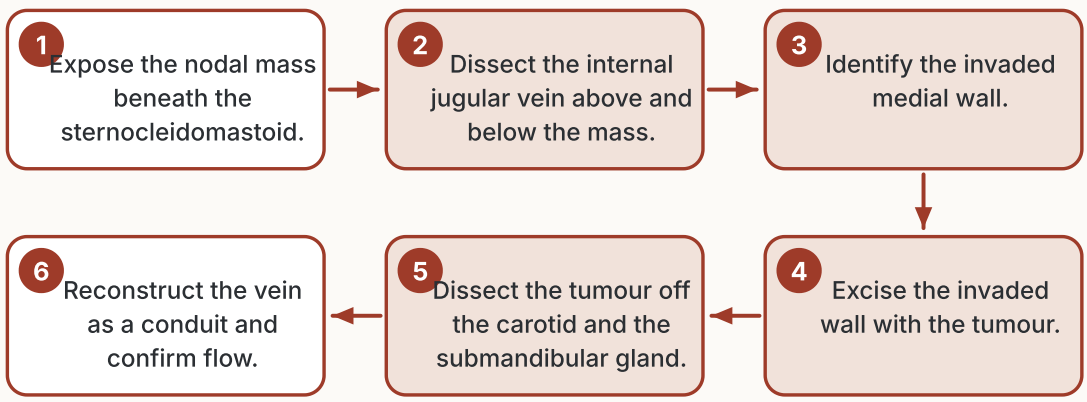
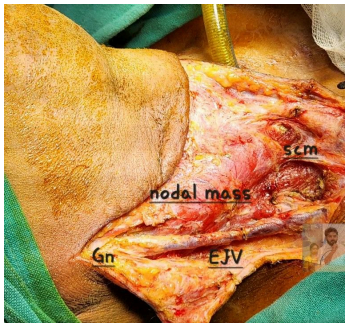
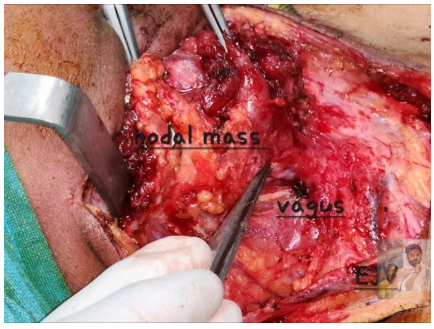


Figure 32.A Operative sequence.

OPERATIVE RECORD



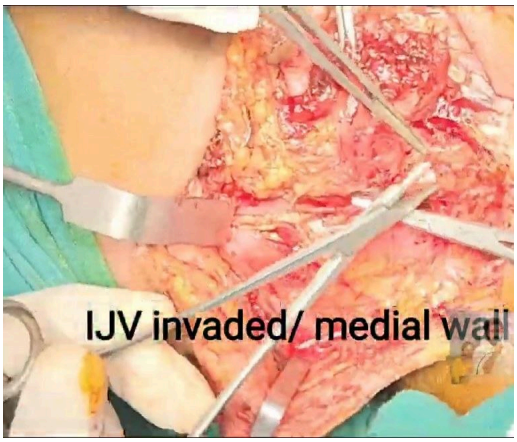
32.1 Nodal mass beneath SCM; EJV and greater auricular nerve labelled. Video 0:05



32.2 Nodal mass on the vagus. Video 0:15



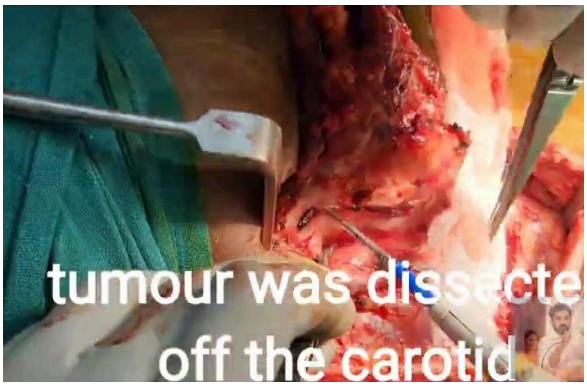
32.3 "Dissection of IJV." Video 0:25



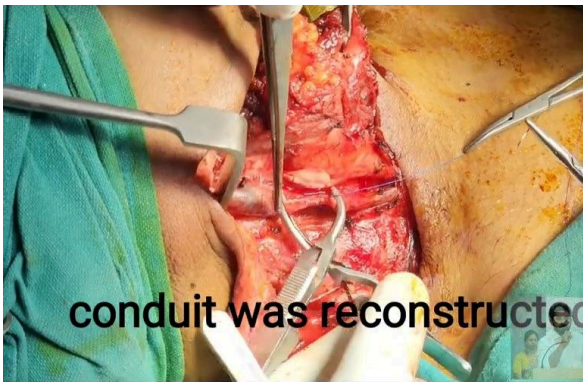
32.4 “IJV invaded: medial wall.” Video 0:35



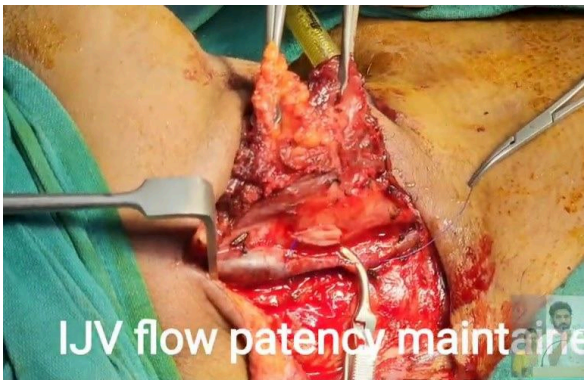
32.5 “Invaded wall of IJV left behind with tumour.” Video 2:05



32.6 “Tumour was dissected off the carotid.” Video 2:15



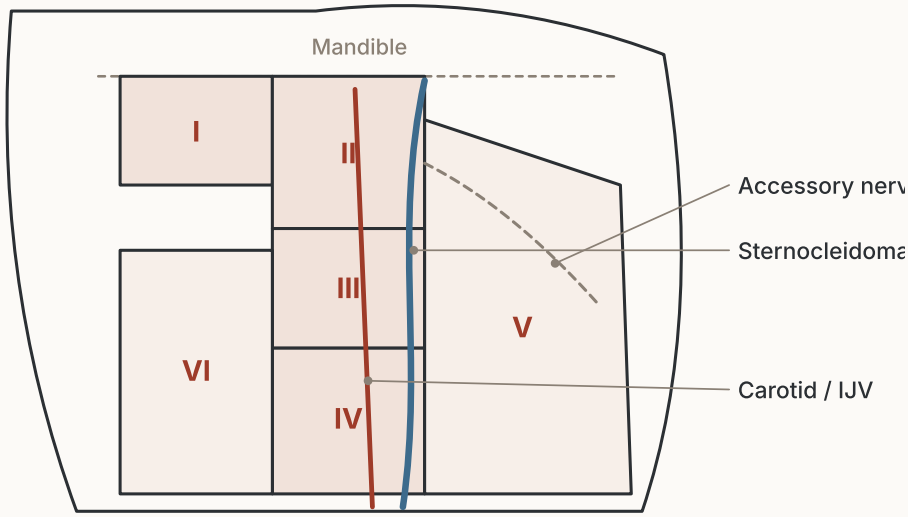
32.7 “Conduit was reconstructed.” Video 1:15



32.8 “IJV flow patency maintained.” Video 1:55



32.9 “Nodal mass dissected off the SMG.” Video 2:55



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 32.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Partial vein invasion	Only the invaded wall was excised and the vein reconstructed.
Narrowing of the reconstructed vein	Closure was planned to preserve more than half of the lumen.

TEACHING POINTS

- **Preserve at least one internal jugular vein.** Bilateral sacrifice risks facial oedema and raised intracranial pressure.
- **Resect only the invaded wall.** Circumferential involvement needs ligation.
- **Check flow after repair.** A thrombosed repair offers no advantage.

CASE SUMMARY

Neck dissection with sleeve resection of the internal jugular vein wall and reconstruction, with flow preserved.

REFERENCES

1. Paka Lubamba G, Hua Y, Bao M, et al. Variant of internal jugular vein reconstruction in bilateral radical neck dissection. *Oral Oncol* 2024;159:107015. doi:10.1016/j.oraloncology.2024.107015
2. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536



33

Milk in the wound

Chyle leak during neck dissection: two patients

Intraoperative recognition and repair of chyle leak

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Two leaks were recognised during surgery: one after laryngectomy with left neck dissection, one during supraclavicular nodal dissection, where chyle mixed with venous blood.

AUTHOR'S PERSPECTIVE

> A chyle leak found during surgery can be repaired in minutes; one found after surgery can take weeks. Both patients were tested before closure, and the leaks were repaired with sutures and muscle cover.

APPROACH

Valsalva and head-down tilt to reveal the leak, then suture ligation of the duct branches and muscle cover.

OPERATIVE STEPS

1. Complete the laryngectomy and inspect the root of the neck.
2. Identify the chyle leak on the left side.
3. Repair the leak with sutures.
4. In the second patient, identify chyle with venous blood at the root of the neck.
5. Repair with a running suture technique.
6. Confirm a dry field.

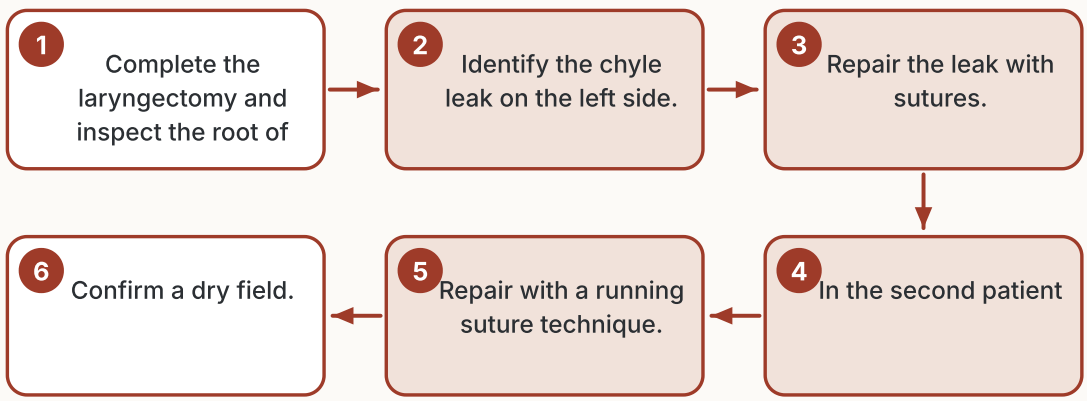
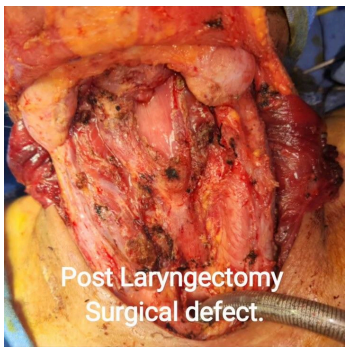


Figure 33.A Operative sequence.

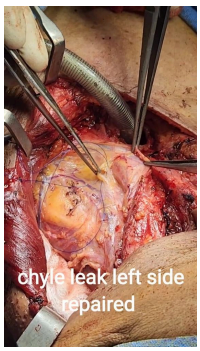
OPERATIVE RECORD



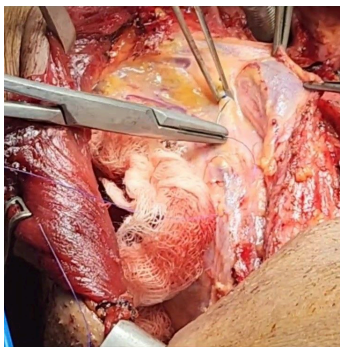
33.1 "Laryngectomy specimen." Video 0:07



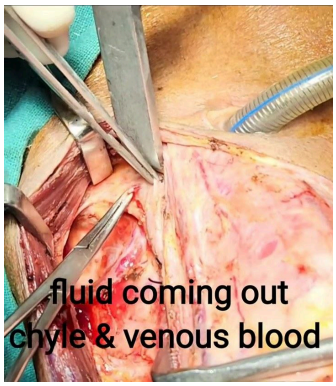
33.2 "Post-laryngectomy surgical defect." Video 0:18



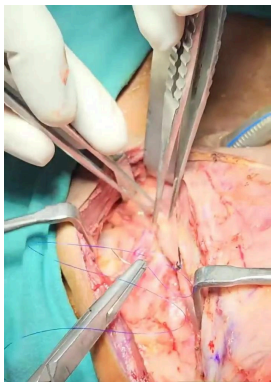
33.3 "Chyle leak left side repaired." Video 0:23



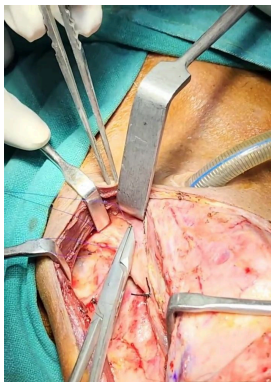
33.4 The repair under a muscle flap. Video 0:54



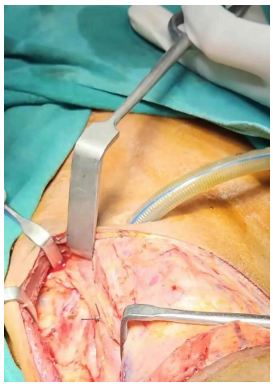
33.5 "Fluid coming out: chyle and venous blood." Video 0:07



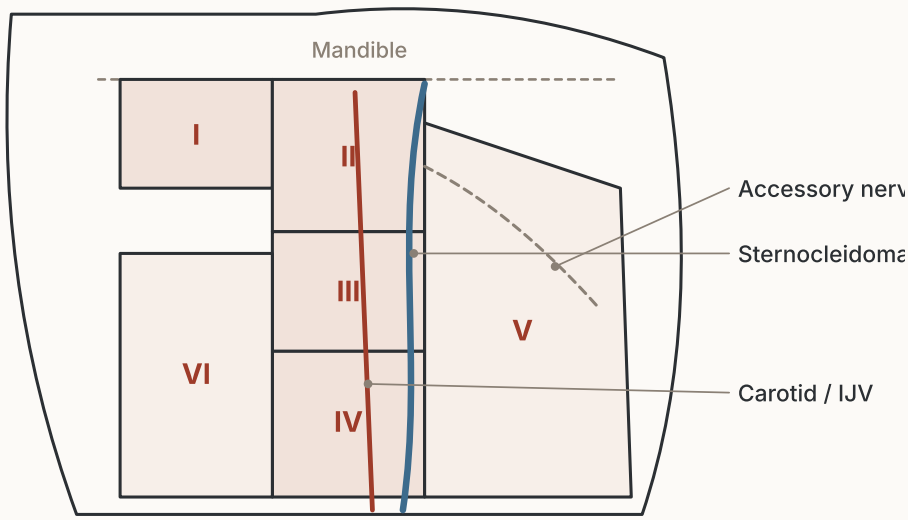
33.6 "Running suture technique repair." Video 0:18



33.7 Repair completed at the root of the neck. Video 0:33



33.8 Dry field after repair. Video 0:59



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 33.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Leak hidden by venous blood	Valsalva separated chyle from blood.
Fragile duct tissue	Sutures were placed through surrounding tissue and covered with muscle.

TEACHING POINTS

- **Look before you close.** Valsalva and Trendelenburg reveal a leak.

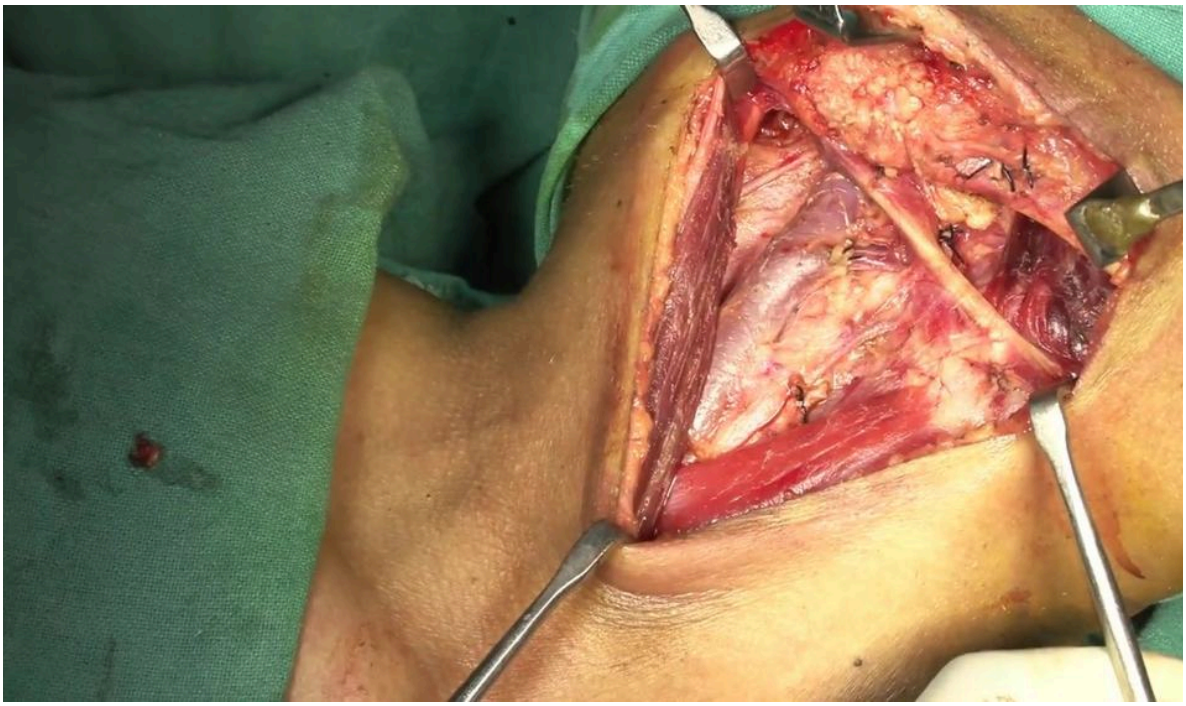
- **Repair with fine non-absorbable sutures.** And cover with muscle.
- **Postoperative leaks are treated in steps.** Diet, octreotide, and re-exploration for high output.

CASE SUMMARY

Intraoperative recognition and suture repair of chyle leaks in two neck dissections.

REFERENCES

1. Deshmukh R, Kulkarni P, Bhutekar U, et al. Management of chyle leak in right side neck dissection: a rare case and review of literature. *Pan Afr Med J* 2021;40:209. doi:10.11604/pamj.2021.40.209.30496
2. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536



34

A neck, slowly

Selective neck dissection, recorded in full for teaching

Anatomical selective neck dissection

PART III · THE NECK Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This recording is a complete selective neck dissection, filmed for teaching at a mid-term HAOICON meeting.

AUTHOR'S PERSPECTIVE

> The neck is the common ground of every operation in this book. Recording an entire dissection without cuts shows the fascial planes and the order in which structures appear, which is what a trainee needs to learn.

APPROACH

Fascial dissection from the sternocleidomastoid towards the jugular chain, level by level.

OPERATIVE STEPS

1. Open the fascial planes at levels II and III.
2. Clear along the jugular chain.
3. Dissect level IV and the lower jugular chain.
4. Complete the dissection and inspect the cleared neck.

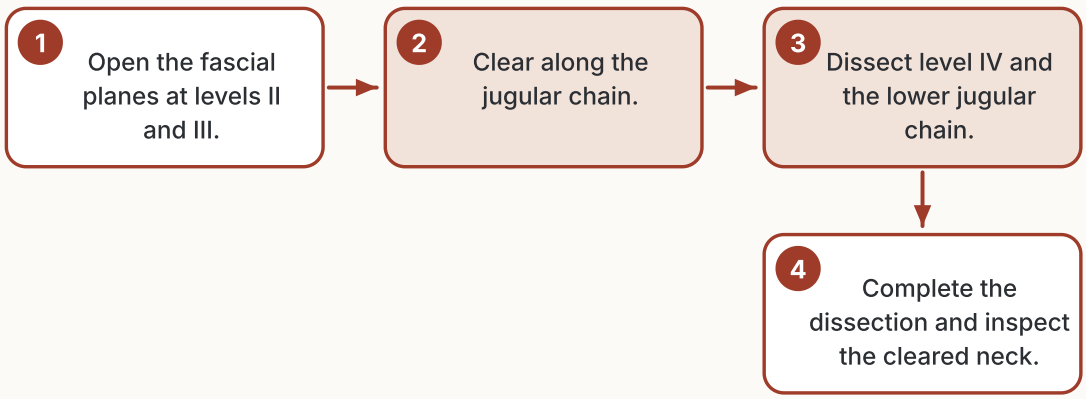
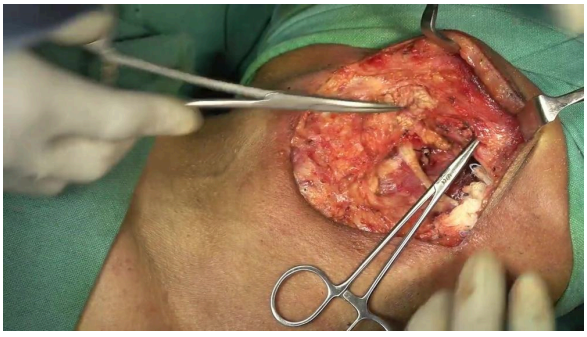
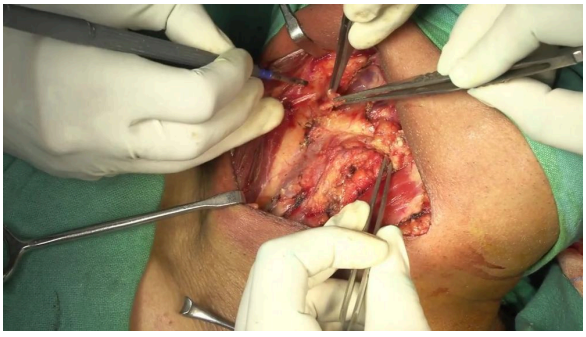


Figure 34.A Operative sequence.

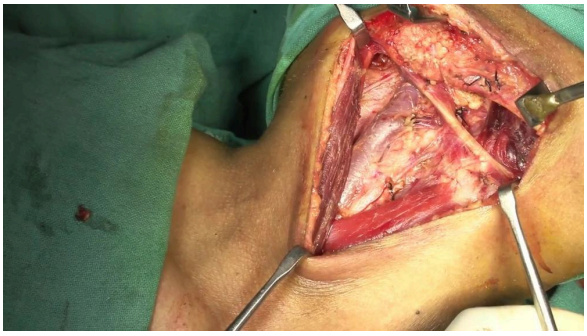
OPERATIVE RECORD



34.1 Fascial planes opened at levels II–III. Video 33:09



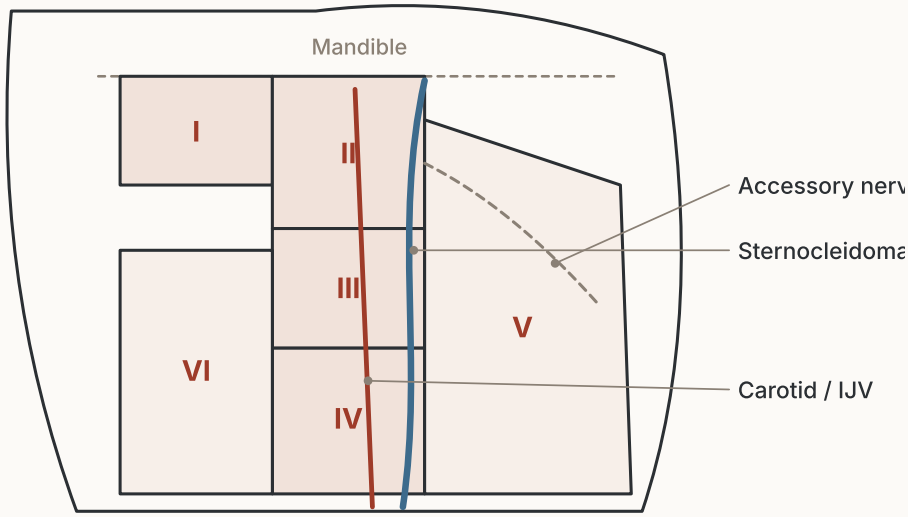
34.2 Clearing along the jugular chain. Video 47:07



34.3 Level IV and the lower jugular chain. Video 68:04



34.4 The completed dissection. Video 78:32



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 34.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Teaching without losing pace	The dissection proceeded level by level in a fixed order.

TEACHING POINTS

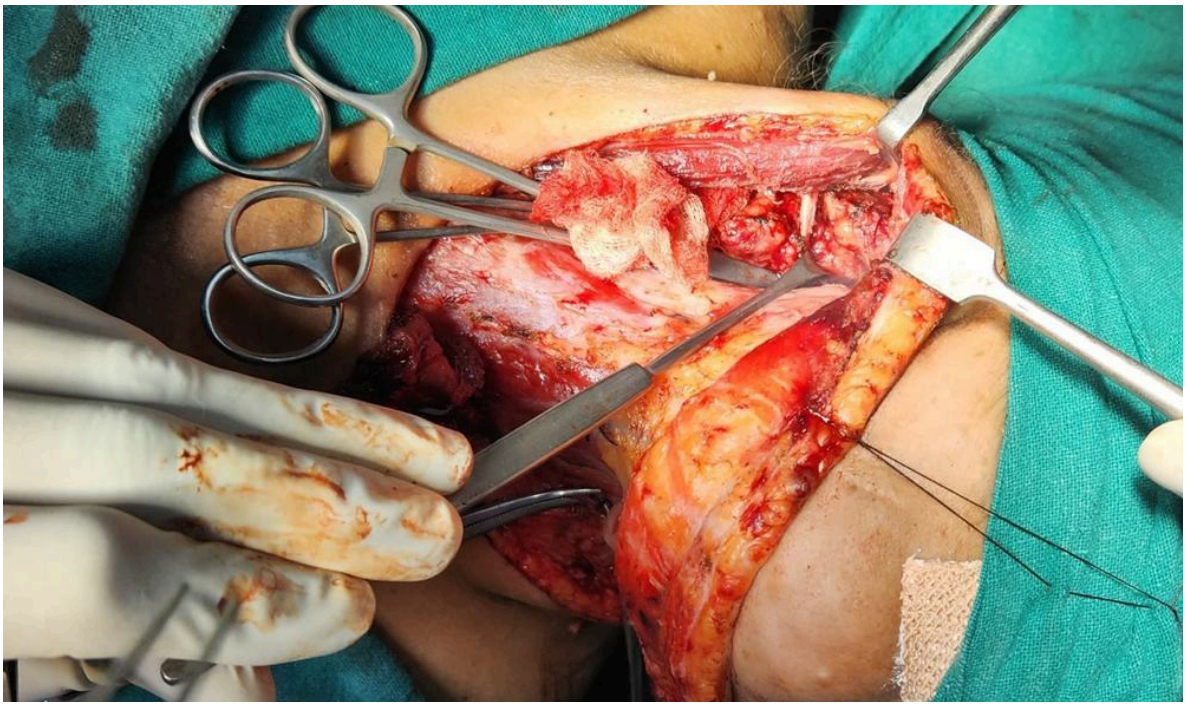
- **Level IIb lies behind the accessory nerve.** Its clearance risks shoulder dysfunction.
- **Submit by level.** The pathologist reports each level separately.
- **Elective neck dissection in early oral cancer improves survival.** Compared with watchful waiting.

CASE SUMMARY

A complete anatomical selective neck dissection recorded for teaching.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536
2. D'Cruz AK, Vaish R, Kapre N, et al. Elective versus therapeutic neck dissection in node-negative oral cancer. *N Engl J Med* 2015;373:521–9. doi:10.1056/NEJMoa1506007



35

Skeletonising the carotid

Nodal disease along the carotid sheath

Neck dissection with skeletonisation of the carotid and internal jugular vein

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the dissection along the carotid sheath with diathermy, the skeletonised carotid and internal jugular vein, and the wide field after clearance.

AUTHOR'S PERSPECTIVE

> Clearing nodal tissue from the carotid sheath is necessary for disease control but leaves the artery bare. In a neck that will be irradiated, or after pharyngectomy, the exposed carotid must be covered with healthy tissue to protect against rupture.

APPROACH

Systematic dissection along the carotid sheath from below upwards, preserving the vagus and leaving the adventitia intact.

OPERATIVE STEPS

1. Dissect along the carotid sheath with diathermy and forceps.
2. Skeletonise the carotid and internal jugular vein under retraction.
3. Expose the vagus and hypoglossal nerves before delivering the specimen.
4. Clear the upper neck.
5. Inspect the wide field.

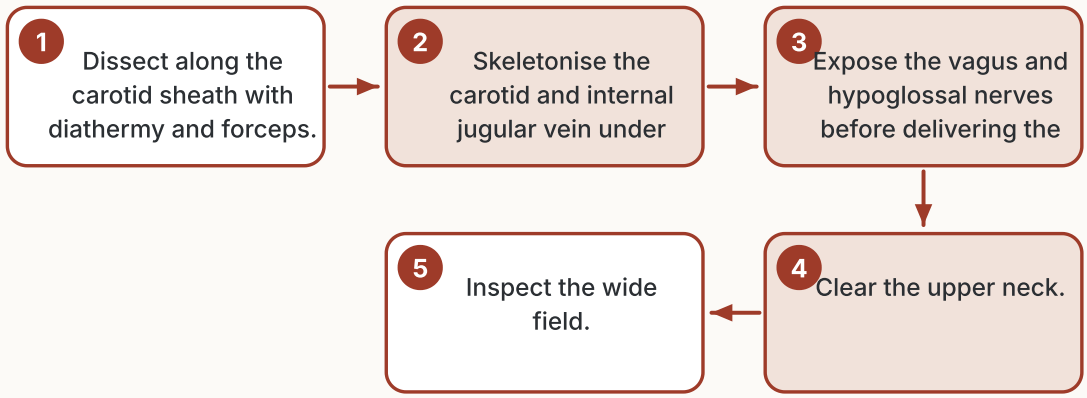
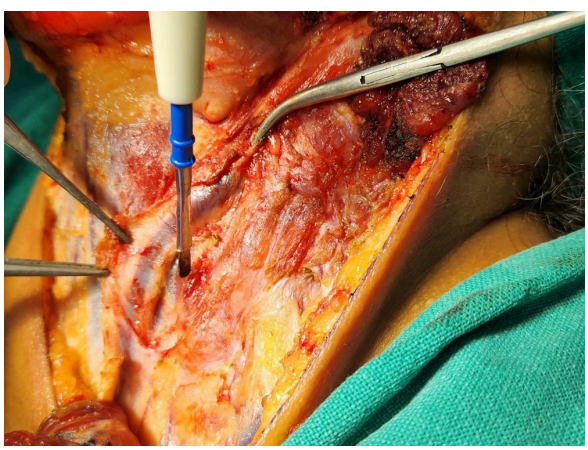
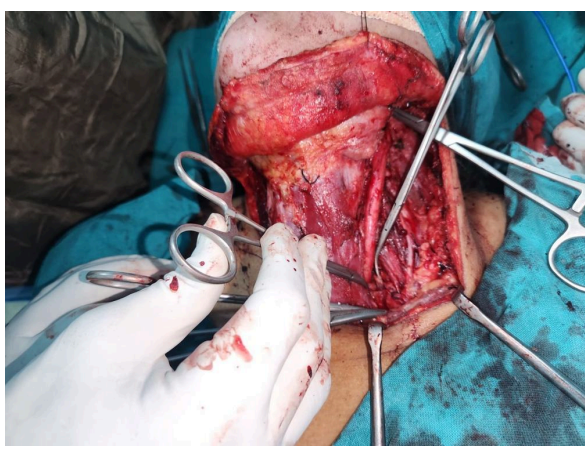


Figure 35.A Operative sequence.

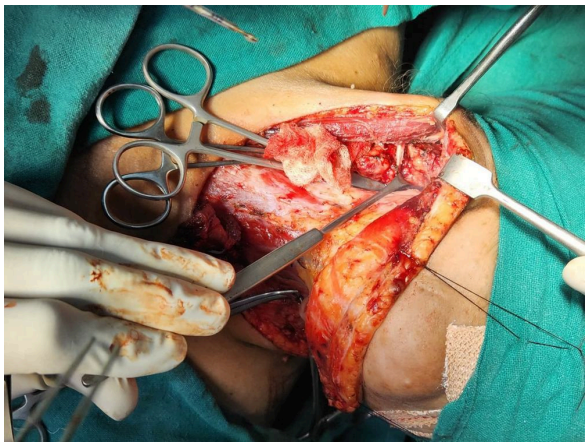
OPERATIVE RECORD



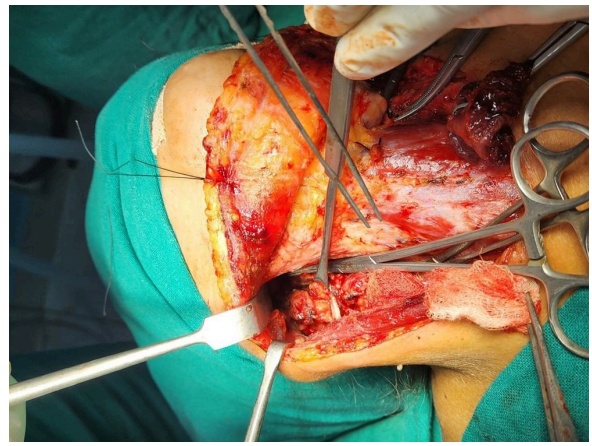
35.1 Neck dissection: dissection along carotid sheath with diathermy and forceps.



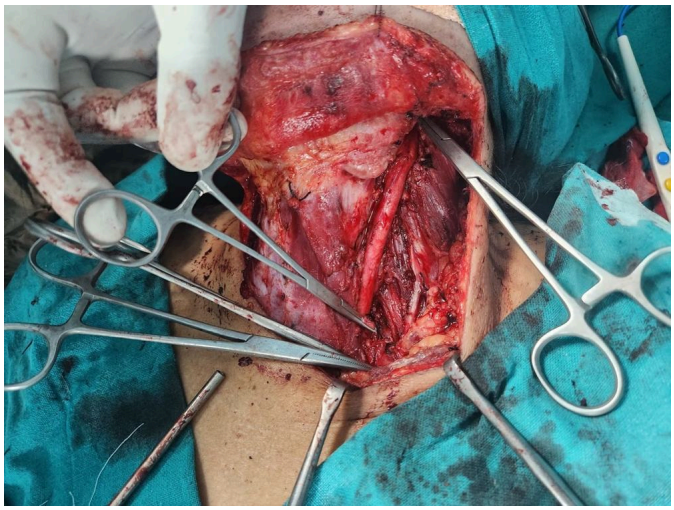
35.2 Neck dissection: skeletonised carotid/IJV with retraction.



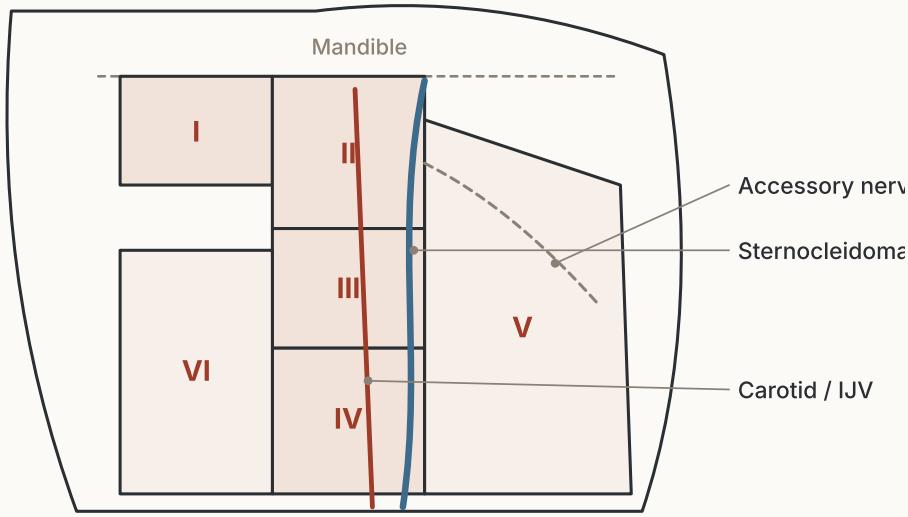
35.3 Neck dissection, upper neck with haemostats.



35.4 Neck dissection, wide field with multiple haemostats.



35.5 Neck dissection: vessels and nerve exposed, haemostats on specimen.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 35.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Exposure of the carotid	The adventitia was preserved and the artery covered at closure.
The vagus within the sheath	The nerve was identified before the sheath contents were dissected.

TEACHING POINTS

- **Preserve the adventitia.** It carries the vasa vasorum.
- **Cover the bare carotid.** Especially with a pharyngeal fistula or after radiotherapy.
- **Watch for warning signs.** A sentinel bleed before a carotid blowout.

CASE SUMMARY

Neck dissection with skeletonisation of the carotid sheath and preservation of the vagus.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536

2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646



36

Peeling the fascia

Neck dissection

Fascial neck dissection off the sternocleidomastoid

PART III · THE NECK Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the fibrofatty specimen being peeled off the sternocleidomastoid, leaving a clean muscle bed.

AUTHOR'S PERSPECTIVE

> The lymphatic contents of the neck lie within fascial compartments. Dissecting in the fascial plane removes the nodes completely while preserving muscles, vessels and nerves, which is the basis of the functional neck dissection.

APPROACH

The fascia of the sternocleidomastoid is incised along its anterior border and peeled back to its posterior border with the specimen.

OPERATIVE STEPS

1. Raise the skin flaps and mark the incision.
2. Dissect the level I and II tissue with diathermy.
3. Peel the fascia off the sternocleidomastoid.
4. Continue the dissection of levels II and III off the muscle.
5. Leave a clean sternocleidomastoid bed.

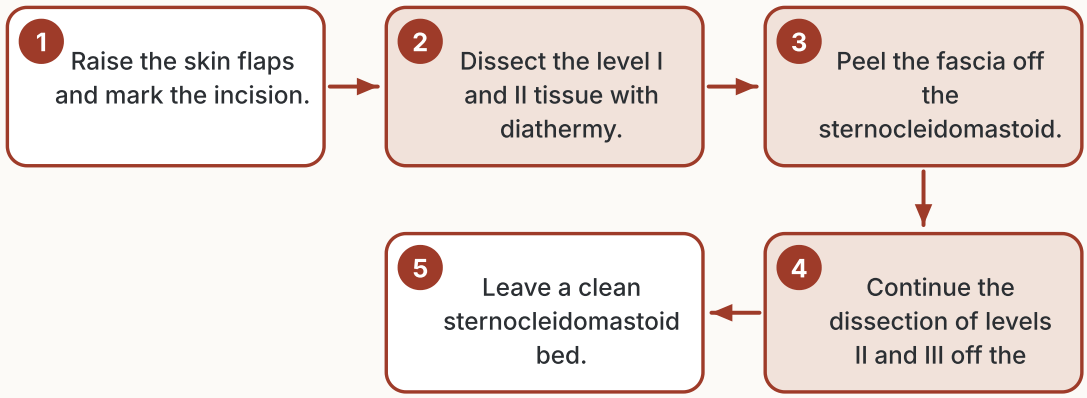


Figure 36.A Operative sequence.

OPERATIVE RECORD



36.1 Neck dissection: upper neck flap raised, cautery dissecting level I/II tissue, sternomastoid and vessels visible.



36.2 Neck dissection: cautery dissection of level II-III tissue off sternomastoid with retractor.



36.3 Neck dissection: fibrofatty/fascial specimen peeled off sternomastoid and lifted with forceps.



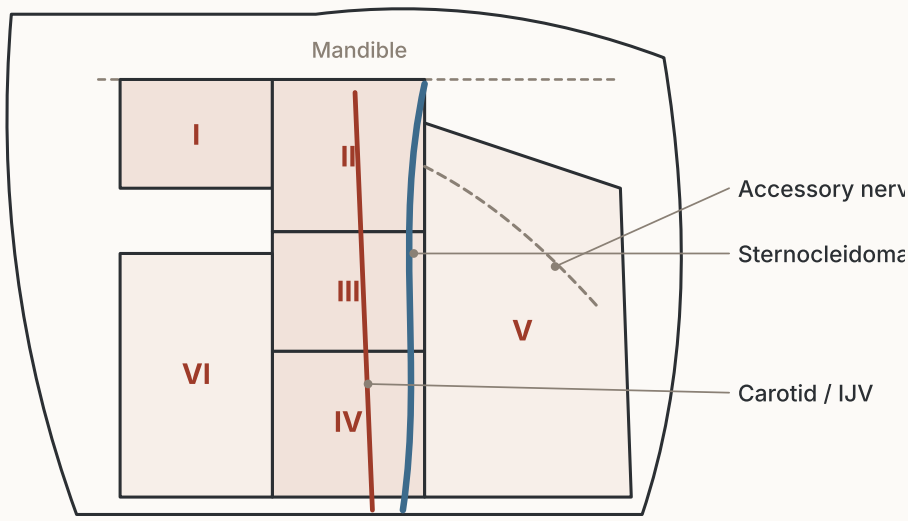
36.4 Sternomastoid muscle bed after stripping of fascia/specimen, clean dissection plane.



36.5 Neck dissection with skin flap and drawn incision; strap/sternomastoid exposure, specimen being cauterised.



36.6 Neck dissection field showing fibrofatty specimen being dissected off muscle with cautery.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 36.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Bleeding from muscle perforators	Diathermy controlled the perforators as the fascia was lifted.

Accessory nerve within the muscle	The nerve was identified where it enters the sternocleidomastoid.

TEACHING POINTS

- **The fascia carries the lymphatics.** The nodes lie within the fascial envelopes, not in the muscle, so the muscle can be kept without compromising clearance.
- **Find the accessory nerve at the sternocleidomastoid.** It enters the deep surface about a third of the way down; identifying it there protects shoulder function.
- **A clean muscle bed signals a complete fascial dissection.** Residual fat on the muscle suggests the plane was not followed.

CASE SUMMARY

Fascial dissection of the neck off the sternocleidomastoid with the muscle preserved.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536



37

The node that broke through the skin

Fungating metastatic node over the angle of the mandible

Excision of the node with overlying skin, neck dissection and pectoralis major flap

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a fungating ulceroproliferative mass over the angle of the mandible, the marked excision and neck incision, and the chest marking for flap planning.

AUTHOR'S PERSPECTIVE

> A node that has ulcerated through the skin is advanced disease, but in selected patients it is still resectable. The skin is excised with the node, and the resulting defect over the great vessels is covered with a pectoralis major flap.

APPROACH

Elliptical excision of the involved skin in continuity with the neck dissection, with the pectoralis major skin paddle replacing the skin.

OPERATIVE STEPS

1. Mark the excision around the fungating mass.
2. Mark the neck incision in continuity.
3. Mark the pectoralis major flap on the chest.
4. Excise the node with skin and complete the neck dissection.
5. Cover the defect with the pectoralis major flap.

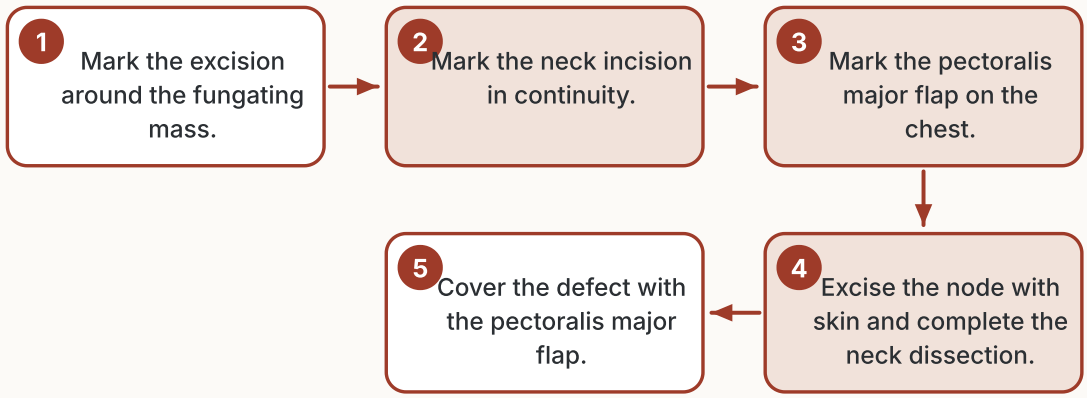
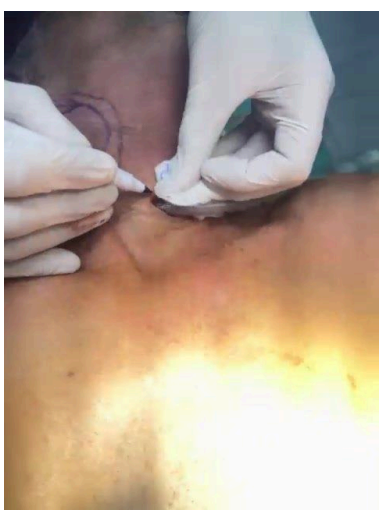


Figure 37.A Operative sequence.

OPERATIVE RECORD



37.1 Chest wall skin marking for flap planning below marked neck lesion.



37.2 Fungating ulceroproliferative skin mass over angle of mandible/upper neck with marked excision margins and neck incision lines.



37.3 Same fungating neck mass with surgical marking pen outlining excision and neck incision.

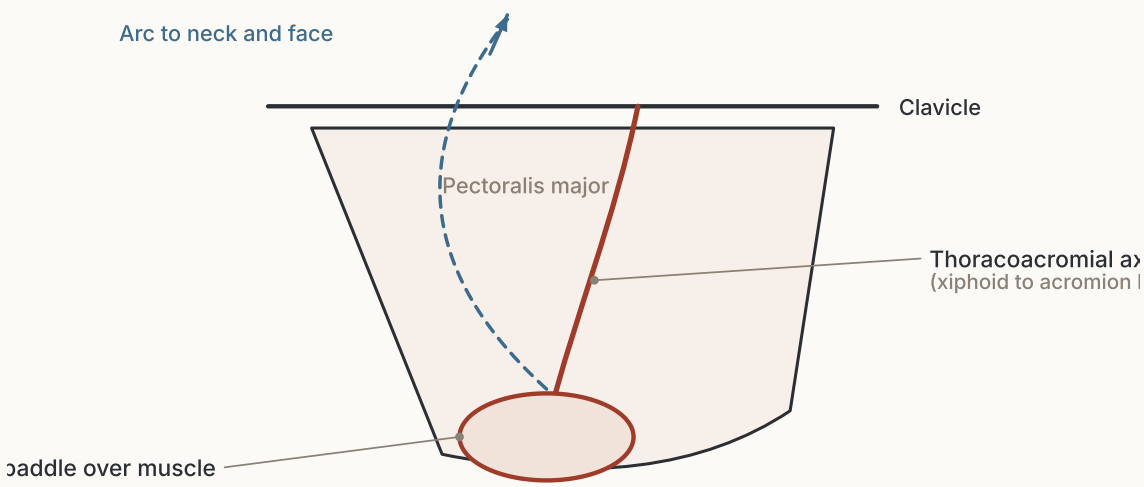


Figure 37.B Pectoralis major myocutaneous flap: design and arc of rotation.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Skin loss over the great vessels	A pectoralis major skin paddle replaced the skin.
Margins of the skin island	The excision was marked well beyond the fungating edge.

TEACHING POINTS

- **Skin involvement is not automatically inoperable.** Resectability depends on the deep structures.
- **Excise skin widely.** Dermal spread extends beyond the visible ulcer.
- **Cover vessels with vascularised tissue.** The pectoralis major is reliable.

CASE SUMMARY

Excision of a fungating metastatic node with overlying skin, neck dissection and pectoralis major flap cover.

REFERENCES

1. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.

2. Cooper JS, Pajak TF, Forastiere AA, et al. Postoperative concurrent radiotherapy and chemotherapy for high-risk squamous-cell carcinoma of the head and neck. *N Engl J Med* 2004;350:1937–44. doi:10.1056/NEJMoa032646



38

The lobulated neck mass

Large lobulated tumour of the submandibular region

En bloc excision

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a large lobulated tumour exposed in the submandibular region and the en bloc specimen.

AUTHOR'S PERSPECTIVE

> A large neck mass is first characterised by imaging and fine-needle aspiration. A well-encapsulated tumour is removed en bloc with a cuff of surrounding tissue, without rupture of the capsule.

APPROACH

Exposure through a neck incision with retraction, dissection outside the capsule and en bloc removal.

OPERATIVE STEPS

1. Expose the lobulated tumour through the neck incision.
2. Dissect outside the capsule.
3. Deliver the tumour with associated tissue.
4. Inspect the en bloc specimen.

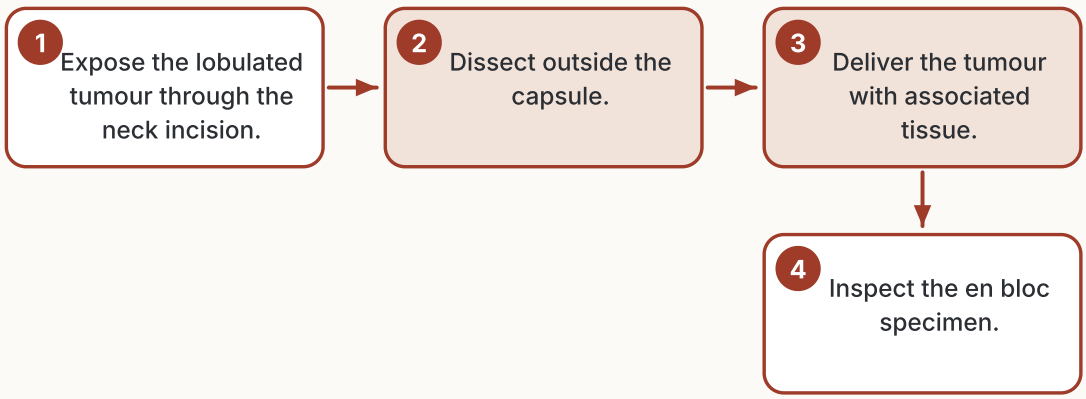
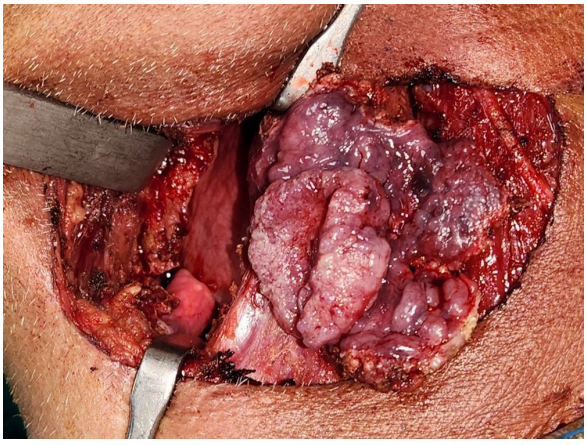
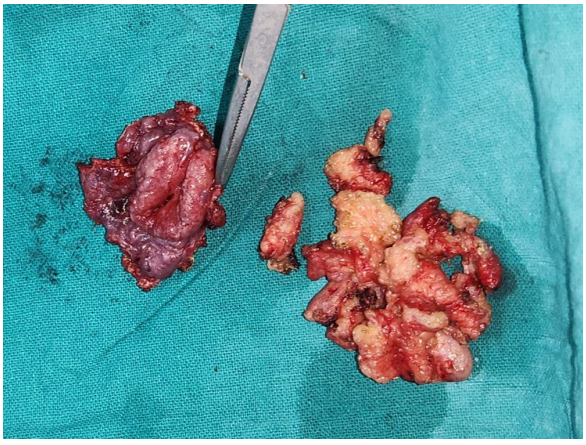


Figure 38.A Operative sequence.

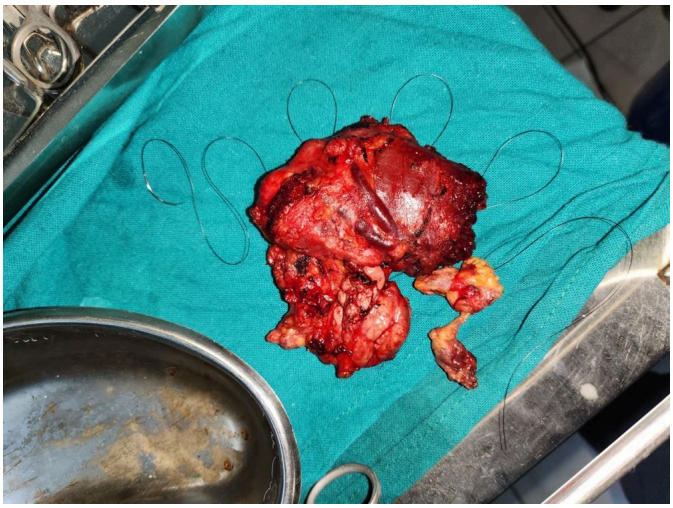
OPERATIVE RECORD



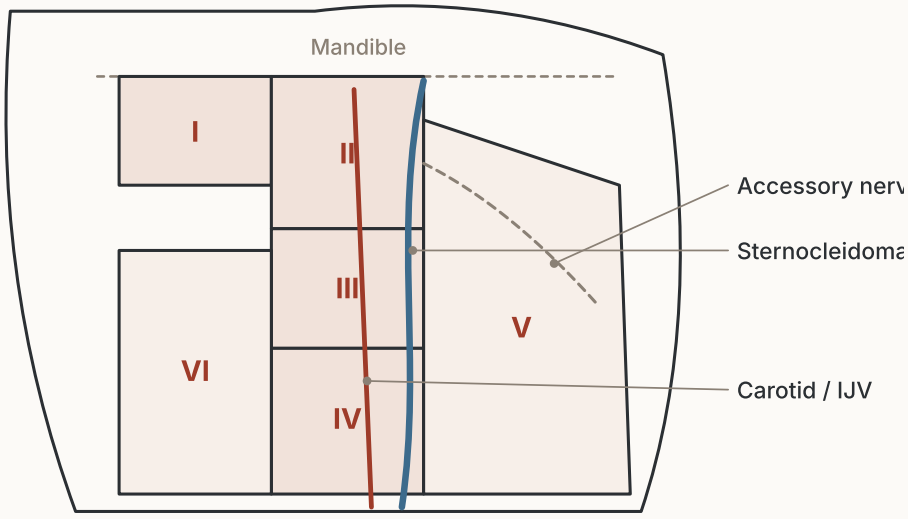
38.1 Large lobulated tumour exposed in neck/submandibular region via retraction.



38.2 Specimens: tumour and fat-bearing nodal tissue, scissors pointing.



38.3 Specimen: large en bloc tumour mass.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 38.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Size of the tumour	A wide incision gave exposure without capsular rupture.
Adjacent nerves	The marginal mandibular and hypoglossal nerves were protected.

TEACHING POINTS

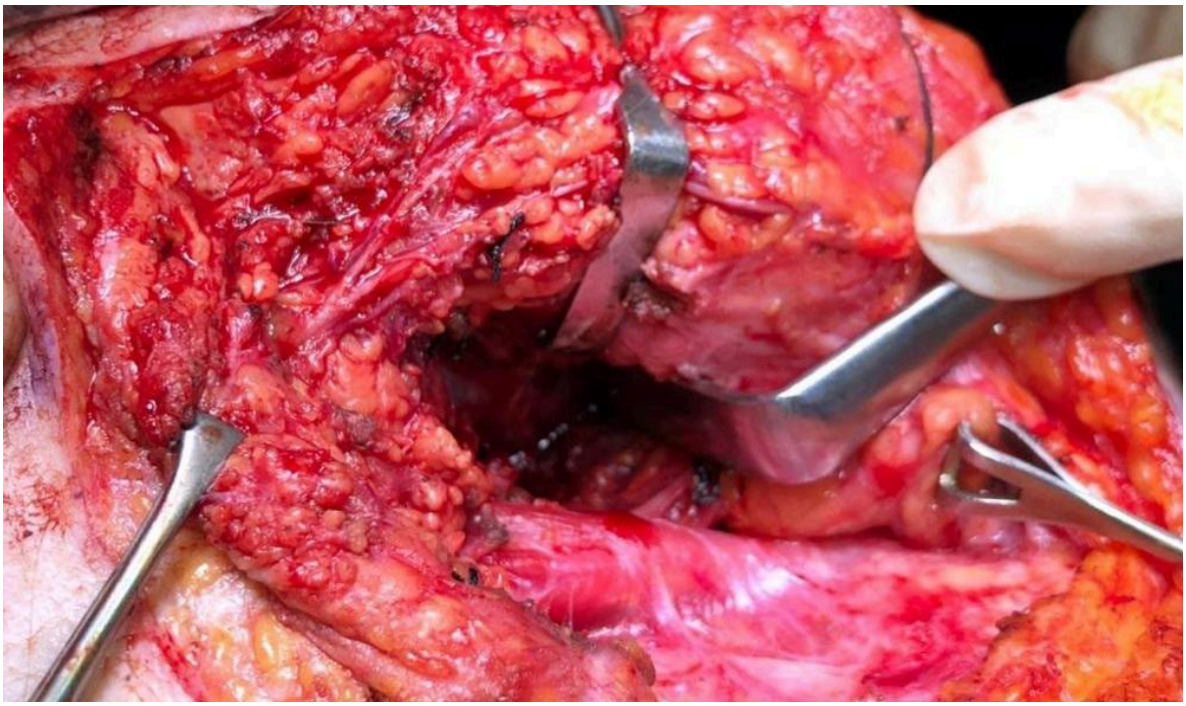
- **Diagnose before you operate.** Imaging and aspiration define the mass.
- **Do not rupture the capsule.** Spillage seeds recurrence.
- **Know the nerves of level I.** Marginal mandibular, lingual and hypoglossal.

CASE SUMMARY

En bloc excision of a large lobulated submandibular region tumour.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536



39

The parapharyngeal mass

Parapharyngeal space tumour

Transcervical excision

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the large rounded tumour specimen with rulers, the deep parapharyngeal cavity after excision, and the transoral view of the palate.

AUTHOR'S PERSPECTIVE

> Most parapharyngeal tumours are benign, commonly salivary or neurogenic. Imaging determines whether the tumour lies in front of or behind the styloid, which predicts its nature and the vessels at risk. Most can be removed through the neck without dividing the mandible.

APPROACH

Transcervical approach through the submandibular triangle, with blunt dissection of the tumour from the parapharyngeal space.

OPERATIVE STEPS

1. Approach the parapharyngeal space through the neck.
2. Dissect the tumour bluntly from surrounding tissue.
3. Deliver the tumour intact.
4. Inspect the deep cavity and the oropharynx transorally.

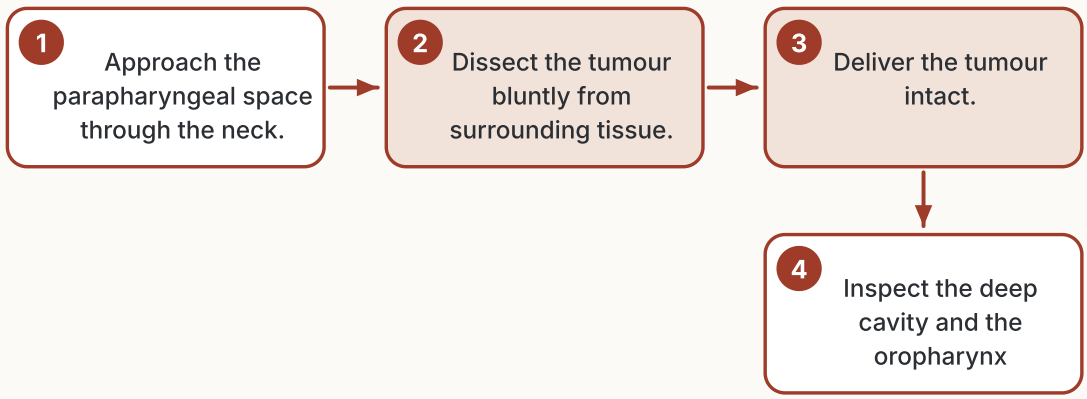
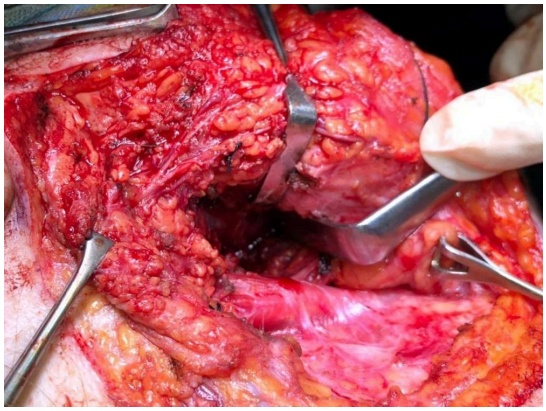


Figure 39.A Operative sequence.

OPERATIVE RECORD



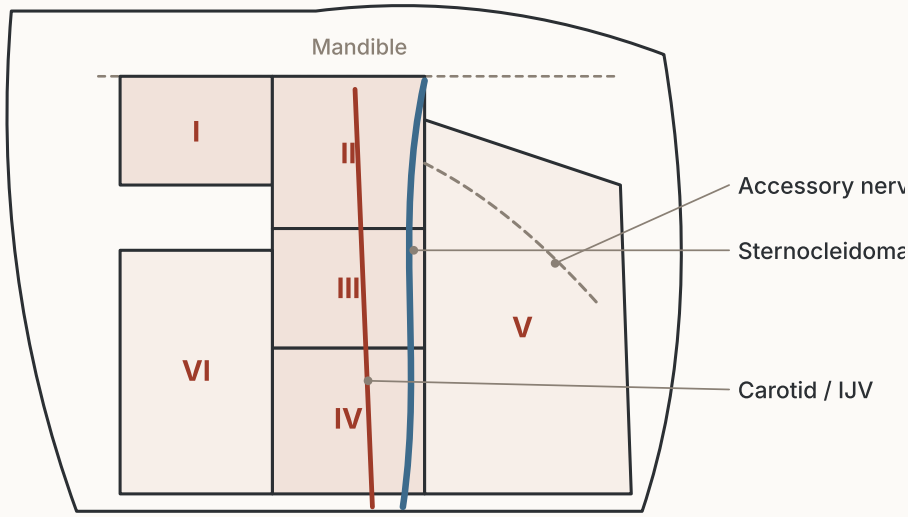
39.1 Transoral view of palate/oropharynx with lesion/sutures.



39.2 Deep neck/parapharyngeal dissection cavity with retractors.



39.3 Large rounded tumour specimen with rulers.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 39.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Deep location near the skull base	Blunt finger dissection freed the capsule.
Great vessels behind the styloid	Imaging defined the relation of the tumour to the carotid before surgery.

TEACHING POINTS

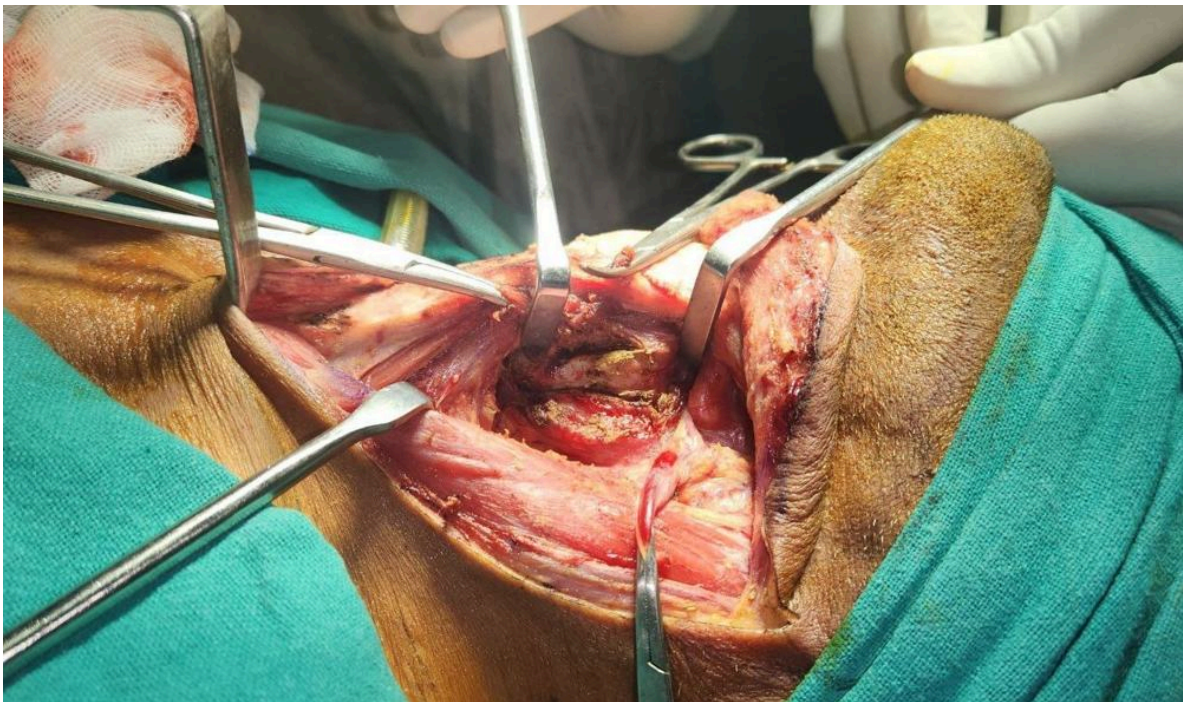
- **Prestyloid tumours are mostly salivary.** Poststyloid tumours are mostly neurogenic or paragangliomas.
- **Most can be removed transcervically.** Mandibulotomy is reserved for large or malignant tumours.
- **Deliver intact.** Capsular rupture of a pleomorphic adenoma causes recurrence.

CASE SUMMARY

Transcervical excision of a parapharyngeal space tumour delivered intact.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536



40

Nerves of the upper neck

Upper neck disease extending towards the skull base

Deep lateral neck dissection with preservation of the lower cranial nerves

PART III · THE NECK

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the deep lateral neck exposed below the mandible, with nerves and vessels slung.

AUTHOR'S PERSPECTIVE

> Dissection of the upper neck near the skull base places the hypoglossal, vagus, accessory and glossopharyngeal nerves at risk. Their loss together causes serious swallowing and voice problems, so each is identified and protected.

APPROACH

Wide exposure under multiple retractors, with each nerve identified and slung before the specimen is mobilised.

OPERATIVE STEPS

1. Raise flaps and retract beneath the mandible.
2. Identify and sling the nerves and vessels.
3. Dissect the deep lateral neck towards the parapharyngeal space.
4. Complete the dissection under retraction.

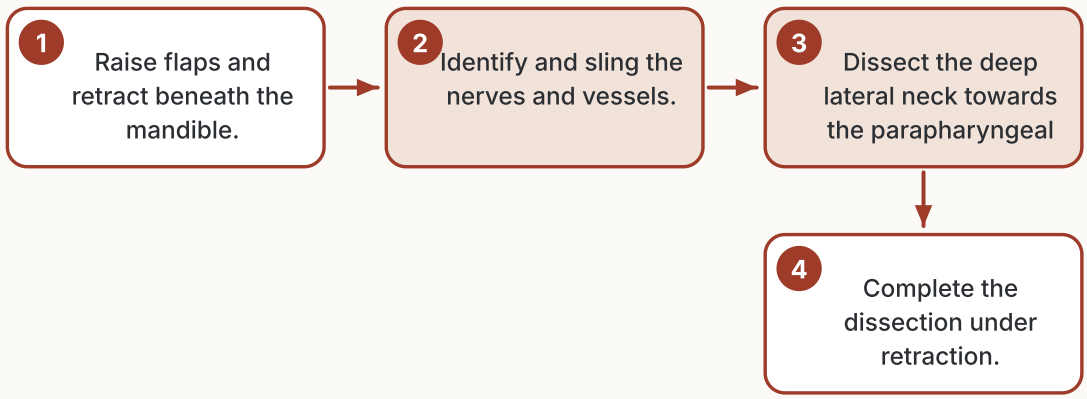
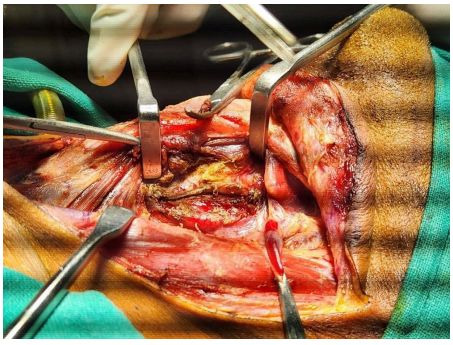
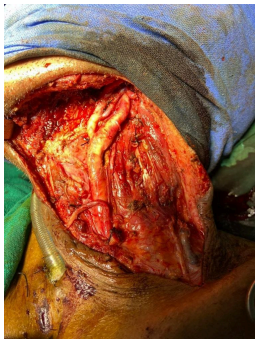


Figure 40.A Operative sequence.

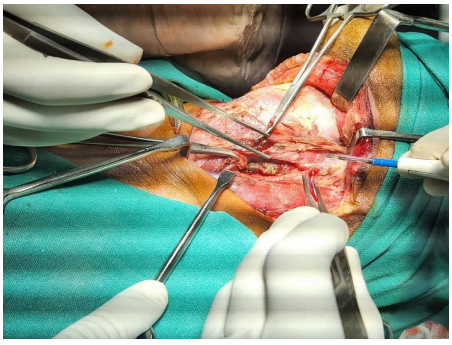
OPERATIVE RECORD



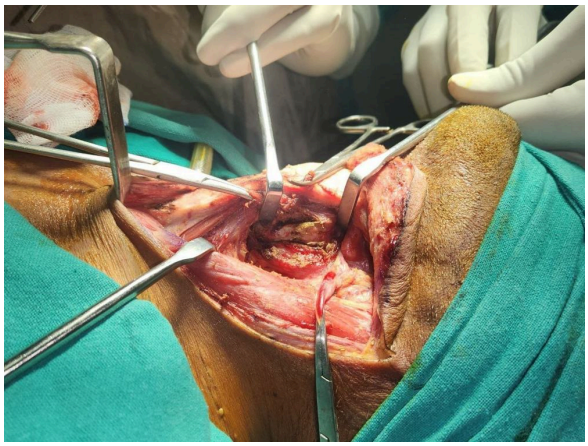
40.1 Neck dissection: nerve/vessel slung, retractors.



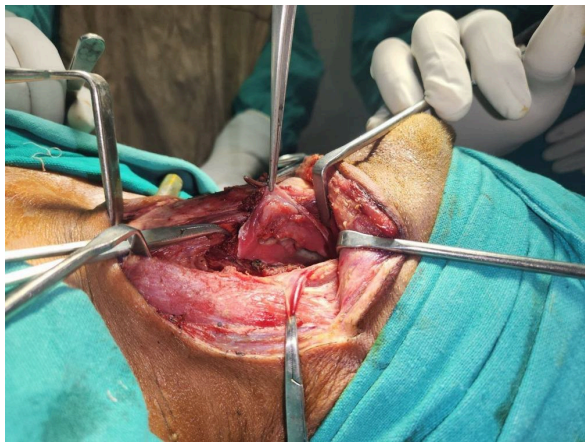
40.2 Neck dissection field with flaps retracted, structures exposed.



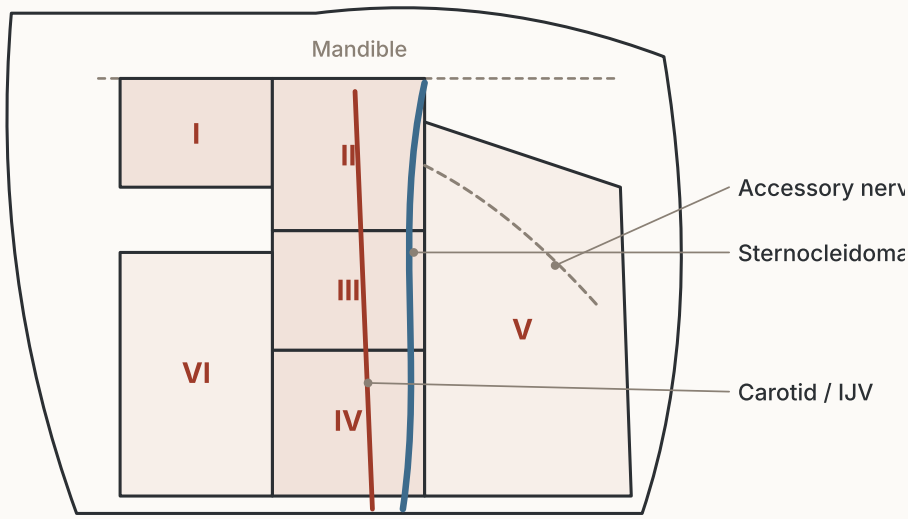
40.3 Neck dissection under retraction with instruments.



40.4 Deep lateral neck/parapharyngeal exposure with multiple retractors.



40.5 Lateral neck deep dissection near mandible, retractors.



Levels named by the 2008 consensus; VII = superior mediastinum below level VI.

Figure 40.B Neck levels and the structures preserved.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Multiple cranial nerves in a small space	Each nerve was identified and slung before division of any tissue.
Limited upper exposure	The posterior belly of digastric was retracted to open the field.

TEACHING POINTS

- **The posterior belly of digastric is the resident's friend.** The vital structures lie deep to it.
- **The hypoglossal nerve crosses the carotids.** Just below the digastric.
- **Combined lower cranial nerve loss disables swallowing.** Protect them all.

CASE SUMMARY

Deep lateral neck dissection with preservation of the lower cranial nerves.

REFERENCES

1. Robbins KT, Shaha AR, Medina JE, et al. Consensus statement on the classification and terminology of neck dissection. *Arch Otolaryngol Head Neck Surg* 2008;134:536–8. doi:10.1001/archotol.134.5.536
2. Fisch U. Infratemporal fossa approach to tumours of the temporal bone and base of the skull. *J Laryngol Otol* 1978;92:949–67. doi:10.1017/s0022215100086382

PART IV

Thyroid, parathyroid and airway

Thyroid cancer and goitre, a parathyroid adenoma, tracheal stenosis and the paralysed vocal fold.

41 The amyloid in the needle

42 Three centimetres of scar

43 Below the cords

44 Two circles

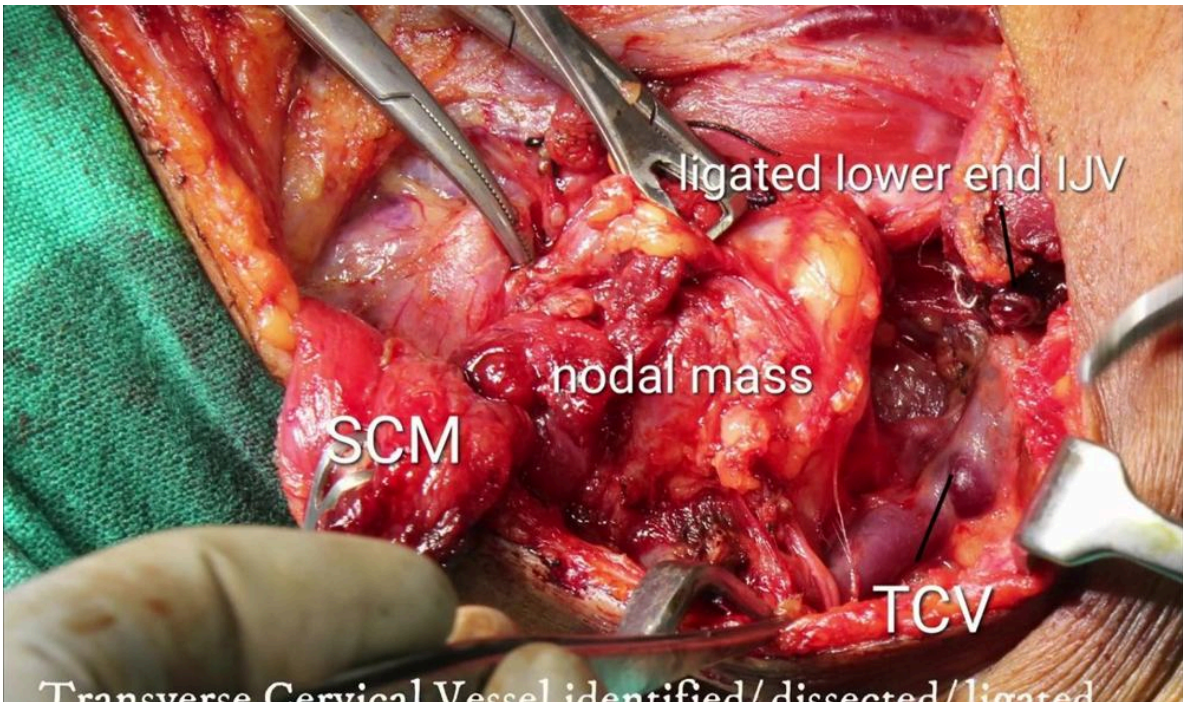
45 The gland behind the blood pressure

46 On the capsule

47 A voice at eighty

48 A single lobe

49 The nodular goitre



41

The amyloid in the needle

Medullary carcinoma of the thyroid with right lateral neck metastasis in a 62-year-old woman

Total thyroidectomy, central neck dissection (VI/VII) and bilateral neck dissection

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 62-year-old woman presented with a right-sided neck swelling. Ultrasound showed a hypoechoic, predominantly solid 2.5 × 2 cm lesion in the right lobe (TIRADS 4) and enlarged right lower and mid deep cervical nodes, the largest 4 × 3.5 cm. FNAC of both showed stromal amyloid with absent follicles, in favour of medullary carcinoma. Serum calcitonin was 40 pg/ml; calcium and PTH were normal; CECT chest and abdomen and urinary and plasma metanephrines were normal; there was no family history of MEN 2 or familial medullary carcinoma.

AUTHOR'S PERSPECTIVE

> Medullary carcinoma does not take up iodine, so surgery is the only curative treatment. With proven lateral nodal disease, the operation is total thyroidectomy with central compartment clearance and lateral neck dissection. Phaeochromocytoma was excluded first.

APPROACH

Collar incision extended laterally, lateral neck dissection first, then thyroidectomy and central (VI) and superior mediastinal (VII) clearance.

OPERATIVE STEPS

1. Raise the subplatysmal flap.
2. Divide the omohyoid; dissect and ligate the internal jugular vein involved by nodal mass.
3. Ligate the transverse cervical vessels; dissect levels II–IV off the deep muscles.
4. Identify the recurrent laryngeal nerve at the thyroid lobe.
5. Dissect at Berry's ligament with the inferior thyroid artery, superior parathyroid and tubercle in view.
6. Clear level VI/VII from hyoid to aortic arch and carotid to carotid.
7. Ligate the thoracic/lymphatic duct in the supraclavicular region.
8. Close in layers over a drain.

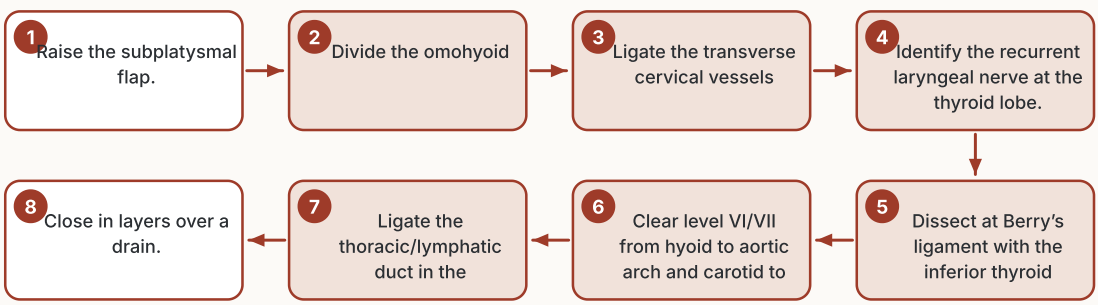
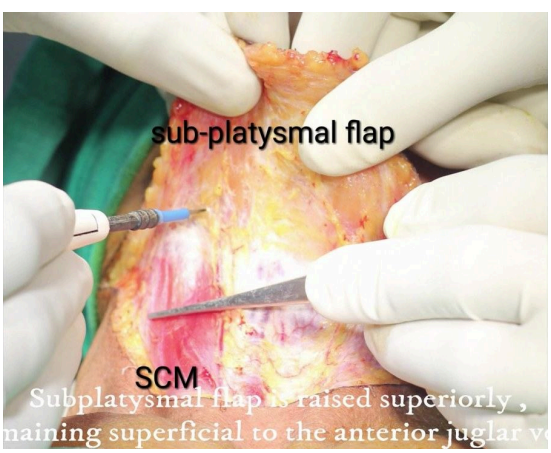
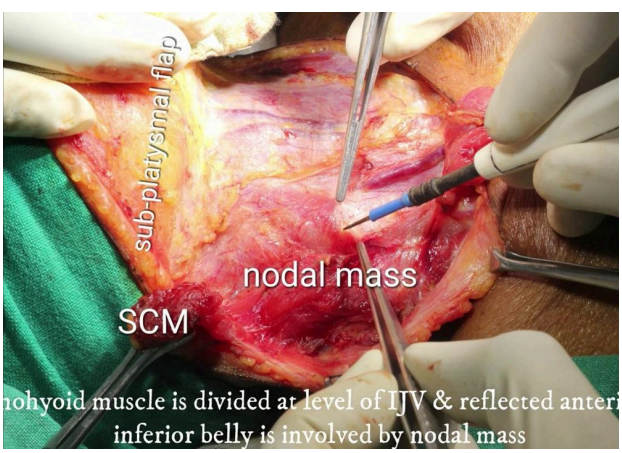


Figure 41.A Operative sequence.

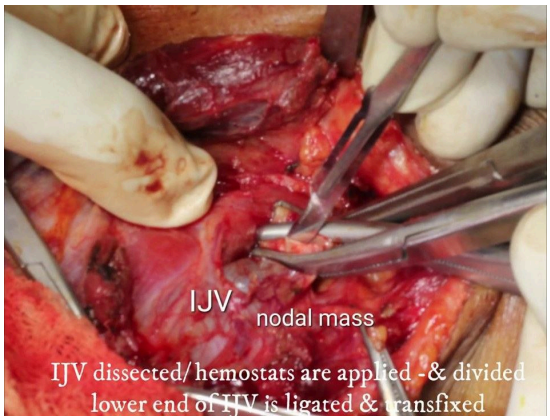
OPERATIVE RECORD



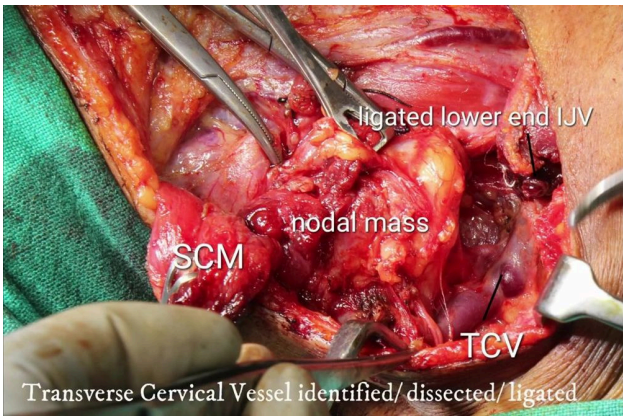
41.1 Sub-platysmal flap raised; SCM labelled. Video 1:22



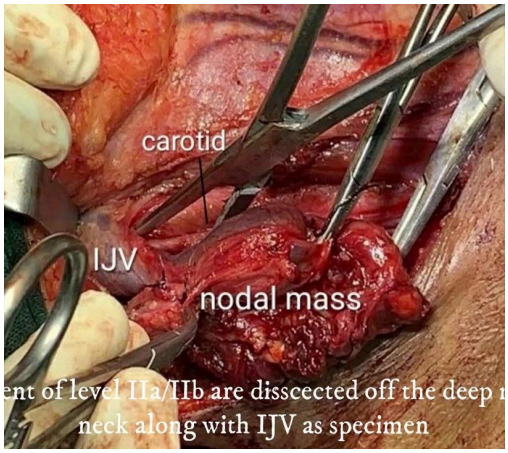
41.2 Omohyoid divided at the IJV; inferior belly involved by nodal mass. Video 1:55



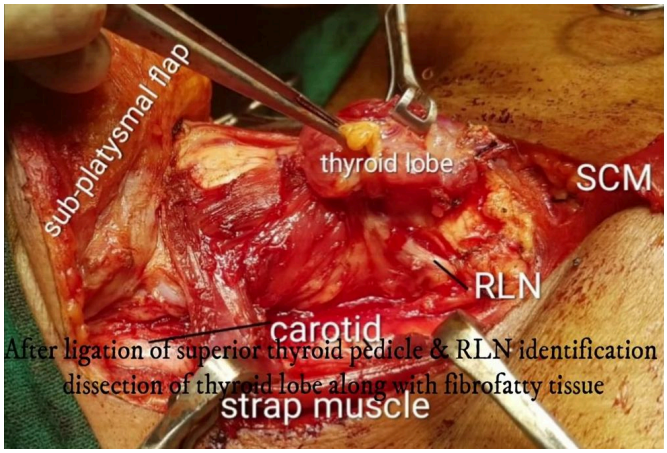
41.3 IJV dissected, lower end ligated and transfixed, with the nodal mass. Video 3:33



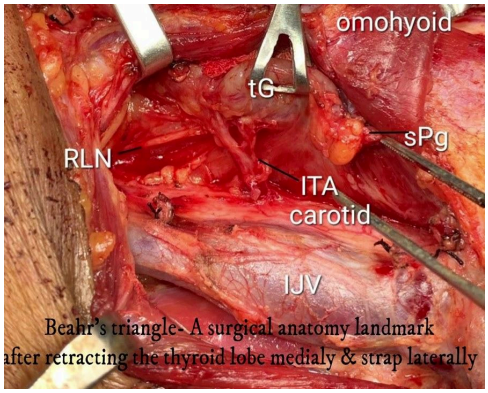
41.4 Transverse cervical vessels identified and ligated; nodal mass on SCM. Video 4:39



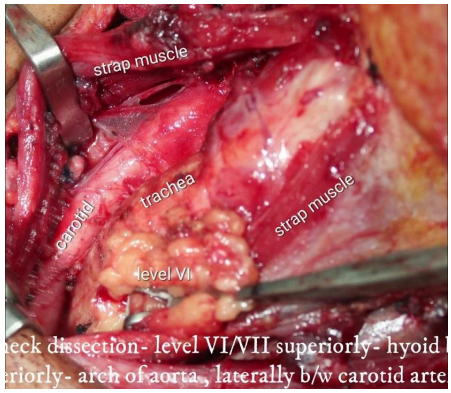
41.5 Levels II–IV dissected off the deep muscles with the IJV as specimen. Video 5:12



41.6 RLN identified at the thyroid lobe; carotid and strap muscle labelled. Video 6:18



41.7 Berry's ligament area: RLN, ITA, carotid, superior parathyroid and tubercle labelled. Video 7:24



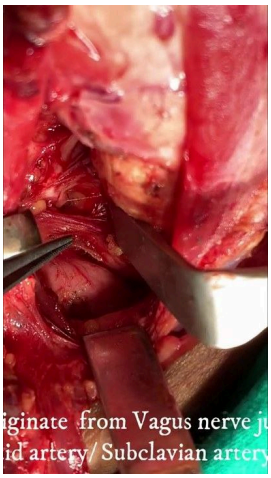
41.8 Central neck dissection, level VI/VII: hyoid to arch of aorta, carotid to carotid. Video 7:56



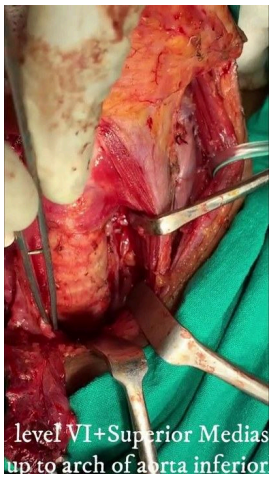
41.9 After removal of the specimen: total thyroidectomy, central and bilateral neck dissection. Video 8:29



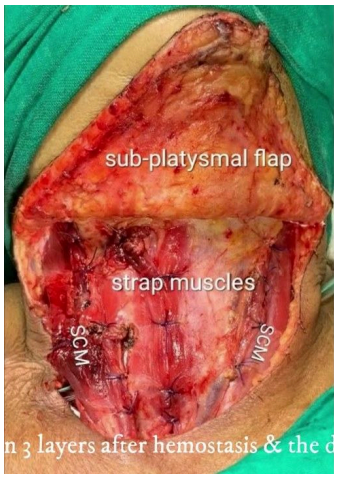
41.10 Supraclavicular region: transverse lymphatic duct ligated. Video 9:02



41.11 Right RLN arising from the vagus behind the carotid and subclavian. Video 10:41



41.12 Central and superior mediastinal (VII) dissection to the aortic arch. Video 11:14



41.13 Wound closed in layers after haemostasis and drain. Video 12:20

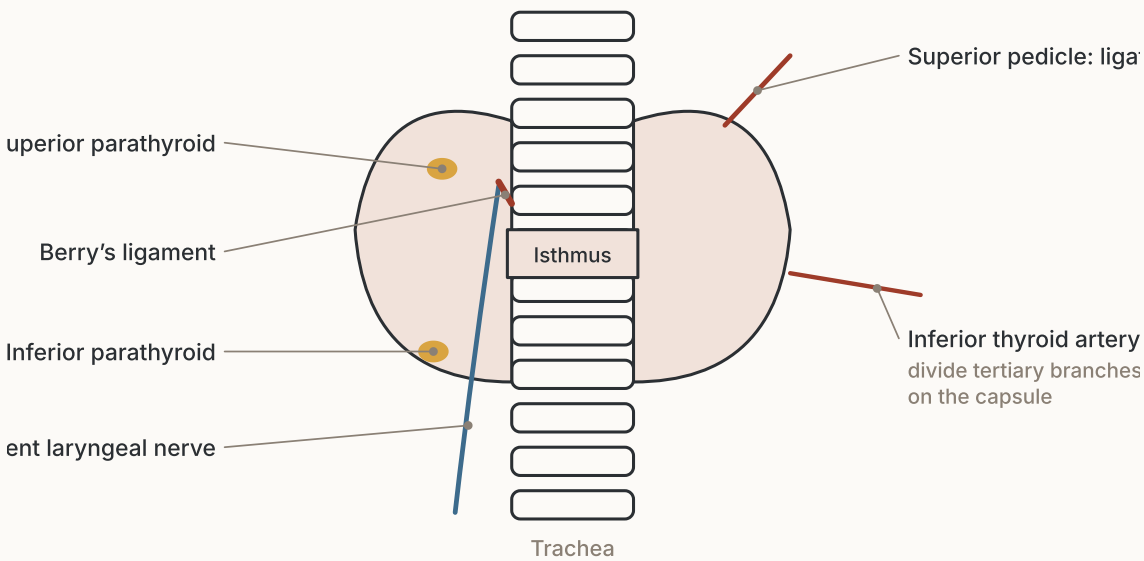


Figure 41.B Thyroid: recurrent laryngeal nerve, parathyroids and Berry's ligament.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Recurrent nerve in a non-recurrent course on the right	The nerve was traced from the vagus behind the carotid and subclavian.
Hypocalcaemia after central clearance	Parathyroids were preserved where possible; mild hypocalcaemia was managed with oral calcium and vitamin D.

TEACHING POINTS

- **Exclude phaeochromocytoma first.** An unrecognised one is dangerous at induction.
- **Total thyroidectomy with level VI.** Lateral dissection for involved nodes.
- **RET testing for every patient.** Family screening follows a positive result.
- **Calcitonin and CEA are the tumour markers.** They guide follow-up.

CASE SUMMARY

Total thyroidectomy with central and bilateral neck dissection for medullary carcinoma with lateral nodal metastasis. Mild hypocalcaemia settled with calcium and vitamin D; histopathology confirmed medullary carcinoma with nodal metastasis; she was well at four weeks, with follow-up by ultrasound and calcitonin and RET counselling for the family.

REFERENCES

1. Wells SA, Asa SL, Dralle H, et al. Revised American Thyroid Association guidelines for the management of medullary thyroid carcinoma. *Thyroid* 2015;25:567–610. doi:10.1089/thy.2014.0335



42

Three centimetres of scar

Post-intubation tracheal stenosis, 3 cm long, with more than 95% luminal narrowing (grade IV), in a 21-year-old

Resection of the stenosed segment with primary crico-tracheal end-to-end anastomosis

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 21-year-old man had been intubated for prolonged periods after accidental trauma and then tracheostomised. A month after decannulation he developed breathlessness and stridor. Imaging showed a 3 cm stenosis with more than 95% narrowing. Opinions elsewhere had ranged from permanent tracheostomy to laser, coblation and dilatation.

AUTHOR'S PERSPECTIVE

> A long, mature, circumferential scar does not respond durably to dilatation or laser. Resection with primary anastomosis is the treatment of choice and offered this young man a life without a tracheostomy.

APPROACH

Collar incision, tracheostomy below the stenosis for ventilation, resection of the stenotic segment and end-to-end anastomosis.

OPERATIVE STEPS

1. Confirm the stenosis on video bronchoscopy.
2. Fashion a tracheostomy below the stenosis and ventilate through it.
3. Expose the hourglass stenotic segment.
4. Dissect and remove the stenotic segment close to the cartilage.
5. Place the posterior wall sutures to the lower tracheal end.
6. Place all anastomotic sutures before tying.
7. Complete a water- and air-tight crico-tracheal anastomosis.

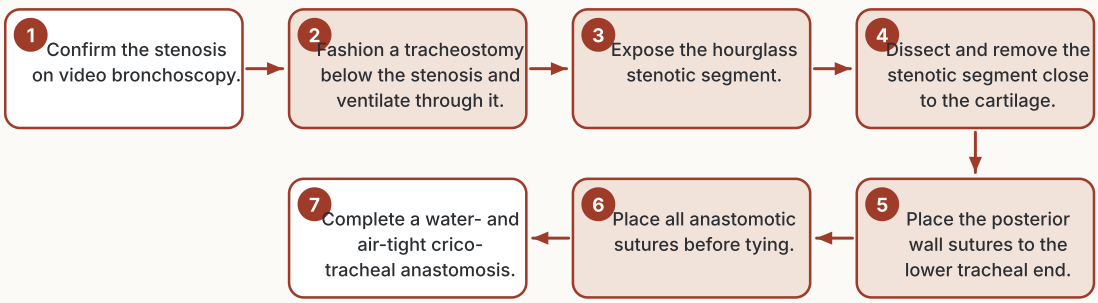
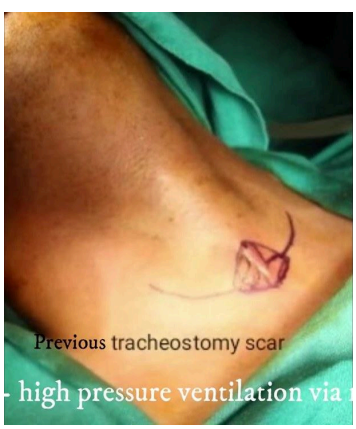


Figure 42.A Operative sequence.

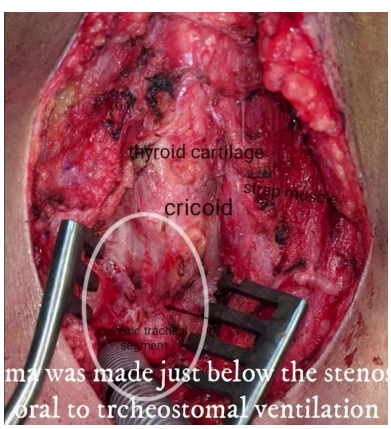
OPERATIVE RECORD



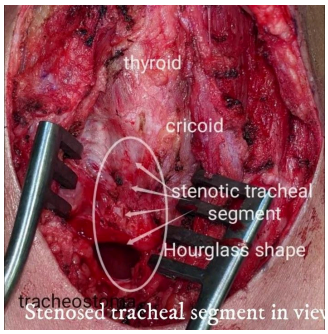
42.1 Video bronchoscopy: tracheal stenosis, luminal narrowing over 95%. Video 0:48



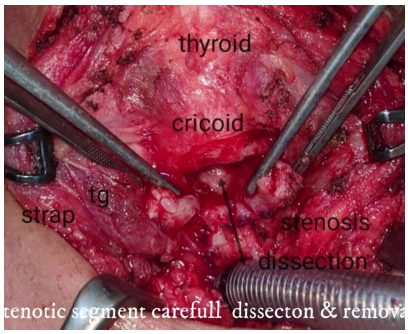
42.2 Previous tracheostomy scar. Video 0:56



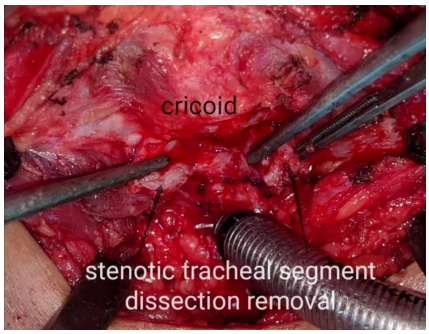
42.3 Tracheostomy made just below the stenosed segment for ventilation. Video 1:03



42.4 "Stenosed tracheal segment in view": hourglass shape. Video 1:11



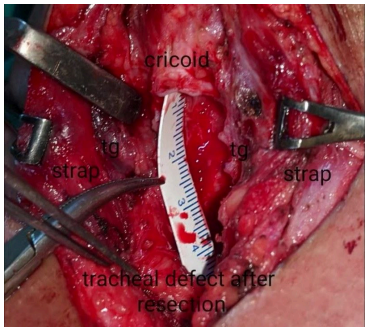
42.5 "Stenotic segment carefully dissected and removed." Video 1:26



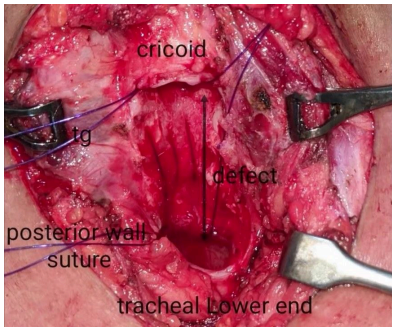
42.6 "Stenotic tracheal segment dissection, removal." Video 1:34



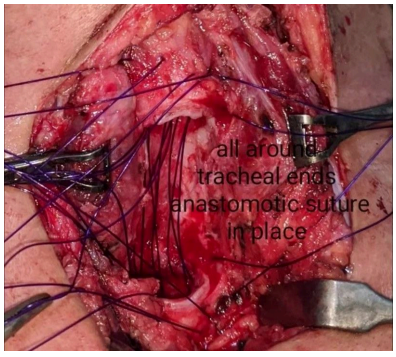
42.7 "Dissection and removal of the stenotic segment." Video 1:56



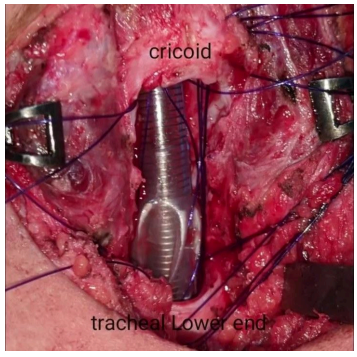
42.8 Tracheal defect after resection, measured at 4 cm. Video 2:04



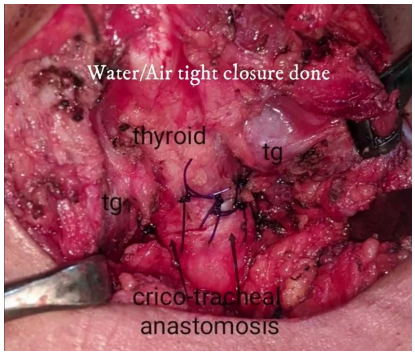
42.9 Posterior wall suture to the tracheal lower end. Video 2:11



42.10 "All-around tracheal end anastomotic suture in place." Video 2:19



42.11 Cricoid and tracheal lower end before tying. Video 2:26



42.12 "Water/air-tight closure done": crico-tracheal anastomosis. Video 2:41

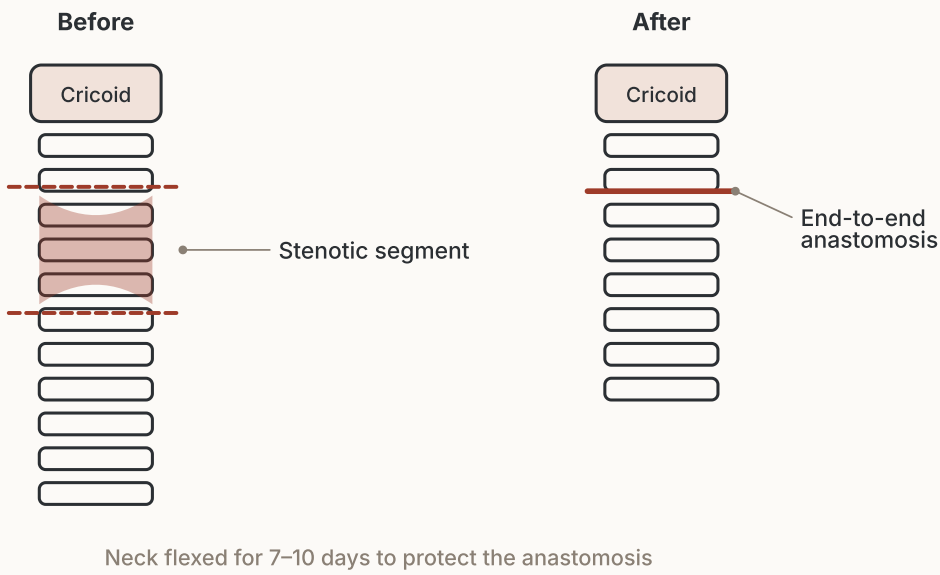


Figure 42.B Tracheal and cricotracheal resection with anastomosis.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Tension across a 4 cm defect	The neck was flexed and release manoeuvres were used as needed.
Recurrent nerve injury	Dissection was kept on the tracheal wall.

TEACHING POINTS

- **Resection is the treatment of choice.** Good or satisfactory results in about 94% of over 500 patients.
- **Grade by tube size.** Myer–Cotton grades I to IV.
- **Keep the neck flexed after surgery.** A chin stitch for 7–10 days protects the anastomosis.

CASE SUMMARY

Resection of a 3 cm grade IV post-intubation tracheal stenosis with primary crico-tracheal anastomosis in a 21-year-old.

REFERENCES

1. Grillo HC, Donahue DM. Postintubation tracheal stenosis. *Chest Surg Clin N Am* 1996;6:725–31.
2. Myer CM, O'Connor DM, Cotton RT. Proposed grading system for subglottic stenosis based on endotracheal tube sizes. *Ann Otol Rhinol Laryngol* 1994;103:319–23. doi:10.1177/000348949410300410



43

Below the cords

Cricotracheal stenosis after failed dilatations; narrowing less than 1 cm below the cords, airway under 3 mm, segment over 1.5 cm involving the cricoid and upper three rings

Partial cricotracheal resection with thyrotracheal anastomosis, single stage

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Multiple dilatations had failed. Bronchoscopy showed narrowing less than 1 cm below the cords with an airway diameter under 3 mm, the segment involving the cricoid and the upper three tracheal rings.

AUTHOR'S PERSPECTIVE

> When the stenosis involves the subglottis, a simple tracheal resection is not enough. The anterior cricoid arch is removed with the stenotic trachea, the posterior cricoid plate is preserved to protect the recurrent laryngeal nerves, and the trachea is sutured to the thyroid cartilage.

APPROACH

Collar incision, division of the isthmus, resection of the anterior cricoid arch and stenotic rings, and thyrotracheal anastomosis over an oral tube.

OPERATIVE STEPS

1. Divide the thyroid isthmus and skeletonise the trachea.
2. Dissect close to the airway to protect the recurrent nerves.
3. Remove the upper tracheal rings anteriorly.
4. Resect the anterior cricoid arch with the fibrotic tissue.
5. Remove intraluminal fibrosis from the posterior cricoid plate.
6. Place lateral tacking sutures and approximate the posterior wall to the cricoid.
7. Complete the anastomosis over an oral tube with the neck flexed.
8. Approximate the thyroid lobes over the anastomosis.

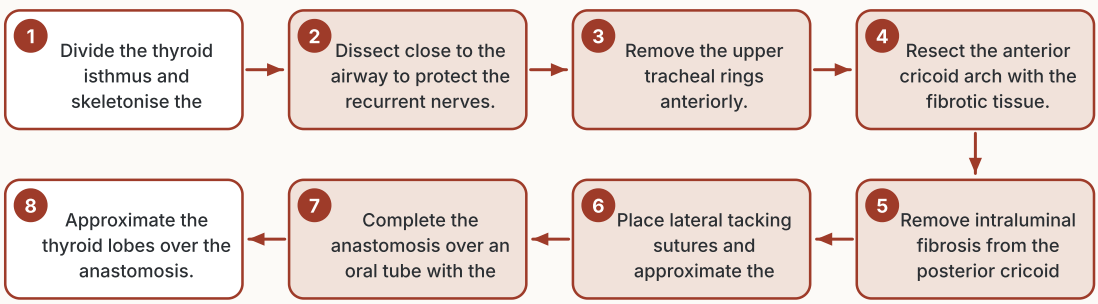


Figure 43.A Operative sequence.

OPERATIVE RECORD



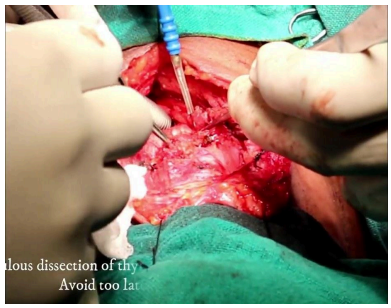
43.1 "Imaging showed luminal narrowing below the glottis": cricotracheal stenosis. Video 0:20



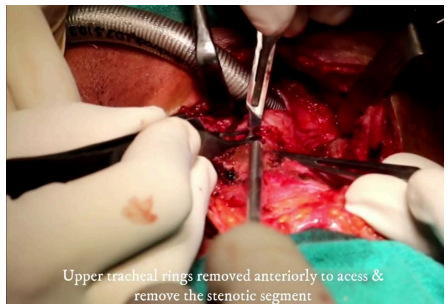
43.2 Bronchoscopy: the stenosis below the cords. Video 0:34



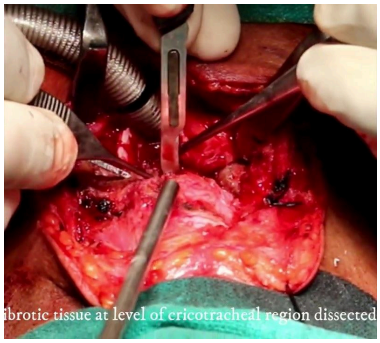
43.3 Thyroid isthmus divided; trachea skeletonised; incision in the intercartilaginous space. Video 1:01



43.4 Meticulous dissection close to the airway to protect the RLN. Video 1:15



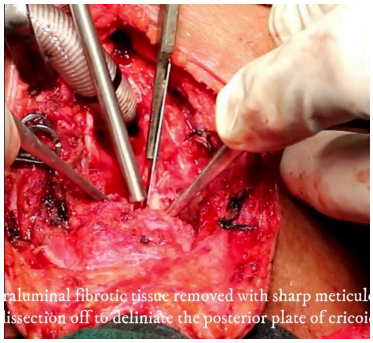
43.5 Upper tracheal rings removed anteriorly to access the stenotic segment. Video 1:42



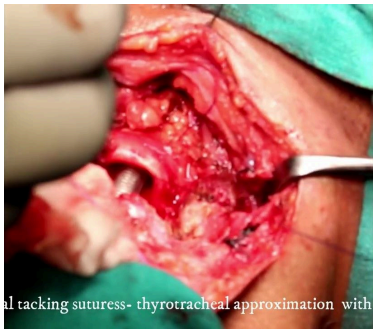
43.6 Fibrotic tissue at the cricotracheal junction dissected and removed. Video 1:56



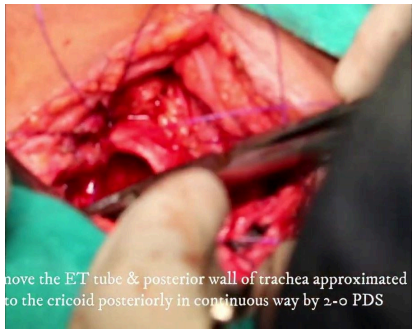
43.7 Anterior cricoid arch partially resected. Video 2:23



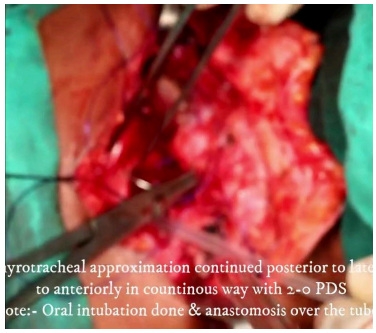
43.8 Intraluminal fibrotic tissue removed sharply off the posterior cricoid plate. Video 2:50



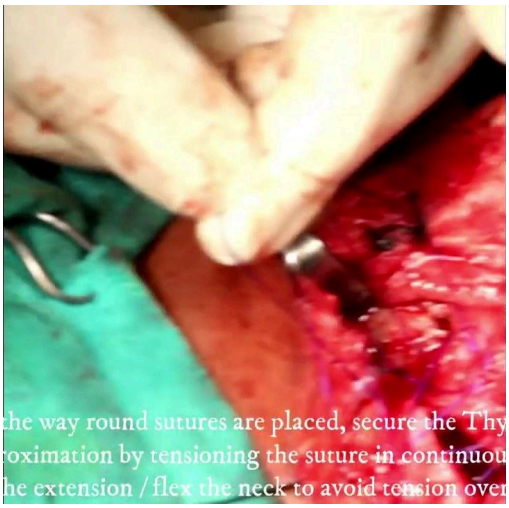
43.9 Lateral tacking sutures: thyrotracheal approximation, PDS 2-0. Video 3:18



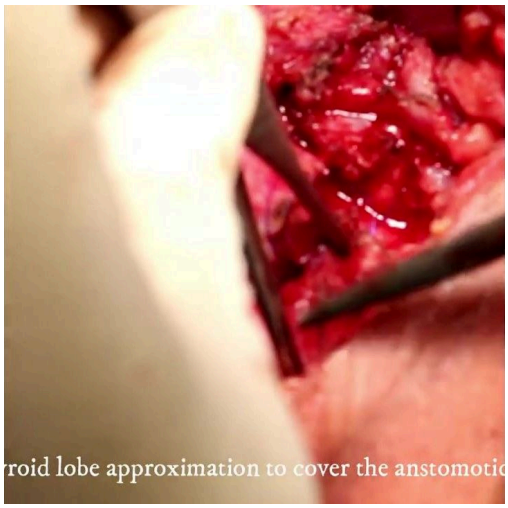
43.10 Posterior wall of trachea approximated to the cricoid, continuous PDS 2-0. Video 3:31



43.11 Approximation continued posterior to lateral to anterior; oral intubation, anastomosis over the tube. Video 3:59



43.12 Sutures tied with the neck flexed to avoid tension. Video 4:40



43.13 Thyroid lobes approximated over the anastomosis. Video 4:53

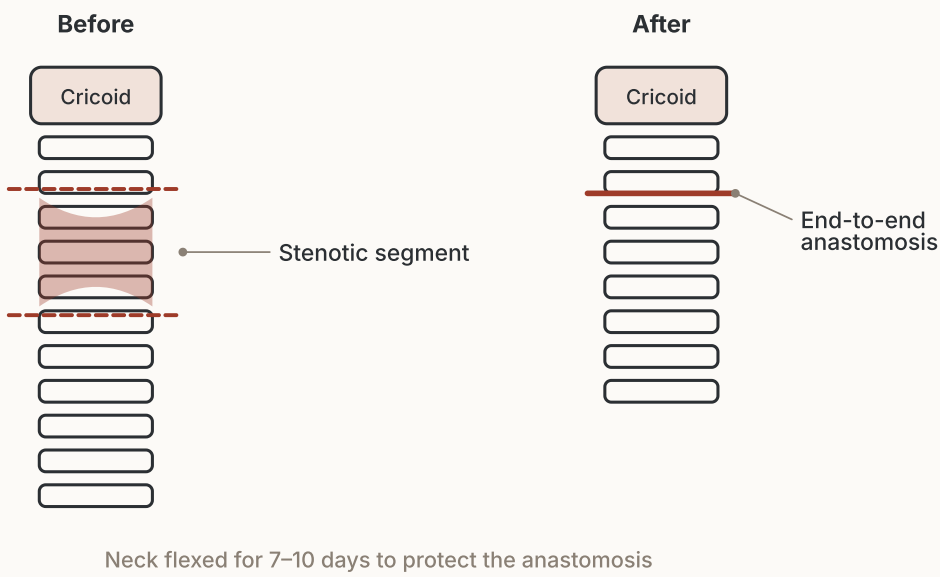


Figure 43.B Tracheal and cricotracheal resection with anastomosis.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Recurrent laryngeal nerves at the cricoid	The posterior cricoid plate was preserved and dissection kept on cartilage.
Tension	The sutures were tied with the neck flexed.

TEACHING POINTS

- **Preserve the posterior cricoid plate.** It protects the recurrent nerves.
- **Glottic involvement worsens the prognosis.** Decannulation rates fall.
- **Extubate early and inspect.** Bronchoscopy confirms the anastomosis.

CASE SUMMARY

Single-stage partial cricotracheal resection with thyrotracheal anastomosis. The patient was extubated immediately; day-1 bronchoscopy showed a healthy suture line, a patent airway, normal voice and mobile cords.

REFERENCES

1. Monnier P. Partial cricotracheal resection and extended cricotracheal resection for pediatric laryngotracheal stenosis. *Thorac Surg Clin* 2018;28:177–87. doi:10.1016/j.thorsurg.2018.01.012
2. Myer CM, O'Connor DM, Cotton RT. Proposed grading system for subglottic stenosis based on endotracheal tube sizes. *Ann Otol Rhinol Laryngol* 1994;103:319–23. doi:10.1177/000348949410300410
3. Grillo HC, Donahue DM. Postintubation tracheal stenosis. *Chest Surg Clin N Am* 1996;6:725–31.



44

Two circles

Tracheostomal stenosis after salvage total laryngectomy

Tracheostomaplasty by the two-circular-incision technique with radial incisions and advancement flaps

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 32-year-old man treated with chemoradiation for laryngeal carcinoma had recurrence and salvage total laryngectomy a year earlier. He developed concentric stomal stenosis with scar and granulation, difficulty in breathing, stomal bleeding and secretion stasis. Serial dilatation had failed.

AUTHOR'S PERSPECTIVE

> The stoma narrows because a ring of scar contracts. Excising that ring between two circular incisions and advancing the skin onto the trachea with radial releases enlarges the opening permanently.

APPROACH

Outer skin and inner tracheal circular incisions, excision of the scar ring, four radial incisions and advancement flaps sutured to the trachea.

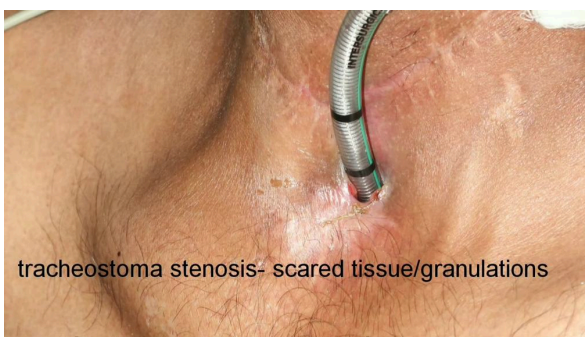
OPERATIVE STEPS

1. Mark the outer incision around the scar tissue.
2. Make the inner tracheal incision and excise the scar ring.
3. Make four radial incisions at 2, 4, 8 and 10 o'clock.
4. Deepen the incisions and undermine the skin.
5. Advance the flaps medially and suture them to the trachea with half-mattress sutures.



Figure 44.A Operative sequence.

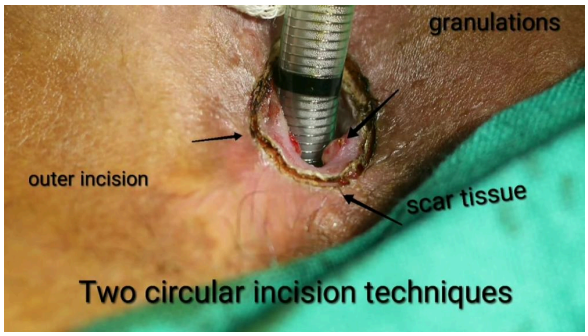
OPERATIVE RECORD



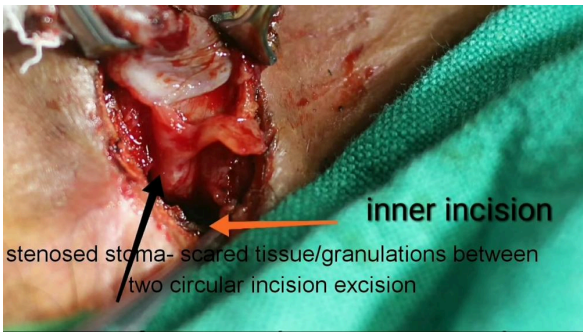
44.1 "Tracheostoma stenosis: scarred tissue, granulations."
Video 0:28



44.2 Circular incision around scar tissue and granulations.
Video 0:38



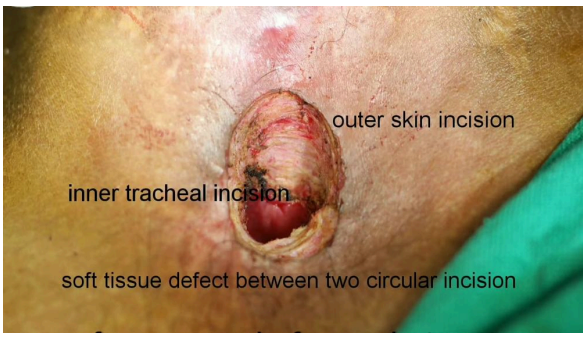
44.3 "Two circular incision techniques": outer incision and scar tissue. Video 0:44



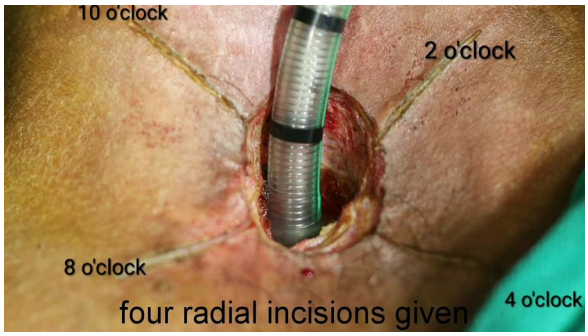
44.4 Inner incision: scar tissue and granulations between the two circles excised. Video 0:59



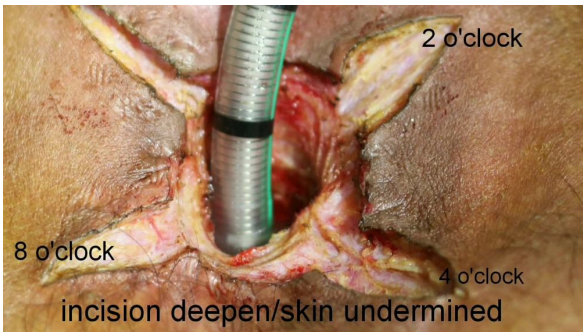
44.5 Soft tissue after excision. Video 1:20



44.6 Defect between the outer skin and inner tracheal incisions. Video 1:25



44.7 "Four radial incisions given" at 2, 4, 8 and 10 o'clock. Video 1:30



44.8 "Incision deepened, skin undermined." Video 1:41



44.9 "All flaps are raised as much as possible: skin undermining." Video 1:46



44.10 "All flaps advanced medially, sutured to trachea by half-mattress technique." Video 1:51

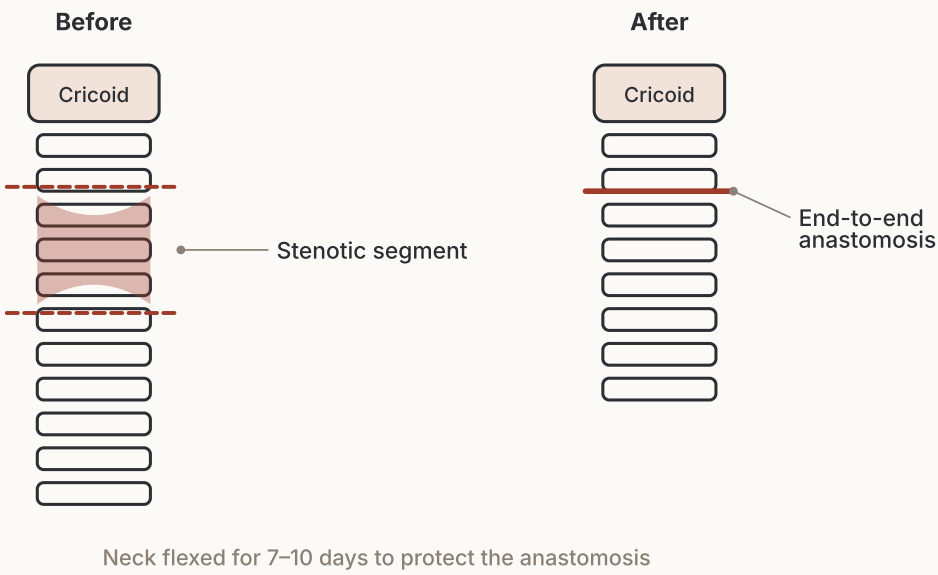


Figure 44.B Tracheal and cricotracheal resection with anastomosis.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Recurrent narrowing	The entire scar ring was excised and the skin advanced onto mucosa.
Irradiated skin	The flaps were undermined widely to avoid tension.

TEACHING POINTS

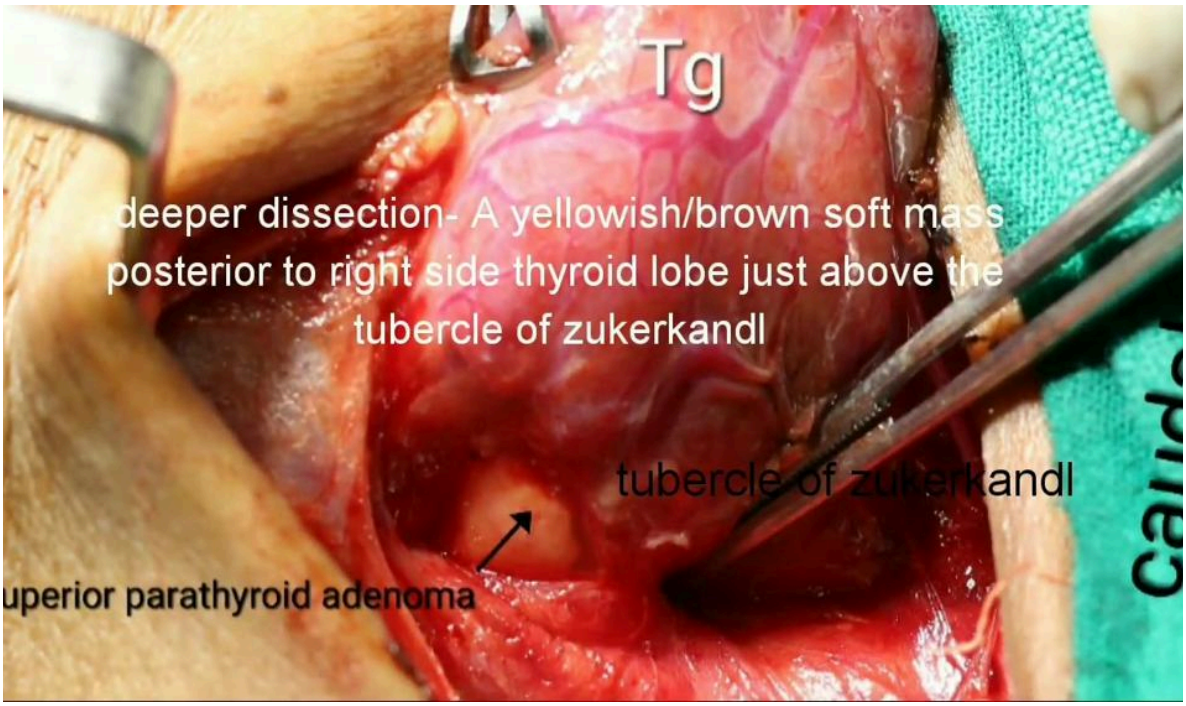
- **Excise the ring.** The contracting scar is the cause.
- **Radial incisions break the circle.** Preventing recontracture.
- **Evert skin onto mucosa.** Half-mattress sutures avoid raw edges.

CASE SUMMARY

Tracheostomaplasty by the two-circular-incision technique for stomal stenosis after salvage laryngectomy.

REFERENCES

1. Tay RX, Sim NHS, Hwee J, Lim MY, Ng HW. Tracheostomal stenosis 10 years after total laryngectomy managed with bilateral advancement flap stomaplasty: a case report. *J Surg Case Rep* 2026;2026(4):rjag310. doi:10.1093/jscr/rjag310



45

The gland behind the blood pressure

Primary hyperparathyroidism: right parathyroid adenoma, 9 × 5 × 7 mm, in a 54-year-old man

Focused excision with preservation of the thyroid

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 54-year-old man had several admissions for malignant hypertension on multiple drugs. Investigation showed creatinine 3.3, calcium 11.2 and PTH 1430. Ultrasound showed a well-circumscribed hypoechoic elliptical lesion of 9 × 5 × 7 mm posterior to the right thyroid lobe with mildly increased vascularity. Abdominal ultrasound was normal.

AUTHOR'S PERSPECTIVE

> Hypercalcaemia with a markedly raised PTH and a localised single lesion is an indication for surgery. Removing the adenoma corrects the calcium and protects the kidneys.

APPROACH

Lower neck incision, lateral approach between the strap muscles and sternocleidomastoid, focused dissection behind the right lobe.

OPERATIVE STEPS

1. Make the lower neck incision and raise subplatysmal flaps.
2. Dissect the plane between the strap muscles and sternocleidomastoid.
3. Retract the sternohyoid to expose the carotid and thyroid.
4. Identify the yellow-brown adenoma posterior to the right lobe above the tubercle of Zuckerkandl.
5. Dissect the lesion with gentle handling of its capsule.
6. Identify the recurrent laryngeal nerve and inferior thyroid vessels.
7. Remove the adenoma, preserving the thyroid.

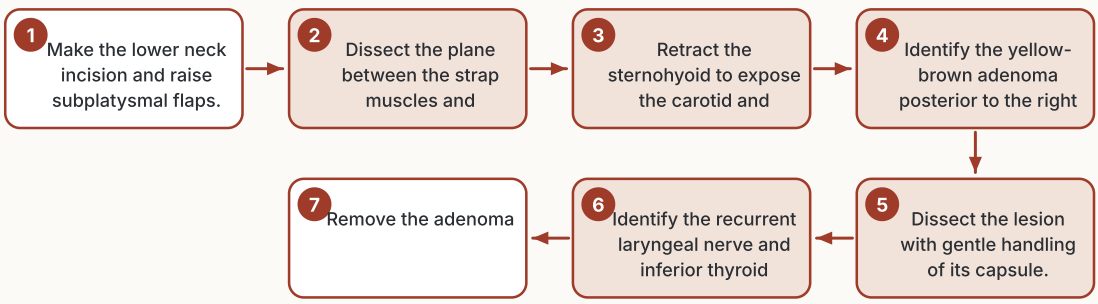
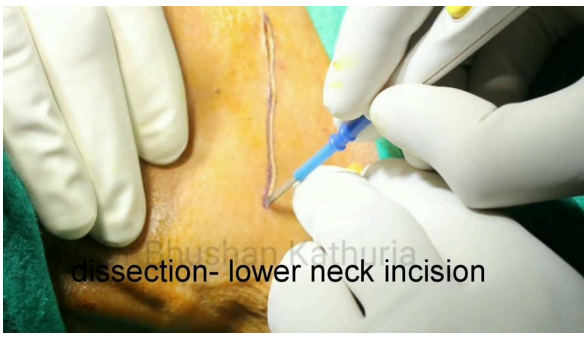


Figure 45.A Operative sequence.

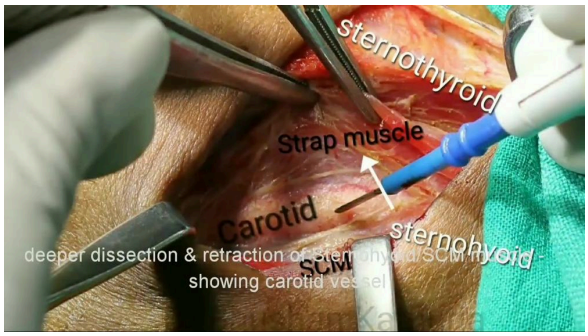
OPERATIVE RECORD



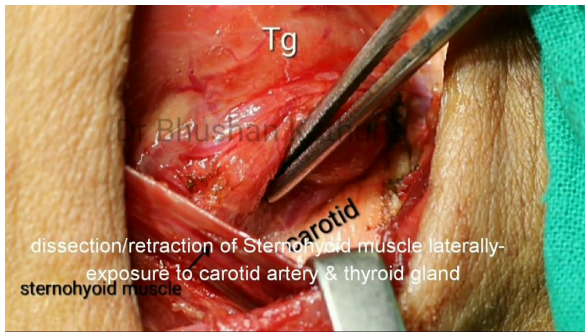
45.1 "Dissection: lower neck incision." Video 0:23



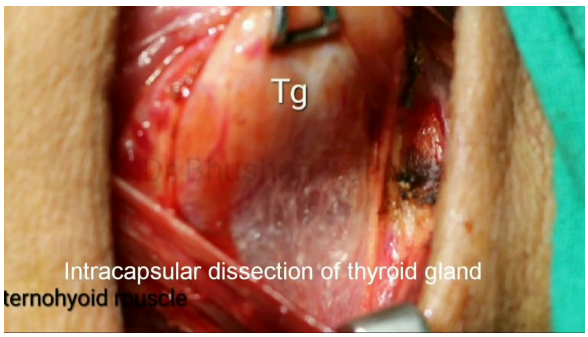
45.2 "Inferior sub-platysmal flap raised." Video 0:37



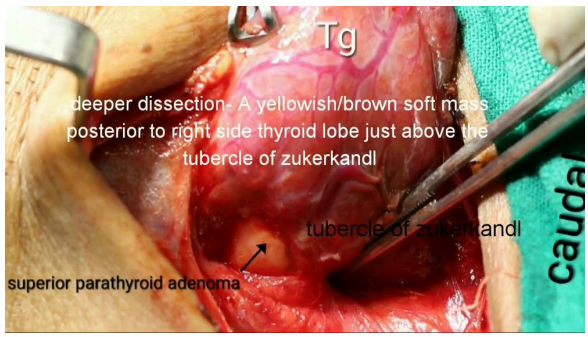
45.3 Deeper dissection, SCM retracted: carotid, strap muscle and sternothyroid labelled. Video 1:11



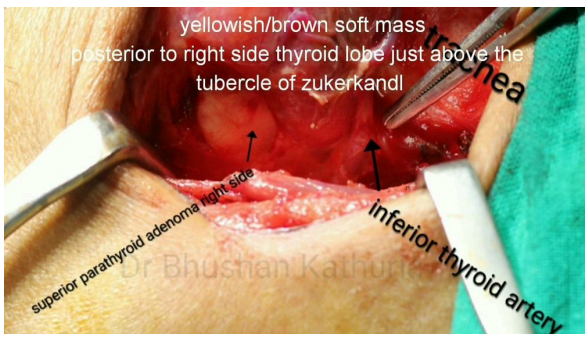
45.4 Sternohyoid retracted laterally, exposing the carotid and thyroid. Video 1:24



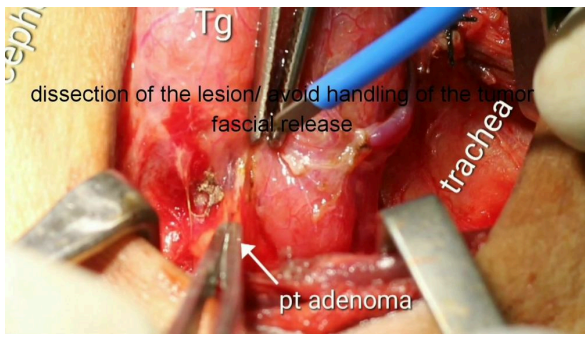
45.5 "Intracapsular dissection of thyroid gland." Video 1:31



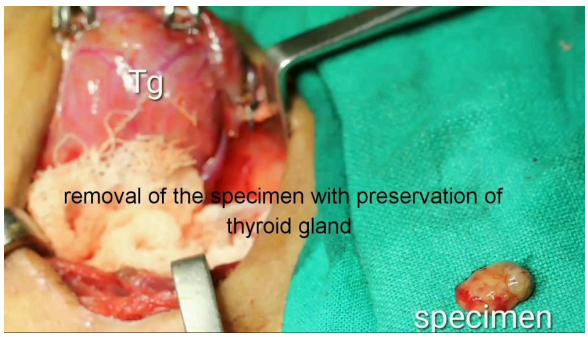
45.6 "A yellowish-brown soft mass posterior to the right thyroid lobe, just above the tubercle of Zuckerkandl." Video 1:38



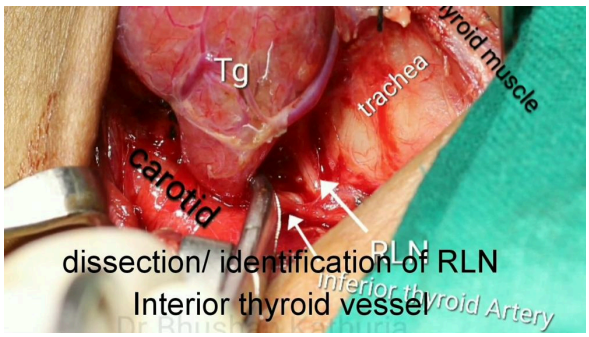
45.7 The adenoma and the inferior thyroid artery. Video 1:45



45.8 Dissection of the lesion with gentle handling of its capsule; adenoma labelled. Video 1:58



45.9 "Removal of the specimen with preservation of thyroid gland." Video 2:05



45.10 "Dissection, identification of RLN", inferior thyroid vessel. Video 2:18



45.11 "Specimen: well-circumscribed yellowish nodular mass, 9 × 5 × 7 mm", confirming the ultrasound. Video 2:12

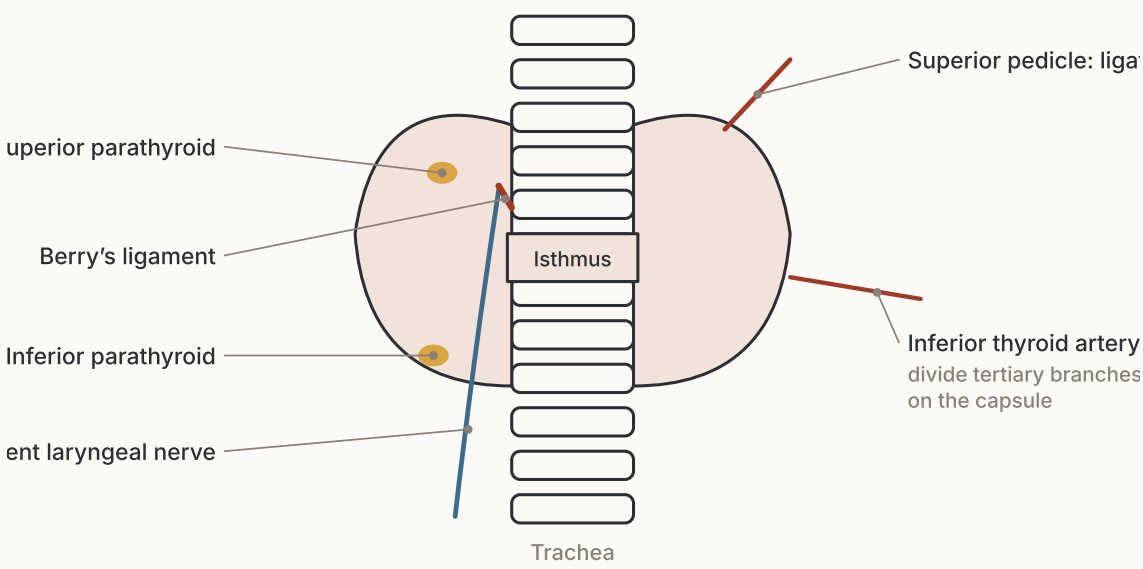


Figure 45.B Thyroid: recurrent laryngeal nerve, parathyroids and Berry's ligament.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Distinguishing adenoma from thyroid and fat	Colour, consistency and position above the tubercle identified it.
Capsular rupture and parathyromatosis	The capsule was handled gently and removed intact.

TEACHING POINTS

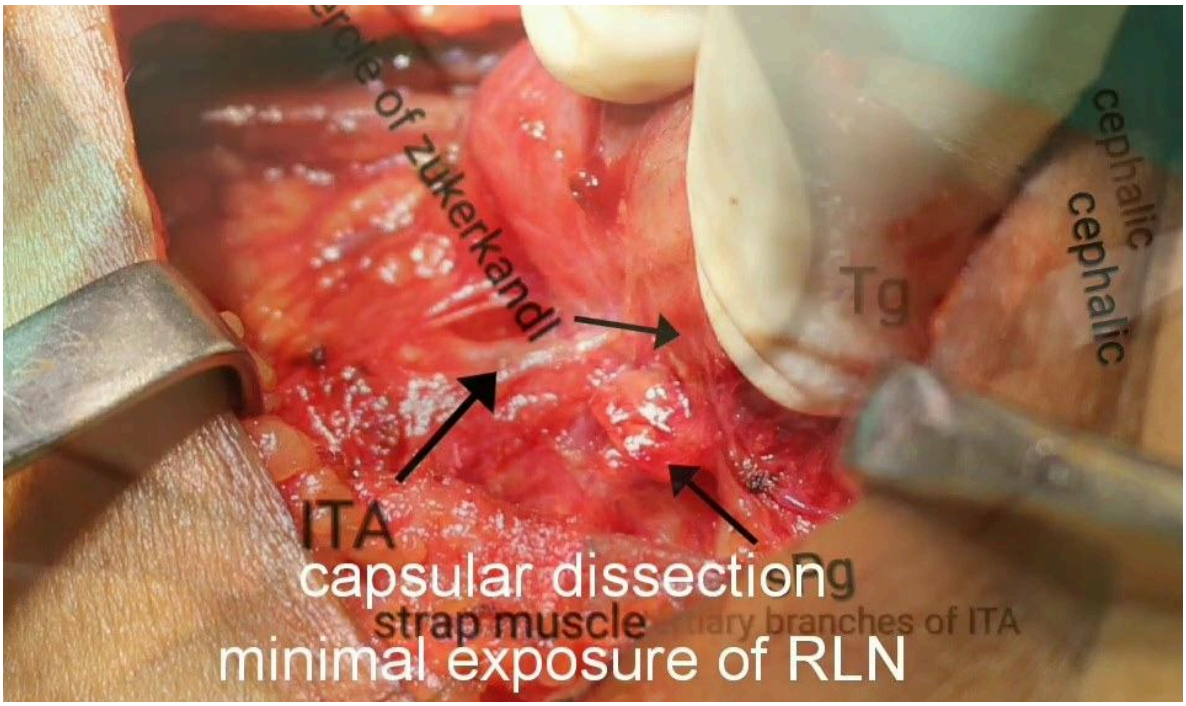
- **Localise before you operate.** Ultrasound and, where available, sestamibi allow a focused unilateral exploration through a small incision.
- **Superior glands lie near the tubercle of Zuckerkandl.** They sit posterior to the recurrent nerve, whereas inferior glands lie anterior to it.
- **A fall in PTH of more than half confirms success.** The short half-life of PTH makes early post-excision values reliable.
- **Watch for hungry bone syndrome.** Bone rapidly takes up calcium after a hyperfunctioning adenoma is removed; supplementation prevents symptomatic hypocalcaemia.

CASE SUMMARY

Excision of a 9 × 5 × 7 mm right parathyroid adenoma. On day 1 PTH fell to 70 (more than 95%) and calcium to 9.2; he was discharged on day 4 with calcium supplements, with normal calcium and PTH.

REFERENCES

1. Silverberg SJ, Clarke BL, Peacock M, et al. Current issues in the presentation of asymptomatic primary hyperparathyroidism: proceedings of the Fourth International Workshop. *J Clin Endocrinol Metab* 2014;99:3580–94. doi:10.1210/jc.2014-1415



46

On the capsule

Thyroid nodule

Hemithyroidectomy by capsular dissection

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The video demonstrates a hemithyroidectomy performed by capsular dissection to reduce recurrent laryngeal nerve neuropraxia and temporary hypoparathyroidism.

AUTHOR'S PERSPECTIVE

> Staying on the thyroid capsule and dividing the tertiary branches of the inferior thyroid artery on the gland protects both the parathyroid blood supply and the recurrent nerve, without the need to expose the whole nerve.

APPROACH

Collar incision, midline separation of the strap muscles, superior pedicle ligation, capsular dissection and release at Berry's ligament.

OPERATIVE STEPS

1. Elevate the subplatysmal flap superiorly.
2. Separate the strap muscles in the midline and retract them laterally.
3. Expose and ligate the superior thyroid pedicle close to the gland.
4. Perform capsular dissection, dividing tertiary branches of the inferior thyroid artery.
5. Dissect the parathyroid with its vasculature off the thyroid surface.
6. Release the lobe from the tracheal bed at Berry's ligament.
7. Inspect the post-surgical bed with nerve and parathyroid preserved; close in layers.

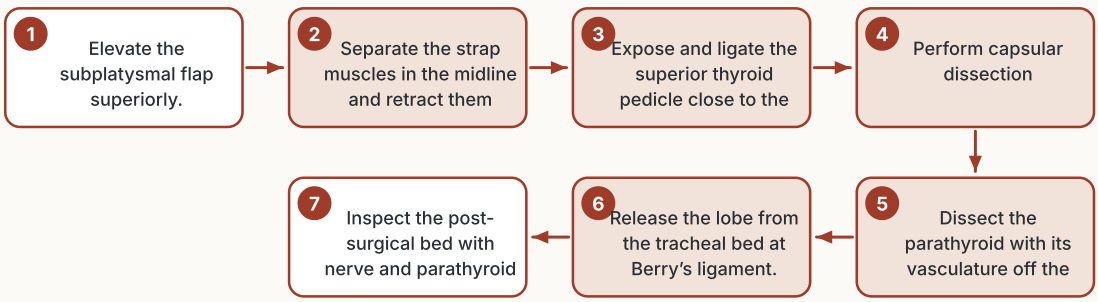
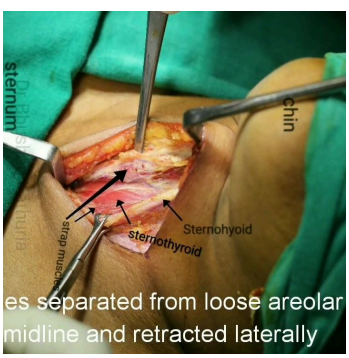


Figure 46.A Operative sequence.

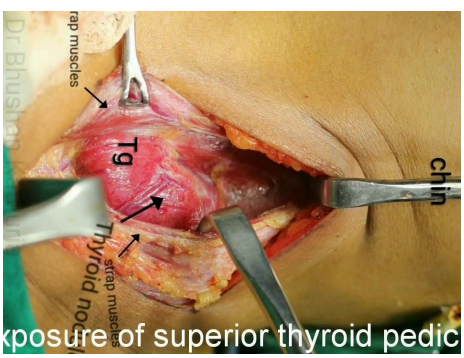
OPERATIVE RECORD



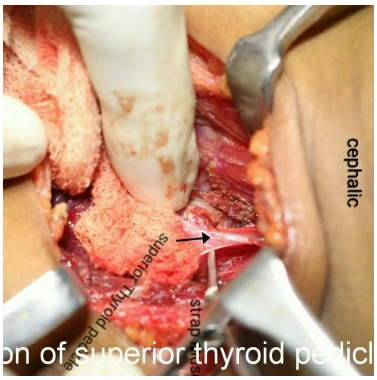
46.1 "Sub-platysmal flap elevated superiorly." Video 0:18



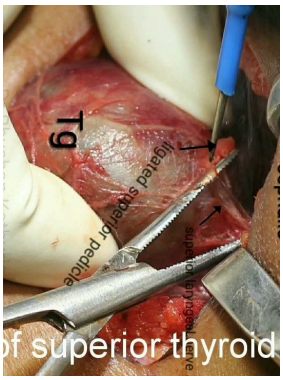
46.2 "Strap muscles separated from loose areolar tissue in midline and retracted laterally." Video 0:54



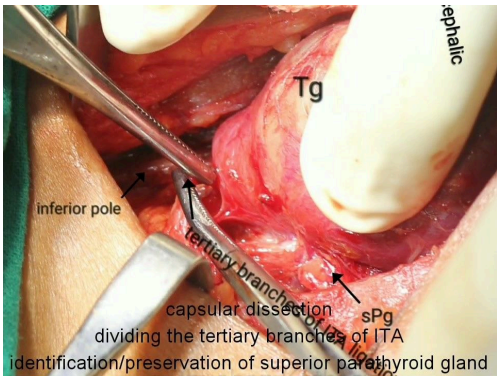
46.3 "Exposure of superior thyroid pedicle." Video 1:42



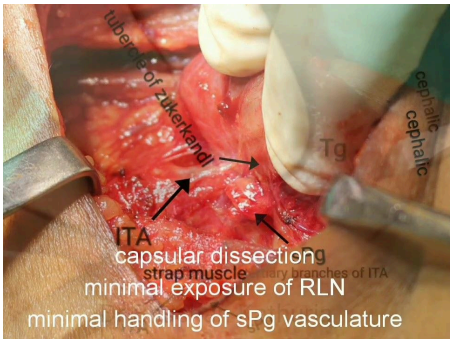
46.4 "Ligation of superior thyroid pedicle." Video 2:18



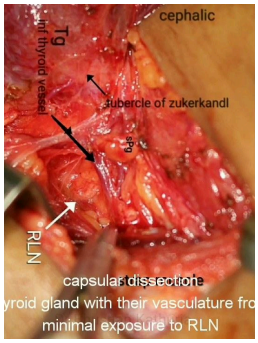
46.5 Superior pedicle ligated, preserving the external branch of the superior laryngeal nerve. Video 2:42



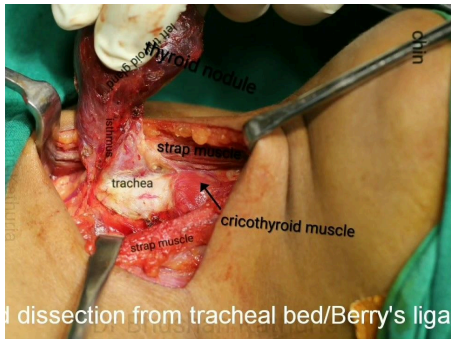
46.6 Capsular dissection: hugging the gland and dividing tertiary branches of the ITA. Video 3:06



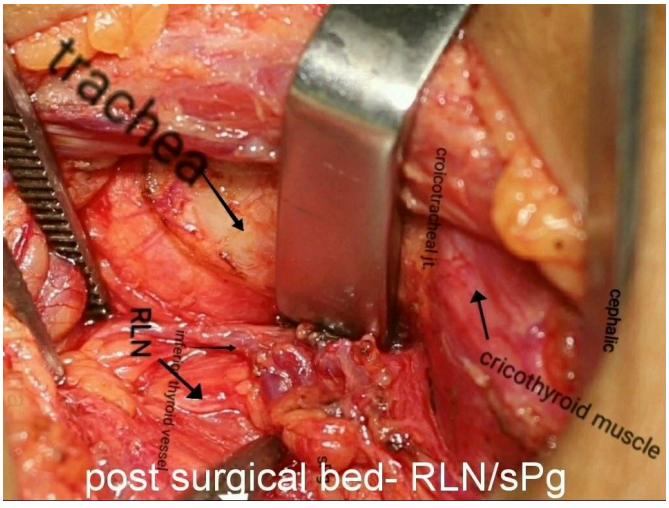
46.7 "Capsular dissection: minimal exposure of RLN, minimal handling of superior parathyroid vasculature." Video 3:18



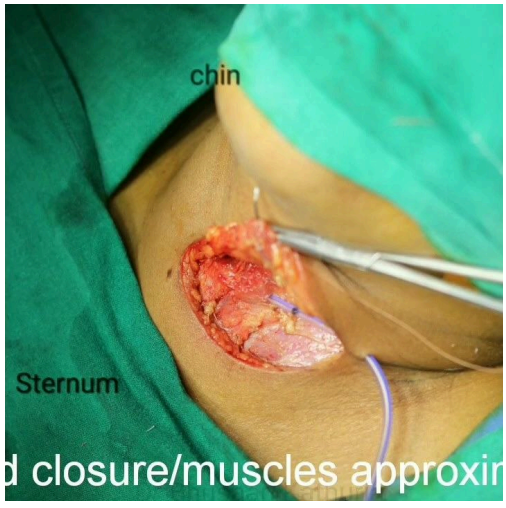
46.8 Dissecting the parathyroid with its vasculature off the thyroid surface. Video 3:42



46.9 "Thyroid dissection from tracheal bed/Berry's ligament." Video 4:06



46.10 "Post-surgical bed: RLN and superior parathyroid." Video 4:31



46.11 "Wound closure, muscle approximation." Video 4:43

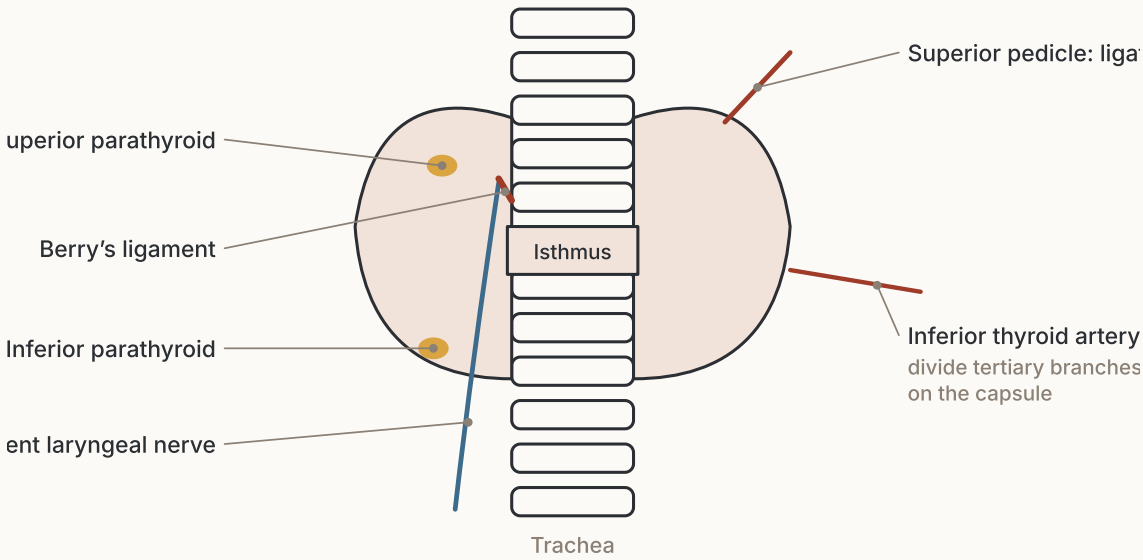


Figure 46.B Thyroid: recurrent laryngeal nerve, parathyroids and Berry's ligament.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
External branch of the superior laryngeal nerve	The superior pedicle was ligated close to the gland.
Parathyroid devascularisation	Tertiary vessels were divided on the capsule.

TEACHING POINTS

- **Ligate the superior pedicle on the gland.** Protecting the external laryngeal nerve.
- **Divide tertiary branches on the capsule.** Preserving parathyroid supply.
- **Berry's ligament is where the nerve is closest.** Dissect it last and with care.

CASE SUMMARY

Hemithyroidectomy by capsular dissection with preservation of the recurrent nerve and superior parathyroid.

REFERENCES

1. Talasila S, Ramya M, Sravanthi T. Prospective observational study of the role of unilateral prophylactic central compartmental lymph node dissection in early papillary thyroid cancer. *Cureus* 2026;18:e102284. doi:10.7759/cureus.102284



47

A voice at eighty

Left vocal cord palsy fixed in abduction in an 80-year-old with hoarseness for one year

Type 1 (medialisation) thyroplasty with a silicone block

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

An 80-year-old patient had hoarseness for one year. Laryngoscopy showed left vocal cord palsy fixed in abduction. Chest X-ray and skull base imaging were normal.

AUTHOR'S PERSPECTIVE

> After a year without recovery, the palsy was considered permanent. A medialisation thyroplasty under local anaesthesia allows the implant to be adjusted while the patient speaks, which suits an elderly patient.

APPROACH

Horizontal incision over the thyroid lamina, inner perichondrial flap, window 3 mm above the inferior border and 6 mm from the midline, silicone implant.

OPERATIVE STEPS

1. Mark the laryngeal framework: thyroid notch, hyoid, cricoid and incision line.
2. Make the incision over the thyroid lamina.
3. Elevate the mucoperichondrial flap.
4. Cut a 7 × 13 mm window 6 mm from the midline and 3 mm above the inferior border.
5. Insert and adjust the silicone block while the patient phonates.

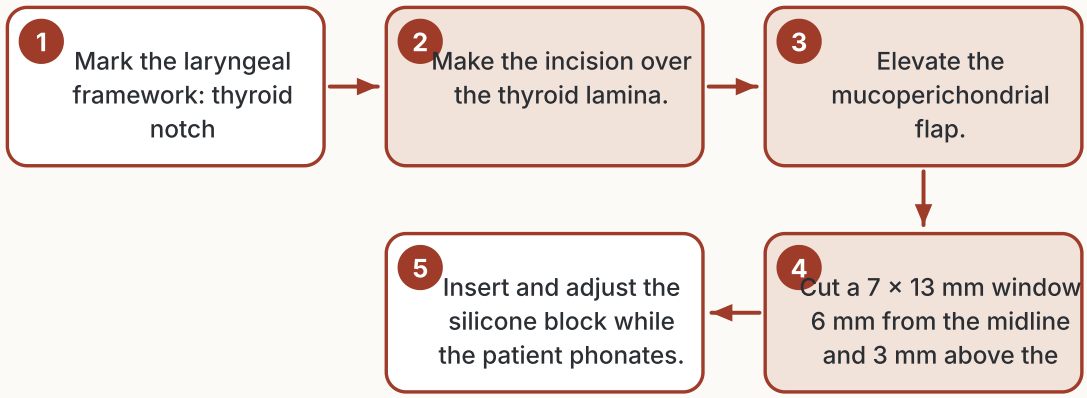
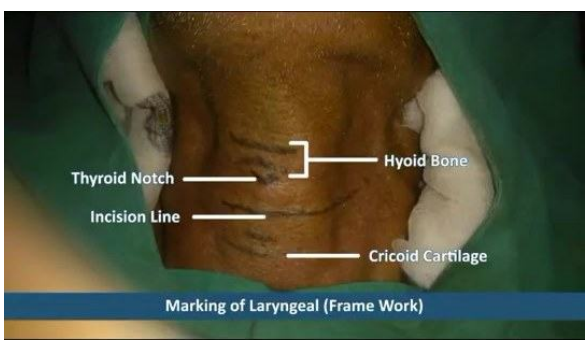


Figure 47.A Operative sequence.

OPERATIVE RECORD



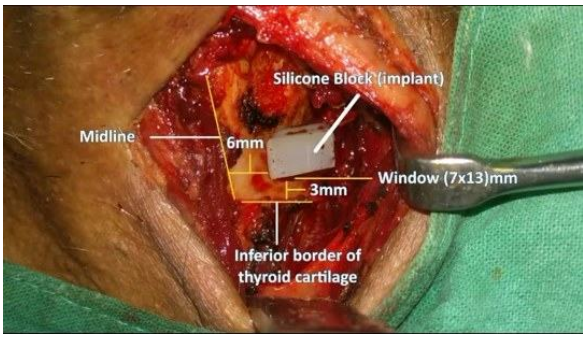
47.1 "Marking of laryngeal framework": thyroid notch, hyoid bone, incision line, cricoid cartilage. Video 0:47



47.2 "Intra-operative incision." Video 0:52



47.3 "Mucoperichondrial flap elevated." Video 0:57



47.4 Silicone block implant through a 7 × 13 mm window, 6 mm from the midline and 3 mm above the inferior border of the thyroid cartilage. Video 1:02

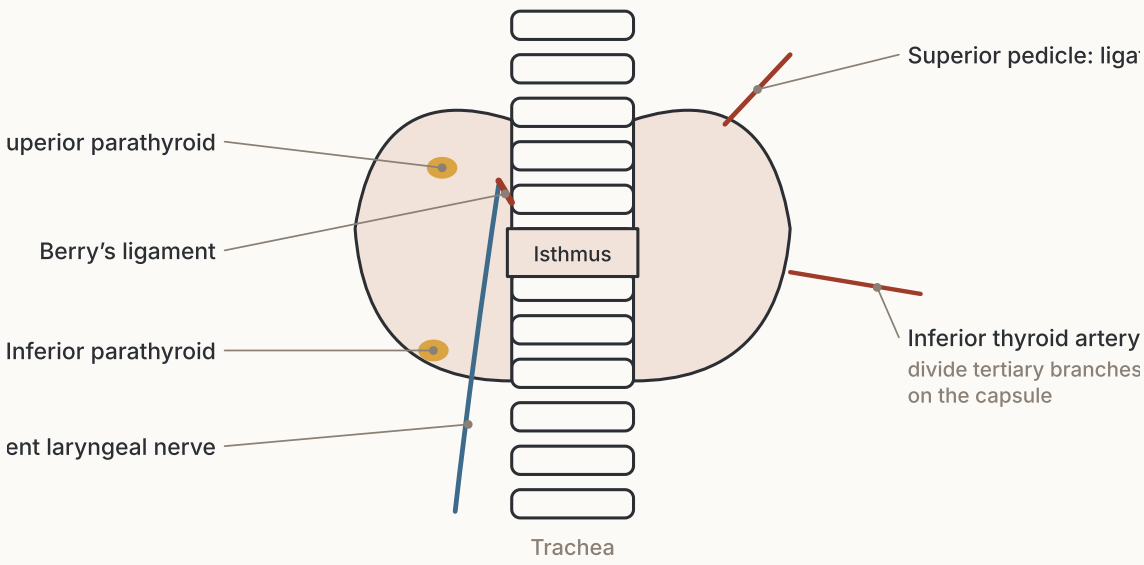


Figure 47.B Thyroid: recurrent laryngeal nerve, parathyroids and Berry's ligament.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Placing the window at the level of the vocal fold	Measurements from the midline and inferior border were used.
Over-medialisation and airway	The implant was adjusted under voice monitoring.

TEACHING POINTS

- **Wait for recovery.** Permanent procedures are usually deferred for about a year.
- **Window position.** About 3 mm above the inferior border.

- **Adjust while the patient speaks.** Local anaesthesia allows fine tuning.

CASE SUMMARY

Type 1 thyroplasty with a silicone block for a left vocal cord palsy in an 80-year-old.

REFERENCES

1. Kosztyła-Hojna B, Berger G, Zdrojkowski M. Phonosurgical methods of treatment in unilateral vocal fold paralysis. *Pol Merkur Lekarski* 2017;42:173–7.



48

A single lobe

Thyroid nodule

Thyroid lobectomy through a collar incision

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the thyroid lobe exposed and delivered through a collar incision, and the specimen.

AUTHOR'S PERSPECTIVE

> A solitary indeterminate or suspicious nodule is removed by lobectomy, which gives a histological diagnosis and treats many low-risk cancers, while preserving the other lobe and often avoiding lifelong hormone replacement.

APPROACH

Collar incision, midline approach between the strap muscles and delivery of the lobe.

OPERATIVE STEPS

1. Make the collar incision and retract the strap muscles.
2. Expose the thyroid lobe.
3. Deliver the lobe through the incision.
4. Remove the lobe with the nodule.

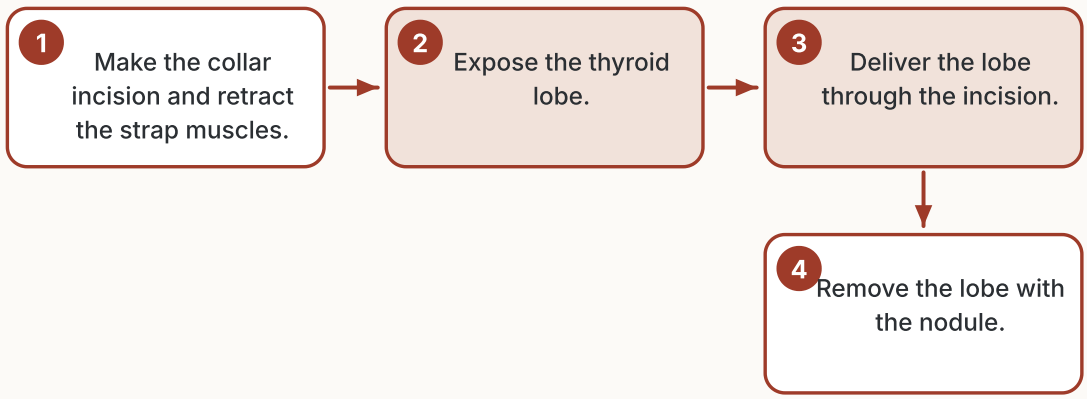
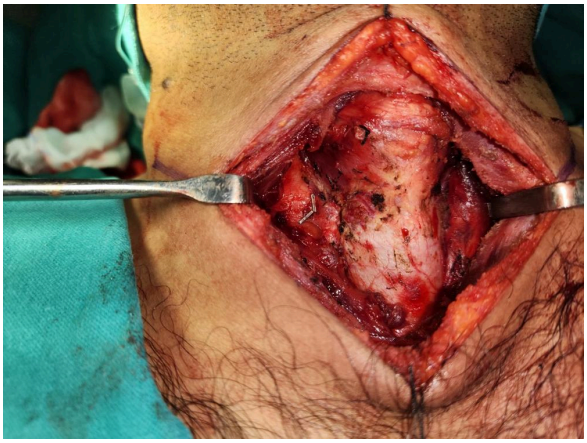
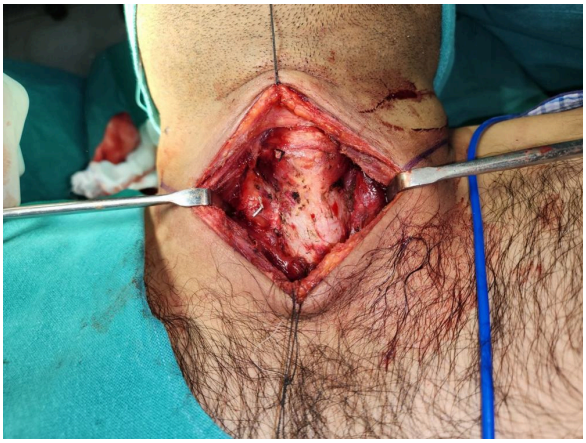


Figure 48.A Operative sequence.

OPERATIVE RECORD



48.1 Thyroid lobe exposed with retractors.



48.2 Midline neck (thyroid) incision with strap muscles retracted, thyroid exposed.



48.3 Delivery of thyroid lobe through collar incision.



48.4 Specimen: thyroid on gauze, capsular surface.



48.5 Specimen: thyroid lobe/nodule.

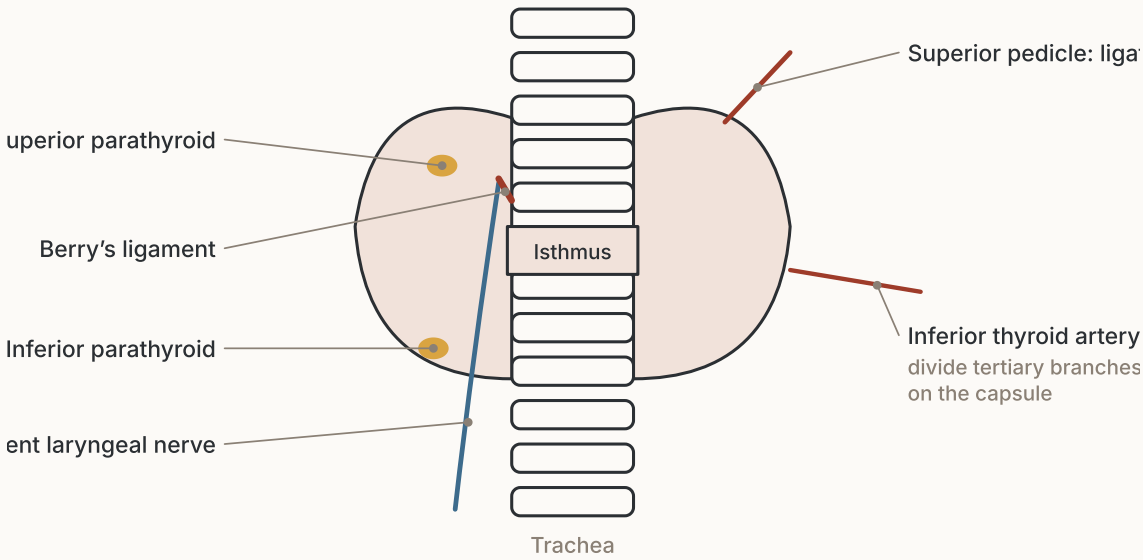


Figure 48.B Thyroid: recurrent laryngeal nerve, parathyroids and Berry's ligament.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Exposure through a small incision	The lobe was delivered after the vascular pedicles were controlled.
Recurrent nerve and parathyroids	Capsular dissection protected both.

TEACHING POINTS

- **Ultrasound and cytology decide the operation.** TIRADS grading selects nodules for aspiration and Bethesda categories guide the extent of surgery.
- **Lobectomy is enough for many low-risk cancers.** It gives definitive histology and avoids lifelong replacement in most patients.
- **Capsular dissection protects nerve and parathyroids.** Dividing vessels on the capsule keeps the parathyroid supply intact.

CASE SUMMARY

Thyroid lobectomy for a solitary nodule through a collar incision.

REFERENCES

1. Talasila S, Ramya M, Sravanthi T. Prospective observational study of the role of unilateral prophylactic central compartmental lymph node dissection in early papillary thyroid cancer. *Cureus* 2026;18:e102284. doi:10.7759/cureus.102284



49

The nodular goitre

Multinodular goitre

Total thyroidectomy

PART IV · THYROID, PARATHYROID AND AIRWAY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows both enlarged nodular lobes exposed after strap retraction and a lobe mobilised on its vascular pedicle.

AUTHOR'S PERSPECTIVE

> A multinodular goitre causing pressure symptoms or with suspicious nodules is treated by total thyroidectomy, since leaving nodular tissue risks recurrence and a difficult reoperation.

APPROACH

Collar incision, division of strap muscles if needed for size, and systematic lobe mobilisation.

OPERATIVE STEPS

1. Retract the strap muscles and expose both lobes.
2. Control the vascular pedicles and mobilise each lobe.
3. Identify the recurrent nerves and parathyroids.
4. Remove both lobes.

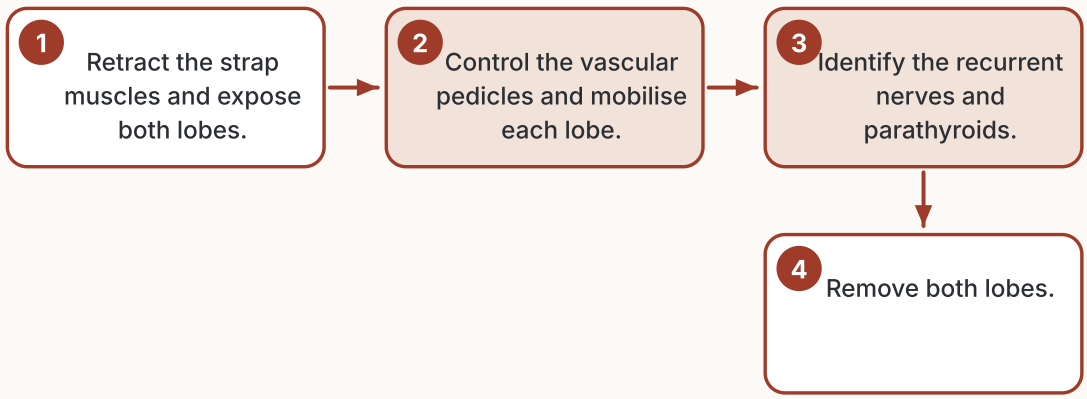


Figure 49.A Operative sequence.

OPERATIVE RECORD



49.1 Thyroidectomy: both enlarged nodular thyroid lobes exposed after strap muscle retraction, collar incision.



49.2 Thyroid lobe being mobilised with artery forceps on vascular pedicle.

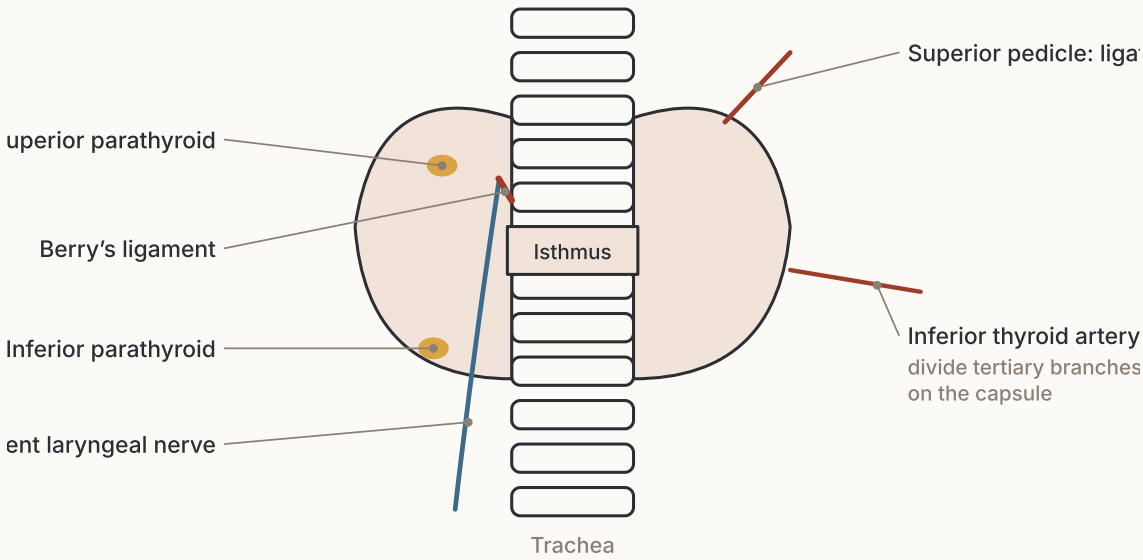


Figure 49.B Thyroid: recurrent laryngeal nerve, parathyroids and Berry's ligament.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Large lobes in a small field	The strap muscles were retracted or divided for access.
Bilateral nerve risk	Each recurrent nerve was identified before the lobe was released.

TEACHING POINTS

- **Total, not subtotal.** Remnant nodules recur.
- **Bilateral nerve risk.** Confirm function of the first side before proceeding where monitoring is used.
- **Check calcium after surgery.** Transient hypocalcaemia is common.

CASE SUMMARY

Total thyroidectomy for multinodular goitre.

REFERENCES

1. Talasila S, Ramya M, Sravanthi T. Prospective observational study of the role of unilateral prophylactic central compartmental lymph node dissection in early papillary thyroid cancer. *Cureus* 2026;18:e102284. doi:10.7759/cureus.102284

PART V

Salivary glands and skin

The parotid and the facial nerve, and skin cancers of the face reconstructed by subunit.

50 Grade 6

51 The facial nerve fan

52 The nerve in its full course

53 The pigmented cheek

54 Around the pinna

55 The upper lip

56 A nose from the forehead

57 The lower lip and chin

58 The temple and the forehead

59 The preauricular ulcer

60 Beside the orbit



50

Grade 6

Mucoepidermoid carcinoma of the parotid with complete facial palsy and skin infiltration

Total radical parotidectomy, extended radical neck dissection, external carotid ligation and PMMC reconstruction

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The patient presented with a parotid mass, House–Brackmann grade 6 facial palsy and infiltration of the overlying skin.

AUTHOR'S PERSPECTIVE

> A complete facial palsy indicates nerve invasion. The whole gland was removed with the nerve and the involved skin, with an extended radical neck dissection, and the defect was covered with a pectoralis major flap.

APPROACH

Total radical parotidectomy with skin excision, extended radical neck dissection, ligation of the external carotid and pectoralis major reconstruction.

OPERATIVE STEPS

1. Excise the parotid with the involved skin.
2. Perform the extended radical neck dissection.
3. Ligate the external carotid artery.
4. Deliver the specimen and inspect the post-surgical bed.
5. Reconstruct with a pectoralis major myocutaneous flap.

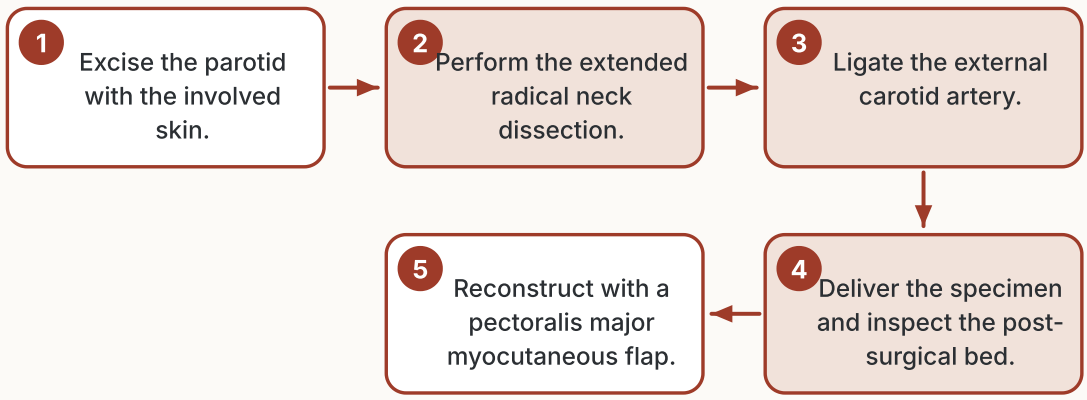
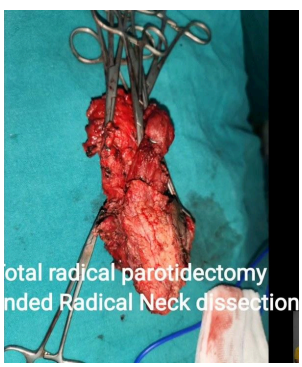
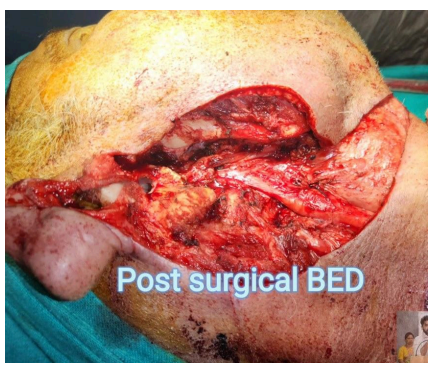


Figure 50.A Operative sequence.

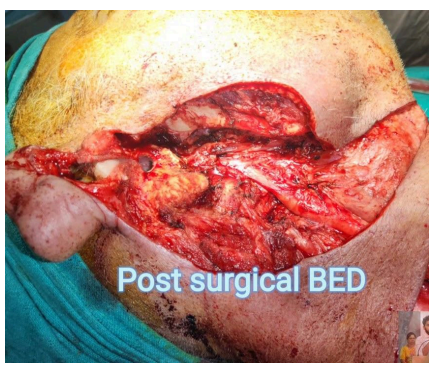
OPERATIVE RECORD



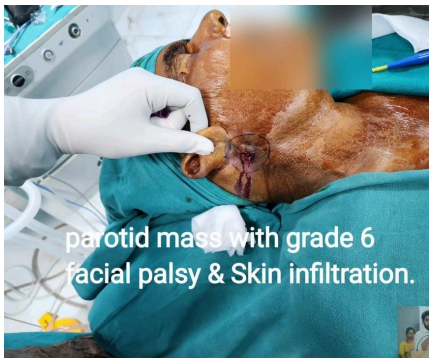
50.1 "Total radical parotidectomy, extended radical neck dissection": the specimen. Video 0:45



50.2 "Post-surgical bed." Video 0:50



50.3 Post-surgical bed, before PMMC reconstruction. Video 0:55



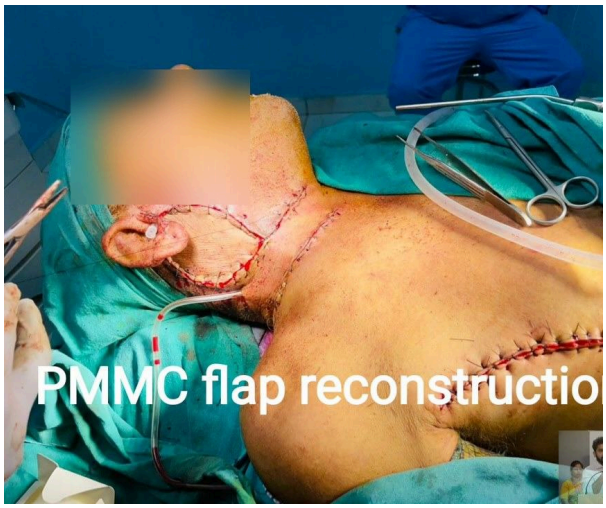
50.4 “Parotid mass with grade 6 facial palsy and skin infiltration.” Video 0:07



50.5 “Total radical parotidectomy, extended radical neck dissection.” Video 0:13



50.6 “External carotid ligation” during the radical resection. Video 0:29



50.7 “PMMC flap reconstruction.” Video 1:00

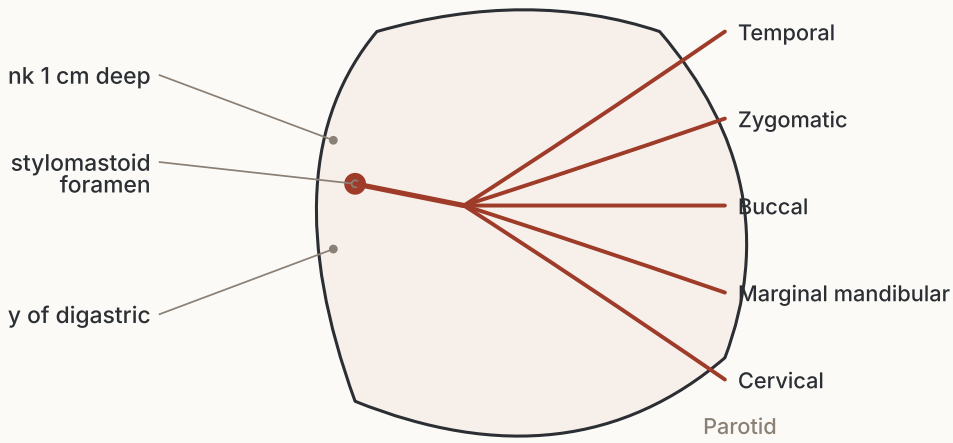


Figure 50.B Facial nerve in the parotid.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Nerve invasion	The facial nerve was resected with the tumour.
A large skin defect over the parotid bed	A pectoralis major flap provided cover.
Eye exposure with facial palsy	Eye protection was planned after surgery.

TEACHING POINTS

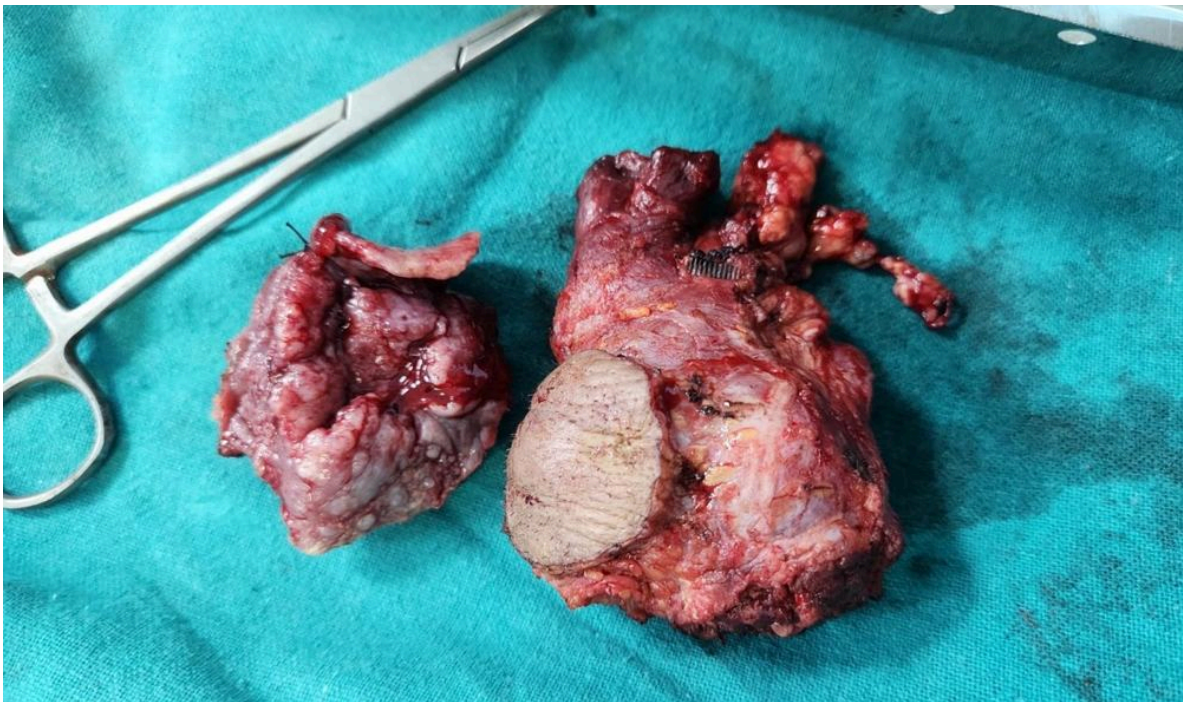
- **Preoperative palsy means malignancy and nerve invasion.** Benign parotid tumours almost never paralyse the face.
- **Frozen section on the proximal nerve stump.** Confirms clearance before the decision on grafting.
- **Protect the eye.** Incomplete closure risks exposure keratitis; tarsorrhaphy or a gold weight is planned early.

CASE SUMMARY

Radical parotidectomy with extended radical neck dissection and pectoralis major reconstruction for mucoepidermoid carcinoma with facial palsy and skin invasion.

REFERENCES

1. Shao A, Wong DK, McIvor NP, et al. Parotid metastatic disease from cutaneous squamous cell carcinoma: prognostic role of facial nerve sacrifice, lateral temporal bone resection, immune status and P-stage. *Head Neck* 2014;36:545–50. doi:10.1002/hed.23323
2. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.



51

The facial nerve fan

Parotid tumour

Superficial parotidectomy with facial nerve preservation

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the facial nerve trunk and branches exposed under the elevated parotid tissue and the parotid bed after removal of the superficial lobe.

AUTHOR'S PERSPECTIVE

> For benign tumours and selected low-grade malignancies of the superficial lobe, the gland is removed above the plane of the facial nerve, which is preserved in full.

APPROACH

Modified Blair incision, identification of the facial nerve trunk, and dissection of the superficial lobe along the nerve branches.

OPERATIVE STEPS

1. Raise the skin flap and expose the parotid.
2. Identify the facial nerve trunk.
3. Trace the branches through the gland with fine forceps.
4. Display the nerve divisions and branches.
5. Remove the superficial lobe with the tumour.

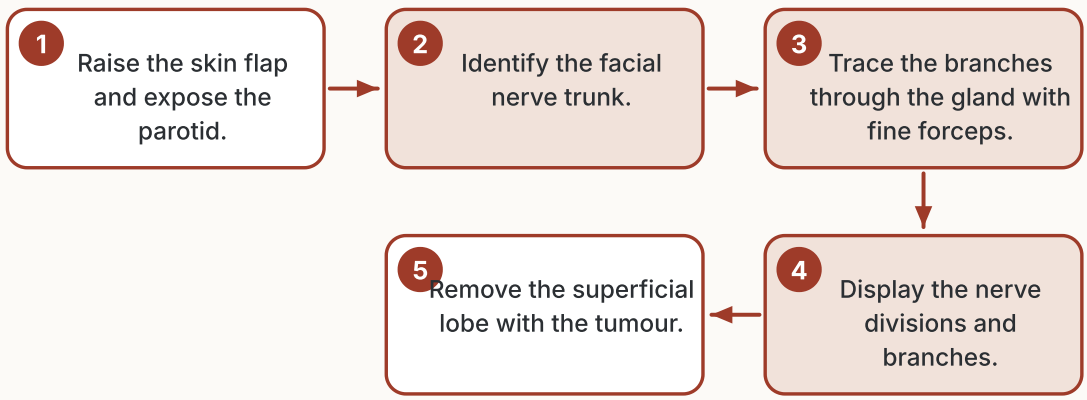
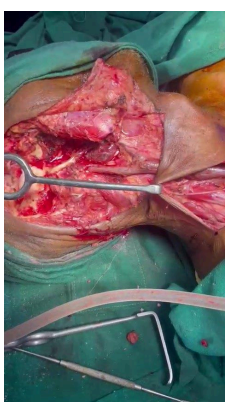


Figure 51.A Operative sequence.

OPERATIVE RECORD



51.1 Facial nerve trunk and branches exposed under elevated parotid tissue (superficial parotidectomy).



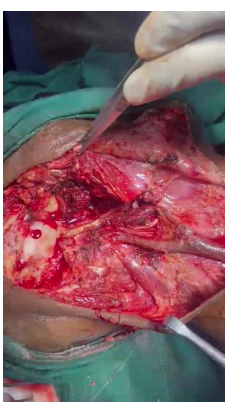
51.2 Parotidectomy: skin flap raised, parotid being dissected off facial nerve, ring retractor.



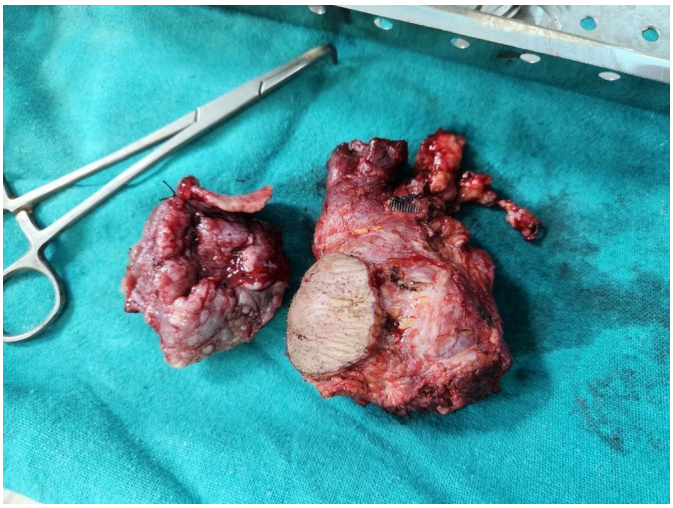
51.3 Facial nerve branches being traced through parotid with fine forceps.



51.4 Facial nerve divisions and branches displayed, wider view.



51.5 Parotid bed after superficial lobe removal with facial nerve branches visible.



51.6 Specimens: tumour and neck dissection with haemostat.

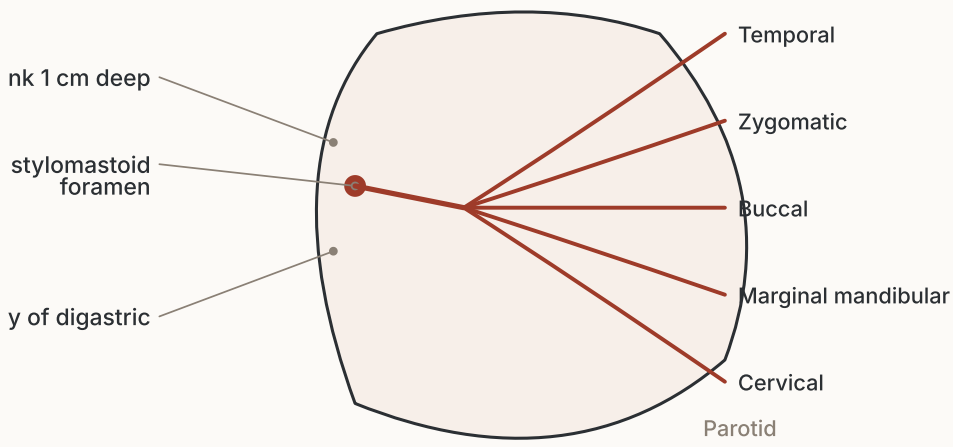


Figure 51.B Facial nerve in the parotid.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Finding the trunk	The tragal pointer, posterior belly of digastric and tympanomastoid suture guided the search.
Branch injury during dissection	Dissection followed the nerve from trunk to periphery.

TEACHING POINTS

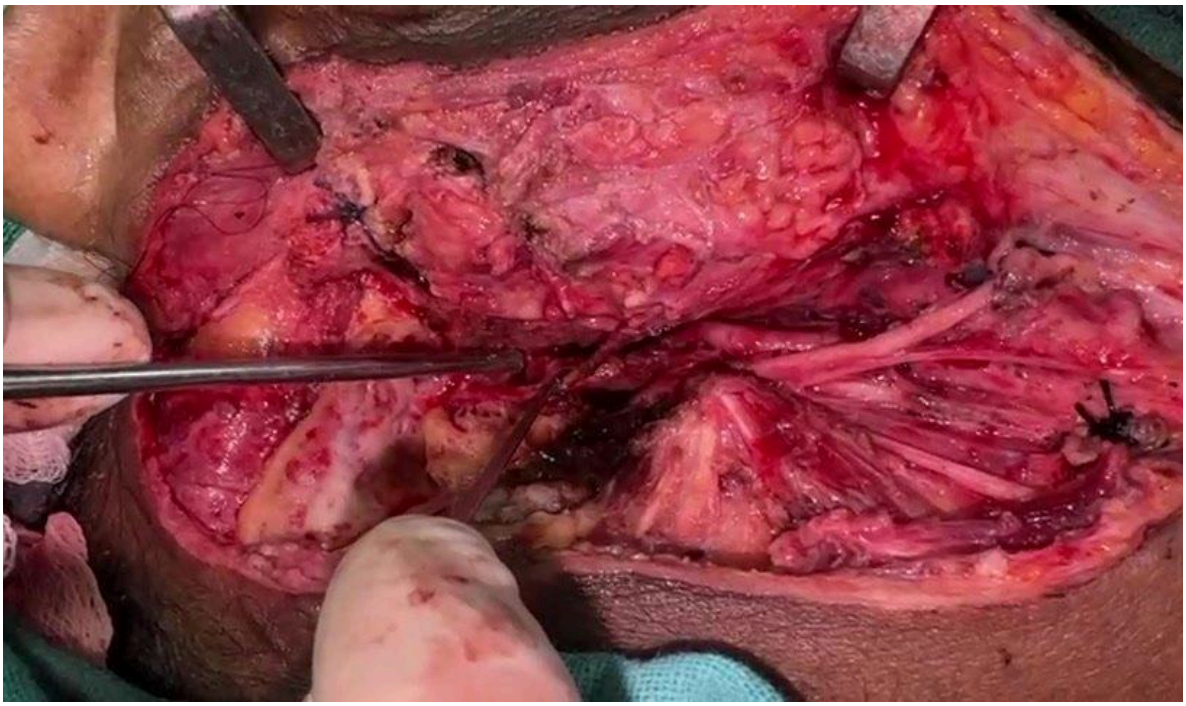
- **Find the trunk first.** About 1 cm deep and inferior to the tragal pointer.
- **Follow the nerve forwards.** Dissection along the branches avoids injury.
- **Temporary weakness is common.** Permanent paralysis should be rare.

CASE SUMMARY

Superficial parotidectomy with complete preservation of the facial nerve.

REFERENCES

1. Shao A, Wong DK, McIvor NP, et al. Parotid metastatic disease from cutaneous squamous cell carcinoma: prognostic role of facial nerve sacrifice, lateral temporal bone resection, immune status and P-stage. *Head Neck* 2014;36:545–50. doi:10.1002/hed.23323



52

The nerve in its full course

Parotid and upper neck disease near the skull base

Parotidectomy with mapping of the facial nerve from the skull base

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the facial nerve branches across the parotid region, a marking suture on a branch, and the facial nerve trunk with the lower cranial nerves near the skull base.

AUTHOR'S PERSPECTIVE

> When disease extends deep or towards the skull base, the facial nerve is mapped from its exit at the stylomastoid foramen and the lower cranial nerves are identified, so that each can be preserved or deliberately resected.

APPROACH

Wide exposure of the parotid and upper neck with the facial nerve traced from the trunk and the lower cranial nerves identified.

OPERATIVE STEPS

1. Expose the facial nerve branches across the parotid region.
2. Mark the branches for orientation.
3. Trace the trunk to the skull base with the lower cranial nerves.

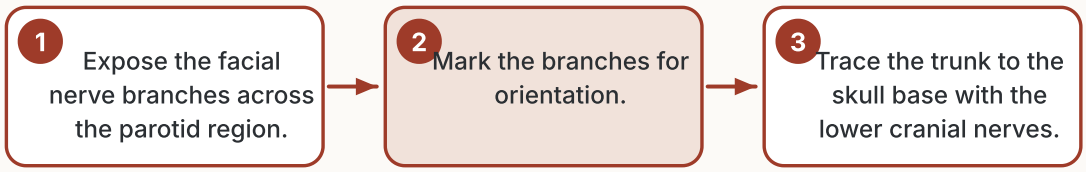
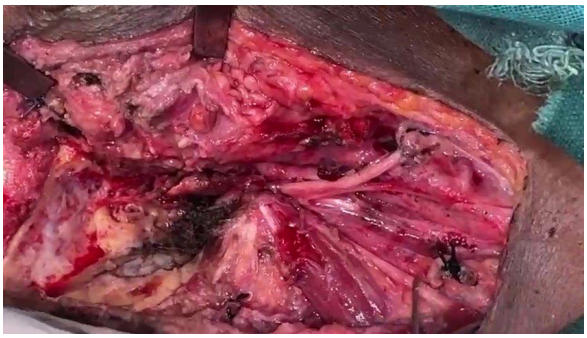
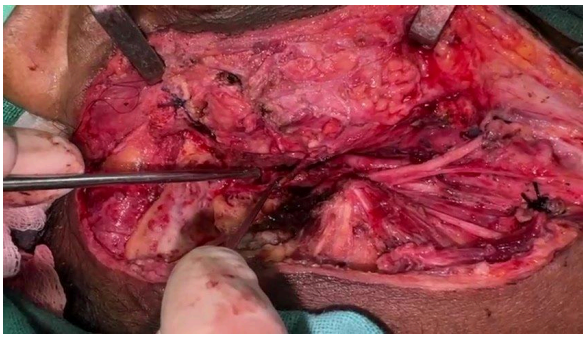


Figure 52.A Operative sequence.

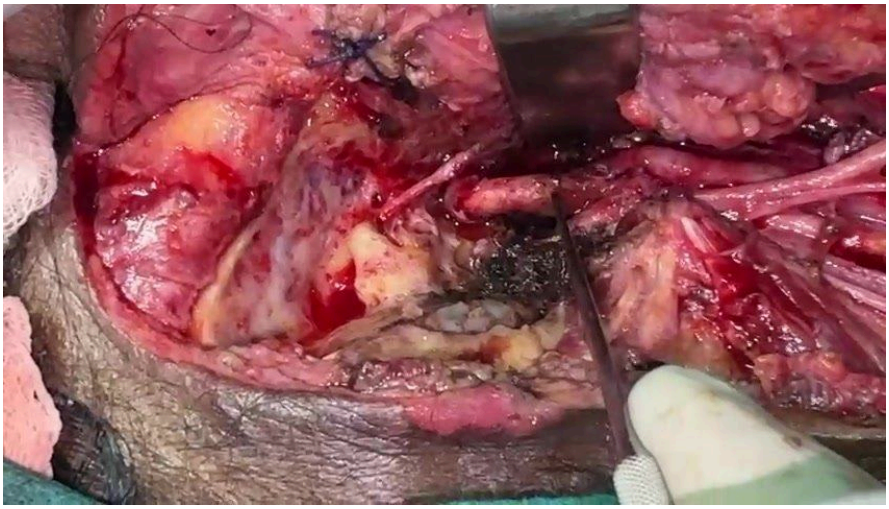
OPERATIVE RECORD



52.1 Close view facial nerve branches, marking suture.



52.2 Wide field: facial nerve branches across parotid region after superficial parotidectomy.



52.3 Facial nerve trunk with lower cranial nerves/vessels near skull base.

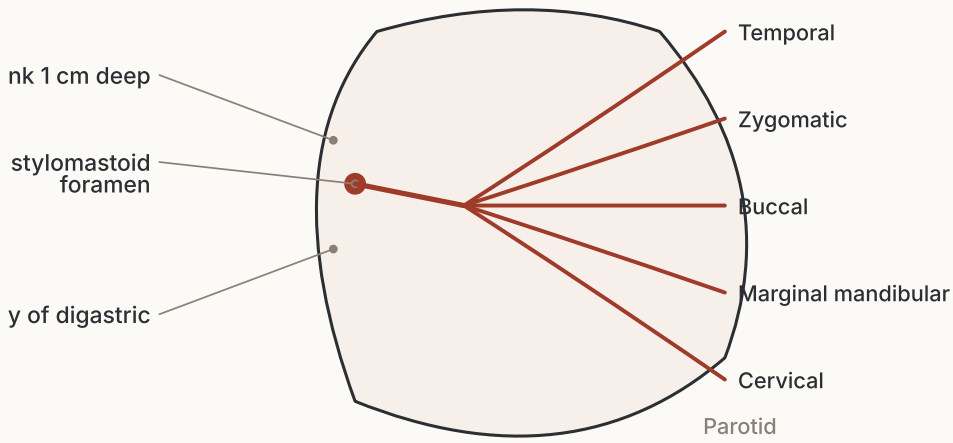


Figure 52.B Facial nerve in the parotid.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Deep extension	The nerve was mapped from the stylomastoid foramen.
Lower cranial nerves near the skull base	Each was identified before deep dissection.

TEACHING POINTS

- **Mark the branches.** Tagging the cut ends or branches orientates later grafting.
- **Mastoidectomy finds the nerve proximally.** When the trunk is involved, the mastoid segment is the safe point of identification.
- **Lower cranial nerves sit just below the skull base.** The vagus, accessory and hypoglossal nerves share the field and must be identified.

CASE SUMMARY

Parotid and upper neck dissection with the facial nerve mapped from the skull base.

REFERENCES

1. Shao A, Wong DK, McIvor NP, et al. Parotid metastatic disease from cutaneous squamous cell carcinoma: prognostic role of facial nerve sacrifice, lateral temporal bone resection, immune status and P-stage. *Head Neck* 2014;36:545–50. doi:10.1002/hed.23323
2. Fisch U. Infratemporal fossa approach to tumours of the temporal bone and base of the skull. *J Laryngol Otol* 1978;92:949–67. doi:10.1017/s0022215100086382



53

The pigmented cheek

Pigmented malignant skin lesion of the face

Wide excision with a through-and-through midface defect

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a pigmented facial lesion with excision margins incised, the specimen from both surfaces and the resulting through-and-through midface defect.

AUTHOR'S PERSPECTIVE

> Pigmented malignancy of the face, particularly melanoma, is excised with margins according to the depth of the lesion. When the tumour involves deeper layers, excision may create a full-thickness defect into the mouth or nose.

APPROACH

Excision with margins marked around the pigmented lesion, taken through all involved layers.

OPERATIVE STEPS

1. Incise the excision margin around the pigmented lesion.
2. Excise through all involved layers.
3. Inspect the specimen surface and deep surface.
4. Inspect the through-and-through midface defect.

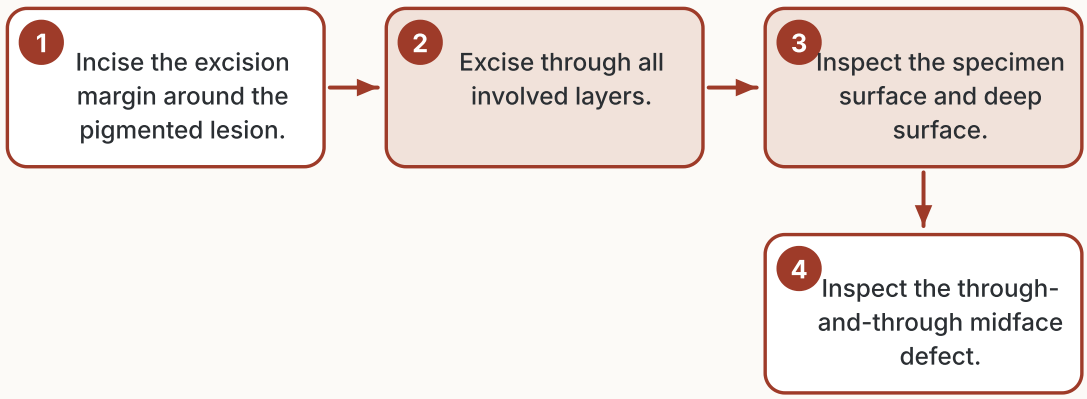
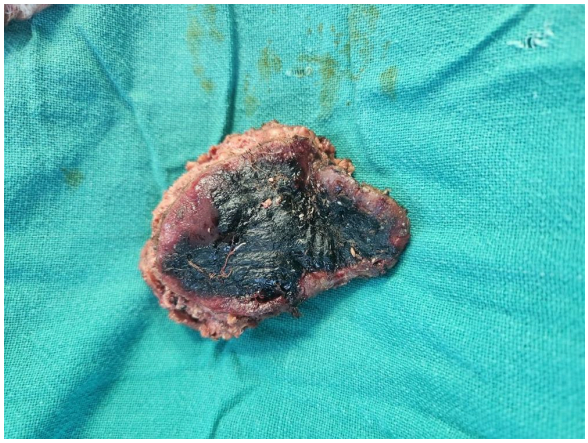


Figure 53.A Operative sequence.

OPERATIVE RECORD



53.1 Specimen: pigmented skin lesion excised, surface view.



53.2 Specimen: deep surface of excised skin lesion.



53.3 Specimens: pigmented lesion and tissue fragments.



53.4 Intraop pigmented facial skin lesion with excision margin incised around it.



53.5 Large through-and-through cheek/midface defect after wide excision.



53.6 Same midface defect, alternate angle.

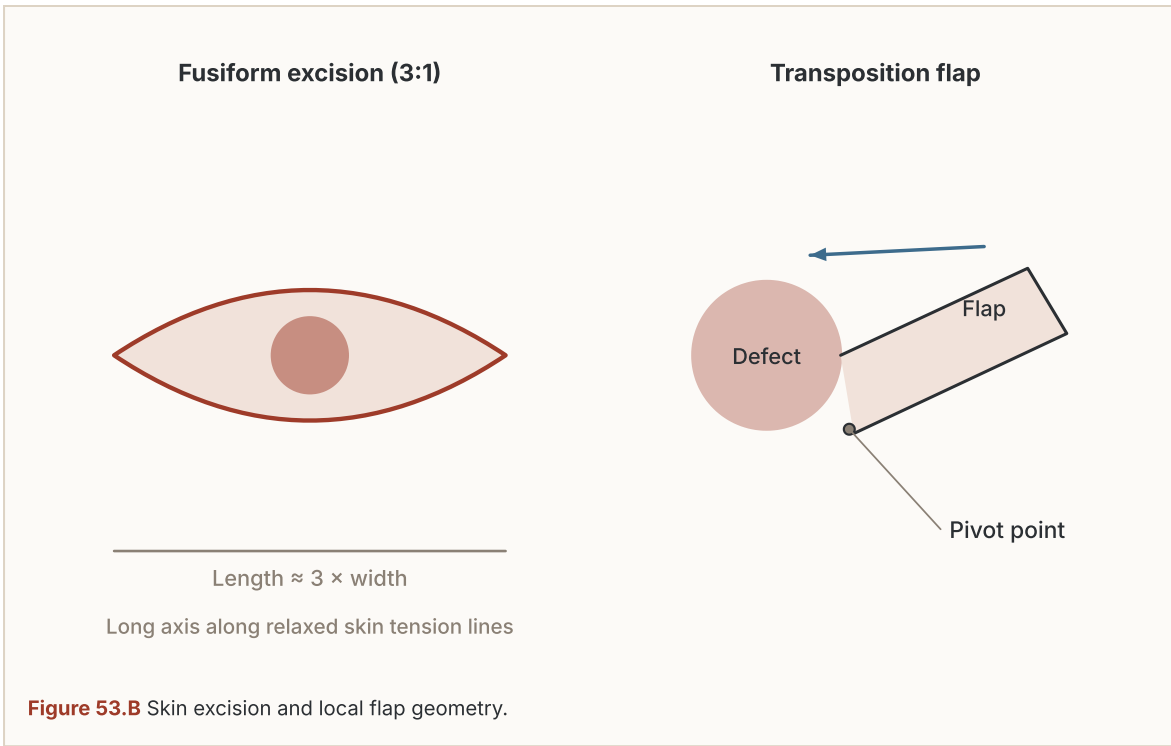


Figure 53.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Margin width in pigmented lesions	Margins were marked according to the clinical extent.
A full-thickness defect	Reconstruction was planned for lining and cover.

TEACHING POINTS

- **Biopsy before definitive excision.** Tumour thickness, not surface size, determines the margin required.
- **Margins in melanoma scale with Breslow depth.** Wider margins are taken for thicker lesions.
- **Full-thickness defects need lining and cover.** Reconstruction must restore both the mucosal and the skin surface.

CASE SUMMARY

Wide excision of a pigmented facial malignancy creating a through-and-through midface defect.

REFERENCES

1. Shao A, Wong DK, McIvor NP, et al. Parotid metastatic disease from cutaneous squamous cell carcinoma: prognostic role of facial nerve sacrifice, lateral temporal bone resection, immune status and P-stage. *Head Neck* 2014;36:545–50. doi:10.1002/hed.23323
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



54

Around the pinna

Periauricular lesion with pinna swelling

Excision around the pinna with flap closure

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the swelling of the auricle, the excision around the pinna and preauricular region, the excised tract and the sutured incisions.

AUTHOR'S PERSPECTIVE

> A periauricular tract or lesion must be removed completely, following it to its base, because incomplete excision is the main cause of recurrence and repeated infection.

APPROACH

Excision around the pinna with a skin flap raised for exposure and the tract followed to its deep extent.

OPERATIVE STEPS

1. Inspect the swelling of the auricle.
2. Raise the skin flap around the pinna.
3. Excise the lesion with its tract.
4. Inspect the elongated specimen.
5. Close the pre- and postauricular incisions.

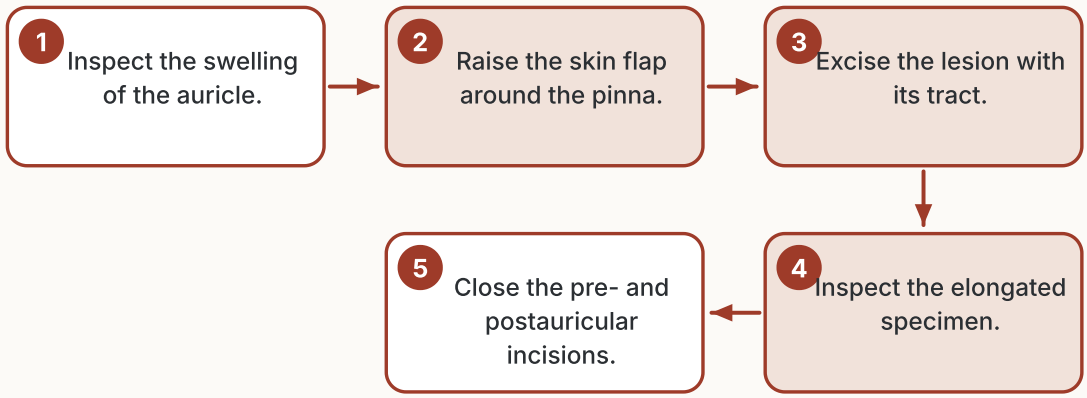
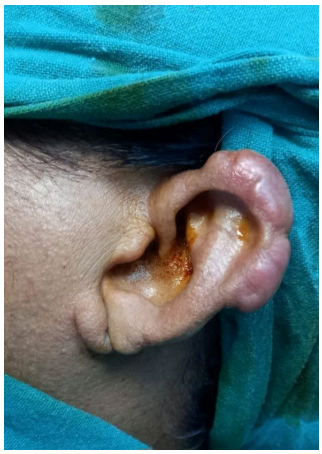


Figure 54.A Operative sequence.

OPERATIVE RECORD



54.1 Swelling of auricle (pinna) - perichondritis/haematoma appearance.



54.2 Raised flap/postauricular skin flap exposure.



54.3 Excision around pinna/preauricular region with gauze.



54.4 Specimen: elongated soft-tissue tract.



54.5 Sutured postauricular/preauricular incision around pinna.



54.6 Postauricular/helical root sutured incision.

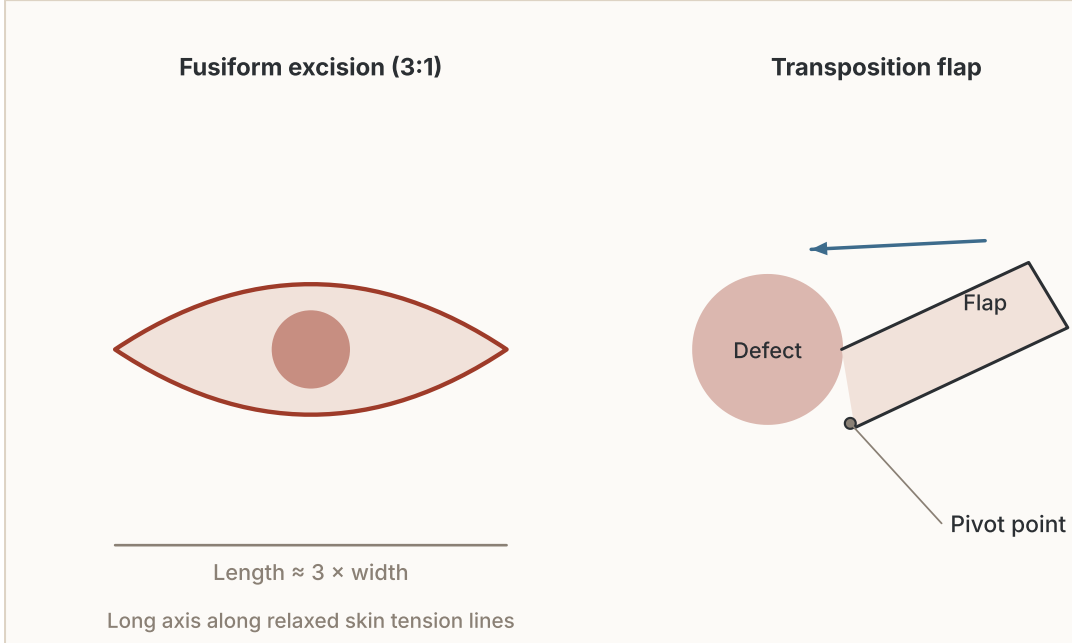


Figure 54.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Branches of the tract	The tract was followed to the helical root and temporalis fascia.
Recurrence	The tract was excised completely.

TEACHING POINTS

- **Follow the tract to its base.** It usually ends at the perichondrium of the helical root, which is excised with it.
- **Do not operate during acute infection.** Inflammation obscures the tract and increases recurrence.
- **A wider exposure reduces recurrence.** Supra-auricular extension of the incision helps follow branches.

CASE SUMMARY

Excision of a periauricular lesion and tract with flap closure.

REFERENCES

1. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



55

The upper lip

Carcinoma of the upper lip and nasal sill

Wedge excision with local flap reconstruction

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the upper lip and nasal sill tumour with the excision and flap design marked, and the wedge defect.

AUTHOR'S PERSPECTIVE

> Defects of up to about a third of the lip can be closed directly; larger defects need lip-switch or advancement flaps. The orbicularis must be repaired to keep the mouth competent.

APPROACH

Full-thickness wedge excision with local flap closure and layered repair of mucosa, muscle and skin.

OPERATIVE STEPS

1. Mark the excision margin and flap design.
2. Excise the lip wedge full thickness.
3. Inspect the defect.
4. Reconstruct in layers: mucosa, orbicularis, skin.



Figure 55.A Operative sequence.

OPERATIVE RECORD



55.1 Upper lip/nasal sill tumour with excision margin marked.



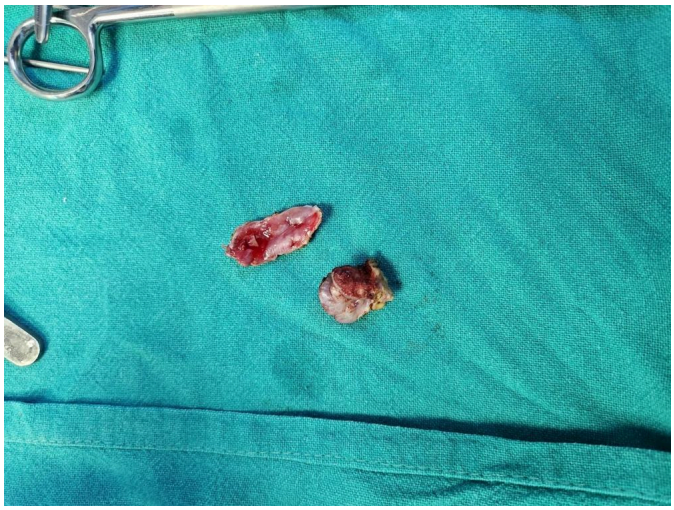
55.2 Lip tumour with marked excision and flap design.



55.3 Prepped face for upper lip/nasal lesion excision.



55.4 Upper lip wedge excision defect, intubated.



55.5 Small excised specimens on drape.

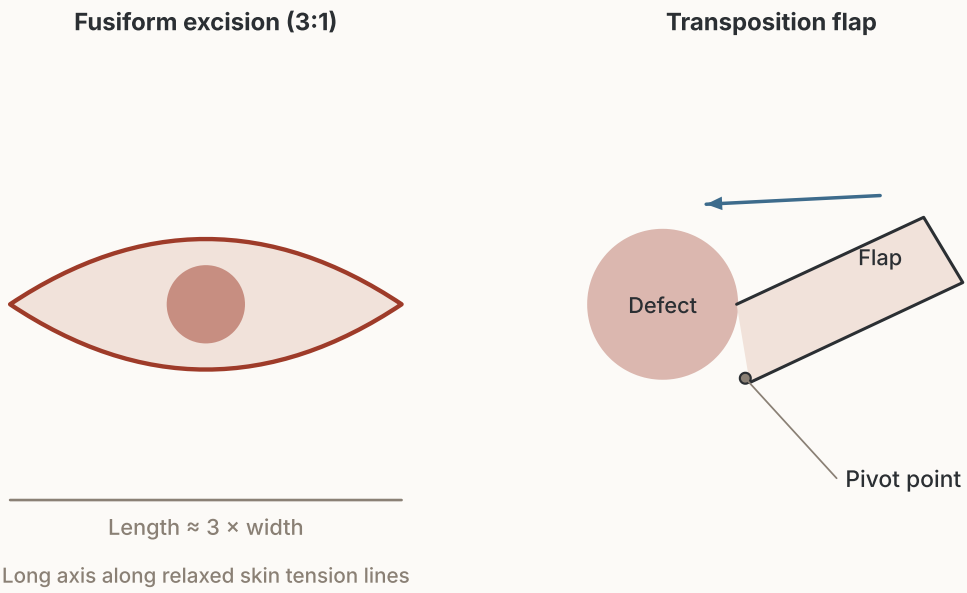


Figure 55.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Oral competence	The orbicularis oris was repaired as a separate layer.
Alignment of the vermilion border	The white roll was marked before excision.

TEACHING POINTS

- **Up to a third of the lip closes directly.** Larger defects need flaps.
- **Mark the vermilion border before infiltration.** Misalignment is obvious.
- **Repair the orbicularis.** For competence.

CASE SUMMARY

Full-thickness wedge excision of an upper lip carcinoma with local flap reconstruction.

REFERENCES

1. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



56

A nose from the forehead

Skin cancer of the nose

Excision and paramedian forehead flap reconstruction

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the nasal defect after excision, the paramedian forehead flap marked and the pedicle rotated to the nose.

AUTHOR'S PERSPECTIVE

> Large nasal defects need skin of matching colour and texture. The paramedian forehead flap, based on the supratrochlear vessels, is the standard reconstruction for complex nasal defects.

APPROACH

Two-stage paramedian forehead flap: transfer and later pedicle division.

OPERATIVE STEPS

1. Excise the nasal lesion with margins.
2. Mark the paramedian forehead flap from a template of the defect.
3. Raise the flap on the supratrochlear pedicle.
4. Rotate and inset the flap into the nasal defect.
5. Close the forehead donor site.

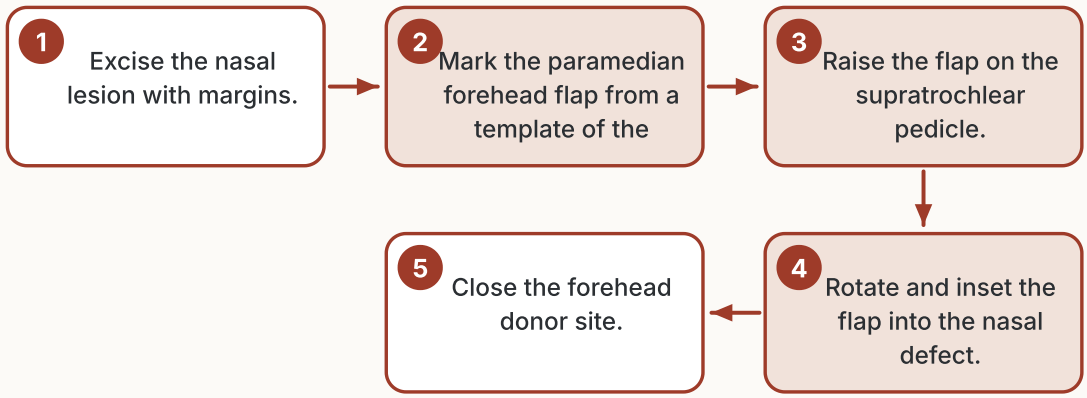


Figure 56.A Operative sequence.

OPERATIVE RECORD



56.1 Paramedian forehead flap marked on forehead.



56.2 Nasal defect after rhinectomy/partial nasal excision, intraop.



56.3 Forehead flap pedicle rotated to nose.



56.4 Nasal skin defect after excision.

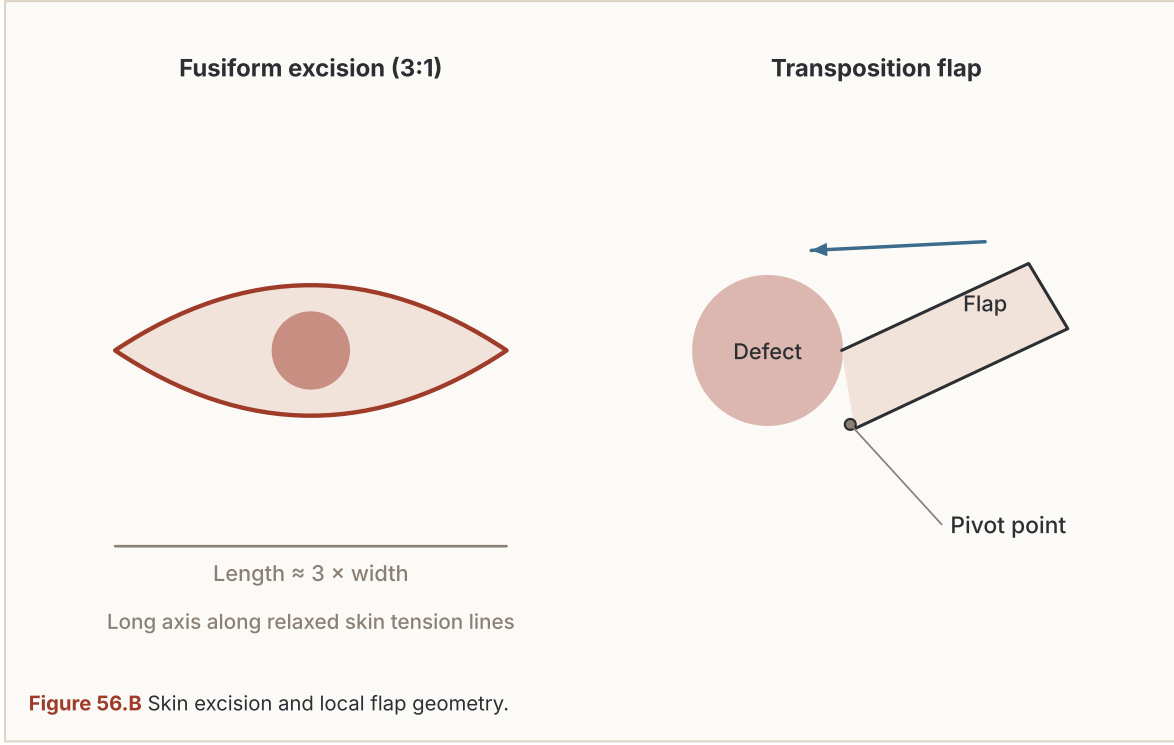


Figure 56.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Matching the defect	A template was used to design the flap.
Pedicle division	Division was planned as a second stage.

TEACHING POINTS

- **The supratrochlear vessels carry the flap.** About 2 cm from the midline.
- **Use a template.** The flap must match the defect exactly.
- **Divide at about three weeks.** Venous congestion is more common in single-stage designs.

CASE SUMMARY

Nasal skin cancer excision reconstructed with a paramedian forehead flap.

REFERENCES

1. Ma R, Loblundo C, Nguyen SA, Patel KG, Hwang MS. Outcomes of the paramedian forehead flap for nasal reconstruction: systematic review and meta-analysis. *Laryngoscope* 2026. doi:10.1002/lary.71018



57

The lower lip and chin

Ulceroproliferative carcinoma of the lower lip and chin

Excision through a lip split with neck dissection and cervicofacial flap closure

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the ulceroproliferative lower lip and chin lesion with the planned lip-split and neck incisions, the flap raised and the closure.

AUTHOR'S PERSPECTIVE

> A lower lip and chin carcinoma is excised with the neck in continuity where nodes are at risk. A cervicofacial flap advances skin from the cheek and neck to close the chin defect.

APPROACH

Excision with planned lip-split and neck incisions, neck dissection, and cervicofacial advancement for closure.

OPERATIVE STEPS

1. Mark the lesion with lip-split and neck incisions.
2. Raise the flap and dissect in the neck.
3. Excise the lesion.
4. Advance the cervicofacial flap and close.

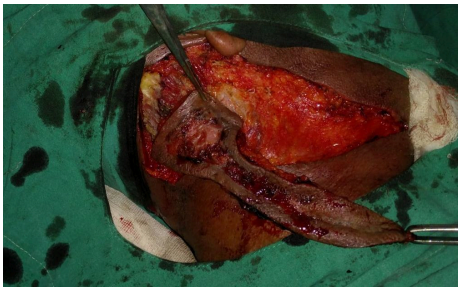


Figure 57.A Operative sequence.

OPERATIVE RECORD



57.1 Ulceroproliferative lower lip/chin lesion with planned lip-split and neck incision marked.



57.2 Neck/parotid flap raised with dissection in progress.



57.3 Sutured cervicofacial flap/neck incision post-closure.

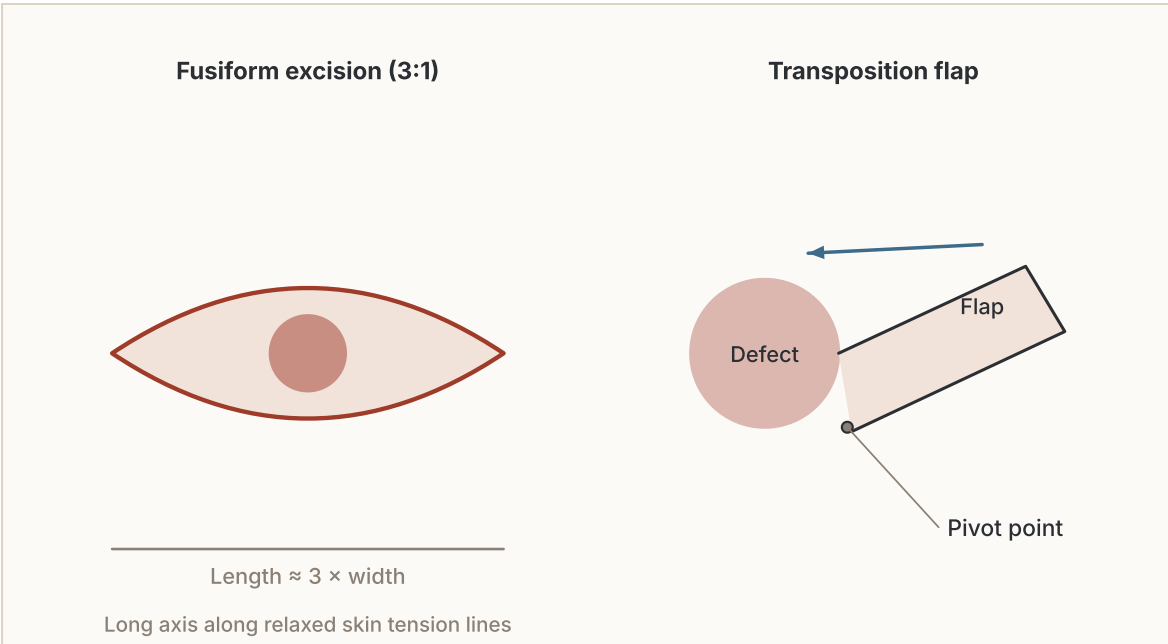


Figure 57.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Closing the chin defect	Cheek and neck skin were advanced as a cervicofacial flap.
Lymphatic drainage to level I	The neck was addressed in the same operation.

TEACHING POINTS

- **Lower lip cancer drains to levels Ia and Ib.** Midline lesions drain bilaterally.
- **Cervicofacial flaps advance large areas of skin.** Their broad base gives a reliable blood supply.
- **Preserve the marginal mandibular nerve where safe.** Its loss distorts the lower lip.

CASE SUMMARY

Excision of a lower lip and chin carcinoma with neck dissection and cervicofacial flap closure.

REFERENCES

1. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



58

The temple and the forehead

Periorbital and temporal skin tumour

Excision with forehead and scalp flap reconstruction

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the periorbital and temporal tumour with local flap planning, and the forehead and scalp flap reconstruction.

AUTHOR'S PERSPECTIVE

> Periorbital defects threaten eyelid function and appearance. Forehead and scalp flaps bring skin of similar quality without distorting the eyelids.

APPROACH

Excision with margins, followed by rotation of forehead and scalp flaps and primary closure of the donor site.

OPERATIVE STEPS

1. Mark the excision and the local flap.
2. Excise the periorbital and temporal lesion.
3. Raise and rotate the forehead or scalp flap.
4. Close the forehead donor site.

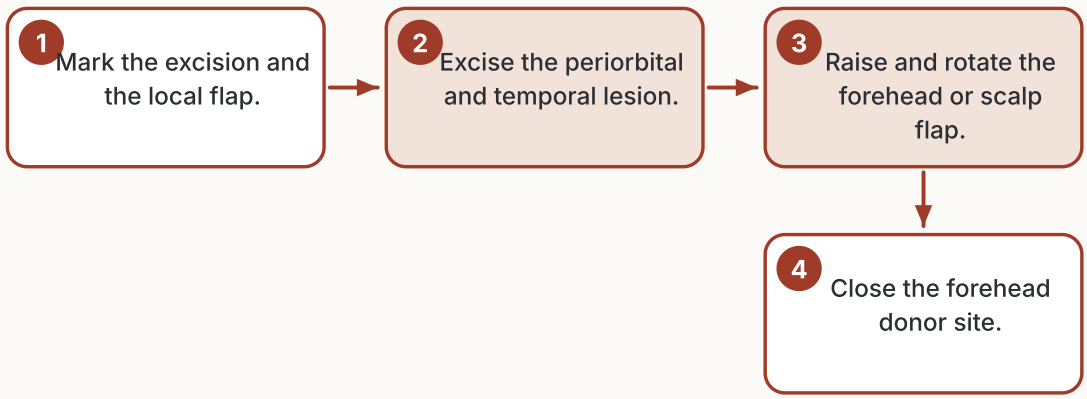


Figure 58.A Operative sequence.

OPERATIVE RECORD



58.1 Periorbital/temporal skin tumour excision with local flap planning.



58.2 Midline forehead flap closure with cheek defect.



58.3 Forehead/scalp flap reconstruction of face sutured.

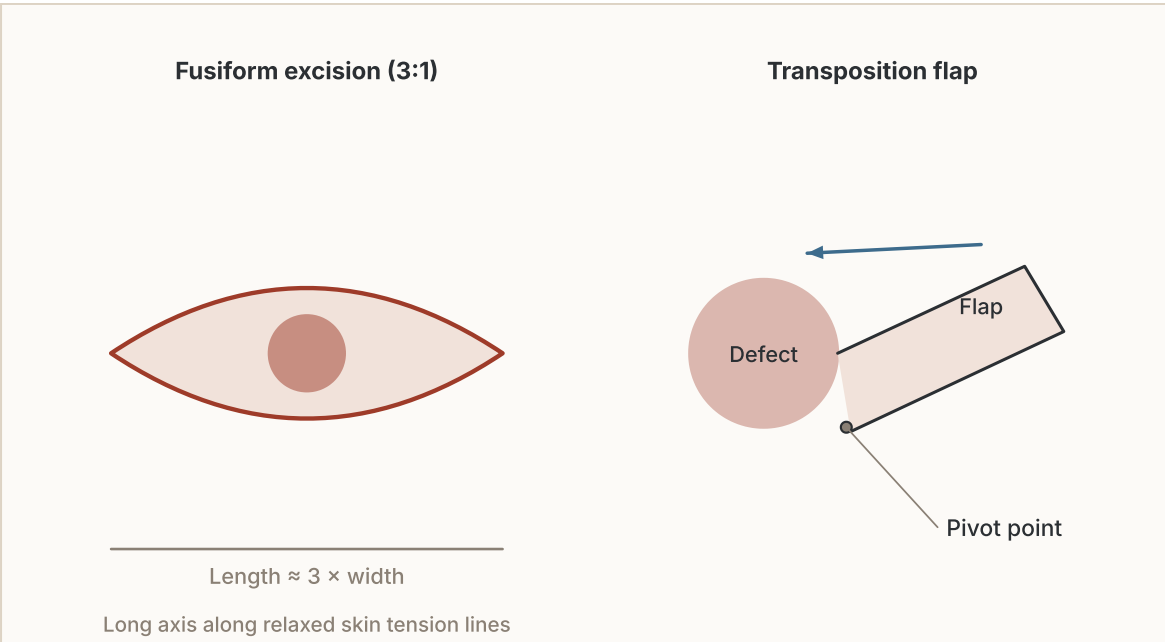


Figure 58.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Avoiding ectropion	Tension was directed away from the lower eyelid.
Frontal branch of the facial nerve	Flaps over the temple were raised in the appropriate plane.

TEACHING POINTS

- **Direct tension away from the eyelid.** To prevent ectropion.
- **The frontal branch crosses the temple.** Raise temporal flaps carefully.
- **Forehead skin matches the face.** Better than distant donor sites.

CASE SUMMARY

Excision of a periorbital and temporal skin tumour with forehead and scalp flap reconstruction.

REFERENCES

1. Ma R, Loblundo C, Nguyen SA, Patel KG, Hwang MS. Outcomes of the paramedian forehead flap for nasal reconstruction: systematic review and meta-analysis. *Laryngoscope* 2026. doi:10.1002/lary.71018
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



59

The preauricular ulcer

Ulcerated preauricular skin cancer

Excision and transposition flap reconstruction

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the ulcerated preauricular lesion, the transposition flap marked, incised and transposed into the defect.

AUTHOR'S PERSPECTIVE

> Preauricular defects are well suited to transposition flaps from the cheek, which move lax skin into the defect and hide the scar in the preauricular crease.

APPROACH

Excision with margins and a transposition flap designed from the adjacent cheek.

OPERATIVE STEPS

1. Inspect the ulcerated lesion beside the ear.
2. Excise the lesion and mark the transposition flap.
3. Incise and raise the flap.
4. Transpose the flap into the defect and close the donor site.

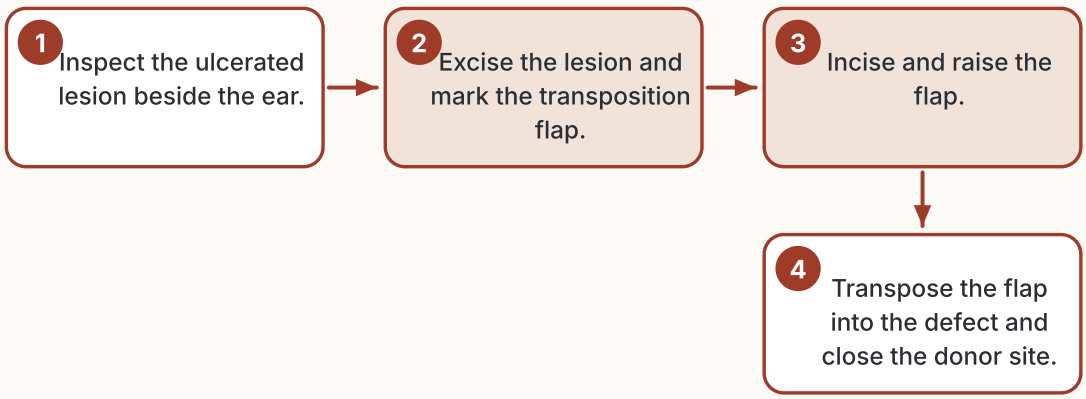


Figure 59.A Operative sequence.

OPERATIVE RECORD



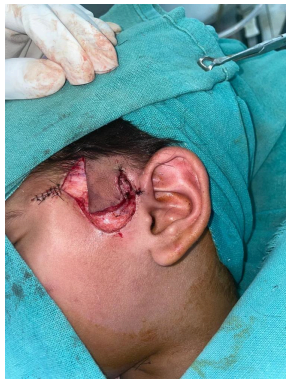
59.1 Preauricular defect with transposition flap marked on cheek.



59.2 Ulcerated preauricular skin lesion beside ear before excision.



59.3 Local transposition flap incised and raised for preauricular defect.



59.4 Flap transposed into preauricular defect.

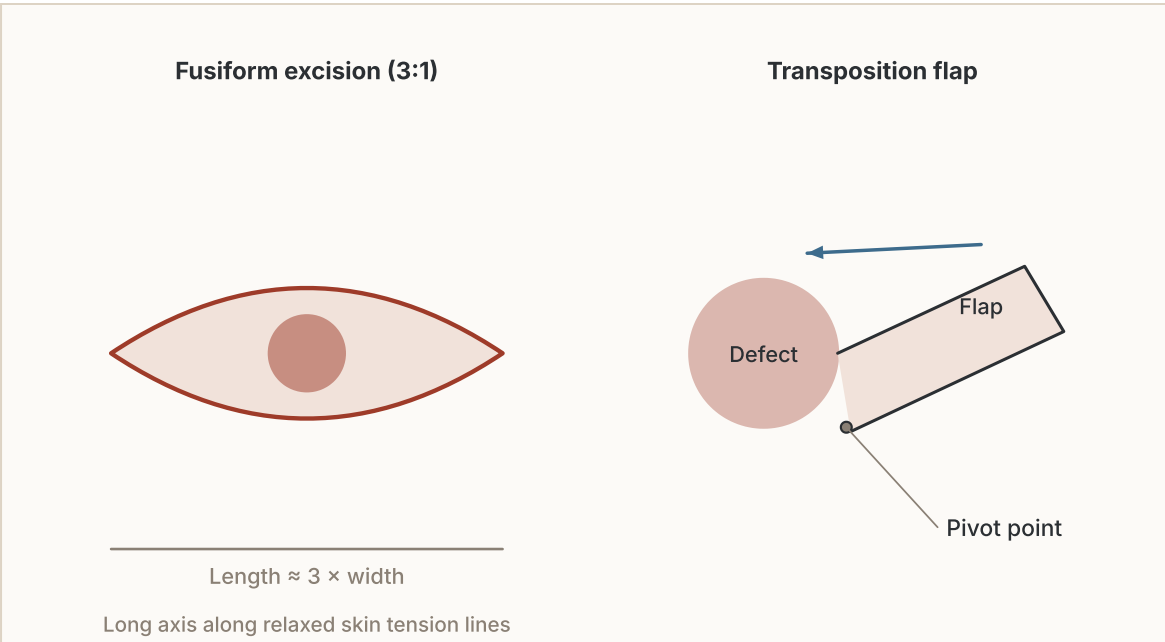


Figure 59.B Skin excision and local flap geometry.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Distortion of the ear or eyelid	The flap was designed in the direction of skin laxity.
Dog-ear at the pivot	The standing cone was excised.

TEACHING POINTS

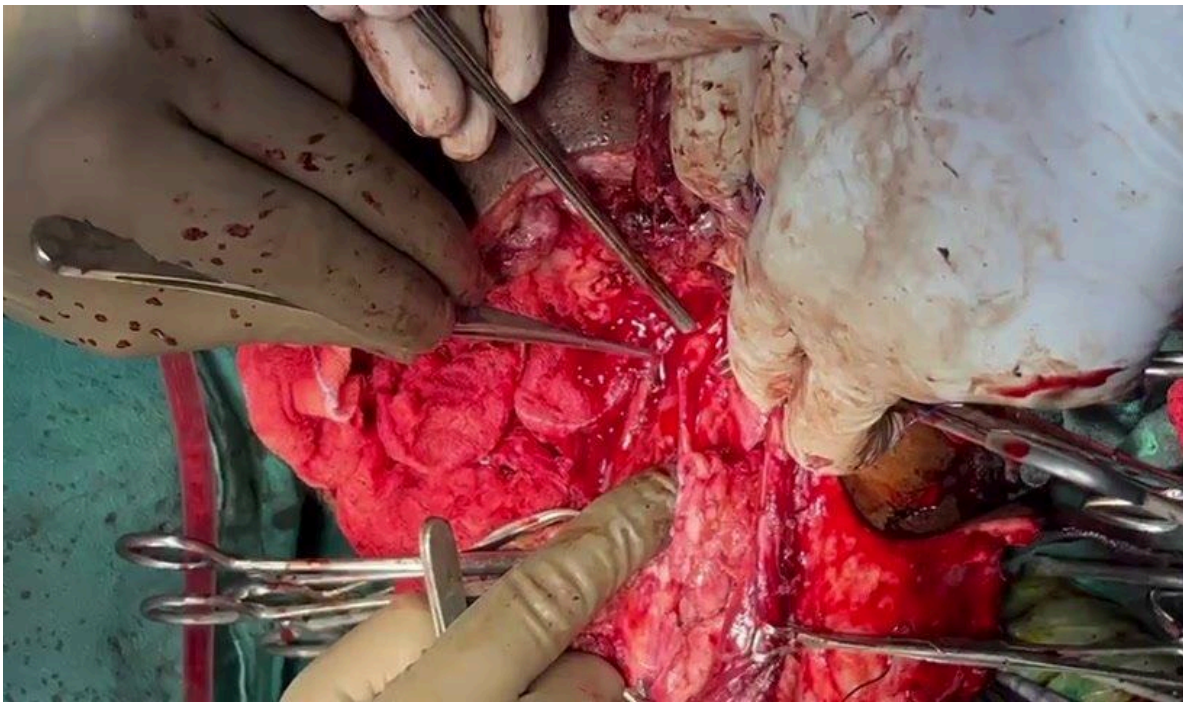
- **Design along relaxed skin tension lines.** The final scar then lies in the natural crease.
- **Pivot point and length.** The flap is measured from the pivot so that it reaches the far edge without tension.
- **Excise the standing cone.** Removal of the dog-ear at the pivot gives a flat contour.

CASE SUMMARY

Excision of a preauricular skin cancer reconstructed with a cheek transposition flap.

REFERENCES

1. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



60

Beside the orbit

Extensive facial malignancy adjacent to the orbit

Resection through a large facial flap with preservation of the eye

PART V · SALIVARY GLANDS AND SKIN

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a large facial flap reflected over the resection, with the orbit at the edge of the field, and the dissection close to it.

AUTHOR'S PERSPECTIVE

> Whether the eye can be preserved depends on involvement of the orbital periosteum. If the periorbita is free, the eye is preserved and the resection stays outside it.

APPROACH

Wide facial flap with the orbit protected and the resection carried along the orbital rim.

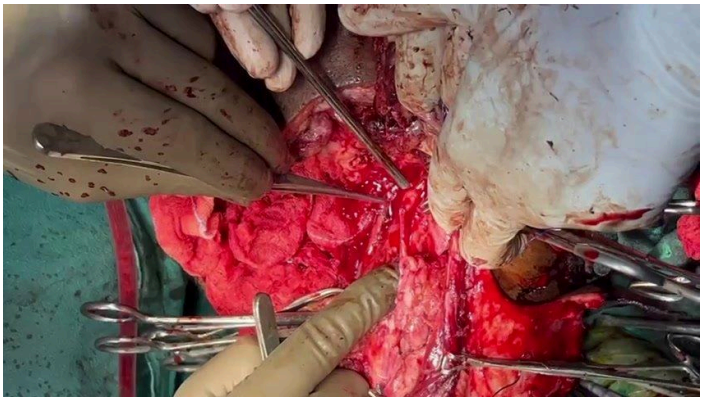
OPERATIVE STEPS

1. Raise the large facial flap.
2. Expose the region next to the orbit.
3. Dissect close to the orbit with scissors.
4. Complete the lateral and neck dissection.

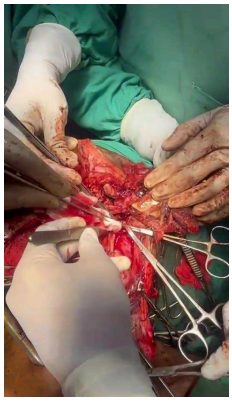


Figure 60.A Operative sequence.

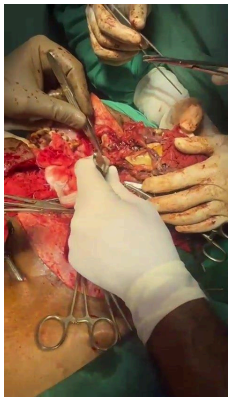
OPERATIVE RECORD



60.1 Large open head and neck resection with mopped field, haemostats and retracted flap; site unclear.



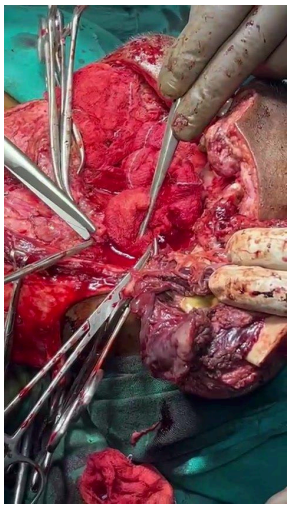
60.2 Open lateral neck/parotid-region dissection with multiple haemostats and retracted tissue; site unclear.



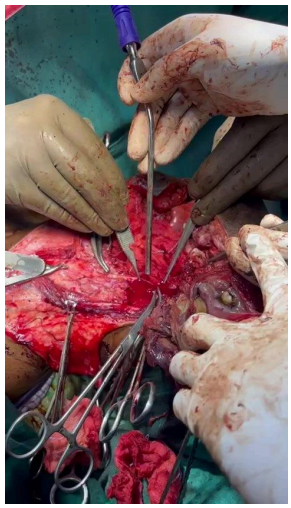
60.3 Open neck dissection field with structures exposed, haemostats and forceps.



60.4 Large facial/cheek skin flap reflected with exposed soft tissue; eye visible at field edge; dissection with scissors and haemostats (possible maxillectomy approach).



60.5 Reflected facial flap with raw undersurface and exposed orbital region/eye during resection.



60.6 Open resection adjacent to the orbit (eye visible in field), dissection with scissors and haemostats; possible maxillectomy.

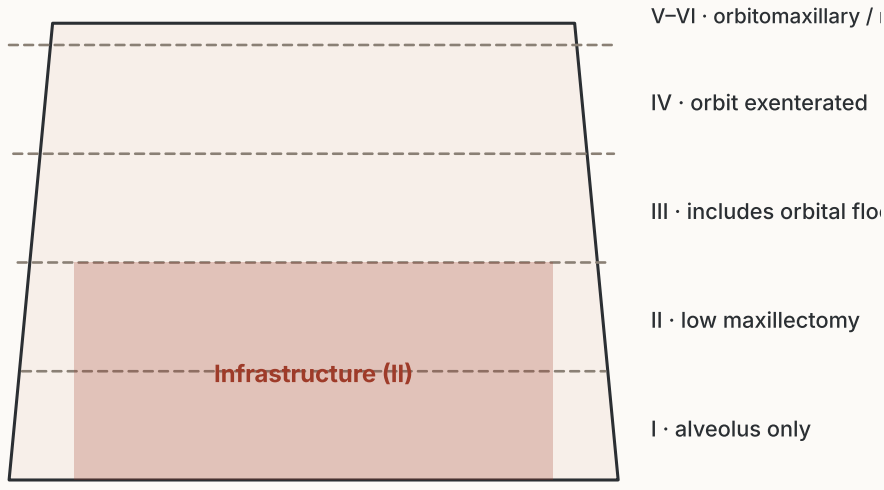


Figure 60.B Maxillary defects (Brown and Shaw): vertical classes.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Proximity to the eye	The periorbita was assessed and preserved where free of disease.

Bleeding in a wide field	The field was controlled with haemostats and packs.

TEACHING POINTS

- **The periorbita is the barrier.** When it is breached by tumour, orbital exenteration is considered.
- **Protect the cornea during surgery.** A tarsorrhaphy stitch or shield prevents abrasion.
- **Plan support for the eye.** If the orbital floor is removed, it must be reconstructed to prevent diplopia and enophthalmos.

CASE SUMMARY

Extensive facial resection through a large flap with the eye preserved.

REFERENCES

1. Brown JS, Shaw RJ. Reconstruction of the maxilla and midface: introducing a new classification. *Lancet Oncol* 2010;11:1001–8. doi:10.1016/S1470-2045(10)70113-3
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z

PART VI

Skull base

Anterior skull base through the nose and the open approaches to the maxilla; the lateral skull base through the ear and neck.

61 The roof of the nose

62 The open way

63 The boy who bled

64 One frontal sinus from two

65 Plugging the cribriform

66 Second time through the sphenoid

67 Draining the apex

68 Pinna to petrous

69 The nerve that was given back

70 The humming that never stopped

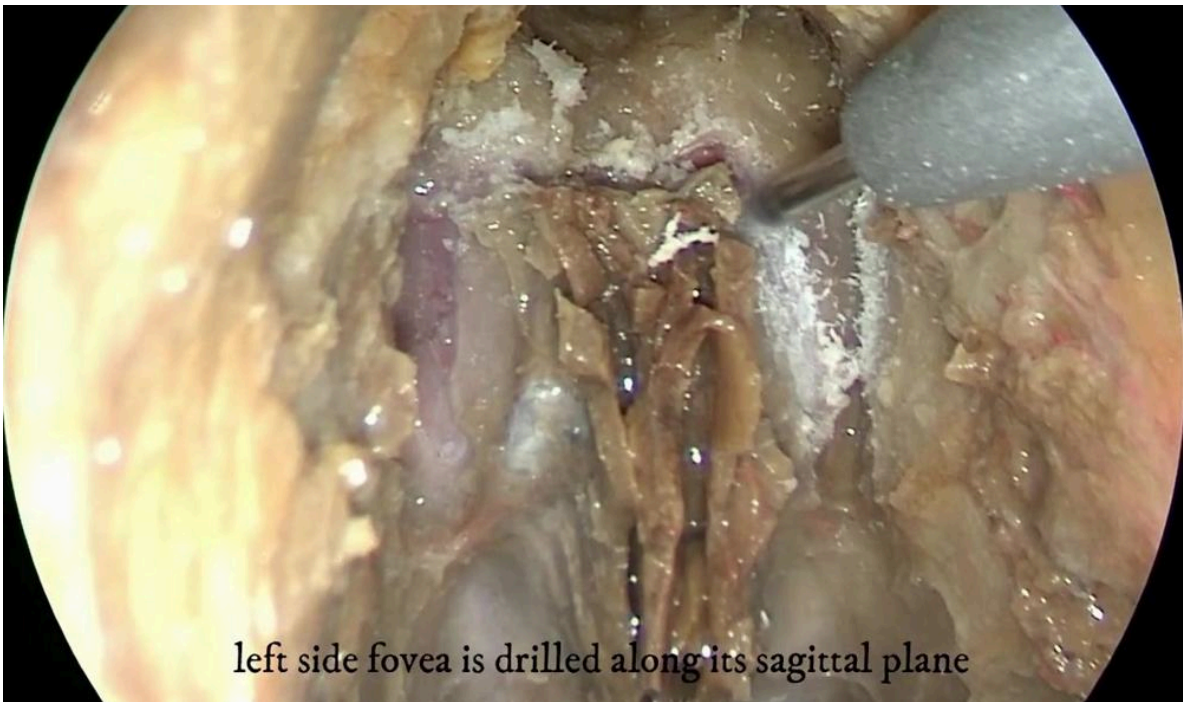
71 Control at C1

72 The jaw swung open

73 The cheek that had to go

74 The palate from below

75 The temporal bone from outside



61

The roof of the nose

Cadaveric dissection, Weill Cornell Medicine, New York

Transnasal endoscopic anterior craniofacial resection: transcribriform approach

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This fellowship dissection demonstrates the anatomy of an endoscopic anterior craniofacial resection. Bilateral middle and superior turbinates were resected with a posterior septectomy and removal of the sphenoid rostrum, and the anterior ethmoidal arteries were identified on both sides.

AUTHOR'S PERSPECTIVE

> Sinonasal malignancies that reach the cribriform plate were once treated by open craniofacial resection. In selected patients the same resection can be performed through the nose, with the cribriform plate, crista galli, dura and olfactory bulbs removed in one unit.

APPROACH

Binostril endoscopic approach: map the ethmoidal arteries, drill the fovea between them in the sagittal plane, and remove the cribriform plate with the overlying dura.

OPERATIVE STEPS

1. Identify the anterior ethmoidal vessels crossing the fovea.
2. Drill the fovea in the sagittal plane between the two ethmoidal arteries.
3. Undermine the ethmoid roof from the dura.
4. Skeletonise and divide the anterior ethmoidal vessels.
5. Perform the anterior osteotomy above the frontal T with a 1 mm Kerrison punch.
6. Incise the dura on each side.
7. Retract the cribriform plate inferiorly; divide the falx and olfactory tracts.
8. Expose the frontal lobes with the frontopolar and orbitofrontal vessels.

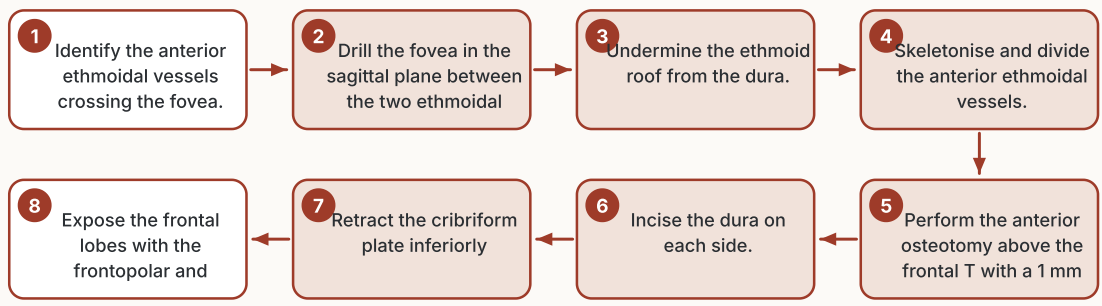


Figure 61.A Operative sequence.

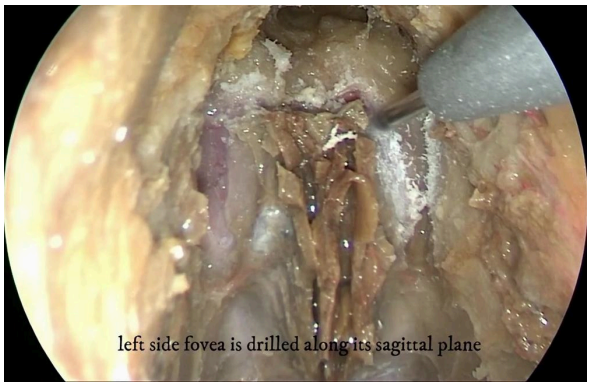
OPERATIVE RECORD



61.1 Anterior ethmoid vessels crossing the fovea posterolateral to anteromedial. Video 0:29



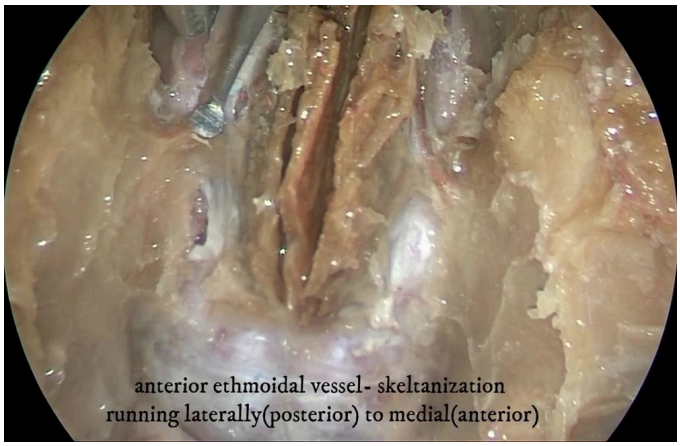
61.2 "Endoscopic craniectomy approach, transcribriform": fovea drilled in the sagittal plane between the two ethmoidal arteries. Video 0:53



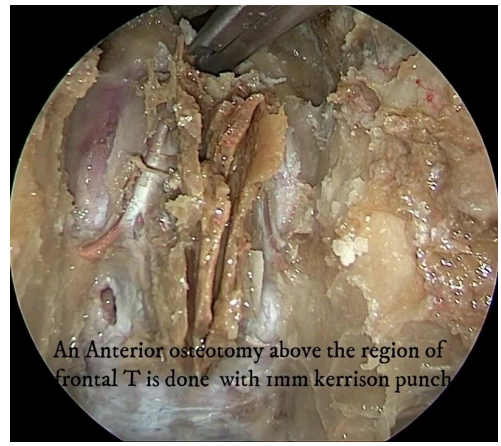
61.3 "Left side fovea is drilled along its sagittal plane." Video 1:17



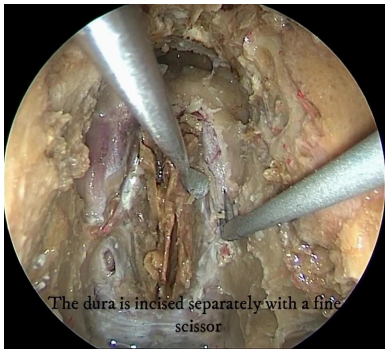
61.4 "Ethmoid roof bone undermined from the underlying dura." Video 1:41



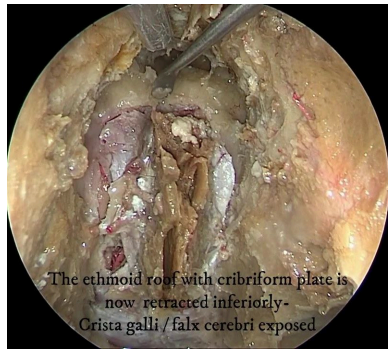
61.5 Anterior ethmoidal vessel skeletonised, running laterally to medially. Video 2:04



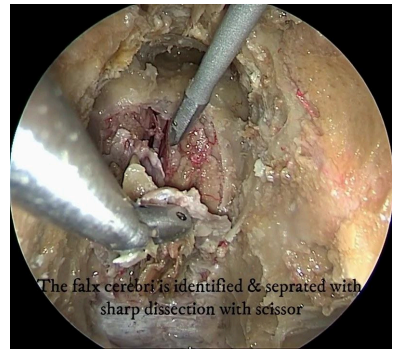
61.6 Anterior osteotomy above the frontal T with a 1 mm Kerrison punch. Video 2:40



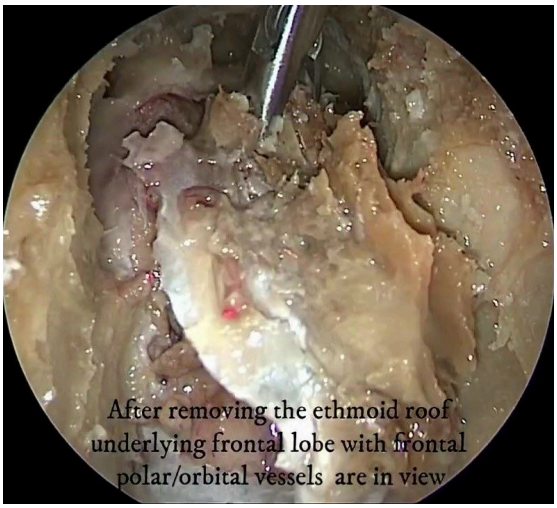
61.7 "The dura is incised separately with a fine scissor." Video 3:16



61.8 Ethmoid roof and cribriform plate retracted inferiorly; crista galli and falx exposed. Video 3:51



61.9 Falx cerebri identified and separated by sharp dissection. Video 4:03



61.10 After removing the ethmoid roof: frontal lobe with frontopolar and orbitofrontal vessels. Video 4:27

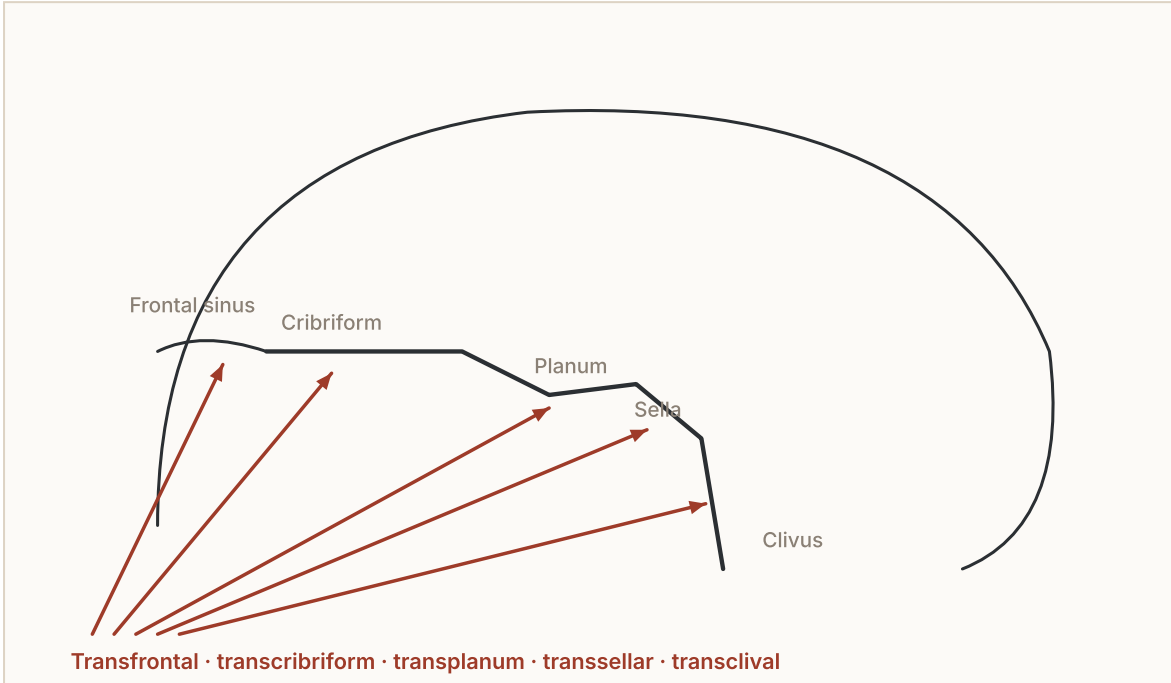


Figure 61.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Bleeding from the ethmoidal arteries	The arteries were skeletonised and divided before the dura was opened.
Reconstruction of a large dural defect	A vascularised nasoseptal flap is harvested at the start.

TEACHING POINTS

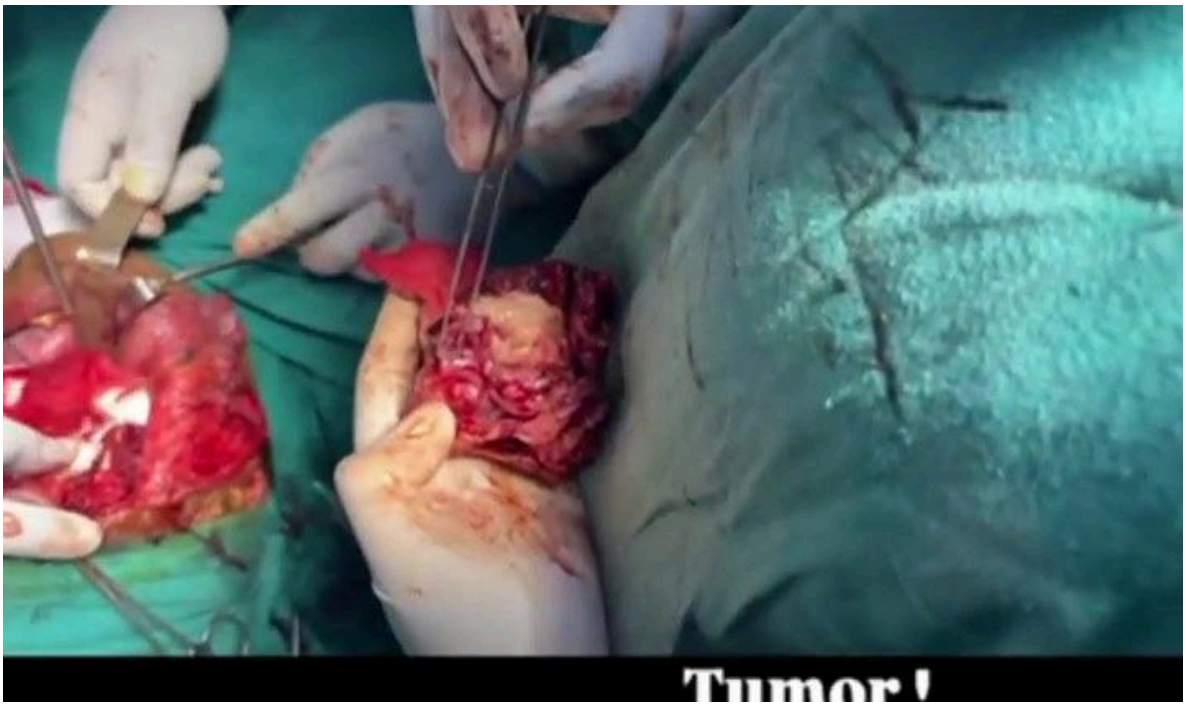
- **Map the ethmoidal arteries first.** They define the anterior and posterior limits.
- **Harvest the nasoseptal flap at the start.** Before the septum is sacrificed.
- **Endoscopic resection is oncologically sound in selected tumours.** Disease-specific survival around 87% at five years.

CASE SUMMARY

A cadaveric endoscopic transcribriform anterior craniofacial resection demonstrating the sequence used in live surgery. With thanks to Dr Theodore H Schwartz, Weill Cornell Medicine.

REFERENCES

1. Hanna E, DeMonte F, Ibrahim S, et al. Endoscopic resection of sinonasal cancers with and without craniotomy: oncologic results. *Arch Otolaryngol Head Neck Surg* 2009;135:1219–24. doi:10.1001/archoto.2009.173
2. Hadad G, Bassagasteguy L, Carrau RL, et al. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope* 2006;116:1882–6. doi:10.1097/01.mlg.0000234933.37779.e4



62

The open way

Tumour of the maxilla

Extended maxillectomy through a modified Weber–Fergusson approach with subciliary and vestibular extension

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A maxillary tumour required extended maxillectomy.

AUTHOR'S PERSPECTIVE

> Tumours extending beyond the reach of the endoscope, or involving the palate, cheek or posterior maxilla, are best removed through an open approach that allows en bloc resection with clear posterior margins.

APPROACH

Modified Weber–Fergusson incision with subciliary and maxillary vestibular extension, bony osteotomies and release of the posterior attachments at the pterygoid plates.

OPERATIVE STEPS

1. Delineate the tumour.
2. Perform the bony osteotomies.
3. Separate the final hard and soft tissue attachments.
4. Deliver the tumour.
5. Clear the posterior margin at the pterygoid plates.
6. Inspect the cavity through the mouth.

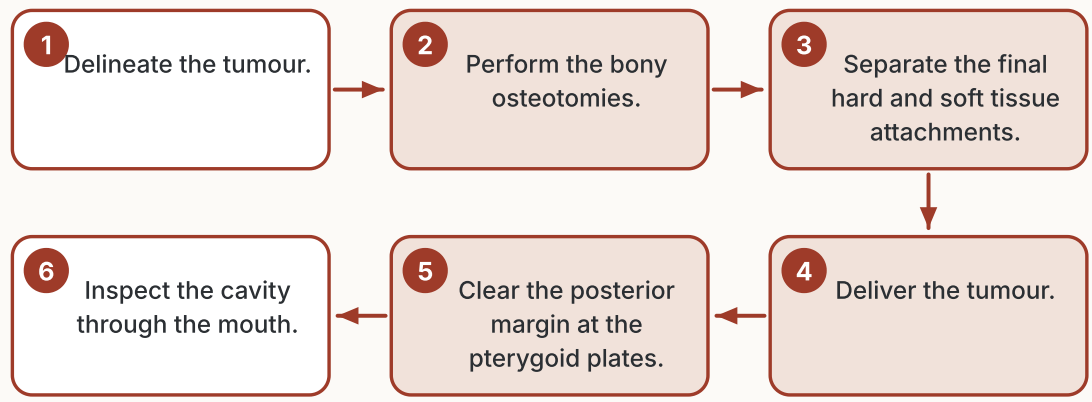


Figure 62.A Operative sequence.

OPERATIVE RECORD



62.1 "Delineating the tumour." Video 0:07



62.2 "Bony osteotomies." Video 0:17



62.3 "Separating the final hard and soft tissue attachments." Video 0:28



62.4 “Tumour.” Video 0:53



62.5 “Posterior margin: pterygoid plates.” Video 1:04



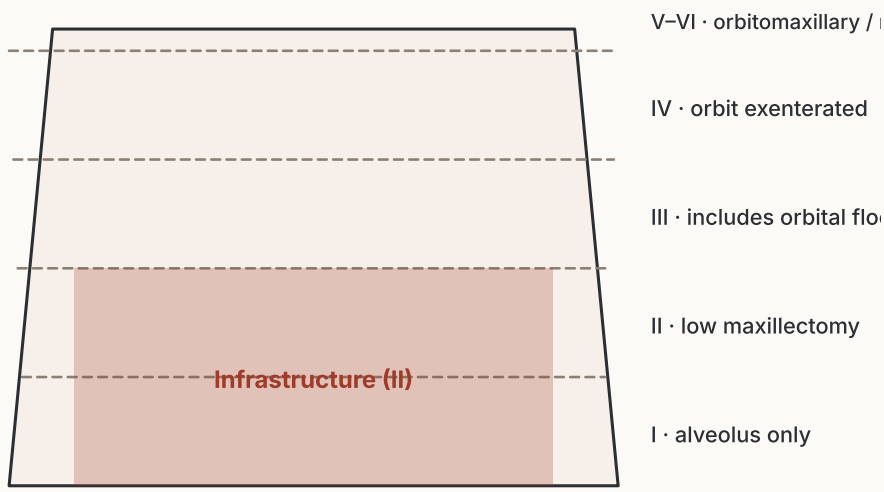
62.6 The cavity after resection, seen through the mouth. Video 1:34



62.7 “Tumour of the maxilla”: presentation, eyes masked. Video 0:02



62.8 Incision closed at the end of surgery; eyes masked. Video 1:45



Horizontal suffix a–d describes the palatal defect.

Figure 62.B Maxillary defects (Brown and Shaw): vertical classes.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Posterior margin	The pterygoid plates were included with the specimen.
Facial scarring	The incision followed facial subunits.

TEACHING POINTS

- **The posterior margin is the critical one.** At the pterygoid plates.
- **Classify the defect.** Vertical and horizontal components decide reconstruction.
- **Low defects suit an obturator.** Higher ones need flap support.

CASE SUMMARY

Extended maxillectomy through a modified Weber–Fergusson approach with clearance at the pterygoid plates.

REFERENCES

1. Brown JS, Shaw RJ. Reconstruction of the maxilla and midface: introducing a new classification. *Lancet Oncol* 2010;11:1001–8. doi:10.1016/S1470-2045(10)70113-3



63

The boy who bled

Juvenile nasopharyngeal angiofibroma

Endoscopic transnasal excision

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

An adolescent male with juvenile nasopharyngeal angiofibroma was treated endoscopically.

AUTHOR'S PERSPECTIVE

> Endoscopic resection gives lower blood loss and recurrence than open surgery for most stages. The tumour is released from its vascular base and attachments in a planned order before delivery.

APPROACH

Endoscopic transnasal approach, superior release off the sphenoid, posterolateral release, then medial release and delivery.

OPERATIVE STEPS

1. Open the endoscopic corridor.
2. Display the tumour surface in the nasopharynx.
3. Mobilise the tumour from its bed.
4. Release it superiorly from the sphenoid.
5. Release the posterolateral attachment.
6. Release the medial-most attachment and deliver the specimen.

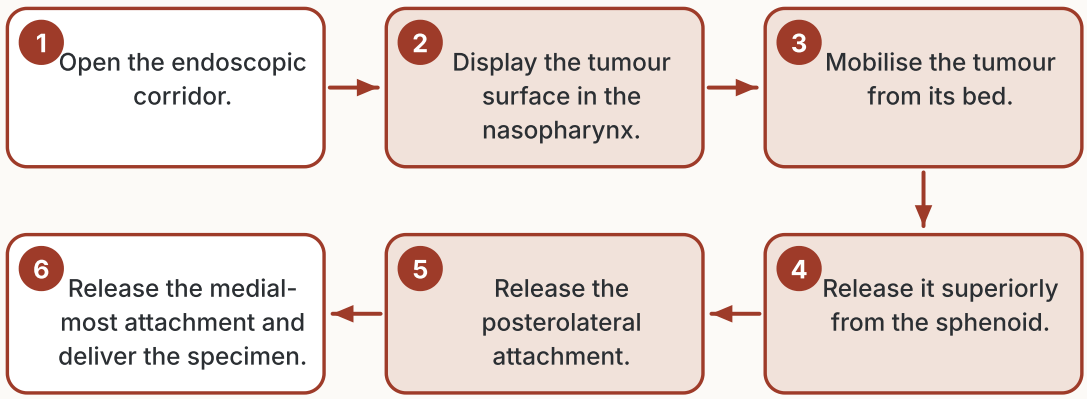
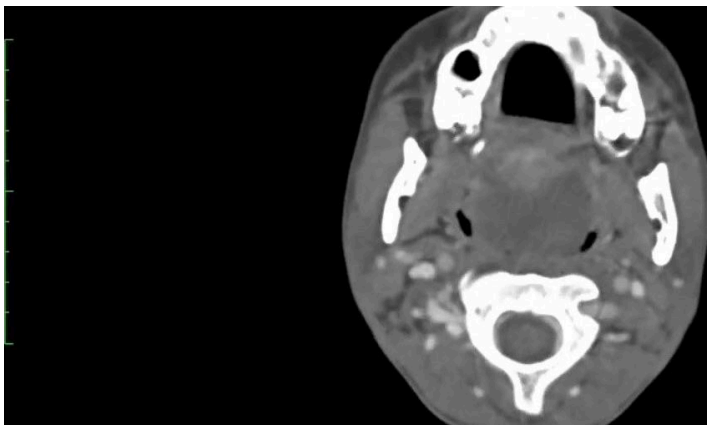
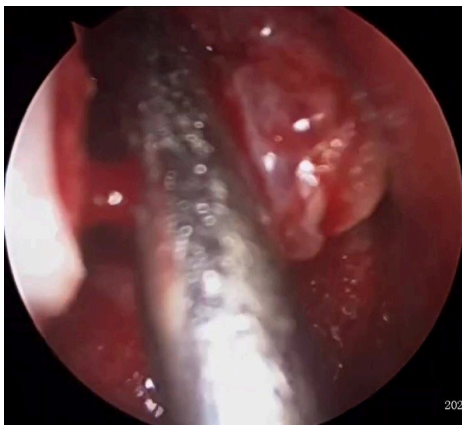


Figure 63.A Operative sequence.

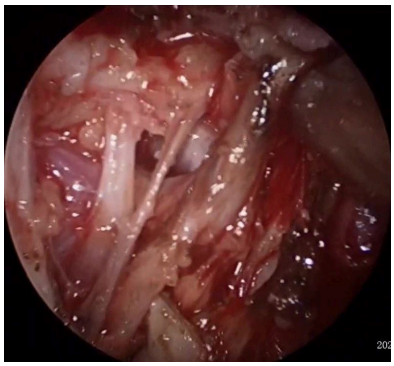
OPERATIVE RECORD



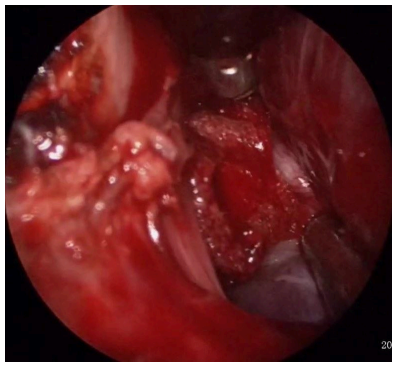
63.1 Axial CT at presentation. Identifying details blurred. Video 0:04



63.2 Endoscopic corridor opened. Video 0:21



63.3 Tumour surface in the nasopharynx. Video 0:56



63.4 Tumour mobilised from its bed. Video 1:22



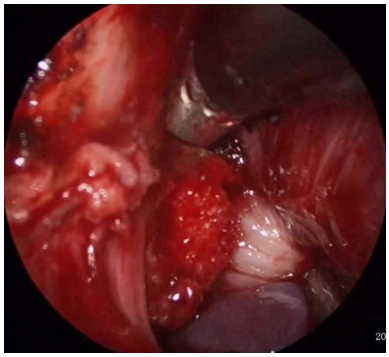
63.5 “Superior dissection off the sphenoid.” Video 1:49



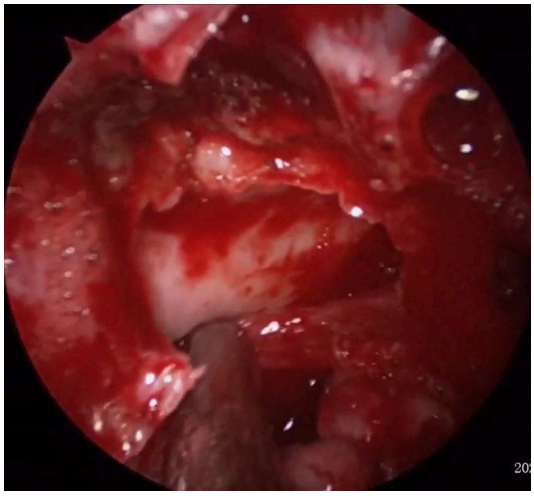
63.6 “Posterolateral attachment released.” Video 2:06



63.7 “Medial-most attachment released.” Video 2:23



63.8 The vascular base of the tumour. Video 1:31



63.9 The bed after removal. Video 2:32



63.10 The specimen, with scale. Video 3:16

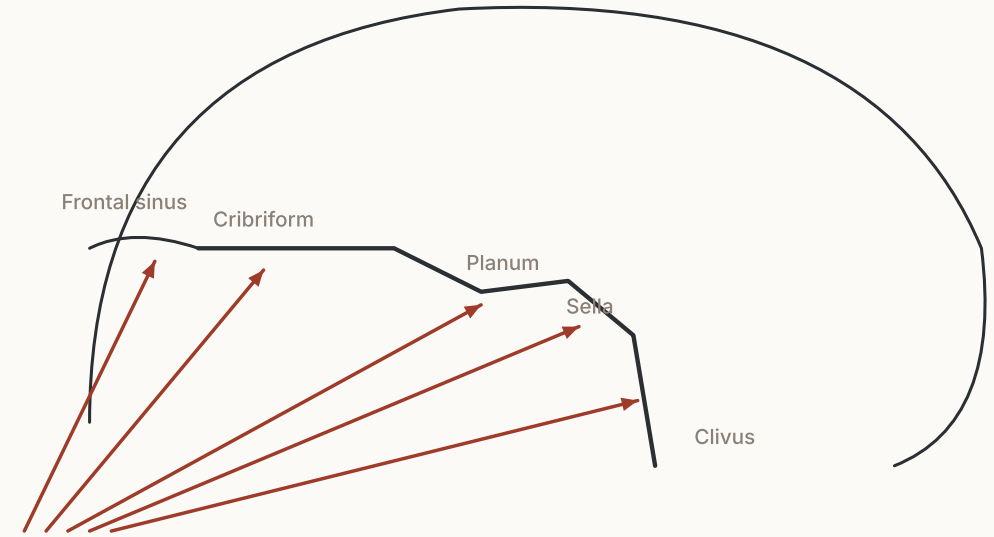


Figure 63.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Haemorrhage	Attachments were released in a planned order to reach the vascular base early.
Residual disease in the sphenoid	The sphenoid base was inspected after removal.

TEACHING POINTS

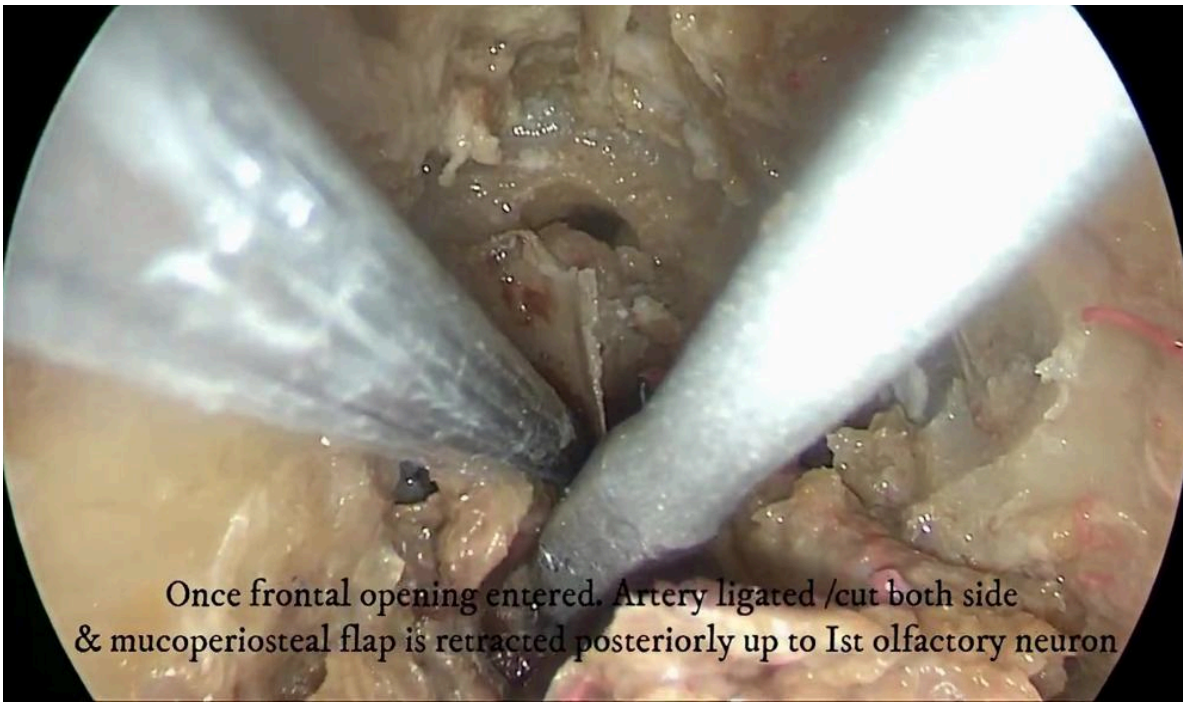
- **Embolise 24–72 hours before surgery.** Reduces blood loss before collateral vessels open.
- **Endoscopic surgery reduces blood loss and recurrence.** Pooled data favour it over open resection for most stages.
- **Follow up with MRI.** Residual disease in the sphenoid and pterygoid base is the commonest source of recurrence.

CASE SUMMARY

Endoscopic excision of a juvenile nasopharyngeal angiofibroma.

REFERENCES

1. Boghani Z, Husain Q, Kanumuri VV, et al. Juvenile nasopharyngeal angiofibroma: a systematic review and comparison of endoscopic, endoscopic-assisted, and open resection in 1047 cases. *Laryngoscope* 2013;123:859–69. doi:10.1002/lary.23843



64

One frontal sinus from two

Cadaveric dissection, Weill Cornell Medicine

Transfrontal approach: Draf III / endoscopic modified Lothrop procedure

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The transfrontal approach gives access to the anterior-most ventral skull base in the sagittal plane and is the first step of the transcribriform approach. Lesions extending laterally into the frontal sinus, fractures and CSF leaks are treated through it.

AUTHOR'S PERSPECTIVE

> A Draf III creates a single wide frontal opening by removing the frontal sinus floors, the frontal beak and the upper septum, giving maximal drainage and access.

APPROACH

Mucosal flaps raised over the frontal process of the maxilla and septum, drilling of the frontal beak and floors, and removal of the intersinus septum.

OPERATIVE STEPS

1. Denude and retract the mucosa over the frontal process of the maxilla and septum.
2. Begin drilling above the lacrimal sac, laterally to the subcutaneous plane.
3. Drill superomedially through the frontal beak and frontal sinus floor.
4. Remove the anteromedial wall of the frontal sinus.
5. Elevate the mucoperiosteal flap back to the first olfactory neuron.
6. Debulk the septal mucosa and remove mucosal remnants.
7. Complete the Draf III with the frontal sinus, frontal T, fovea and olfactory groove in view.

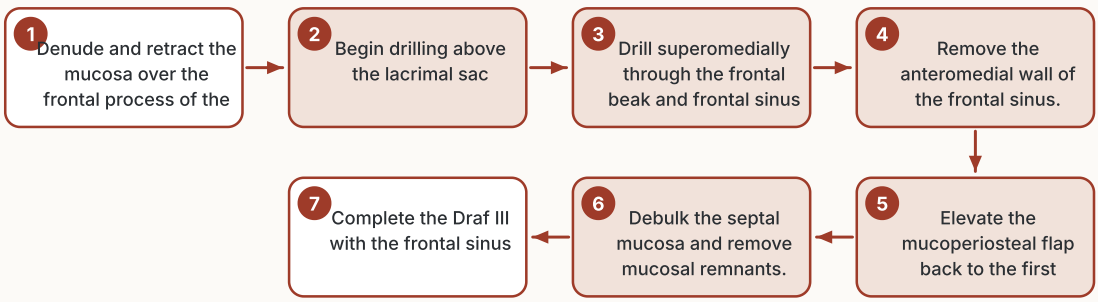
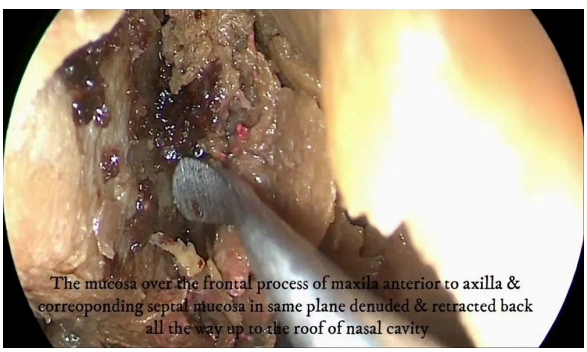
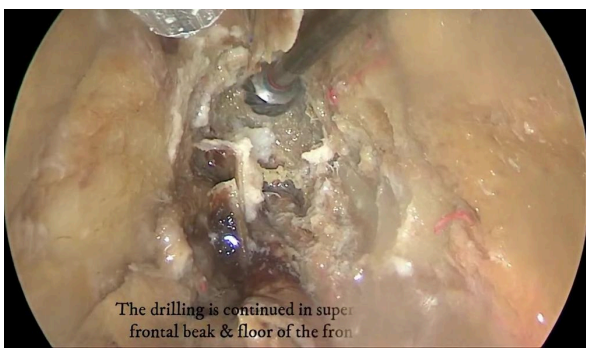


Figure 64.A Operative sequence.

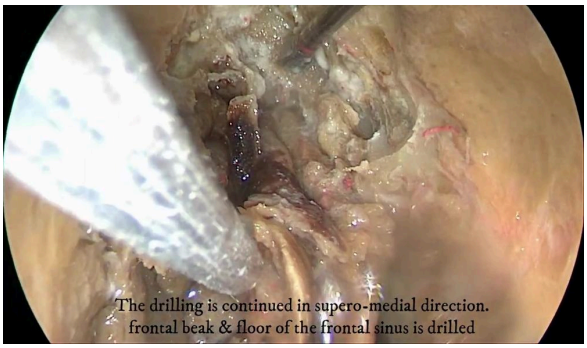
OPERATIVE RECORD



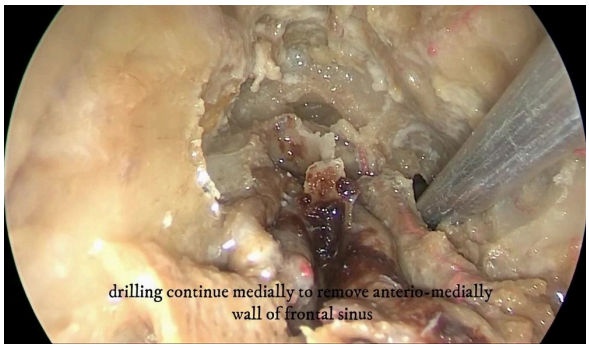
64.1 Mucosa over the frontal process of maxilla and septum denuded and retracted. Video 0:26



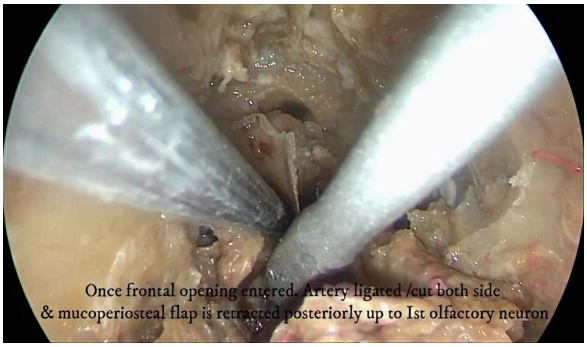
64.2 Drilling begins just above the lacrimal sac, laterally to the subcutaneous plane. Video 1:37



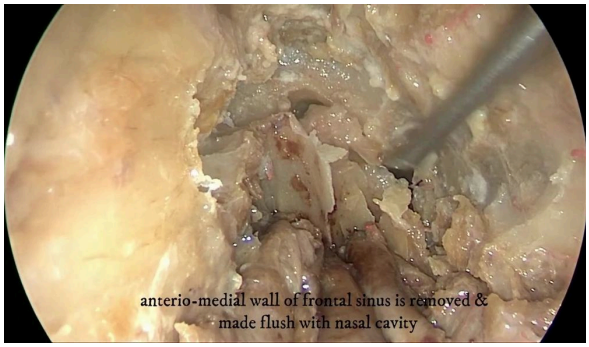
64.3 Drilling continued superomedially: frontal beak and floor of the frontal sinus. Video 1:54



64.4 Drilling medially to remove the anteromedial wall of the frontal sinus. Video 2:30



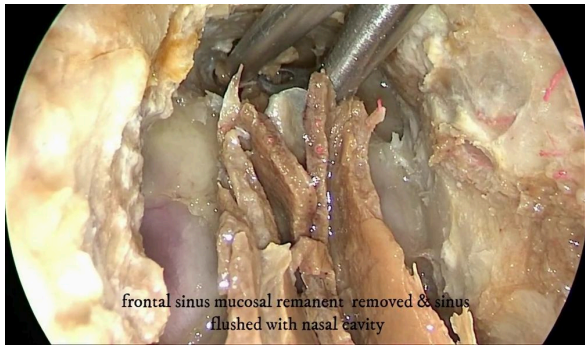
64.5 Frontal opening entered; mucoperiosteal flap retracted back to the first olfactory neuron. Video 2:47



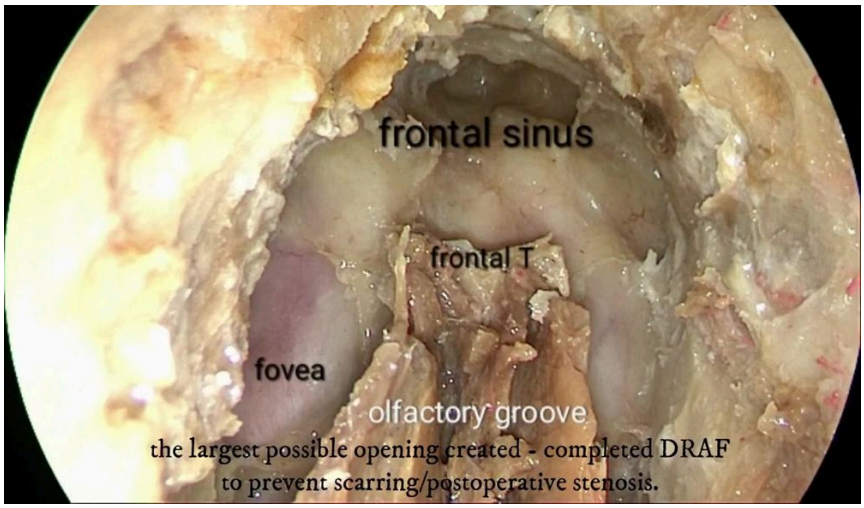
64.6 Anteromedial wall of the frontal sinus removed, flush with the nasal cavity. Video 3:23



64.7 Septal mucosa and mucoperiosteum debulked. Video 5:26



64.8 Frontal sinus mucosal remnants removed; sinus flush with the nasal cavity. Video 6:01



64.9 Completed Draf III: frontal sinus, frontal T, fovea, olfactory groove. Video 6:54

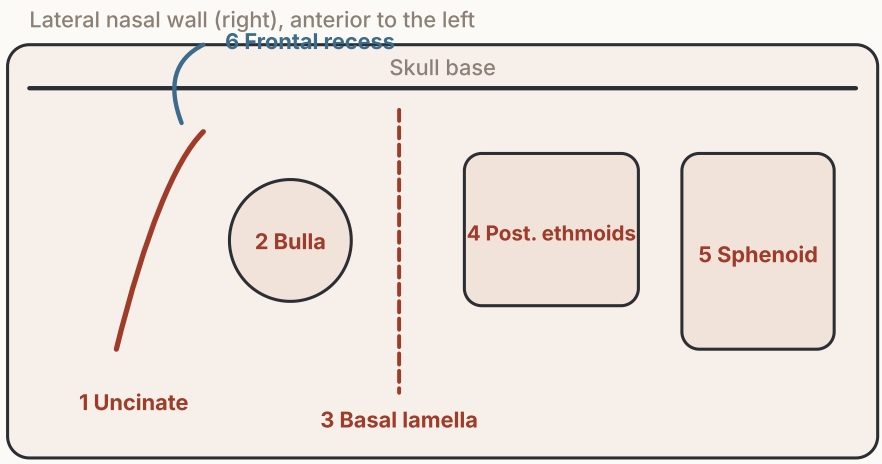


Figure 64.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Posterior limit	The first olfactory neuron marked the posterior extent.
Restenosis	The neo-ostium was made as wide as possible.

TEACHING POINTS

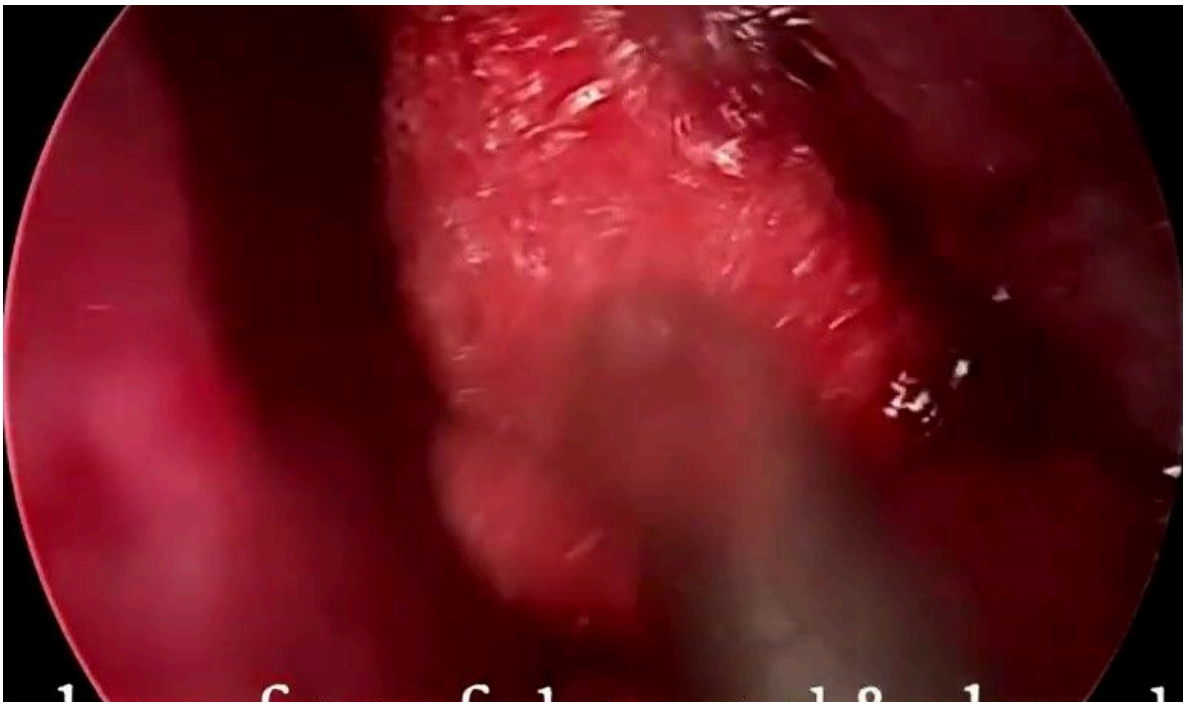
- **The first olfactory neuron is the posterior limit.** Drilling behind it risks the cribriform plate and CSF leak.
- **Drill laterally to the subcutaneous plane.** The wider the common opening, the lower the risk of closure.
- **Restenosis occurs in about one in six.** Mucosal preservation and a wide neo-ostium reduce it.

CASE SUMMARY

A cadaveric Draf III (endoscopic modified Lothrop) demonstrating the landmarks and sequence.

REFERENCES

1. Abuzeid WM, Vakil M, Lin J, et al. Endoscopic modified Lothrop procedure after failure of primary endoscopic sinus surgery: a meta-analysis. *Int Forum Allergy Rhinol* 2018;8:605–13. doi:10.1002/alr.22055



65

Plugging the cribriform

Right cribriform encephalocele and left traumatic CSF leak: two patients

Endoscopic transnasal repair with fat plug, middle turbinate flap and glue

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Two patients had a defect in the same region: one with a congenital encephalocele through the right cribriform plate, and one with a traumatic CSF leak from the left cribriform plate.

AUTHOR'S PERSPECTIVE

> Endoscopic repair closes most anterior skull base defects at the first attempt. The encephalocele was reduced to the defect edge and the repair was layered, using local tissue that does not need a distant donor site.

APPROACH

Endoscopic localisation of the defect, autologous fat plug, middle turbinate flap rotated over the defect, and tissue glue.

OPERATIVE STEPS

1. Expose the encephalocele and reduce it to the cribriform defect.
2. Reconstruct the skull base with graft and mesh.
3. In the second patient, expose the left cribriform defect.
4. Prepare the middle turbinate flap and increase its arc of rotation.
5. Plug the defect with autologous fat as a dural substitute.
6. Rotate the turbinate flap over the defect; apply tissue glue.
7. Pack the nose with gelfoam.

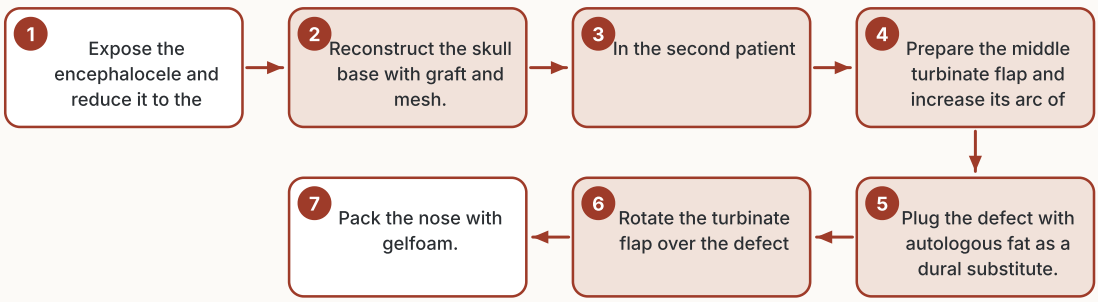
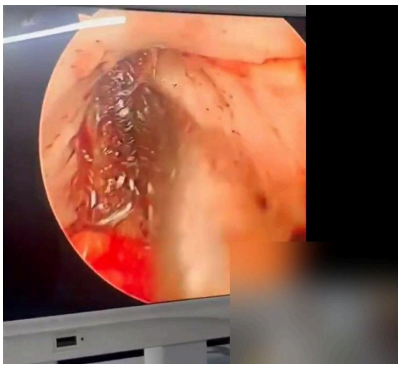
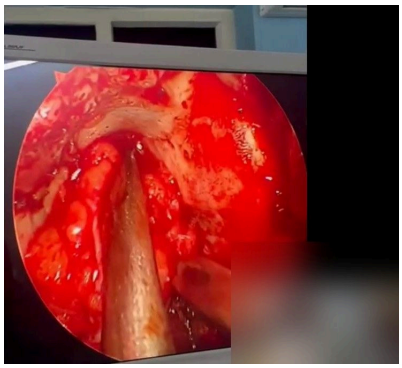


Figure 65.A Operative sequence.

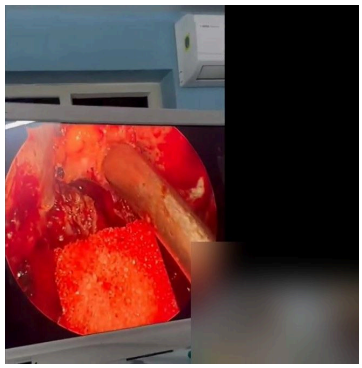
OPERATIVE RECORD



65.1 Encephalocele: the sac in the nasal cavity. Video 0:33



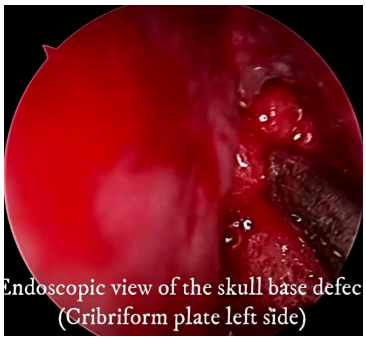
65.2 Encephalocele reduced at the cribriform defect. Video 0:44



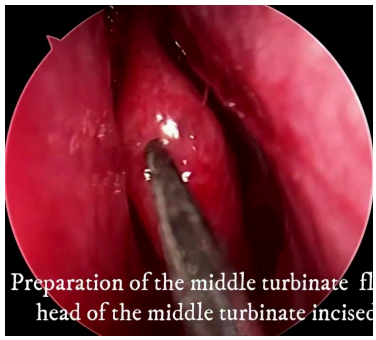
65.3 Graft prepared for the defect. Video 1:05



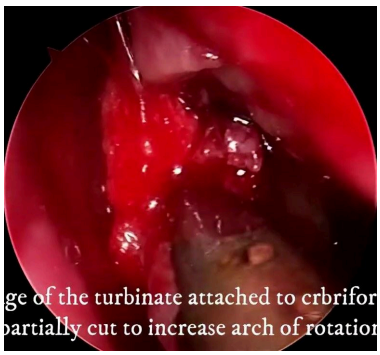
65.4 Mesh reconstruction of the skull base. Video 1:31



65.5 "Endoscopic view of the skull base defect (cribriform plate, left side)." Video 0:17



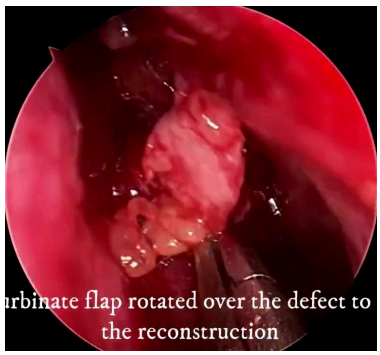
65.6 Middle turbinate flap prepared: head of the middle turbinate incised. Video 0:30



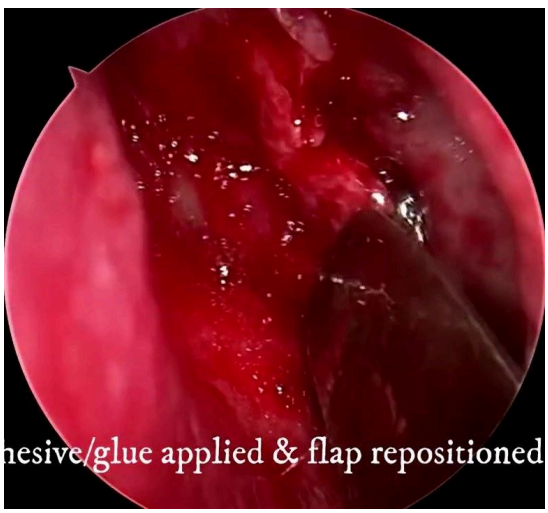
65.7 Front edge of the turbinate partially cut to increase its arc of rotation. Video 0:58



65.8 "Autologous fat graft harvested and plugged into the defect as dural substitute." Video 1:12



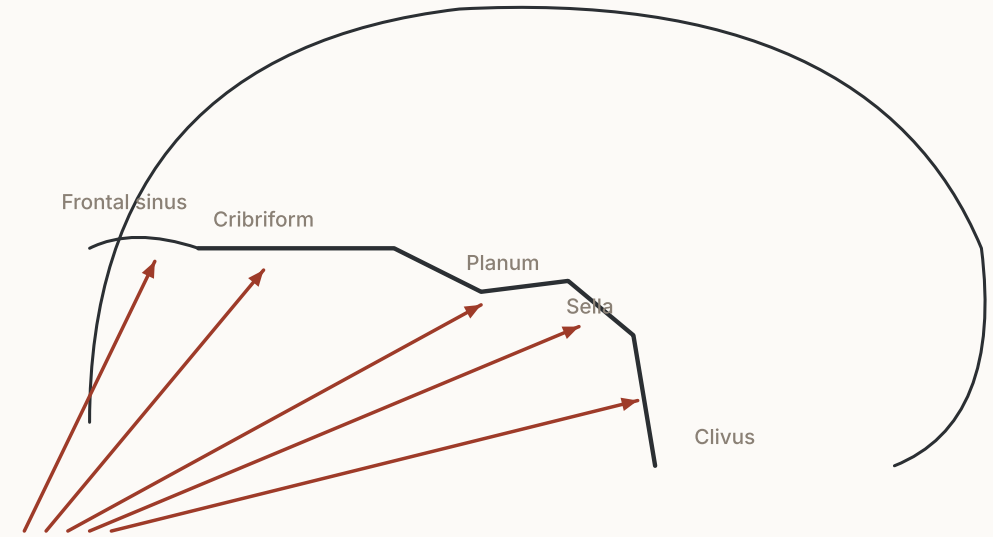
65.9 "Middle turbinate flap rotated over the defect to augment the reconstruction." Video 2:00



65.10 Tissue adhesive applied and flap repositioned. Video 2:13



65.11 Post-operative: flap in place, no CSF rhinorrhoea. Video 2:34



Transfrontal · transcribriform · transplanum · transsellar · transclival

Figure 65.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Defect localisation	The defect was identified endoscopically on the cribriform plate.
Graft displacement	The fat plug was tucked into the defect and covered with a vascularised flap and glue.

TEACHING POINTS

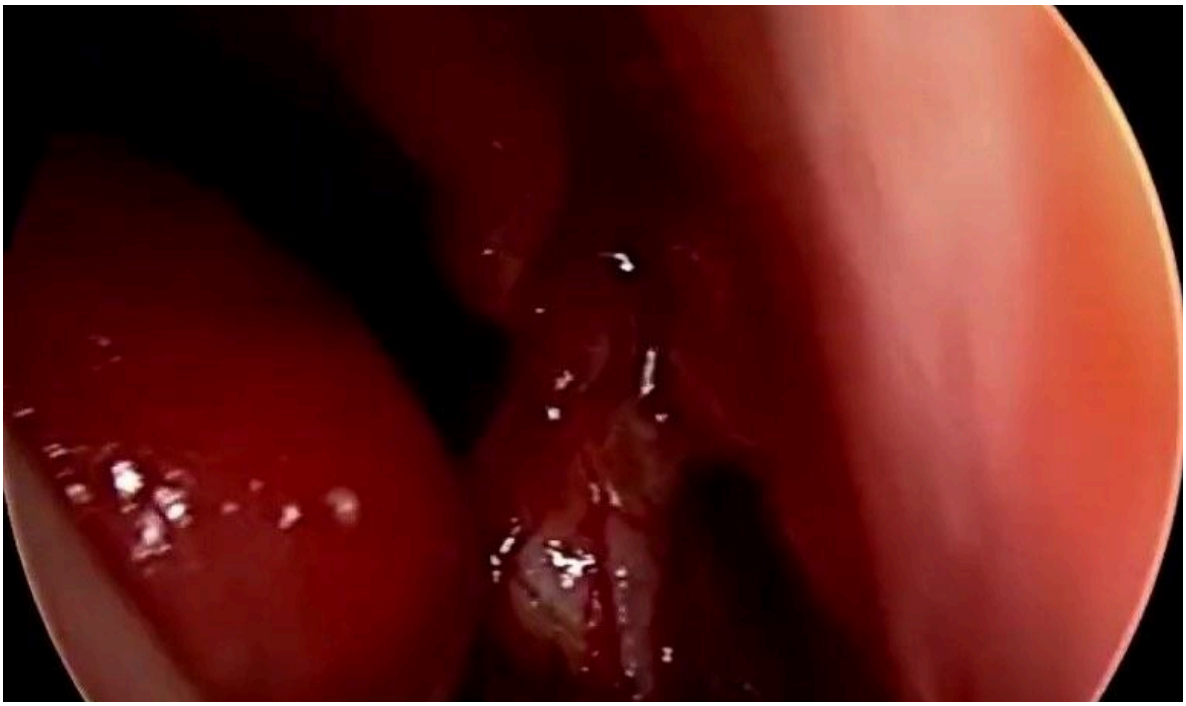
- **Endoscopic repair succeeds in about 90% at first attempt.** And in about 97% after revision.
- **Reduce the sac to the defect edge.** Encephalocele tissue is non-functional and is coagulated back to the bone margin.
- **Layer the repair.** Underlay, overlay and a vascularised flap give the best seal for larger defects.

CASE SUMMARY

Endoscopic repair of a cribriform encephalocele and a traumatic CSF leak. At follow-up the flap was in place with no CSF rhinorrhoea.

REFERENCES

1. Hegazy HM, Carrau RL, Snyderman CH, Kassam A, Zweig J. Transnasal endoscopic repair of cerebrospinal fluid rhinorrhea: a meta-analysis. *Laryngoscope* 2000;110:1166–72. doi:10.1097/00005537-200007000-00019
2. Ma J, Huang Q, Li X, et al. Endoscopic transnasal repair of cerebrospinal fluid leaks with and without an encephalocele in pediatric patients: from infants to children. *Childs Nerv Syst* 2015;31:1493–8. doi:10.1007/s00381-015-2746-y



66

Second time through the sphenoid

Residual pituitary macroadenoma after previous surgery, with visual impairment

Revision endoscopic transnasal transsphenoidal excision with multilayer reconstruction

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The patient had undergone surgery elsewhere and had residual macroadenoma with visual impairment. Hormonal status (GH, IGF-1, LH, prolactin and TSH) was normal.

AUTHOR'S PERSPECTIVE

> With visual compromise from residual tumour, revision surgery was indicated. The endoscopic binostril technique gives a wide view of the sella and suprasellar region, and a nasoseptal flap is raised first to reconstruct the expected defect.

APPROACH

Revision endoscopic transsphenoidal approach, three- to four-handed binostril technique, nasoseptal flap, wide sellar opening and multilayer repair.

OPERATIVE STEPS

1. Elevate the nasoseptal flap (no septal cartilage after previous surgery).
2. Secure the flap in the nasopharynx.
3. Remove the sphenoid rostrum by shoulder osteotomy.
4. Drill the sella to eggshell and widen to the four blues.
5. Incise dura and capsule; remove soft tumour by curettage and suction.
6. Approach the suprasellar part extracapsularly and dissect it off the arachnoid, stalk and chiasma.
7. Inspect the sella with 0° and 30° scopes.
8. Reconstruct in layers with fat, fascia lata and the nasoseptal flap.

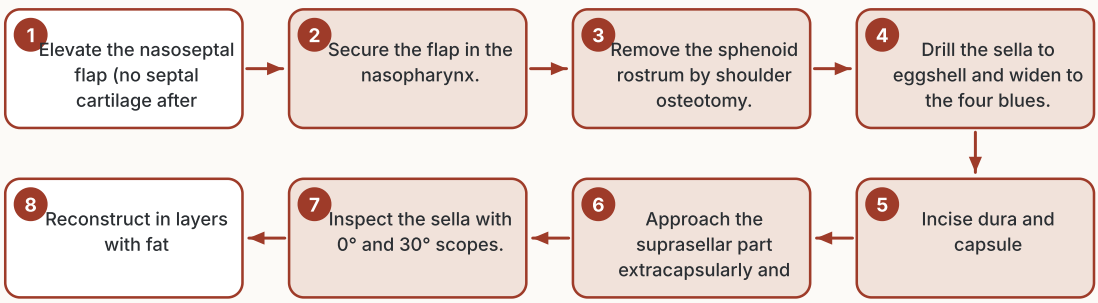
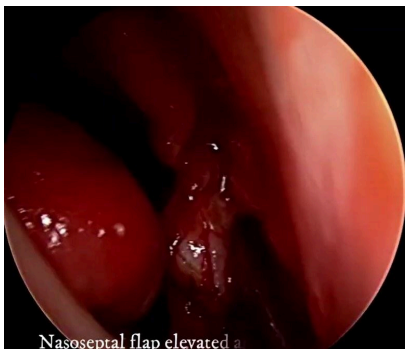
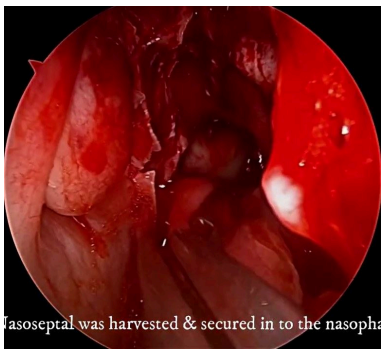


Figure 66.A Operative sequence.

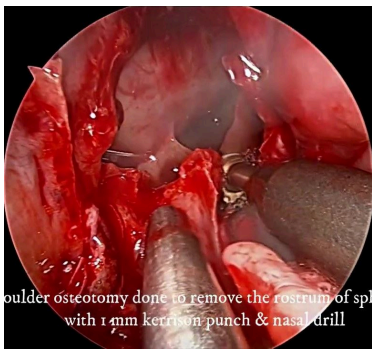
OPERATIVE RECORD



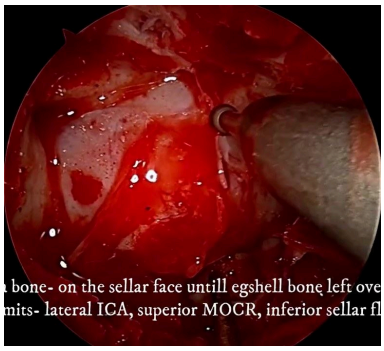
66.1 Nasoseptal flap elevated. Video 1:17



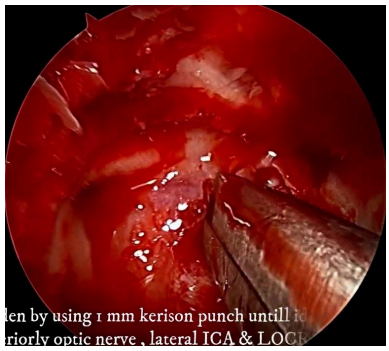
66.2 Nasoseptal flap harvested and secured in the nasopharynx. Video 2:51



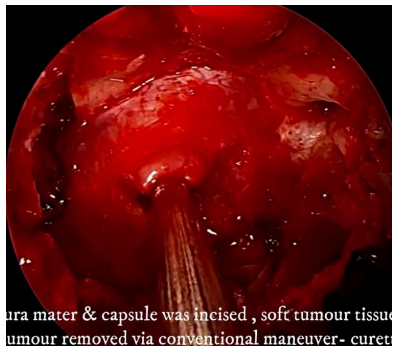
66.3 Shoulder osteotomy to remove the sphenoid rostrum. Video 3:22



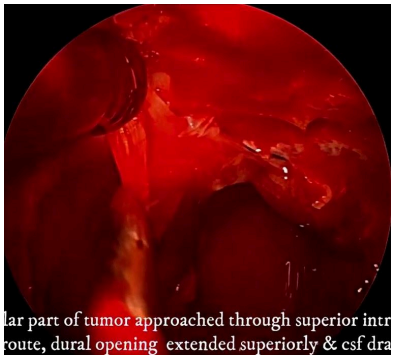
66.4 Sellar bone drilled to eggshell: lateral ICA, superior MOCR, inferior sellar floor. Video 5:27



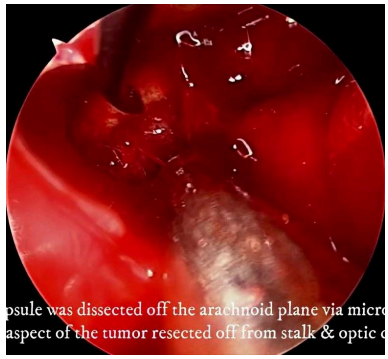
66.5 Opening widened to the four blues: optic nerve, ICA and LOCR, sellar floor. Video 6:29



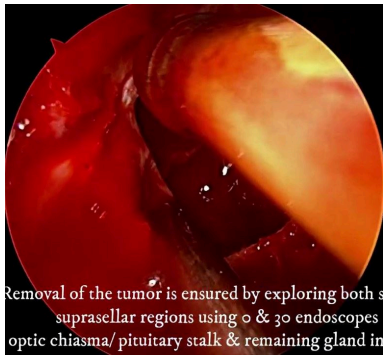
66.6 Dura and capsule incised; soft tumour removed by curettage and suction. Video 8:34



66.7 Suprasellar part approached through an extracapsular route. Video 9:05



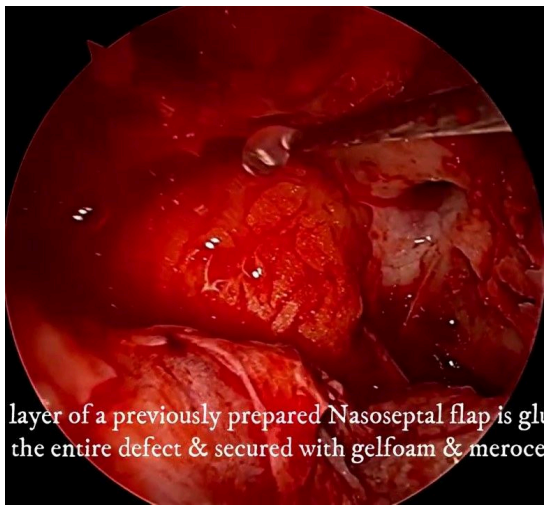
66.8 Capsule dissected off the arachnoid; tumour freed from stalk and chiasma. Video 10:07



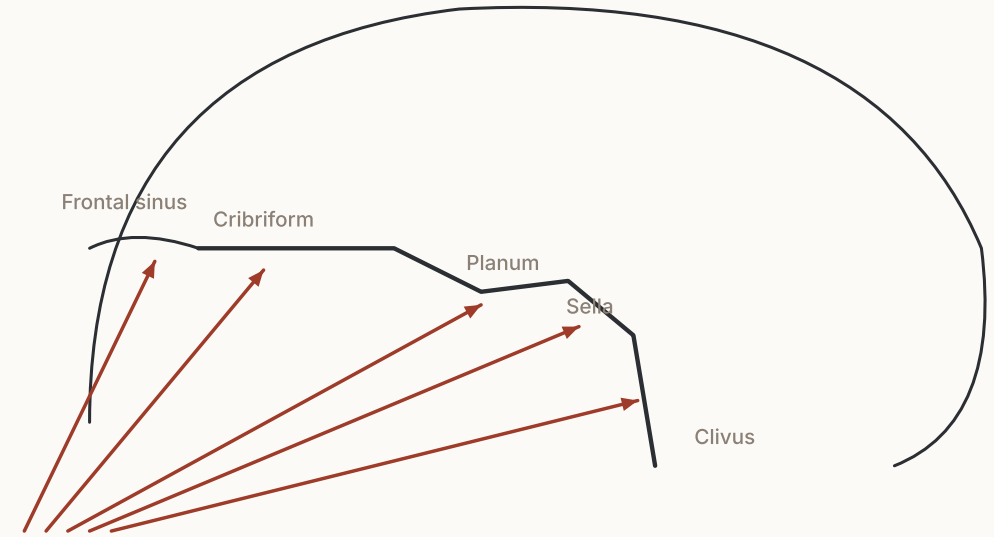
66.9 Sella and suprasellar region checked with 0° and 30° scopes. Video 10:39



66.10 Multilayer reconstruction: abdominal fat and fascia lata. Video 11:10



66.11 Nasoseptal flap glued over the defect. Video 11:41



Transfrontal · transcribriform · transplanum · transsellar · transclival

Figure 66.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Scarring and missing landmarks from previous surgery	The flap was raised first and the sella widened to all four blues.
CSF leak from a breached diaphragm	Multilayer reconstruction with a vascularised flap was used.

TEACHING POINTS

- **The four blues.** The cavernous carotid on each side and the intercavernous sinuses above and below define the sellar opening.
- **Extracapsular dissection for the suprasellar part.** Keeps the arachnoid intact and reduces CSF leak.
- **Endoscopic surgery causes less diabetes insipidus and hypothyroidism.** Meta-analysis shows fewer endocrine and septal complications than the microscope.

CASE SUMMARY

Revision endoscopic transsphenoidal excision of a residual macroadenoma with multilayer reconstruction.

REFERENCES

1. Chen J, Liu H, Man S, et al. Endoscopic vs. microscopic transsphenoidal surgery for the treatment of pituitary adenoma: a meta-analysis. *Front Surg* 2022;8:806855. doi:10.3389/fsurg.2021.806855
2. Hadad G, Bassagasteguy L, Carrau RL, et al. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope* 2006;116:1882–6. doi:10.1097/01.mlg.0000234933.37779.e4



67

Draining the apex

Cholesterol granuloma of the petrous apex

Endoscopic transnasal drainage

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A cholesterol granuloma of the petrous apex abutted the posterior sphenoid wall.

AUTHOR'S PERSPECTIVE

> When the lesion is medial and abuts the sphenoid, drainage through the nose avoids a lateral approach that endangers hearing.

APPROACH

Endoscopic transsphenoidal approach, opening of the cyst wall and creation of a permanent drainage pathway.

OPERATIVE STEPS

1. Open the sphenoid towards the petrous apex.
2. Enter the granuloma cavity.
3. Evacuate the contents.
4. Inspect the drained cavity.

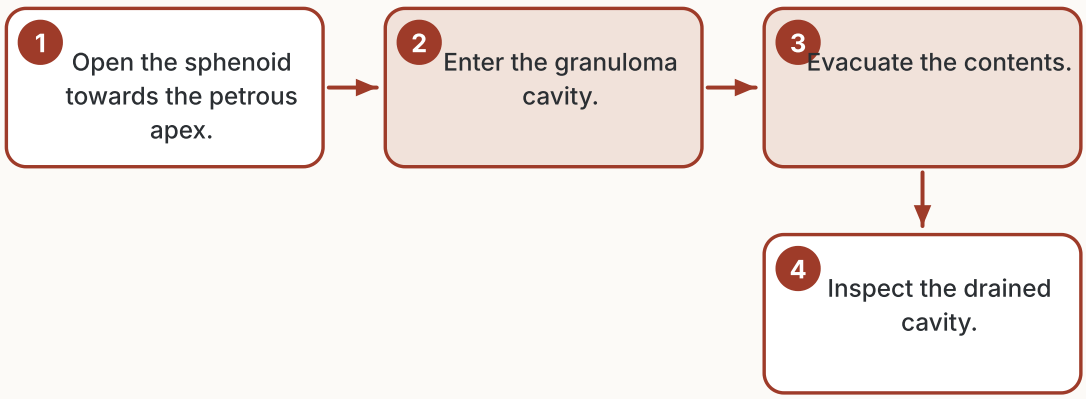
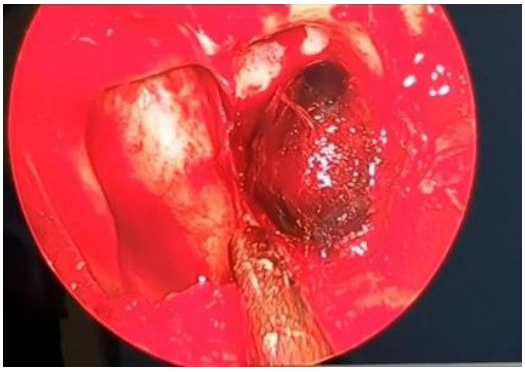
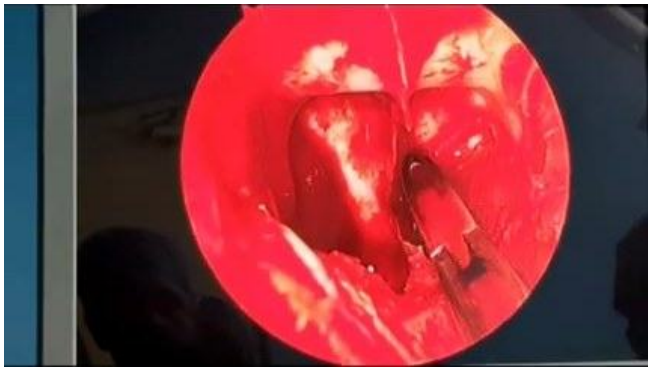


Figure 67.A Operative sequence.

OPERATIVE RECORD



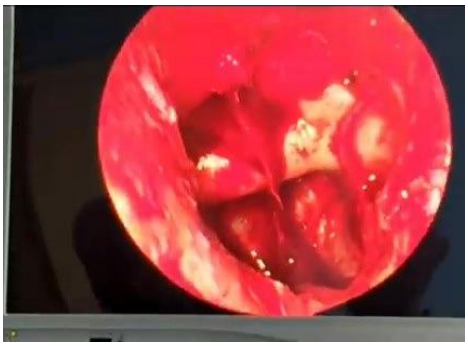
67.1 The sphenoid opened towards the petrous apex. Video 0:07



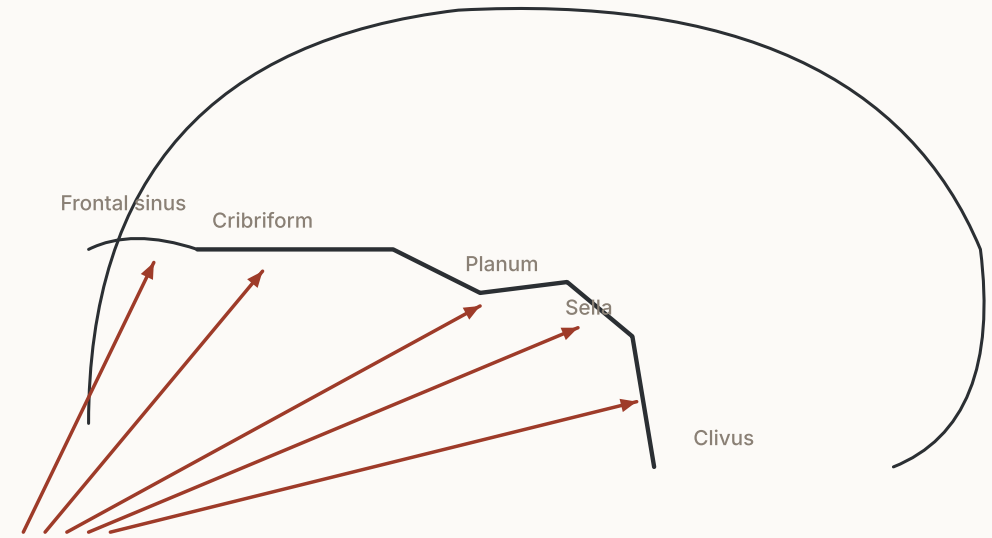
67.2 The granuloma cavity entered. Video 0:32



67.3 Contents evacuated. Video 0:57



67.4 The drained cavity. Video 1:13



Transfrontal · transcribriform · transplanum · transsellar · transclival

Figure 67.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Re-closure of the opening	The opening was made wide.
The paraclival carotid	The opening was made medial to the carotid.

TEACHING POINTS

- **Medial lesions abutting the sphenoid suit the endonasal route.** Hearing is preserved, unlike lateral transtemporal routes.
- **Keep the pathway open.** A stent or pedicled flap reduces re-closure and recurrence.

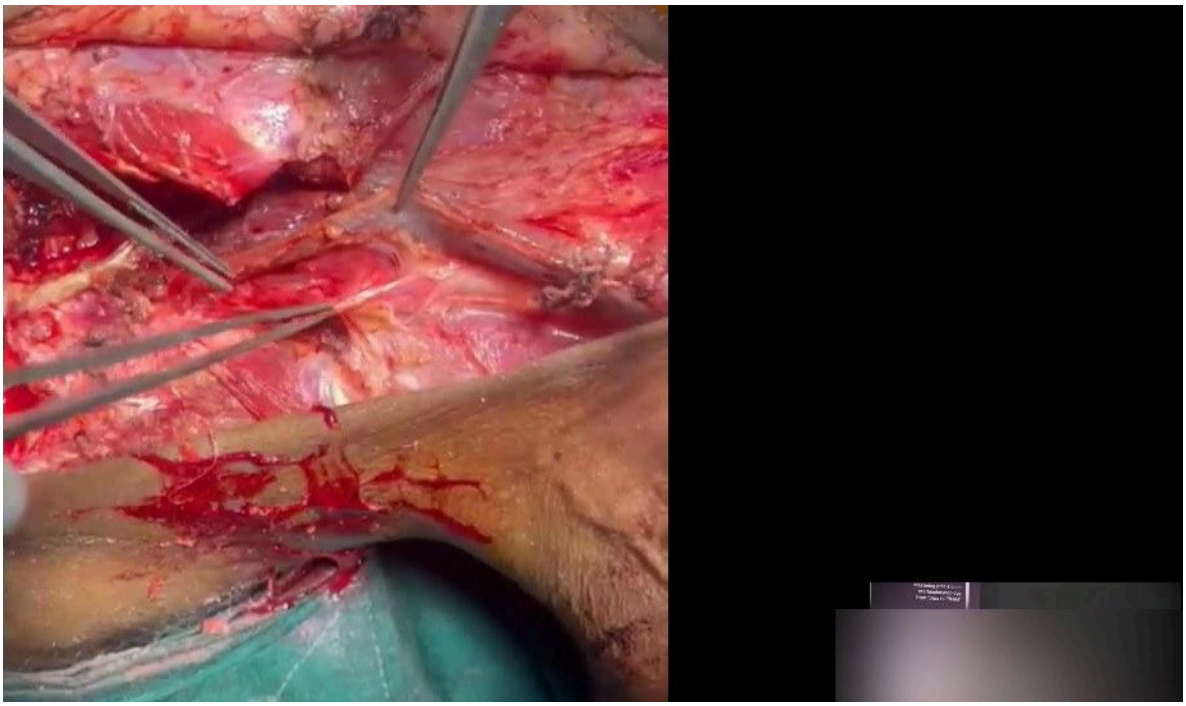
- **MRI is diagnostic.** The lesion is bright on both T1 and T2 sequences.

CASE SUMMARY

Endoscopic transnasal drainage of a petrous apex cholesterol granuloma.

REFERENCES

1. Kim JS, Kim DH, Yoon WS, Kim Y. Endoscopic endonasal transpterygoid approach using pedicled nasoseptal flap for petrous apex cholesterol granuloma. *J Craniofac Surg* 2019;30:1833–5. doi:10.1097/SCS.0000000000005589
2. Hadad G, Bassagasteguy L, Carrau RL, et al. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope* 2006;116:1882–6. doi:10.1097/01.mlg.0000234933.37779.e4



68

Pinna to petrous

Squamous cell carcinoma of the external auditory canal and pinna

Total pinna excision, lateral temporal bone resection, parotidectomy, posterior marginal mandibulectomy, neck dissection and PMMC reconstruction

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A squamous cell carcinoma involved the external auditory canal and pinna.

AUTHOR'S PERSPECTIVE

> Canal carcinoma is removed en bloc with the lateral temporal bone. The pinna, parotid and adjacent mandible were included because of local extension, and the neck was dissected.

APPROACH

Total pinna excision with en bloc lateral temporal bone resection, parotidectomy, posterior marginal mandibulectomy and neck dissection, with pectoralis major flap reconstruction.

OPERATIVE STEPS

1. Mobilise the block with pinna and parotid.
2. Dissect along the temporal bone.
3. Identify the facial nerve and parotid region.
4. Complete the lateral temporal bone resection.
5. Take the posterior mandibular margin and dissect the neck.
6. Inspect the cavity before reconstruction with the pectoralis major flap.

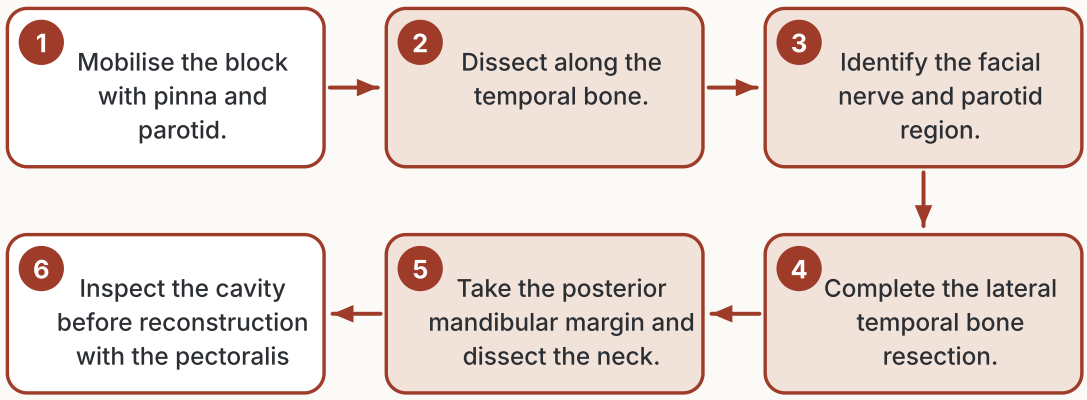
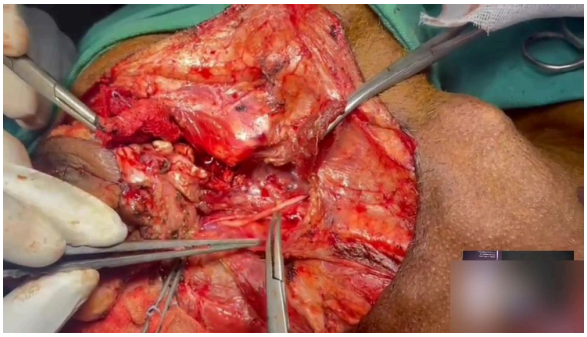
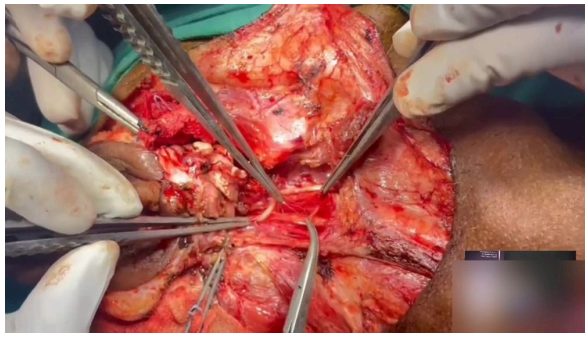


Figure 68.A Operative sequence.

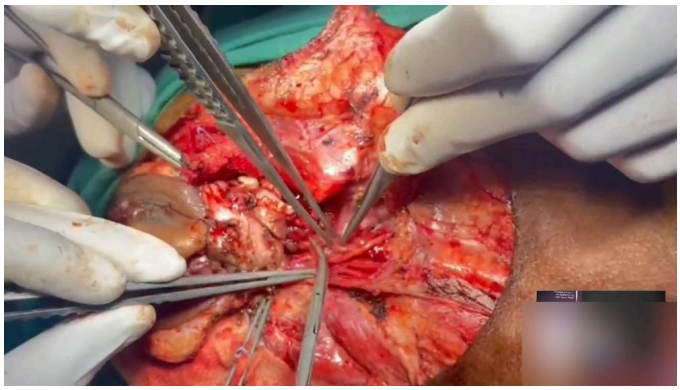
OPERATIVE RECORD



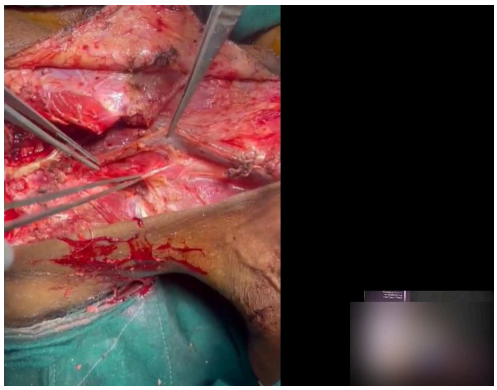
68.1 The block mobilised with pinna and parotid. Video 0:12



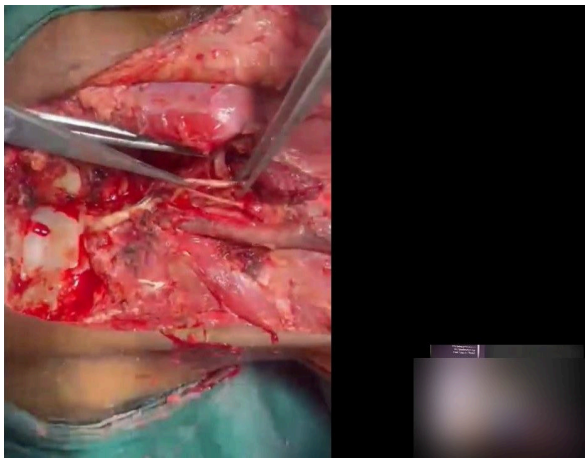
68.2 Dissection along the temporal bone. Video 0:17



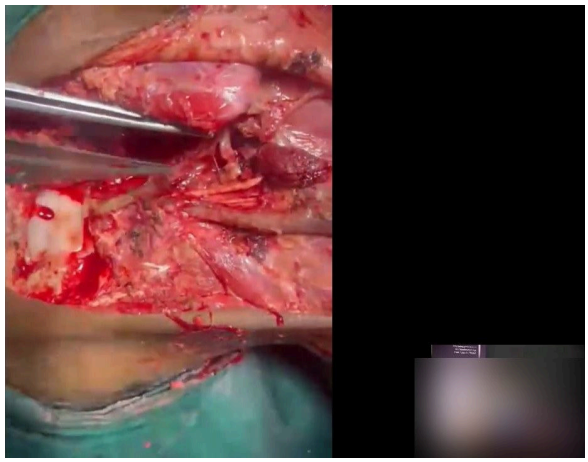
68.3 Facial nerve and parotid region. Video 0:28



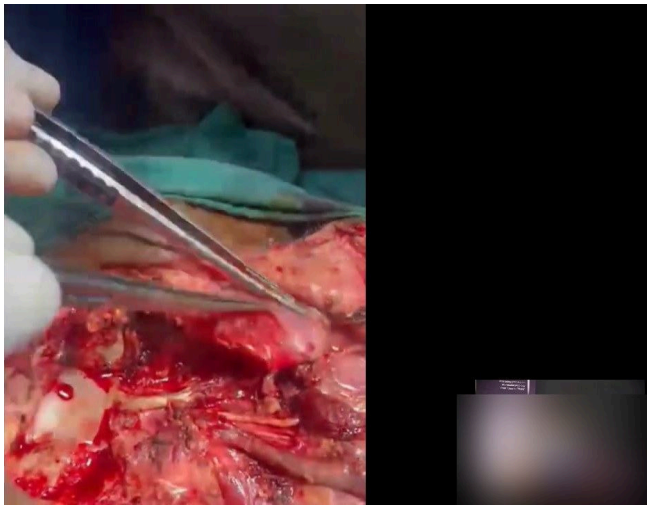
68.4 Lateral temporal bone resection in progress. Video 0:43



68.5 Upper neck and mandibular margin. Video 1:03



68.6 The cavity after resection. Video 1:09



68.7 Before PMMC inset. Video 1:19

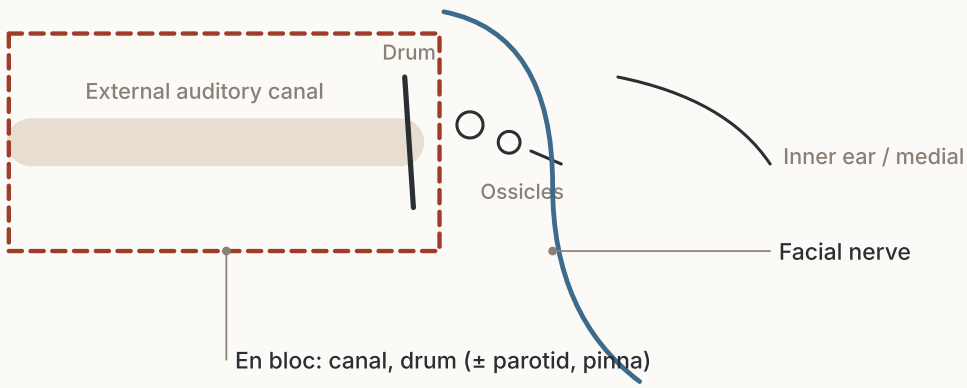


Figure 68.B Lateral temporal bone resection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
En bloc removal of the canal	The canal was removed with the lateral temporal bone, not piecemeal.
A large lateral skull base defect	A pectoralis major flap provided cover.

TEACHING POINTS

- **Pittsburgh staging predicts survival.** Two-year survival falls from about 100% for T1 to 7% for T4.
- **En bloc resection.** Piecemeal removal is associated with recurrence.
- **Radiotherapy for T3 and above.** Adjuvant treatment improves survival in advanced stages.

CASE SUMMARY

En bloc lateral temporal bone resection with pinna, parotid and neck for external auditory canal carcinoma, reconstructed with a pectoralis major flap.

REFERENCES

1. Moody SA, Hirsch BE, Myers EN. Squamous cell carcinoma of the external auditory canal: an evaluation of a staging system. *Am J Otol* 2000;21:582–8.



69

The nerve that was given back

Glomus jugulotympanicum

Lateral skull base excision with facial nerve grafting

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Two recordings document glomus jugulotympanicum surgery: the facial nerve graft, and the full approach from the pinna to the petrous bone.

AUTHOR'S PERSPECTIVE

> When the tumour involves the facial nerve, the involved segment is resected and the nerve is grafted in the same sitting, which gives the best chance of useful facial function.

APPROACH

Combined transmastoid and neck approach with control of the great vessels, tumour removal at the jugular foramen and interposition grafting of the facial nerve.

OPERATIVE STEPS

1. Expose the facial nerve in the temporal bone.
2. Remove the tumour and display the nerve gap.
3. Lay the graft in the fallopian canal.
4. Make the post-auricular and neck incision.
5. Open the mastoid and neck together; identify the great vessels and lower cranial nerves.
6. Dissect the tumour at the jugular foramen.
7. Inspect the field after removal.

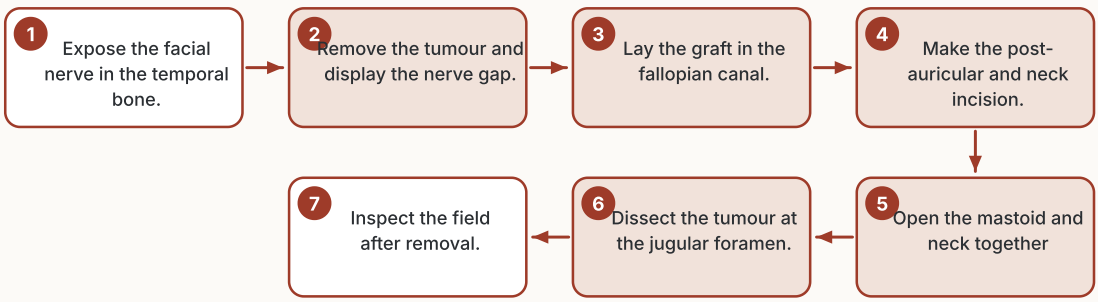
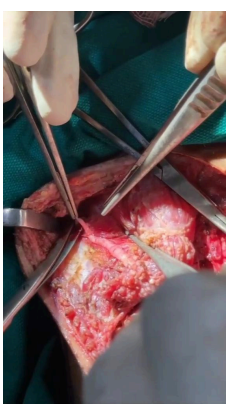


Figure 69.A Operative sequence.

OPERATIVE RECORD



69.1 Exposure of the facial nerve in the temporal bone. Video 0:18



69.2 The nerve gap after tumour removal. Video 0:39



69.3 Graft lying in the fallopian canal. Video 1:01



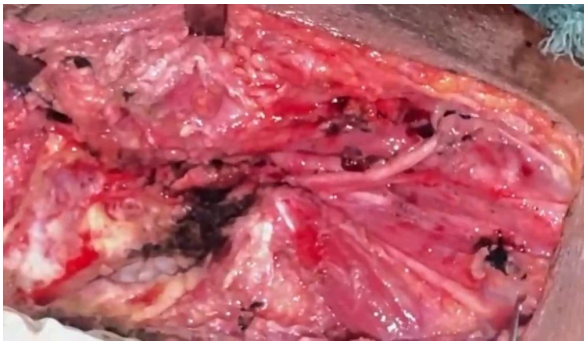
69.4 Graft in place. Video 1:11



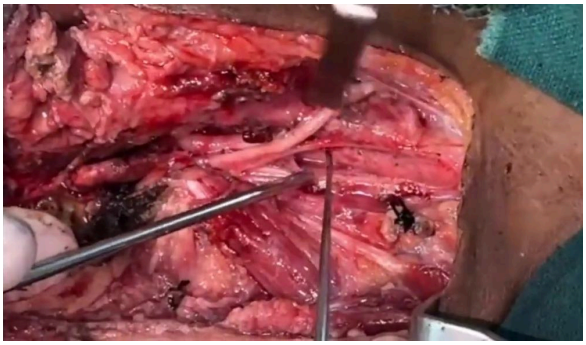
69.5 Post-auricular and neck incision. Video 0:24



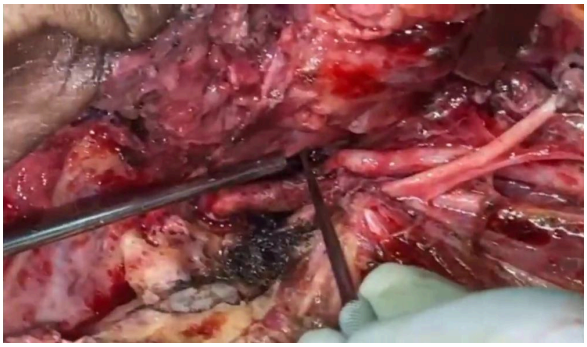
69.6 Mastoid and neck opened together. Video 1:03



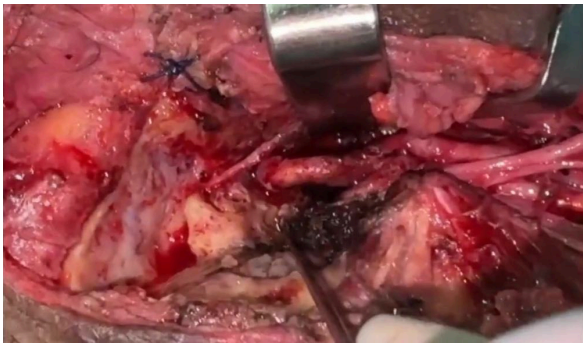
69.7 Great vessels and lower cranial nerves in the neck. Video 1:32



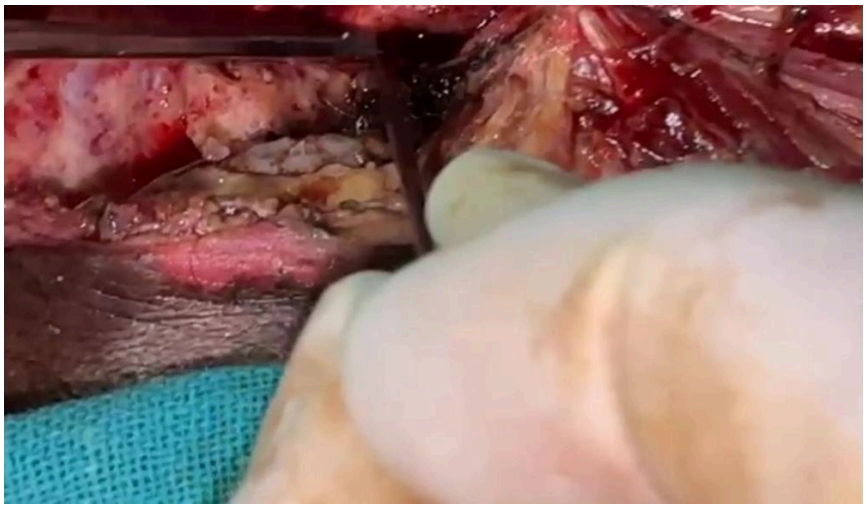
69.8 Facial nerve and jugular bulb region. Video 2:02



69.9 Tumour dissected at the jugular foramen. Video 2:31



69.10 The field after tumour removal. Video 3:00



69.11 Final view. Video 3:29

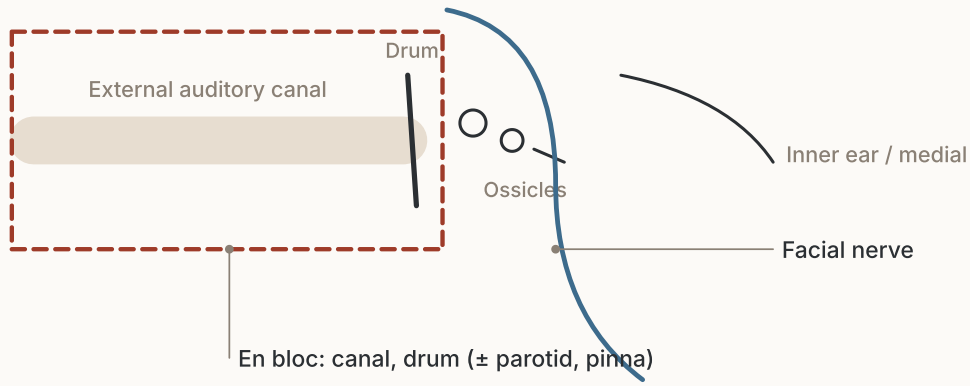


Figure 69.B Lateral temporal bone resection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Facial nerve involvement	The involved segment was resected and grafted.
Bleeding from the sigmoid sinus and jugular bulb	The vessels were controlled in the neck and above.

TEACHING POINTS

- **Embolise before surgery.** Paragangliomas are highly vascular; embolisation reduces blood loss.
- **Control the internal jugular vein below and the sigmoid sinus above.** The tumour is then isolated before the jugular bulb is opened.
- **Graft in the same sitting.** Interposition grafting commonly achieves House–Brackmann grade III.

CASE SUMMARY

Lateral skull base excision of a glomus jugulotympanicum with interposition grafting of the facial nerve.

REFERENCES

1. Fisch U. Infratemporal fossa approach to tumours of the temporal bone and base of the skull. *J Laryngol Otol* 1978;92:949–67. doi:10.1017/s0022215100086382



70

The humming that never stopped

Synchronous right glomus jugulotympanicum and carotid body tumour in a 45-year-old man

Lateral skull base and neck exploration with jugular foramen dissection and carotid skeletonisation

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 45-year-old man had long-standing tinnitus and was diagnosed with synchronous right glomus jugulotympanicum and carotid body tumour. He had visited centres across the north of India and been referred onwards repeatedly. A continuous humming kept him from work and sleep, and he had become withdrawn and depressed. He underwent surgery at We Care Hospital, Rohtak.

AUTHOR'S PERSPECTIVE

> Both tumours lay on the same side and could be addressed in a single operation through a combined lateral skull base and neck approach, with control of the carotid in the neck first.

APPROACH

Neck exploration with carotid control, transection of the canal, facial nerve dissection and jugular foramen dissection.

OPERATIVE STEPS

1. Review the CT with the jugular foramen lesion.
2. Transect the external auditory canal and expose the tumour.
3. Expose the synchronous carotid body tumour.
4. Dissect the facial nerve; perform temporal bone dissection after neck exploration.
5. Dissect the jugular foramen, remove the tumour and skeletonise the carotid.

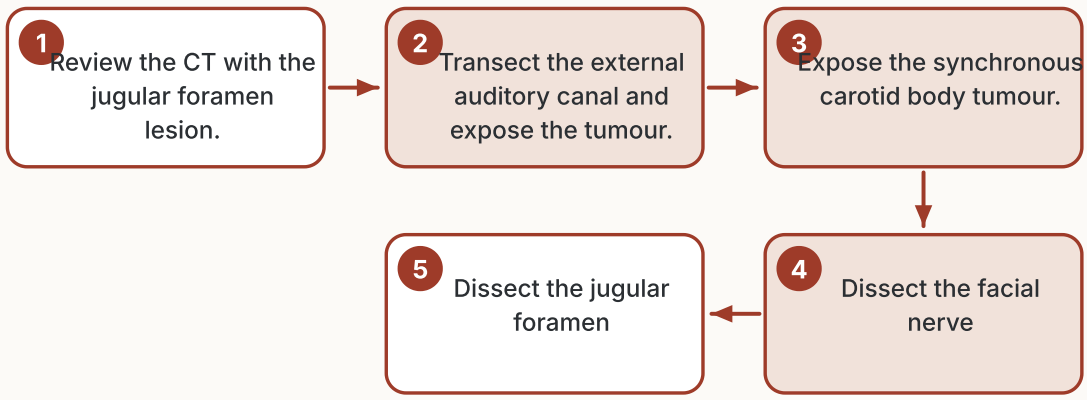


Figure 70.A Operative sequence.

OPERATIVE RECORD



70.1 CT: the jugular foramen lesion marked. Video 0:19



70.2 "EAC transection, tumour exposure." Video 0:31



70.3 "Synchronous carotid body tumour." Video 0:44



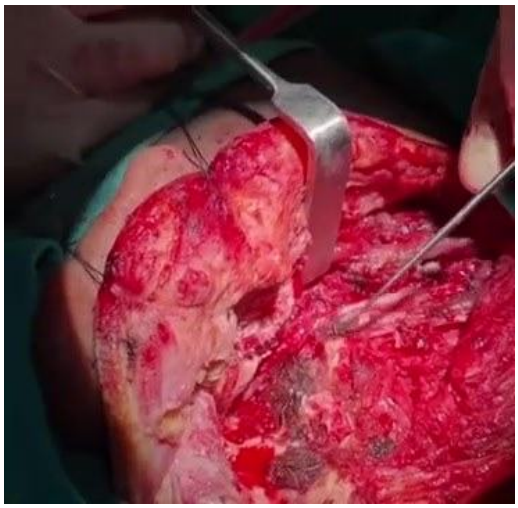
70.4 “Facial nerve dissection”; temporal bone dissection after neck exploration. Video 0:57



70.5 “Jugular foramen dissection, tumour removal, carotid artery skeletonised.” Video 1:10



70.6 The skull base cavity during dissection. Video 1:48



70.7 Neck and skull base in continuity. Video 3:30



70.8 Final field. Video 4:33

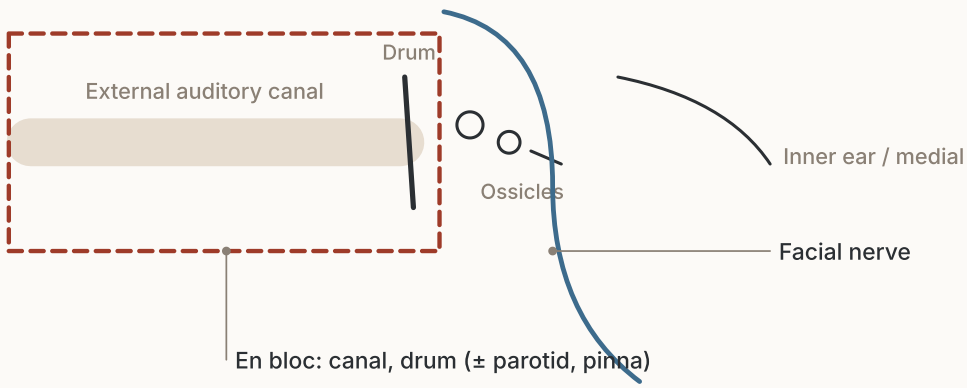


Figure 70.B Lateral temporal bone resection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Two vascular tumours on one side	The carotid was controlled in the neck before either tumour was dissected.
Lower cranial nerves at the jugular foramen	Dissection was carried out with the nerves identified.

TEACHING POINTS

- **Paragangliomas are often multiple.** Image the whole neck and skull base.
- **Shamblin class predicts vascular risk.** Class III may need vascular repair.
- **Consider genetic testing.** SDH mutations are common in multiple tumours.

CASE SUMMARY

Single-stage excision of synchronous right glomus jugulotympanicum and carotid body tumour through a combined lateral skull base and neck approach.

REFERENCES

1. Shamblin WR, ReMine WH, Sheps SG, Harrison EG. Carotid body tumor (chemodectoma): clinicopathologic analysis of ninety cases. *Am J Surg* 1971;122:732–9. doi:10.1016/0002-9610(71)90436-3

2. Fisch U. Infratemporal fossa approach to tumours of the temporal bone and base of the skull. *J Laryngol Otol* 1978;92:949–67. doi:10.1017/s0022215100086382



71

Control at C1

Glomus jugulotympanicum with internal carotid involvement

Intraoperative internal carotid artery management at the C1 level

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This video demonstrates control of the internal carotid artery at the level of C1 during glomus surgery.

AUTHOR'S PERSPECTIVE

> Where a lateral skull base tumour wraps the internal carotid, proximal control high in the neck, at the first cervical vertebra, is the safety line before tumour dissection at the skull base.

APPROACH

Exposure of the internal carotid from the neck up to C1, with control maintained during dissection and continuous irrigation.

OPERATIVE STEPS

1. Expose the vessel with irrigation in view.
2. Obtain control at C1.
3. Dissect along the internal carotid.
4. Clear tumour from the vessel wall.
5. Maintain control while dissecting.
6. Inspect the field with the carotid preserved.

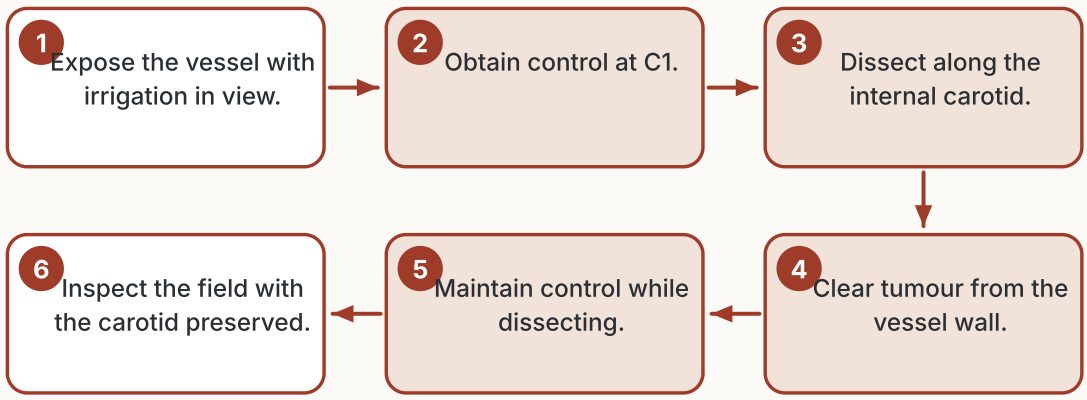
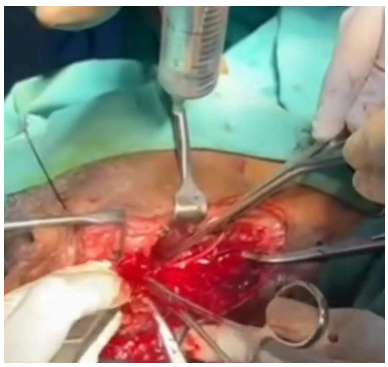
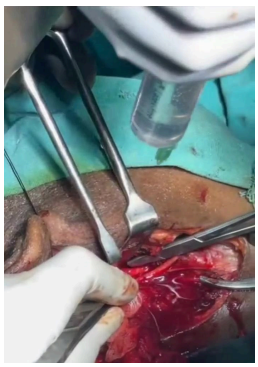


Figure 71.A Operative sequence.

OPERATIVE RECORD



71.1 Saline irrigation over the vessel during dissection. Video 0:34



71.2 Carotid control at C1. Video 0:50



71.3 Dissection along the ICA. Video 1:05



71.4 Vessel wall cleared of tumour. Video 1:21



71.5 Control maintained while dissecting. Video 1:42



71.6 Final field with the carotid preserved. Video 1:53

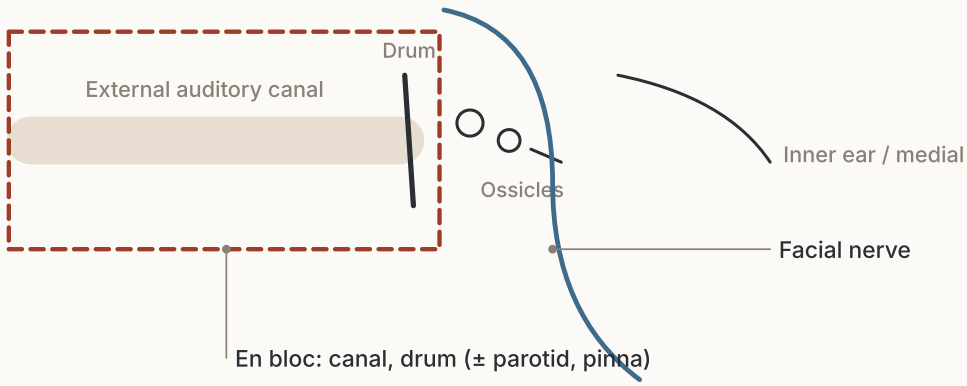


Figure 71.B Lateral temporal bone resection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Carotid injury	Proximal control was obtained before dissection.
Poor visibility near the vessel	Continuous irrigation kept the field clear.

TEACHING POINTS

- **Control the ICA in the neck first.** Proximal control precedes any dissection at the skull base.
- **Balloon test occlusion where sacrifice is possible.** It predicts tolerance of carotid occlusion.
- **Irrigate.** Continuous irrigation keeps the vessel wall in view and cools during drilling.

CASE SUMMARY

Internal carotid artery control at C1 during excision of a glomus jugulotympanicum, with the artery preserved.

REFERENCES

1. Fisch U. Infratemporal fossa approach to tumours of the temporal bone and base of the skull. *J Laryngol Otol* 1978;92:949–67. doi:10.1017/s0022215100086382
2. Shamblin WR, ReMine WH, Sheps SG, Harrison EG. Carotid body tumor (chemodectoma): clinicopathologic analysis of ninety cases. *Am J Surg* 1971;122:732–9. doi:10.1016/0002-9610(71)90436-3



72

The jaw swung open

Maxillary tumour with posterior extension

Maxillectomy through a Weber–Fergusson approach with mandibulotomy

PART VI · SKULL BASE

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the Weber–Fergusson exposure with the maxilla resected, the lip split with mandibulotomy, and the maxillectomy specimen with teeth and palate.

AUTHOR'S PERSPECTIVE

> When a maxillary tumour extends posteriorly towards the pterygoid region and infratemporal fossa, a mandibulotomy added to the Weber–Fergusson approach opens the posterior field and allows the posterior margin to be taken under vision.

APPROACH

Weber–Fergusson incision with cheek flap, lip split and paramedian mandibulotomy swung laterally.

OPERATIVE STEPS

1. Elevate the cheek flap to expose the maxilla.
2. Split the lip and expose the mandible and dentition.
3. Perform the mandibulotomy and swing the mandible.
4. Resect the maxilla.
5. Deliver the specimen with teeth and palate.

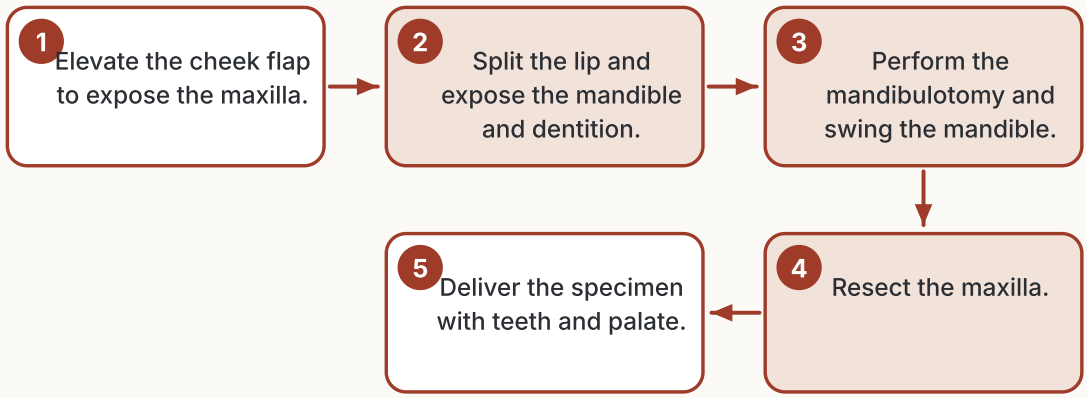
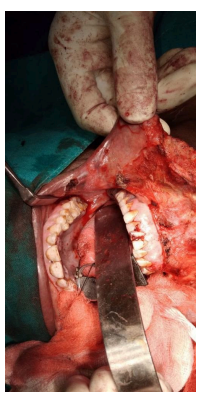


Figure 72.A Operative sequence.

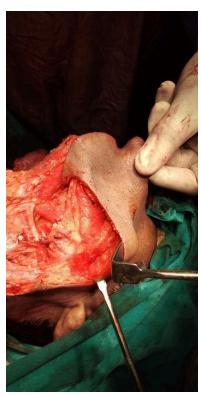
OPERATIVE RECORD



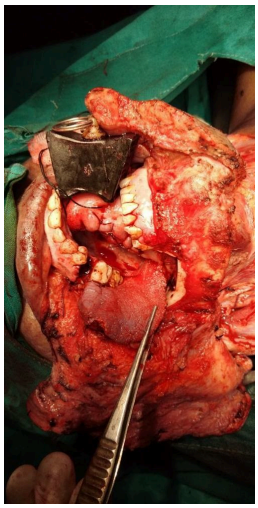
72.1 Lip-split exposure of mandible and dentition.



72.2 Mandibulotomy: mandible swung with retractor.



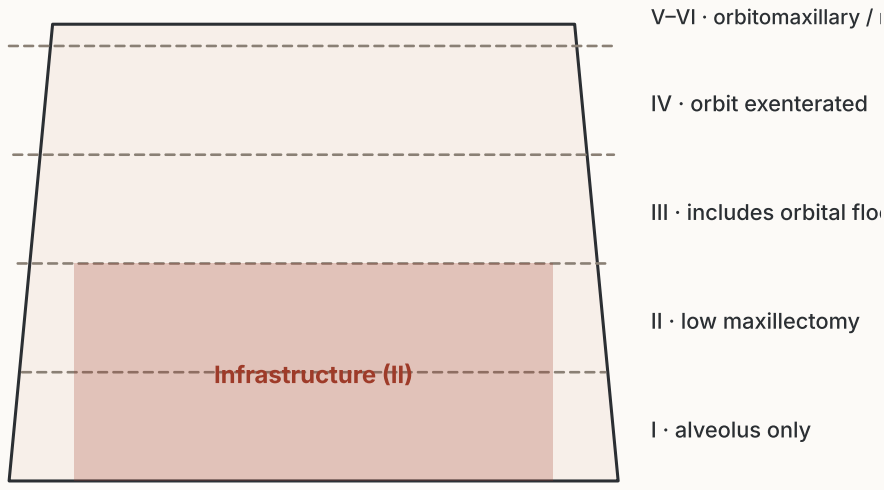
72.3 Cheek flap elevated exposing maxilla.



72.4 Weber-Ferguson type exposure with maxilla resected.



72.5 Maxillectomy specimen with teeth and palate.



Horizontal suffix a–d describes the palatal defect.

Figure 72.B Maxillary defects (Brown and Shaw): vertical classes.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Posterior exposure	The mandibulotomy opened the pterygoid region.
Restoring occlusion	The mandible was plated after the resection.

TEACHING POINTS

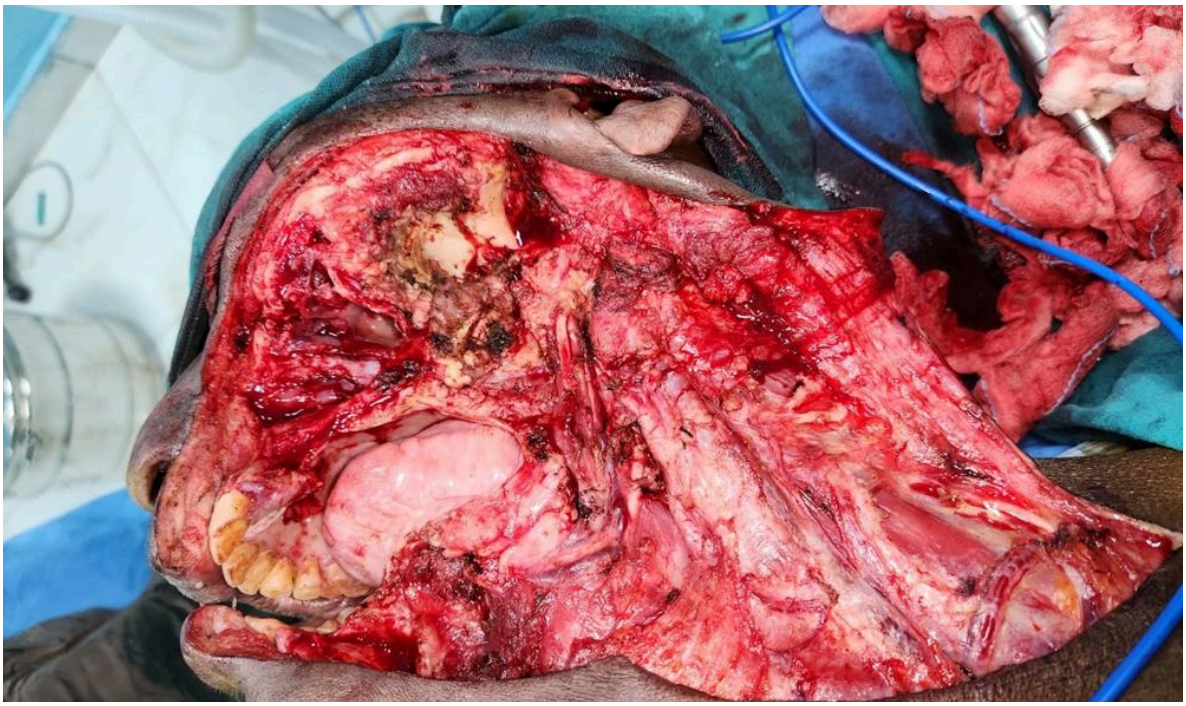
- **Mandibulotomy extends the Weber–Fergusson approach posteriorly.** It opens the pterygoid region and infratemporal fossa.
- **Pre-plate before cutting.** Accurate reduction restores the occlusion.
- **The posterior margin decides control.** Local recurrence is most often posterior.

CASE SUMMARY

Maxillectomy with mandibulotomy through a Weber–Fergusson approach for a tumour with posterior extension.

REFERENCES

1. Brown JS, Shaw RJ. Reconstruction of the maxilla and midface: introducing a new classification. *Lancet Oncol* 2010;11:1001–8. doi:10.1016/S1470-2045(10)70113-3



73

The cheek that had to go

Maxillary carcinoma involving the cheek skin

Total maxillectomy with resection of the overlying cheek skin and neck dissection

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the large cheek flap reflected over the total maxillectomy defect, the composite specimen with teeth and the cheek skin with its central ulcer.

AUTHOR'S PERSPECTIVE

> When a maxillary tumour ulcerates through the cheek, the skin is resected in continuity with the maxilla, creating a through-and-through defect that needs a flap for cover.

APPROACH

Total maxillectomy with an island of cheek skin, cheek flap reflection and neck dissection.

OPERATIVE STEPS

1. Prepare and drape with the eye protected.
2. Reflect the cheek flap, leaving the involved skin with the specimen.
3. Complete the total maxillectomy and neck dissection.
4. Deliver the composite specimen with teeth and soft tissue.
5. Inspect the specimen surfaces.

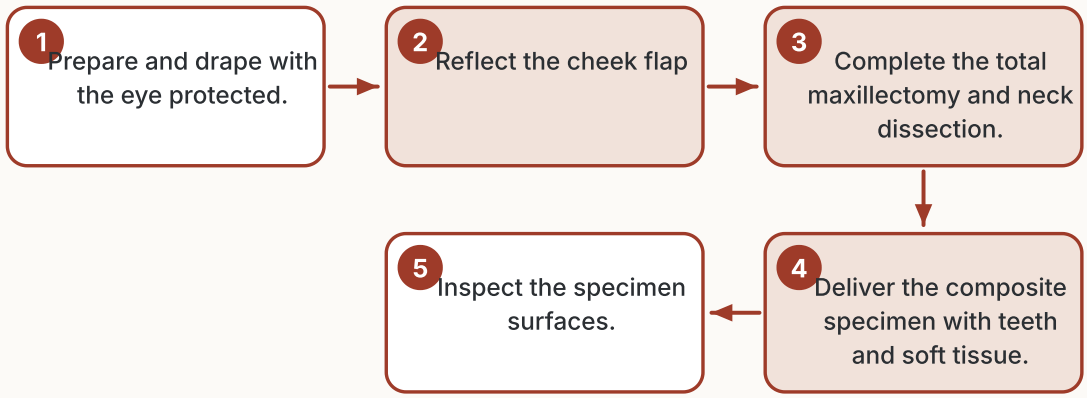


Figure 73.A Operative sequence.

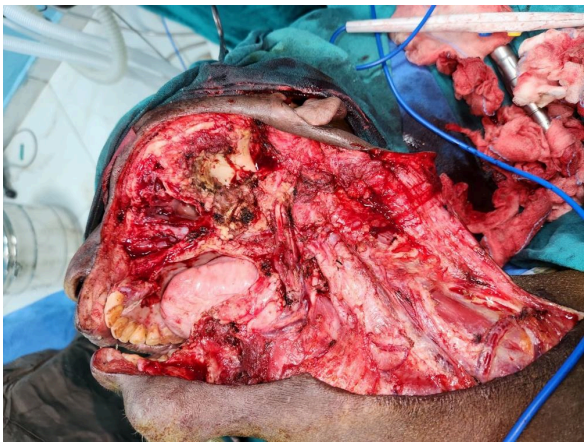
OPERATIVE RECORD



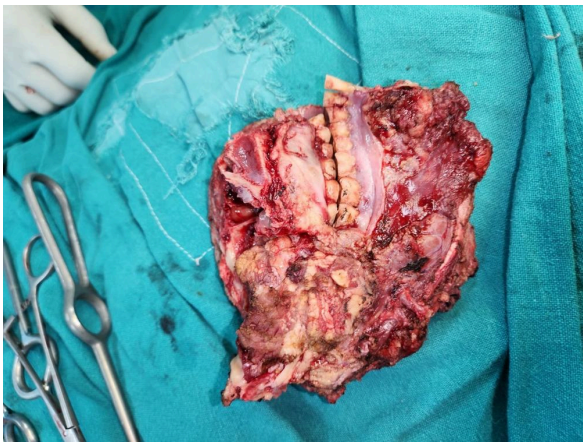
73.1 Specimen: cheek skin with central ulcer, external surface.



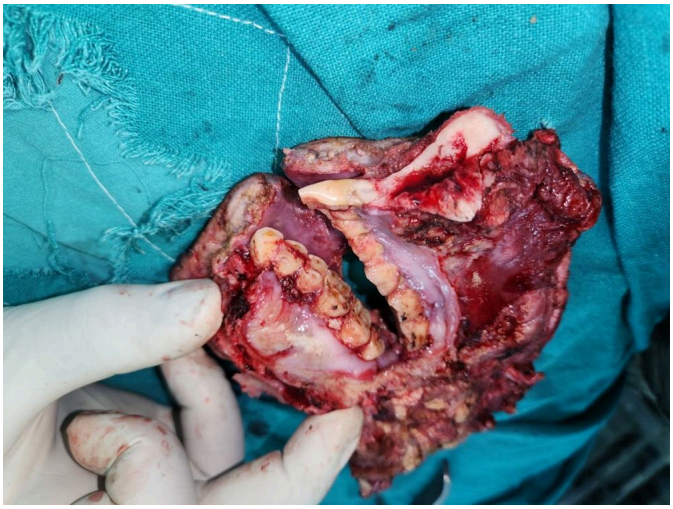
73.2 Prepped and draped patient, eye protected, for facial/maxillary surgery.



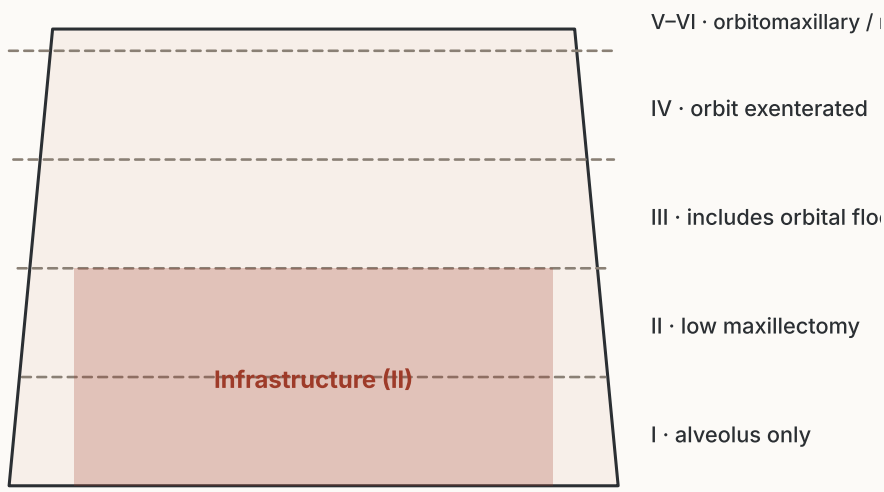
73.3 Large cheek flap reflected showing total maxillectomy/oral defect and neck dissection.



73.4 Specimen: composite maxilla/alveolus with teeth and soft tissue.



73.5 Specimen: composite resection with teeth, deep surface held in hand.



Horizontal suffix a–d describes the palatal defect.

Figure 73.B Maxillary defects (Brown and Shaw): vertical classes.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Skin involvement	The ulcerated skin was taken with the maxilla.
Through-and-through defect	Flap cover was required for the cheek.

TEACHING POINTS

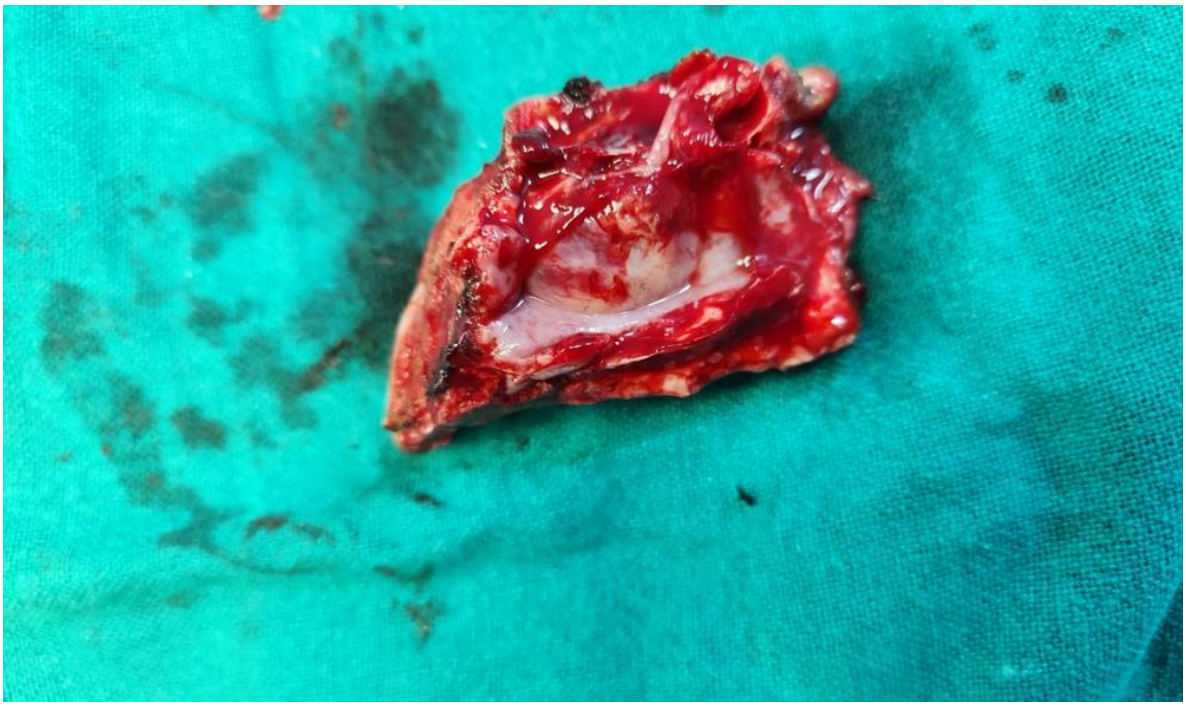
- **Skin ulceration is T4 disease.** The involved skin is resected in continuity, not shaved.
- **Protect the eye during surgery.** Corneal protection is essential when working close to the orbit.
- **Through-and-through defects need flap cover.** A skin graft alone cannot restore a full-thickness cheek.

CASE SUMMARY

Total maxillectomy with resection of involved cheek skin and neck dissection.

REFERENCES

1. Brown JS, Shaw RJ. Reconstruction of the maxilla and midface: introducing a new classification. *Lancet Oncol* 2010;11:1001–8. doi:10.1016/S1470-2045(10)70113-3
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



74

The palate from below

Carcinoma of the upper alveolus and palate

Infrastructure maxillectomy

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the infrastructure maxillectomy specimen with teeth and palate.

AUTHOR'S PERSPECTIVE

> Tumours confined to the alveolus and hard palate below the antral floor need only an infrastructure maxillectomy. The defect is rehabilitated with an obturator, which allows direct inspection of the cavity for recurrence.

APPROACH

Transoral or lip-split access with osteotomies below the orbital floor.

OPERATIVE STEPS

1. Expose the maxilla and palate.
2. Perform the osteotomies below the antral floor.
3. Deliver the specimen with teeth and palate.
4. Prepare the cavity for an obturator.

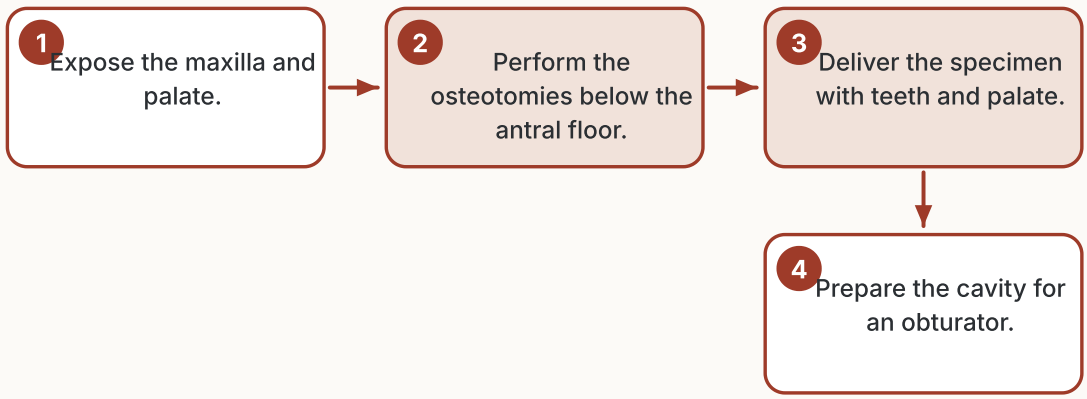
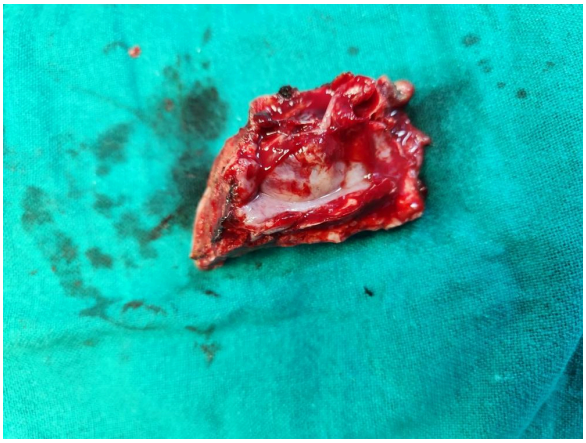


Figure 74.A Operative sequence.

OPERATIVE RECORD



74.1 Specimen: infrastructure maxillectomy with teeth and palate.



74.2 Specimen: partial maxillectomy/palate segment.

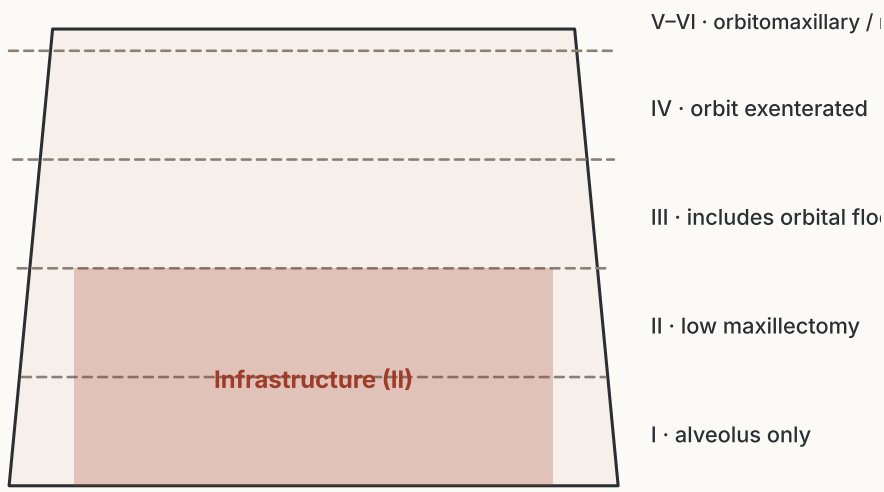


Figure 74.B Maxillary defects (Brown and Shaw): vertical classes.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Oronasal communication	An obturator was planned.
Margins at the palate	Mucosal margins were checked on the specimen.

TEACHING POINTS

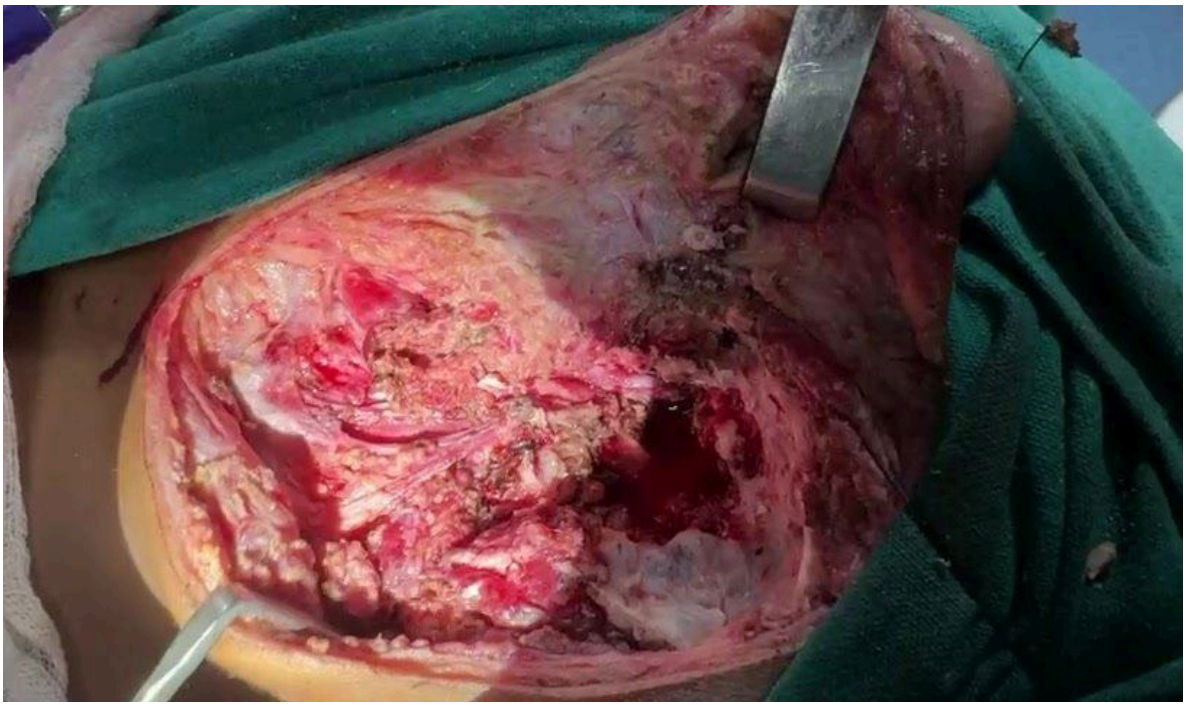
- **Infrastructure maxillectomy suits low tumours.** Those confined to the alveolus and palate below the antral floor.
- **An obturator allows inspection.** The cavity can be examined for recurrence at each visit.
- **Plan the prosthesis before surgery.** An impression and surgical obturator restore speech and swallowing immediately.

CASE SUMMARY

Infrastructure maxillectomy for carcinoma of the upper alveolus and palate.

REFERENCES

1. Brown JS, Shaw RJ. Reconstruction of the maxilla and midface: introducing a new classification. *Lancet Oncol* 2010;11:1001–8. doi:10.1016/S1470-2045(10)70113-3



75

The temporal bone from outside

Malignancy involving the temporal bone

Lateral temporal bone resection with upper neck dissection

PART VI · SKULL BASE Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the lateral temporal bone resection cavity with the pinna removed, and the neck dissection with the internal carotid, internal jugular vein and lower cranial nerves below the temporal bone.

AUTHOR'S PERSPECTIVE

> En bloc lateral temporal bone resection with dissection of the upper neck gives control of the great vessels and lower cranial nerves before the deep margin is taken.

APPROACH

Lateral temporal bone resection with parotid and upper neck dissection.

OPERATIVE STEPS

1. Expose the internal carotid, internal jugular vein and lower cranial nerves below the temporal bone.
2. Complete the lateral temporal bone resection with the pinna.
3. Inspect nerves and vessels beneath the temporal bone defect.

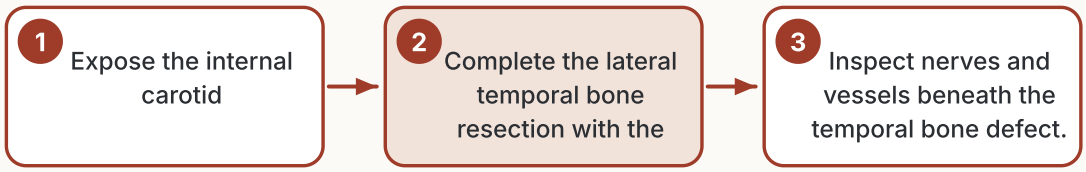
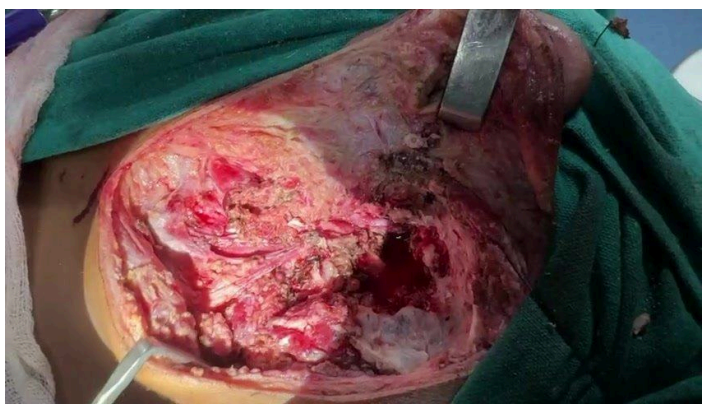


Figure 75.A Operative sequence.

OPERATIVE RECORD



75.1 Neck/skull base dissection: ICA/IJV and lower cranial nerves exposed below temporal bone resection.



75.2 Lateral temporal bone resection cavity with surrounding soft tissue, pinna removed.



75.3 Same field with forceps on nerve/vessel, temporal bone defect above.

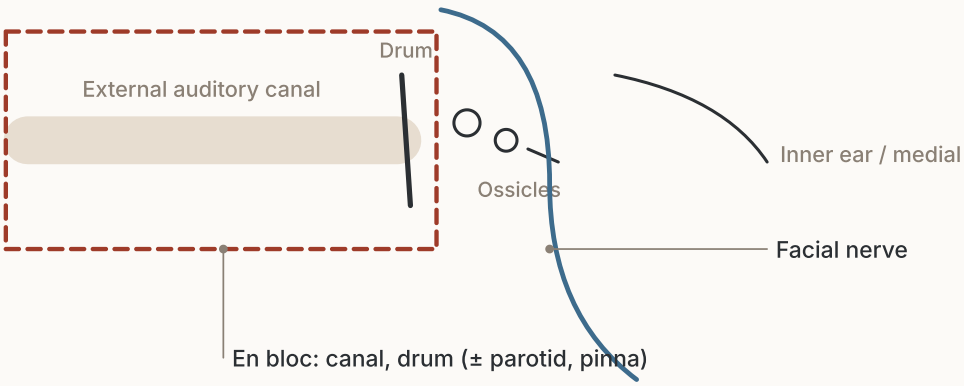


Figure 75.B Lateral temporal bone resection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Deep margin at the skull base	The great vessels were controlled in the neck first.
Facial nerve	Its relation to the tumour was assessed during resection.

TEACHING POINTS

- **Control the vessels in the neck first.** The internal carotid and jugular vein are secured before the deep margin is taken.
- **En bloc resection.** The canal and drum are removed as one unit to avoid tumour spillage.
- **Plan reconstruction and radiotherapy.** Most patients need flap cover and adjuvant treatment.

CASE SUMMARY

Lateral temporal bone resection with upper neck dissection.

REFERENCES

1. Moody SA, Hirsch BE, Myers EN. Squamous cell carcinoma of the external auditory canal: an evaluation of a staging system. *Am J Otol* 2000;21:582–8.

PART VII

The ear

Cochlear implants, tympanoplasty and ossiculoplasty through the endoscope, stapedotomy and the facial nerve.

76 Through the round window

77 Square off the edges

78 It came back

79 Two ears to reshape

80 A cartilage cap on the stapes

81 Tucked in front

82 The missing long process

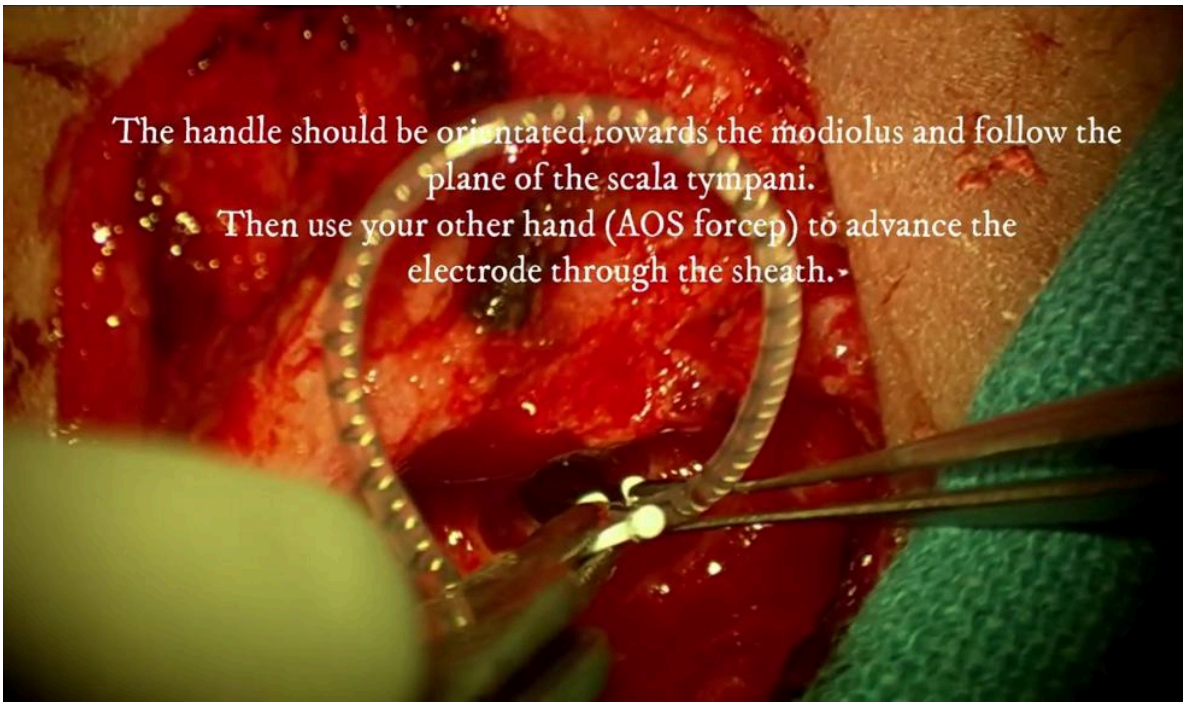
83 What was left behind

84 A piston through the footplate

85 Moving the malleus

86 Freeing the nerve

87 A drum through the endoscope



76

Through the round window

Severe-to-profound sensorineural hearing loss

Cochlear implant (Nucleus CI632, slim modiolar electrode) through the extended round window approach

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording documents an early Indian experience with the CI632 slim modiolar electrode, inserted through a sheath via the extended round window approach.

AUTHOR'S PERSPECTIVE

> Round window insertion avoids drilling a cochleostomy and is less traumatic to the cochlea. The slim modiolar electrode sits close to the modiolus for efficient stimulation; its sheath must be aligned with the scala tympani for a smooth insertion.

APPROACH

Cortical mastoidectomy, posterior tympanotomy, drilling of the round window overhang and sheath-guided electrode insertion.

OPERATIVE STEPS

1. Perform posterior tympanotomy for the extended round window approach.
2. Drill away the round window overhang to see the membrane.
3. Prepare the CI632 implant with slim modiolar electrode.
4. Orient the sheath handle towards the plane of the scala tympani.
5. Advance the electrode through the sheath with AOS forceps.
6. Seal with autologous fascia around the electrode.
7. Coil the redundant lead under the bony overhang.
8. Confirm intracochlear position on immediate X-ray.

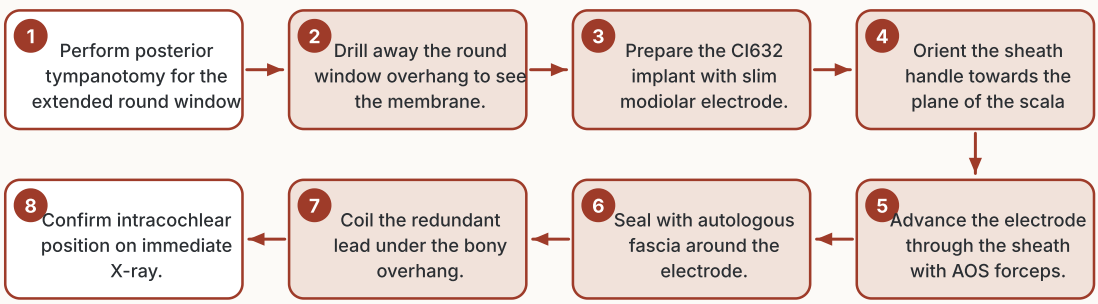
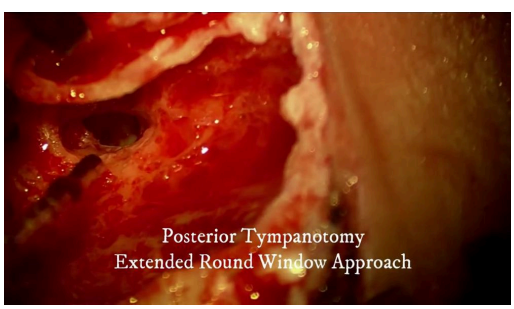


Figure 76.A Operative sequence.

OPERATIVE RECORD



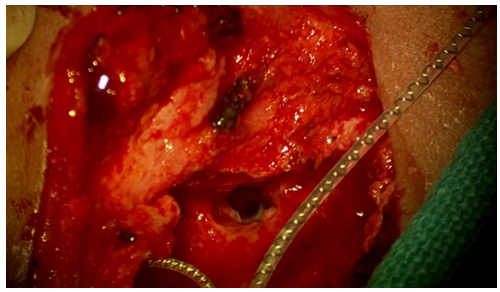
76.1 "Posterior tympanotomy, extended round window approach." Video 0:07



76.2 "Preparing the extended round window via facial recess: drill away the overhang to see the round window membrane." Video 0:12



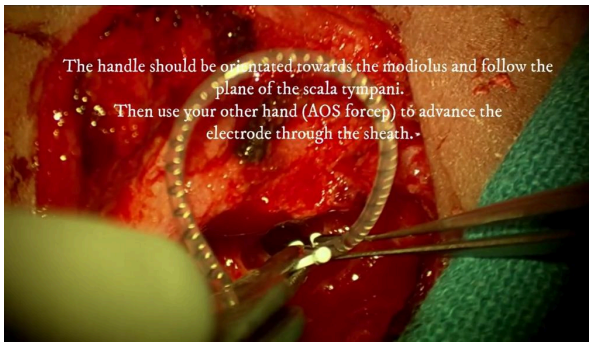
76.3 "Cochlear Nucleus CI632 cochlear implant with slim modiolar electrode." Video 0:17



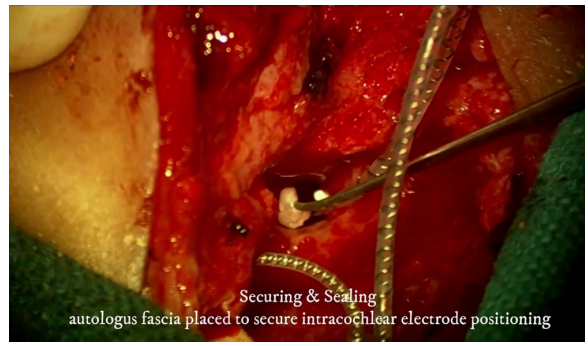
76.4 The electrode in its sheath at the facial recess. Video 0:37



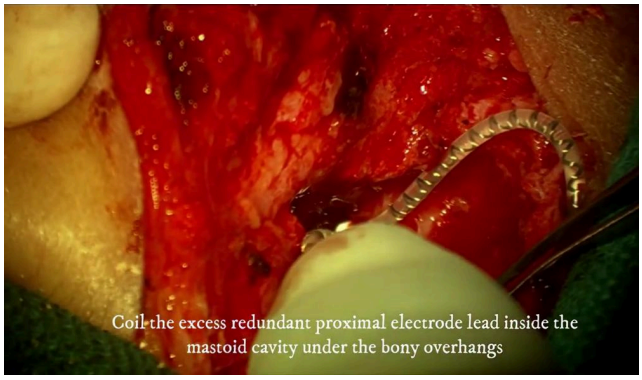
76.5 "The handle should be oriented towards the plane of the scala; then use your other hand to advance the electrode through the sheath." Video 0:57



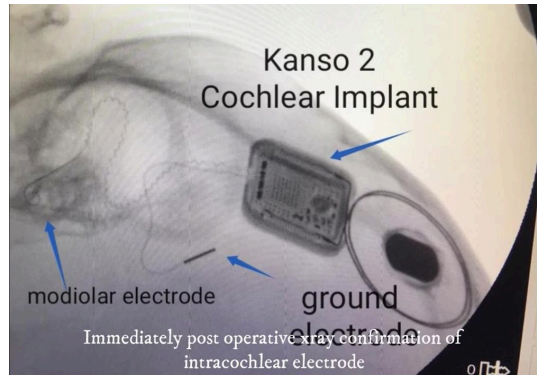
76.6 Advancing the electrode with AOS forceps. Video 1:02



76.7 "Securing and sealing: autologous fascia placed to secure intracochlear electrode positioning." Video 1:18



76.8 "Coil the excess redundant proximal electrode lead inside the mastoid cavity under the bony overhang." Video 1:28



76.9 Immediate post-operative X-ray: intracochlear electrode and ground electrode. Video 1:43

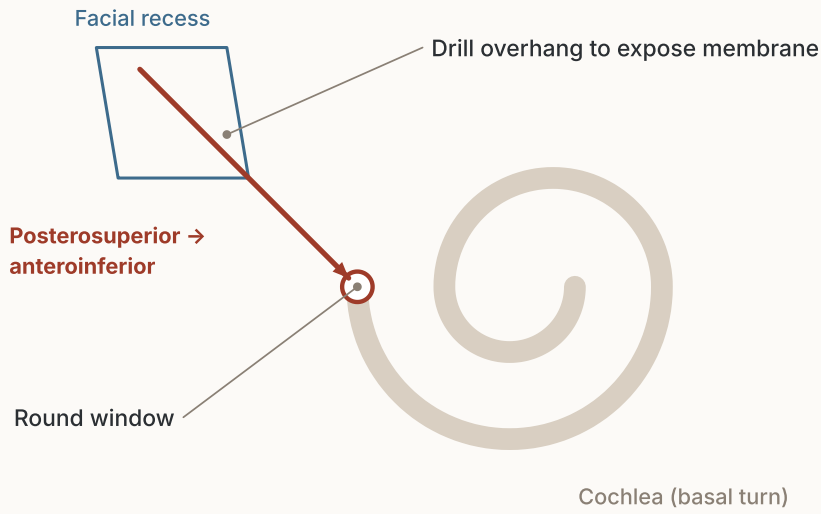


Figure 76.B Cochlear implant: round window insertion vector.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
A hidden round window membrane	The overhang was drilled for a full view.
Electrode misplacement	The sheath was aligned with the scala before advancing.

TEACHING POINTS

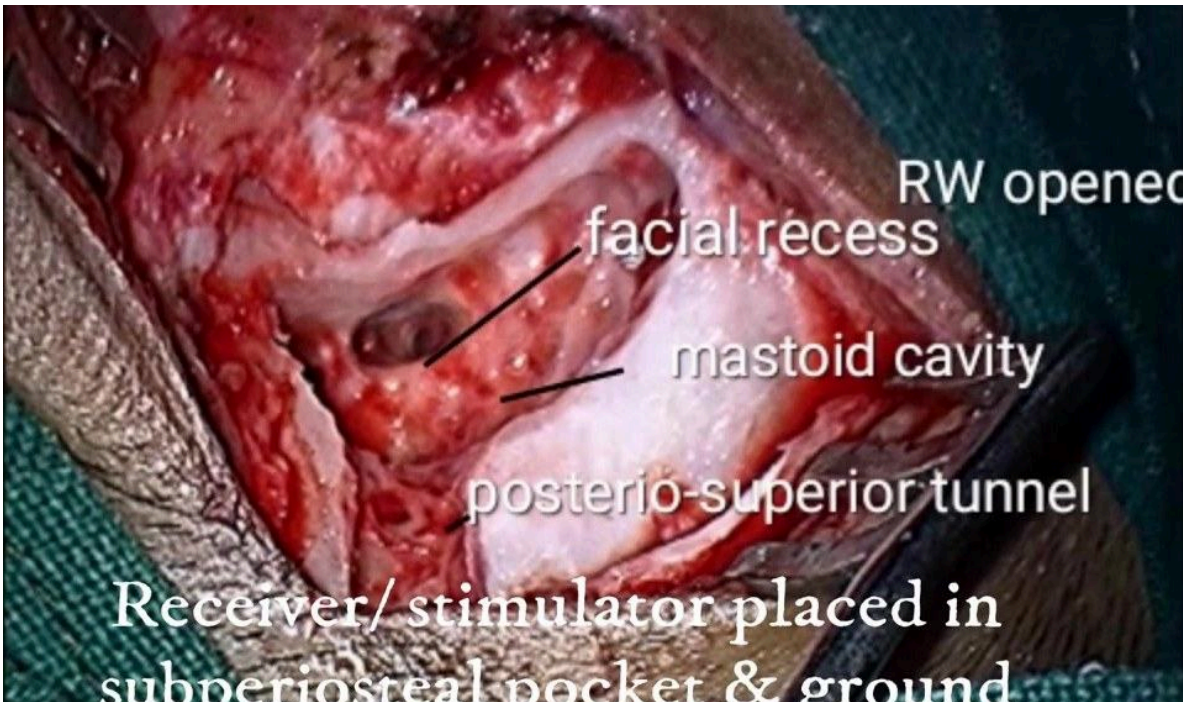
- **Drill the overhang.** Until the membrane is fully seen.
- **Insertion vector.** Posterosuperior to anteroinferior.
- **Seal the window.** Fascia around the electrode.
- **Confirm position.** Immediate post-operative imaging.

CASE SUMMARY

Cochlear implantation with a CI632 slim modiolar electrode through the extended round window approach, with intracochlear position confirmed radiologically.

REFERENCES

1. Luers JC, Hüttenbrink KB, Beutner D. Surgical anatomy of the round window: implications for cochlear implantation. *Clin Otolaryngol* 2018;43:417–24. doi:10.1111/coa.13048



77

Square off the edges

Sensorineural hearing loss

Cochlear implant through cortical mastoidectomy, posterior tympanotomy and round window

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording demonstrates the conventional round window route through a wide posterior tympanotomy.

AUTHOR'S PERSPECTIVE

> The view of the round window niche through the facial recess is limited; saucerising the edges of the posterior tympanotomy creates a straight trajectory for a slow, atraumatic insertion.

APPROACH

Cortical mastoidectomy, posterior tympanotomy saucerised for trajectory, receiver in a subperiosteal pocket and round window insertion.

OPERATIVE STEPS

1. Open the posterior tympanotomy towards the round window.
2. Saucerise the edges for access and trajectory.
3. Identify the round window, stapedial tendon and incus.
4. Place the receiver in its pocket and the ground electrode under the flap.
5. Insert the electrode slowly until no resistance.
6. Seal the round window with fascia.
7. Close in layers without tension.

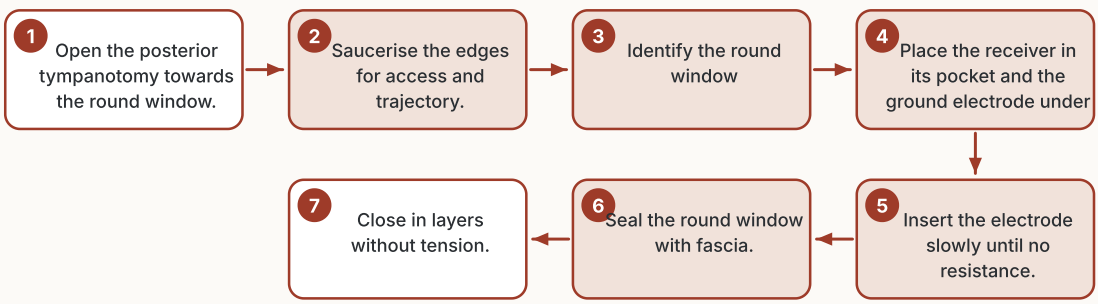
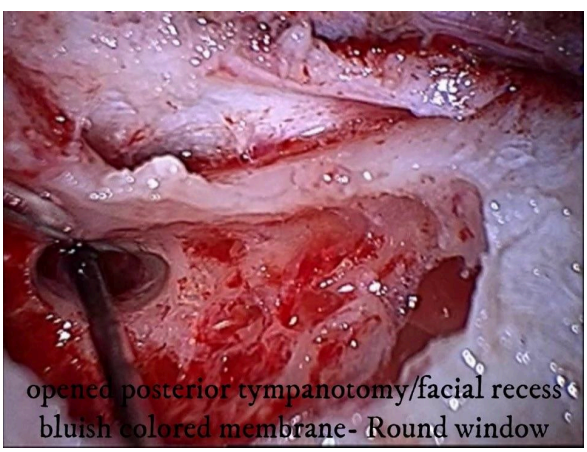


Figure 77.A Operative sequence.

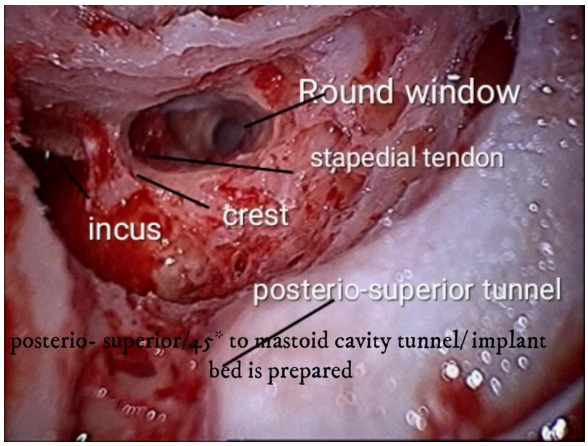
OPERATIVE RECORD



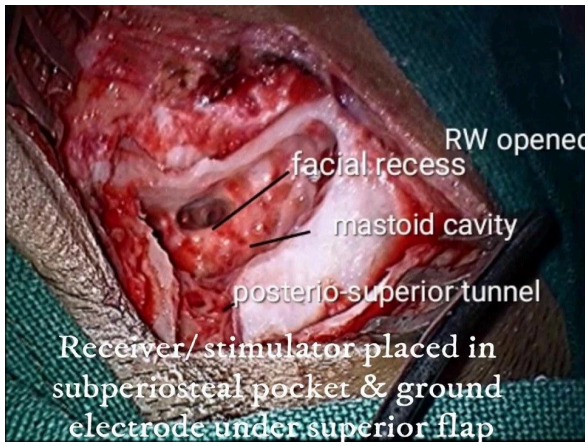
77.1 Posterior tympanotomy through the facial recess towards the round window. Video 0:26



77.2 "Saucerise the posterior tympanotomy: square off the edges for easy access and trajectory to the round window." Video 1:19



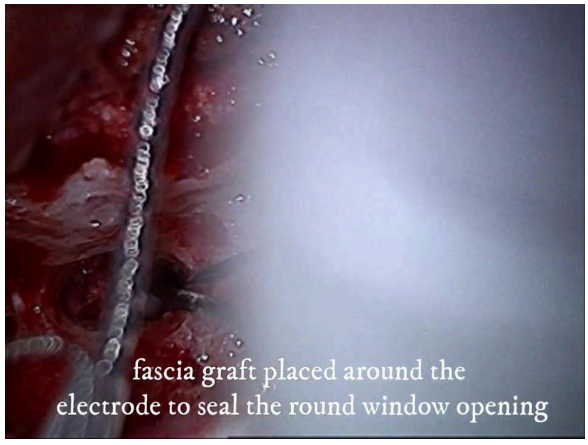
77.3 Round window, stapedial tendon, incus and posterior superior tunnel labelled. Video 2:29



77.4 "Receiver/stimulator placed in subperiosteal pocket; ground electrode under superior flap"; RW opened, facial recess labelled. Video 2:47



77.5 "A slow insert is performed by electrode holding forceps to minimise the cochlear trauma until no resistance." Video 3:40



77.6 "Fascia graft placed around the electrode to seal the round window opening." Video 4:15



77.7 "Closure is performed in layers; complete closure at implant site without any tension." Video 5:25

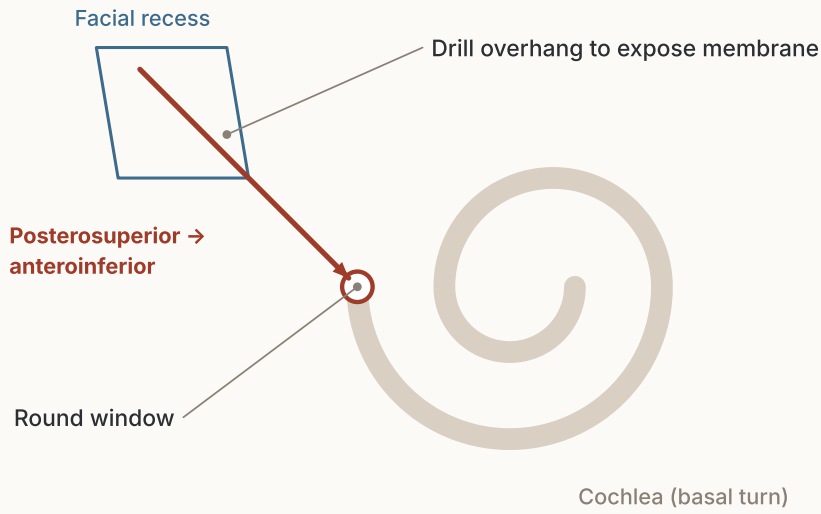


Figure 77.B Cochlear implant: round window insertion vector.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Trajectory	The posterior tympanotomy edges were saucerised.
Intracochlear trauma	Insertion was slow and stopped at first resistance.

TEACHING POINTS

- **Saucerise the posterior tympanotomy.** A straight line from the mastoid to the round window decides the quality of insertion.
- **Insert slowly.** Slow insertion reduces intracochlear pressure and trauma.
- **Close without tension over the receiver.** Wound breakdown over the device is a serious complication.

CASE SUMMARY

Cochlear implantation through cortical mastoidectomy, posterior tympanotomy and the round window.

REFERENCES

1. Luers JC, Hüttenbrink KB, Beutner D. Surgical anatomy of the round window: implications for cochlear implantation. *Clin Otolaryngol* 2018;43:417–24. doi:10.1111/coa.13048



78

It came back

Recurrent cholesteatoma of the middle ear, attic and antrum

Endoscopic clearance with PORP and fascia graft

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Cholesteatoma had recurred after earlier surgery in the middle ear, attic and antrum.

AUTHOR'S PERSPECTIVE

> The endoscope sees round corners into the sinus tympani, facial recess and anterior attic, where residual disease hides. Endoscopic clearance allowed disease removal and ossicular reconstruction in one stage.

APPROACH

Transcanal endoscopic approach with removal of disease from middle ear, attic and antrum, PORP and fascia grafting.

OPERATIVE STEPS

1. Display the recurrent cholesteatoma in middle ear, attic and antrum.
2. Clear disease from the stapes and facial canal.
3. Inspect the post-surgical bed.
4. Reconstruct with PORP and fascia graft.

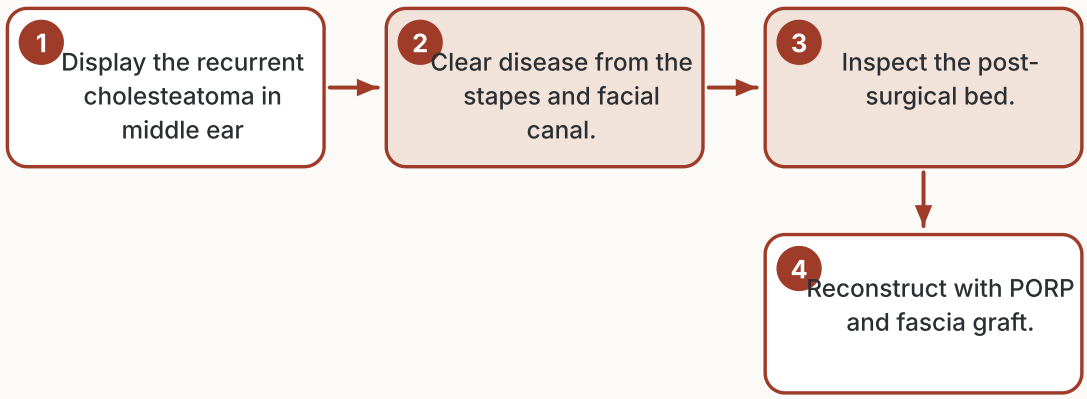
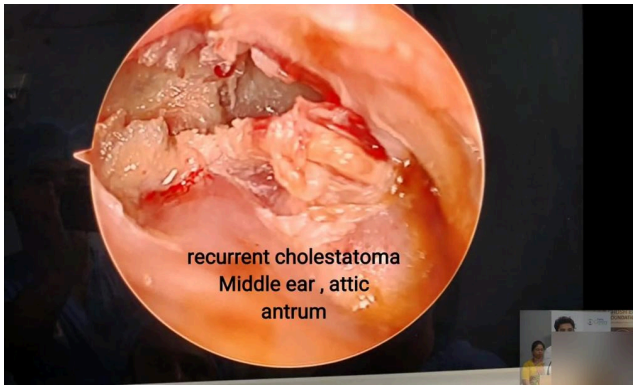
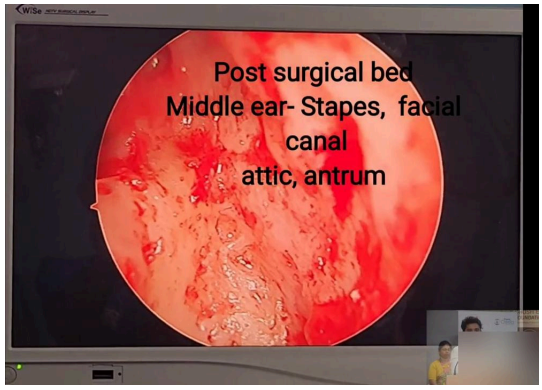


Figure 78.A Operative sequence.

OPERATIVE RECORD



78.1 "Recurrent cholesteatoma: middle ear, attic, antrum." Video 0:07



78.2 "Post-surgical bed: middle ear, stapes, facial canal, attic, antrum." Video 0:32



78.3 "PORP with fascia grafting done." Video 0:52

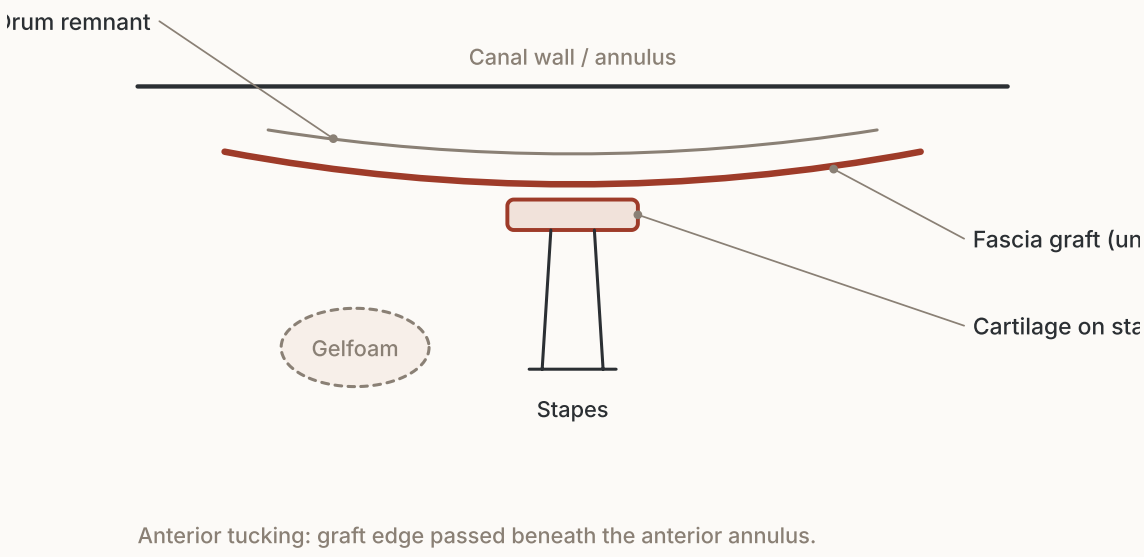


Figure 78.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Disease in hidden recesses	Angled endoscopes were used.
Ossicular reconstruction	A PORP was placed under the graft.

TEACHING POINTS

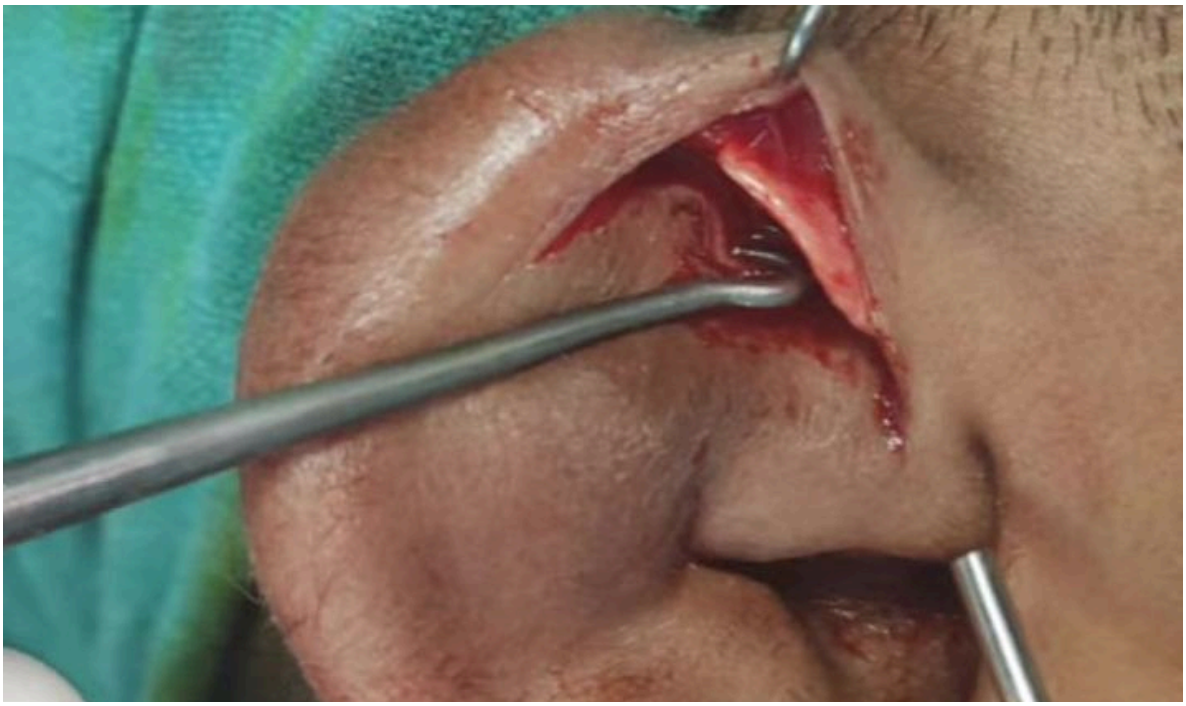
- **Recurrence rises with time.** In pooled data, from about 7% at one year to about 39% at fifteen years; surveillance must be long.
- **Endoscopic assistance reduces residual disease.** It reveals cholesteatoma in recesses hidden from the microscope.
- **Check the sinus tympani.** Angled endoscopes show the commonest site of residual disease.

CASE SUMMARY

Endoscopic clearance of recurrent cholesteatoma with PORP and fascia grafting.

REFERENCES

1. Handoko E, Handoko RE, Wahyudi AD. Evaluating long-term recurrence of cholesteatoma following primary surgery: an umbrella review of surgical techniques and patient factors. *J Laryngol Otol* 2026;140:845–51. doi:10.1017/S0022215126105234



79

Two ears to reshape

Malignant lesion of the upper pinna; constricted (cup) ear in a young man

Excision with helical advancement; cup-ear correction with a cartilage frame

PART VII · THE EAR

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Two patients are shown: an elderly woman with an ulcerated upper pinna lesion, and a young man with a constricted ear causing cosmetic and functional concern.

AUTHOR'S PERSPECTIVE

> The pinna tumour needed clear margins with reconstruction that kept the helical outline. The cup ear needed its upper pole re-expanded and supported with cartilage.

APPROACH

Excision with chondrocutaneous helical advancement; upper pole opened and supported with a three-piece cartilage frame.

OPERATIVE STEPS

1. Excise the upper pinna lesion.
2. Close with a helical advancement flap.
3. Open the upper pole of the cup ear.
4. Prepare cartilage pieces with a template.
5. Assemble a three-piece cartilage frame base.
6. Insert the frame under the upper pole skin.

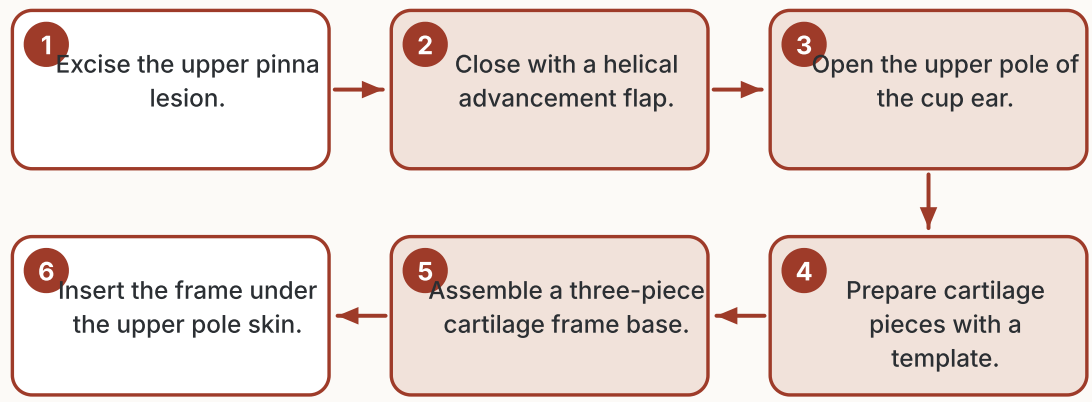
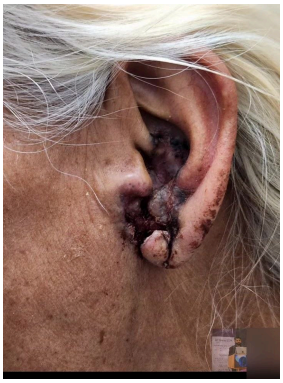


Figure 79.A Operative sequence.

OPERATIVE RECORD



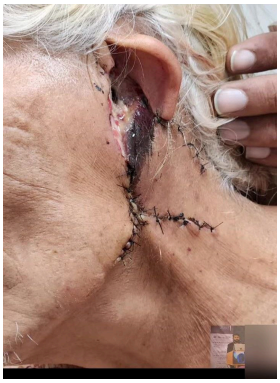
79.1 Ulcerated lesion of the upper pinna. Video 0:19



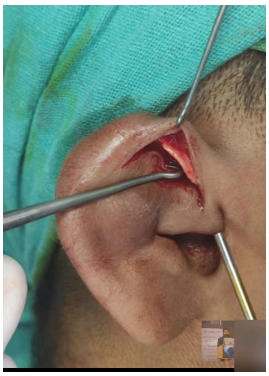
79.2 "Excision." Video 0:08



79.3 The excised specimen. Video 0:24



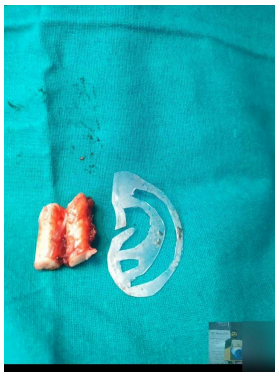
79.4 Closure after excision with a helical advancement flap. Video 0:35



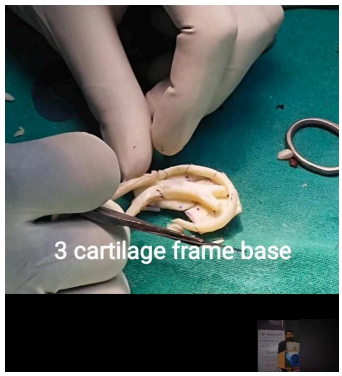
79.5 “Constricted/cup ear: cosmetic and functional issues”: the deformity. Video 0:57



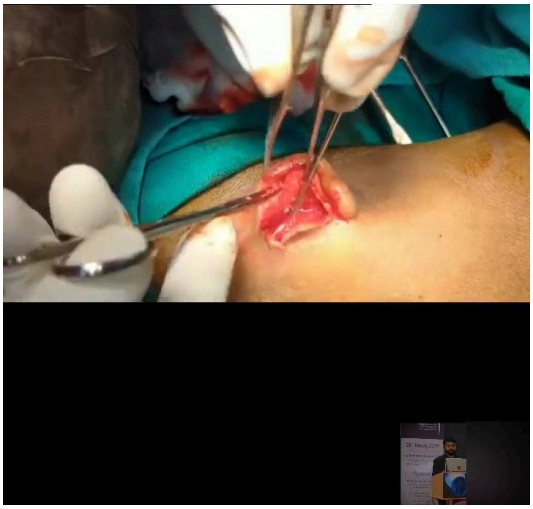
79.6 Upper pole opened for reshaping. Video 1:08



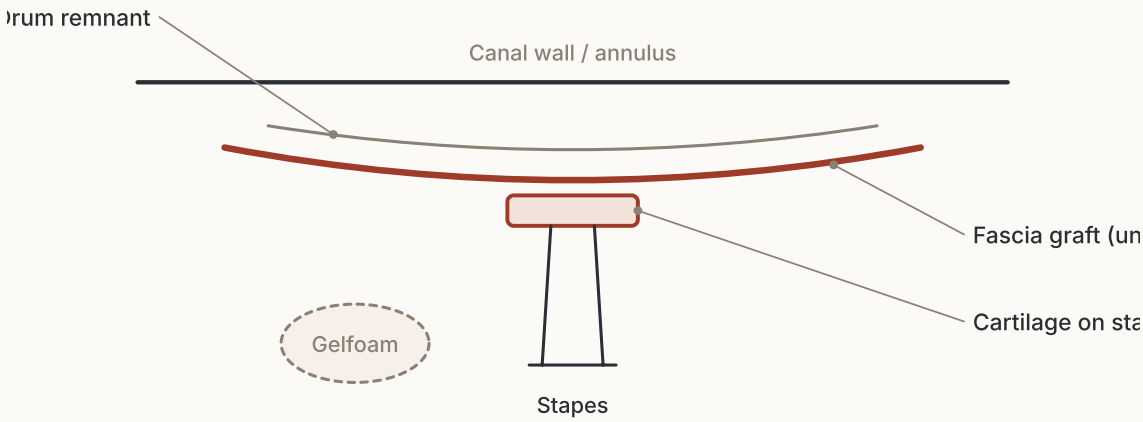
79.7 Costal or conchal cartilage pieces and template. Video 1:25



79.8 “3 cartilage frame base.” Video 1:30



79.9 Frame inset under the skin of the upper pole. Video 1:52



Anterior tucking: graft edge passed beneath the anterior annulus.

Figure 79.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Loss of helical contour after excision	A chondrocutaneous advancement restored the rim.
Deficient upper pole	A cartilage frame supported the re-expanded pole.

TEACHING POINTS

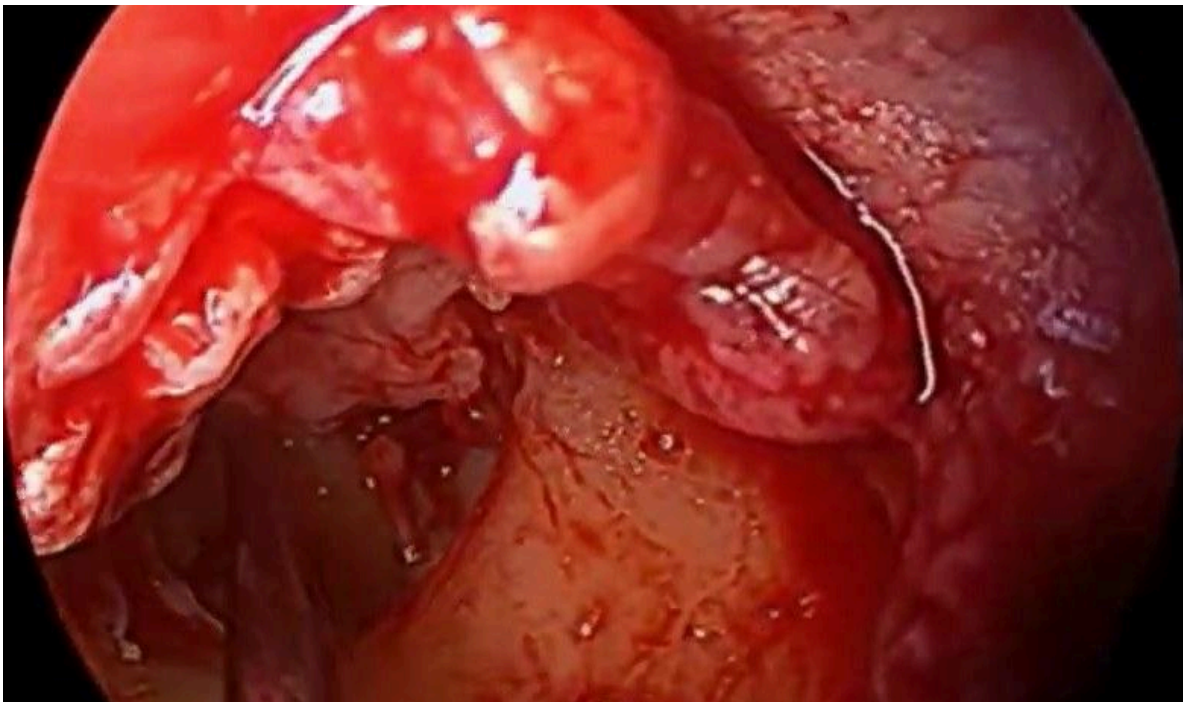
- **Clear margins first.** Reconstruction follows confirmation of clear excision.
- **Chondrocutaneous advancement closes helical defects.** The rim is restored without a visible notch.
- **Support the upper pole in cup ear.** Cartilage grafts prevent the expanded pole from collapsing again.

CASE SUMMARY

Excision of an upper pinna malignancy with helical reconstruction, and cup-ear correction with a cartilage frame.

REFERENCES

1. Moody SA, Hirsch BE, Myers EN. Squamous cell carcinoma of the external auditory canal: an evaluation of a staging system. *Am J Otol* 2000;21:582–8.



80

A cartilage cap on the stapes

Chronic otitis media with ossicular erosion

Endoscopic tympanoplasty with tragal cartilage ossiculoplasty

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording shows an endoscopic tympanoplasty with reconstruction of the ossicular chain using tragal cartilage.

AUTHOR'S PERSPECTIVE

> With the stapes intact, a shaped tragal cartilage graft on the stapes head under the malleus restores sound conduction without a synthetic prosthesis.

APPROACH

Transcanal endoscopic approach, margin refreshment, tympanomeatal flap, underlay fascia, cartilage on the stapes head.

OPERATIVE STEPS

1. Freshen and undermine the perforation margin.
2. Elevate the tympanomeatal flap.
3. Place a temporalis fascia graft as underlay.
4. Support the graft with gelfoam.
5. Place a modulated tragal cartilage graft over the stapes head.
6. Position the cartilage under the malleus head.
7. Reposition the graft and flap.

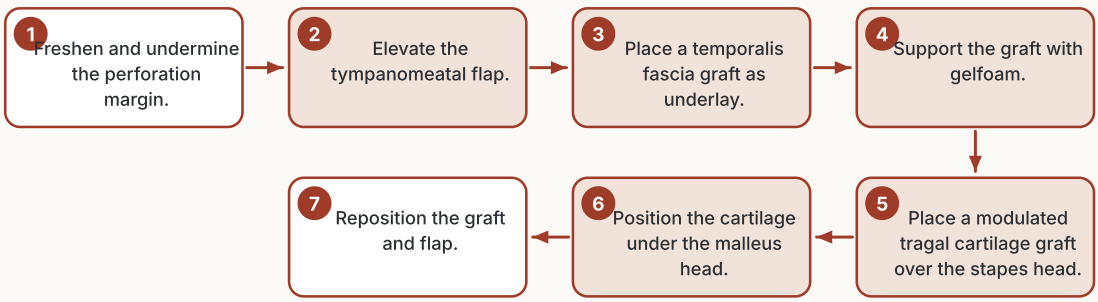
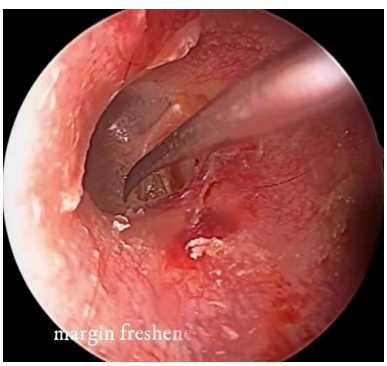
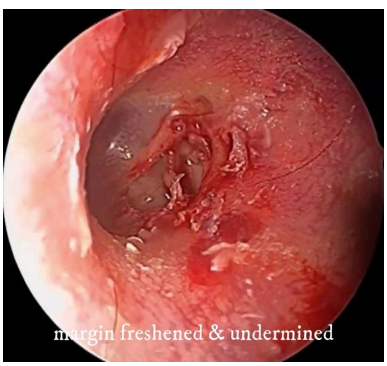


Figure 80.A Operative sequence.

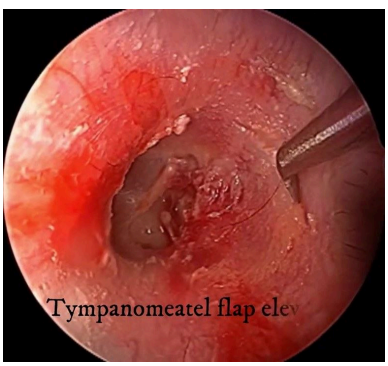
OPERATIVE RECORD



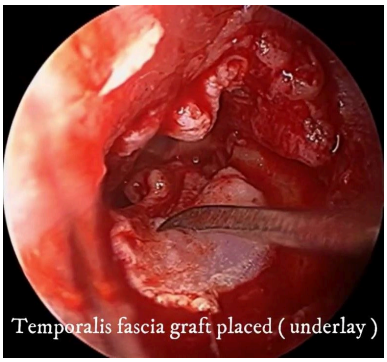
80.1 Margin freshened. Video 0:12



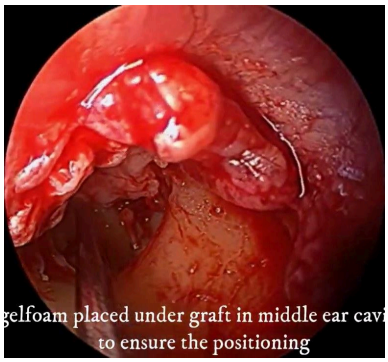
80.2 "Margin freshened and undermined." Video 0:47



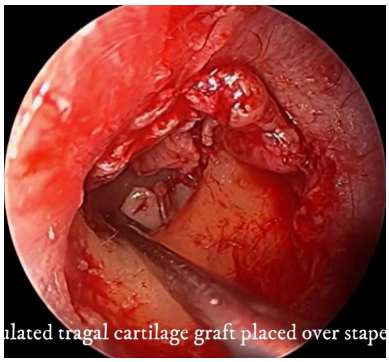
80.3 "Tympanomeatal flap elevated." Video 1:04



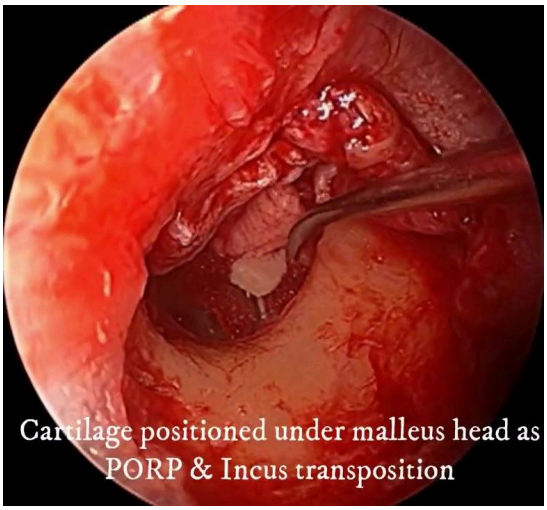
80.4 "Temporalis fascia graft placed (underlay)." Video 1:38



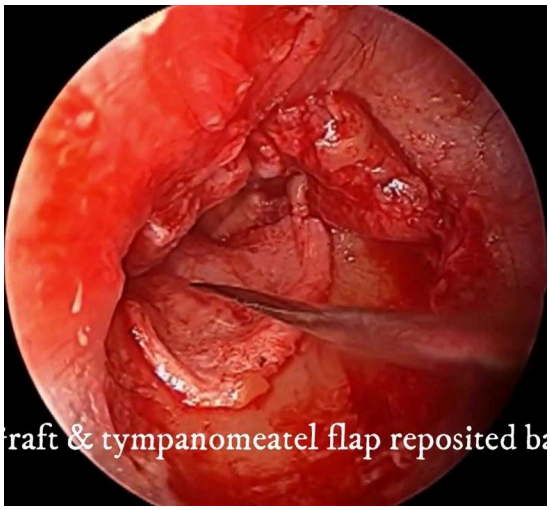
80.5 "Gelfoam placed under graft in middle ear cavity to ensure the positioning." Video 1:55



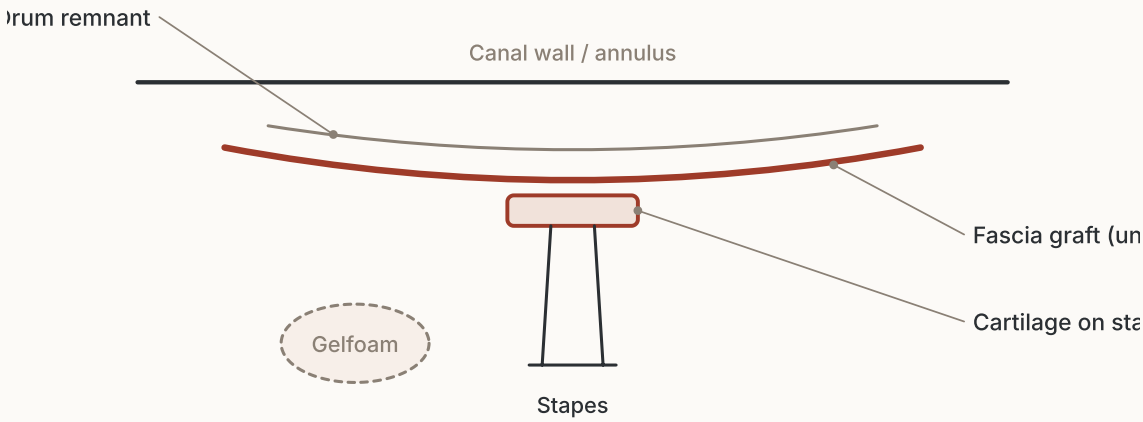
80.6 "Modulated tragal cartilage graft placed over stapes head." Video 2:13



80.7 "Cartilage positioned under malleus head as PORP and incus transposition." Video 2:38



80.8 "Graft and tympanomeatal flap reposited back." Video 2:56



Anterior tucking: graft edge passed beneath the anterior annulus.

Figure 80.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Graft stability	Gelfoam supported the cartilage.
Prosthesis extrusion	Cartilage was used in place of a synthetic prosthesis.

TEACHING POINTS

- **Endoscopic ossiculoplasty matches the microscope.** Air–bone gap closure is comparable with shorter operating time.
- **Cartilage reduces extrusion.** It protects the drum from a rigid prosthesis.
- **Gelfoam support keeps the graft in place.** It holds the graft against the remnant while it takes.

CASE SUMMARY

Endoscopic tympanoplasty with tragal cartilage ossiculoplasty.

REFERENCES

1. Lim CY, Yeo BSY, Goh X, et al. Outcomes of endoscopic versus microscopic ossicular chain reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2025;135:1899–907. doi:10.1002/lary.31991



81

Tucked in front

Anterior tympanic membrane perforation

Endoscopic tympanoplasty with anterior tucking

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording demonstrates closure of an anterior perforation with the anterior tucking technique.

AUTHOR'S PERSPECTIVE

> Anterior perforations fail most often because the graft falls away from the anterior annulus. Tucking the graft under the annulus anchors it; the endoscope gives a direct view without a postauricular incision.

APPROACH

Transcanal endoscopic underlay grafting with the anterior edge tucked under the annulus.

OPERATIVE STEPS

1. Inspect the perforation and its margins.
2. Raise the tympanomeatal flap and inspect the middle ear.
3. Place the graft medial to the remnant.
4. Tuck the anterior edge under the annulus.
5. Check the graft position.
6. Reposition the flap.

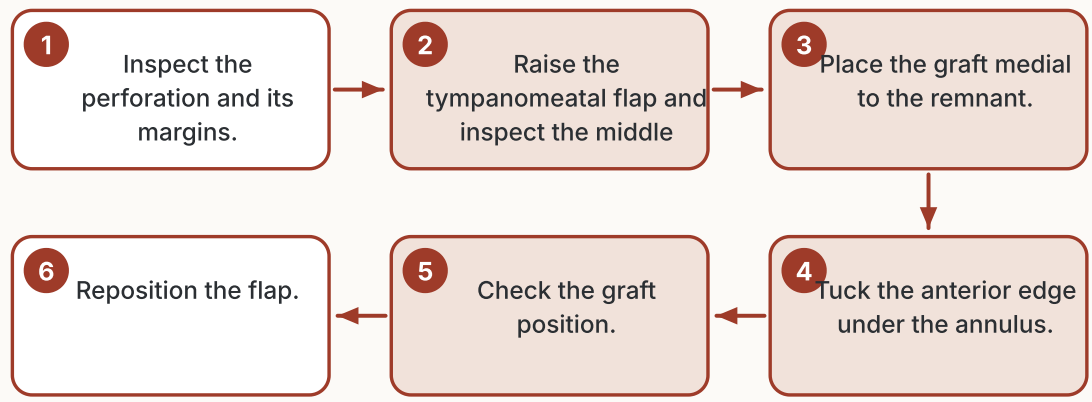
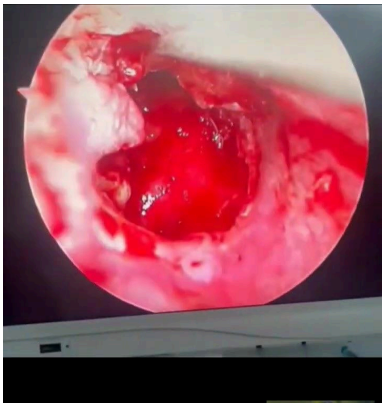


Figure 81.A Operative sequence.

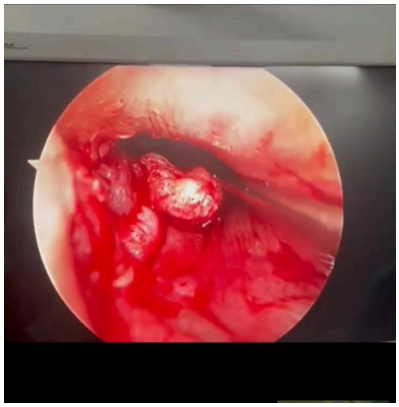
OPERATIVE RECORD



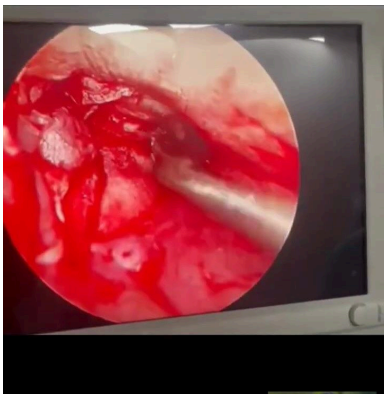
81.1 The perforation and its margins. Video 0:02



81.2 Tympanomeatal flap raised; middle ear inspected. Video 0:17



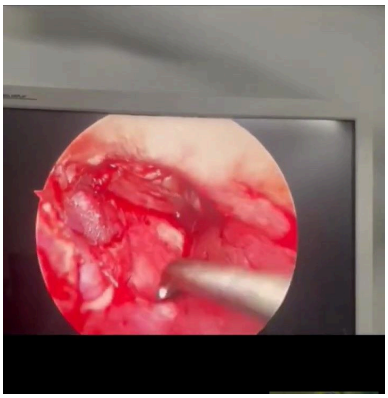
81.3 Graft placed medial to the remnant. Video 0:32



81.4 Graft edge tucked under the anterior annulus. Video 0:37



81.5 Graft position checked. Video 0:42



81.6 Flap reposited over the graft. Video 0:52

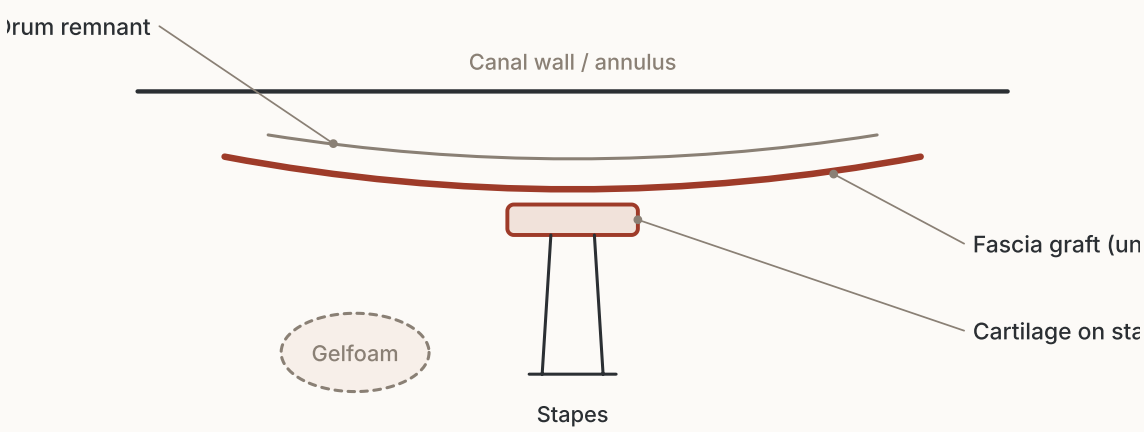


Figure 81.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Anterior graft failure	The graft edge was tucked under the anterior annulus.
Limited anterior view	The endoscope gave direct visualisation.

TEACHING POINTS

- **Tuck under the anterior annulus.** Anchors the graft where failure is most frequent.

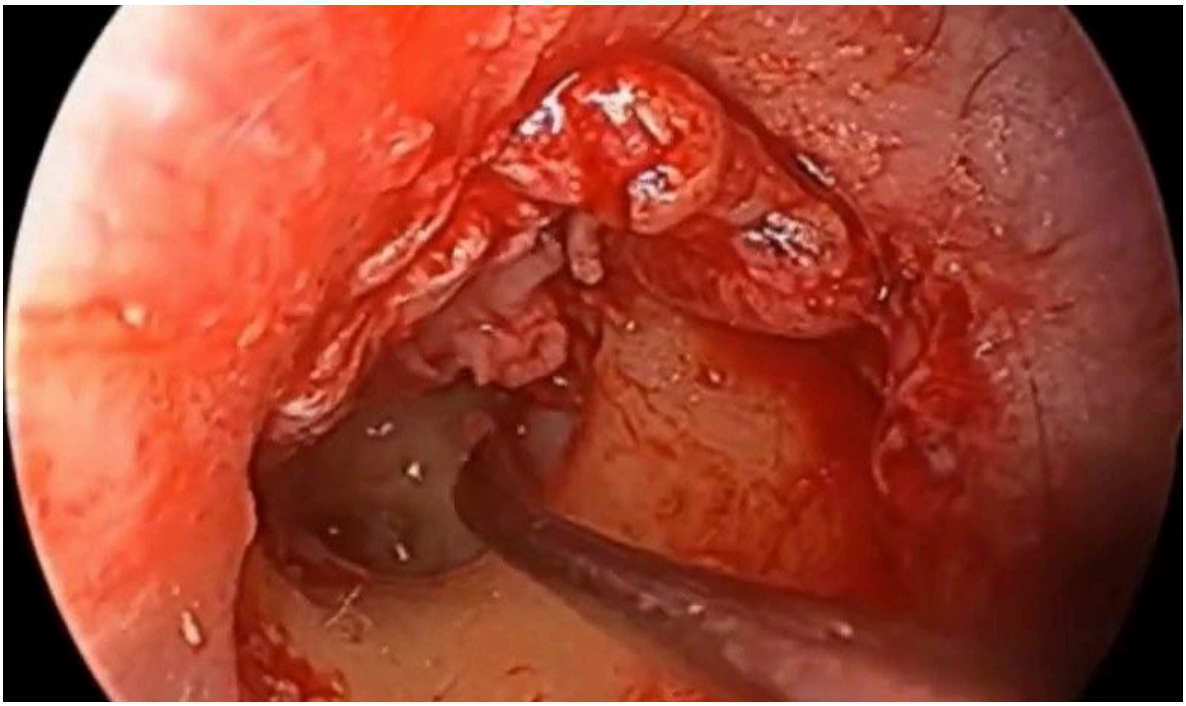
- **Refresh the margin.** Removing the epithelial rim allows the graft to adhere.
- **Spare the chorda.** Endoscopic approaches are associated with less taste disturbance.

CASE SUMMARY

Endoscopic tympanoplasty with anterior tucking for an anterior perforation.

REFERENCES

1. Alzahrani MA, Erwe IH, Alshehri MA, et al. Impact of surgical approach on taste dysfunction and quality of life in middle ear surgery: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2026;283:6165–78. doi:10.1007/s00405-026-10403-9
2. Lim CY, Yeo BSY, Goh X, et al. Outcomes of endoscopic versus microscopic ossicular chain reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2025;135:1899–907. doi:10.1002/lary.31991



82

The missing long process

Medium perforation with necrosis of the incus; stapes suprastructure present

Endoscopic ossiculo-tympanoplasty with cartilage over the stapes head

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

Endoscopy showed a medium perforation with a necrosed incus and an intact stapes suprastructure.

AUTHOR'S PERSPECTIVE

> With the long process of the incus gone, the chain must be bridged. A cartilage piece on the stapes head under the malleus reconnects the drum to the stapes.

APPROACH

Transcanal endoscopic underlay with tragal cartilage over the stapes head.

OPERATIVE STEPS

1. Confirm incus necrosis with the stapes present.

2. Freshen and undermine the margin.
3. Elevate the tympanomeatal flap.
4. Place the underlay fascia graft.
5. Support with gelfoam.
6. Place the tragal cartilage over the stapes head under the malleus.
7. Reposition graft and flap.

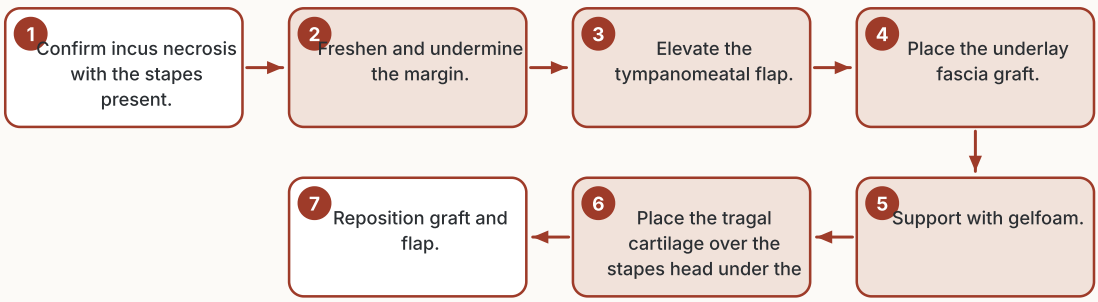
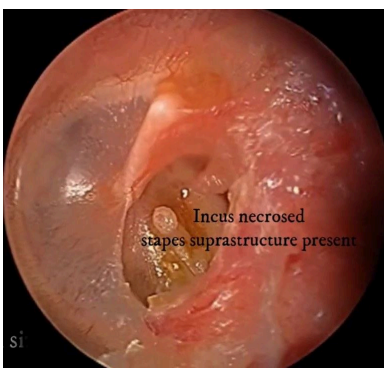
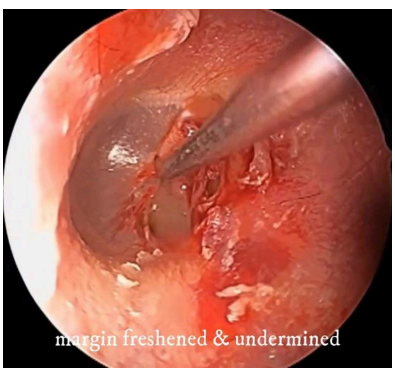


Figure 82.A Operative sequence.

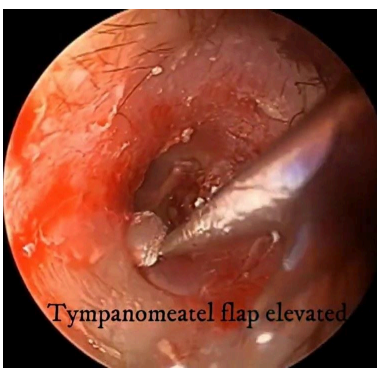
OPERATIVE RECORD



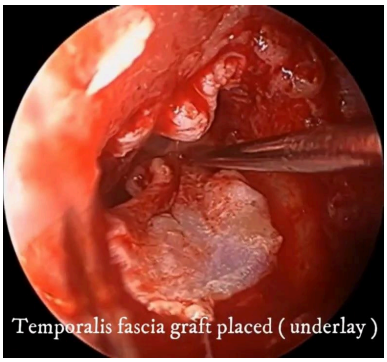
82.1 "Incus necrosed; stapes suprastructure present." Video 0:02



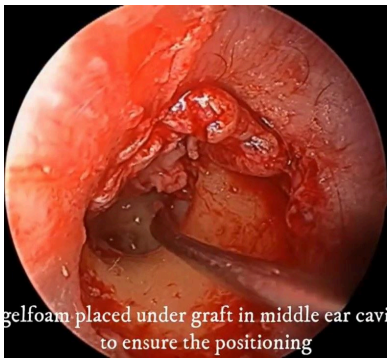
82.2 "Margin freshened and undermined." Video 0:18



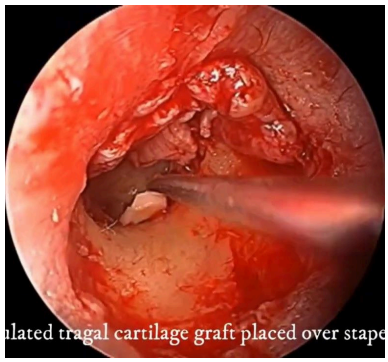
82.3 "Tympanomeatal flap elevated." Video 0:33



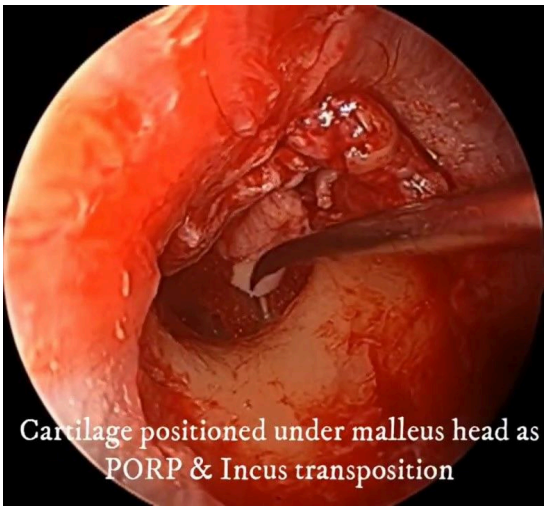
82.4 “Temporalis fascia graft placed (underlay).” Video 0:49



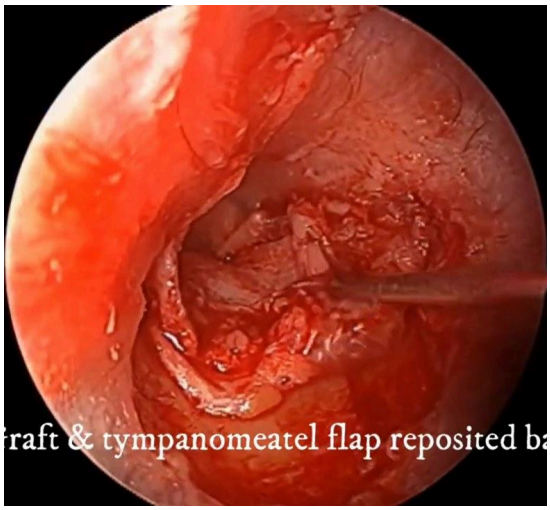
82.5 “Gelfoam placed under graft in middle ear cavity to ensure the positioning.” Video 0:59



82.6 “Modulated tragal cartilage graft placed over stapes head.” Video 1:04



82.7 “Cartilage positioned under malleus head as PORP and incus transposition.” Video 1:20



82.8 “Graft and tympanomeatal flap reposited back.” Video 1:30

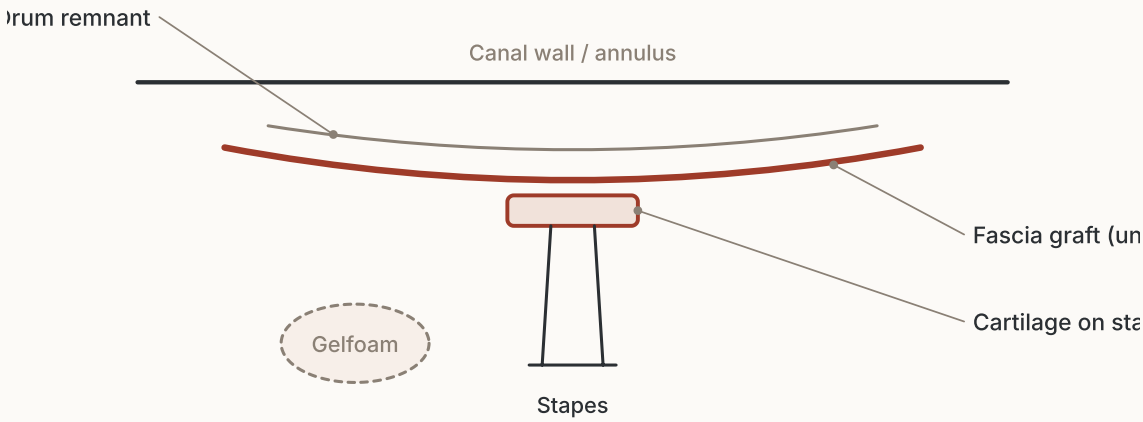


Figure 82.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Bridging the gap	Cartilage on the stapes head under the malleus.
Graft displacement	Gelfoam support in the middle ear.

TEACHING POINTS

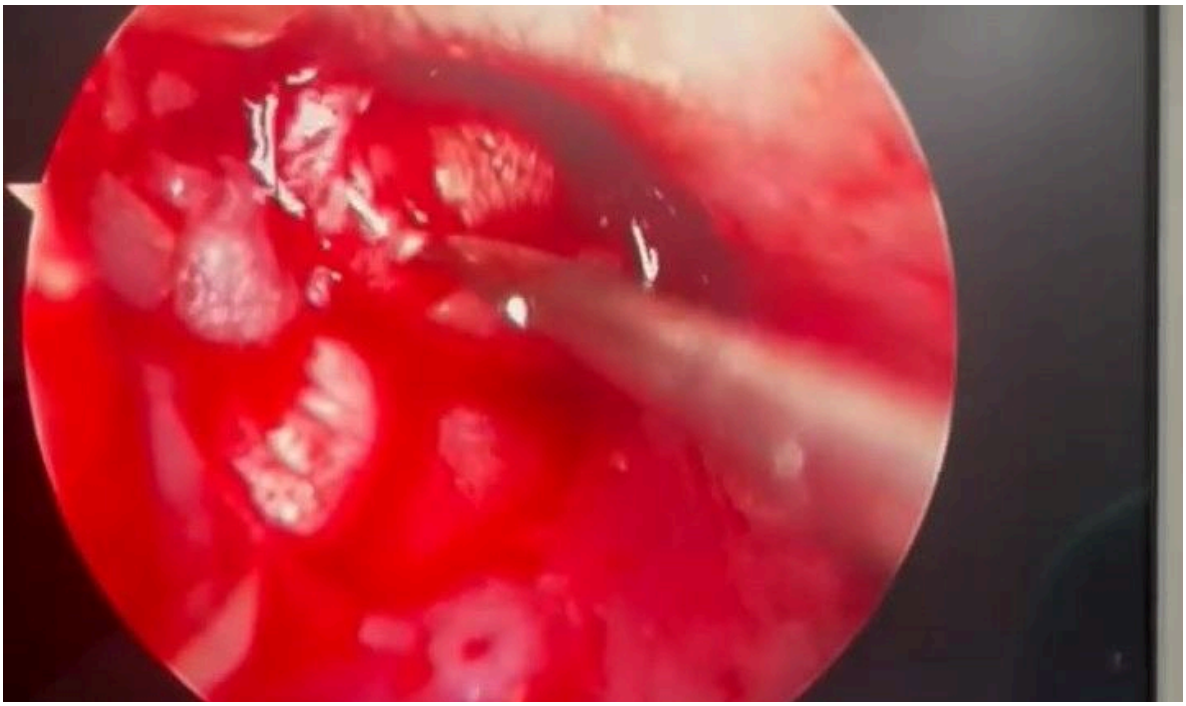
- **Incus long process erosion is the commonest ossicular defect.** In chronic otitis media.
- **Check stapes mobility first.** A fixed stapes changes the reconstruction.
- **Endoscopic and microscopic results are similar.** Meta-analysis shows comparable hearing outcomes.

CASE SUMMARY

Endoscopic ossiculo-tympanoplasty for incus necrosis with cartilage over the stapes head.

REFERENCES

1. Lim CY, Yeo BSY, Goh X, et al. Outcomes of endoscopic versus microscopic ossicular chain reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2025;135:1899–907. doi:10.1002/lary.31991



83

What was left behind

Large central perforation with an impacted cotton foreign body

Removal of the foreign body and endoscopic tympanoplasty with anterior tucking

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A large central perforation was found with a cotton foreign body impacted in the middle ear.

AUTHOR'S PERSPECTIVE

> Foreign material in the middle ear maintains inflammation and prevents graft take. It must be removed completely before a graft is placed.

APPROACH

Transcanal endoscopic removal of the foreign body, clearance of the middle ear and anterior tucking tympanoplasty.

OPERATIVE STEPS

1. Inspect the perforation and the foreign material.
2. Remove the cotton foreign body.
3. Clear the middle ear.
4. Prepare and place the graft with anterior tucking.
5. Support with gelfoam.
6. Reposition the flap and pack the canal.

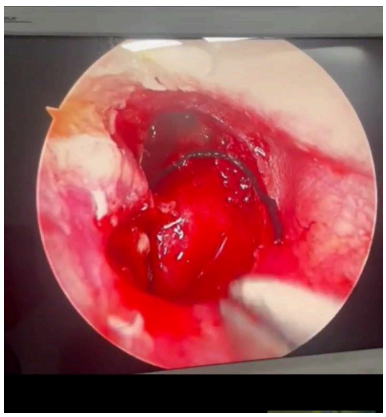


Figure 83.A Operative sequence.

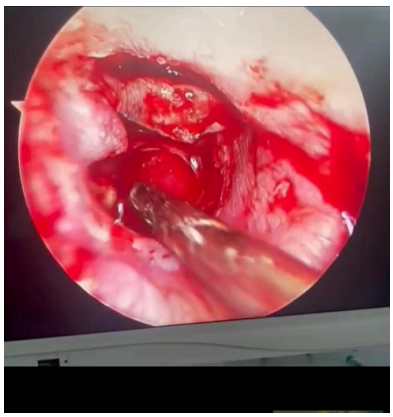
OPERATIVE RECORD



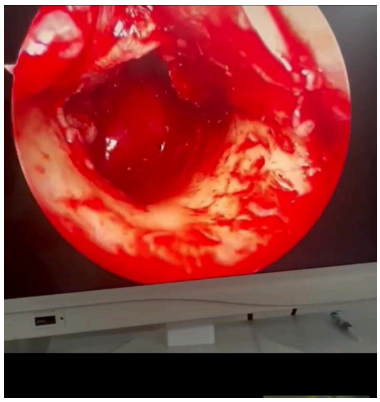
83.1 The large perforation with foreign material in the middle ear. Video 0:08



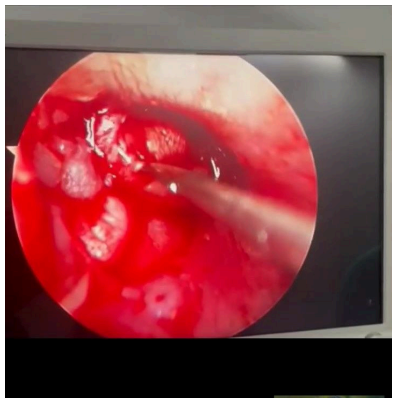
83.2 Cotton foreign body being removed. Video 0:20



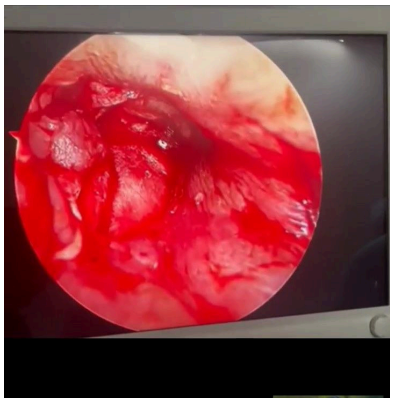
83.3 Middle ear cleared. Video 0:31



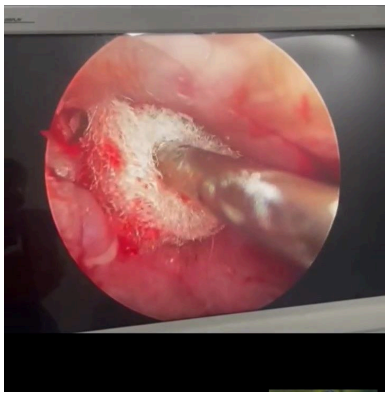
83.4 Middle ear after clearance. Video 0:48



83.5 Graft prepared for anterior tucking. Video 1:00



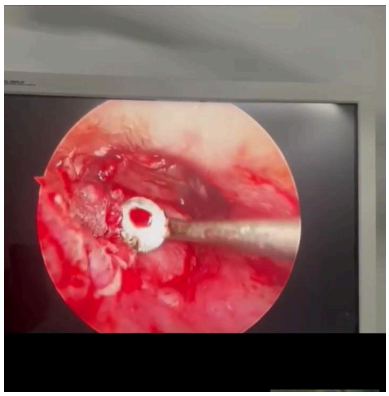
83.6 Graft tucked anteriorly. Video 1:17



83.7 Gelfoam support. Video 1:34



83.8 Graft in position. Video 1:40



83.9 Flap reposited; canal packed. Video 1:57

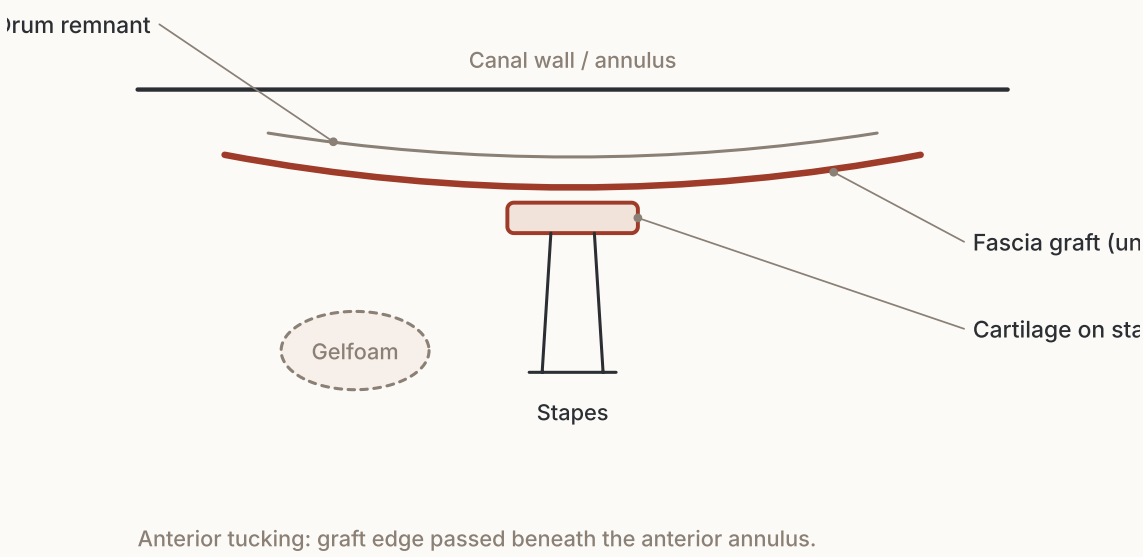


Figure 83.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Residual fibres	The middle ear was cleared under magnification.
A large perforation	Anterior tucking secured the graft.

TEACHING POINTS

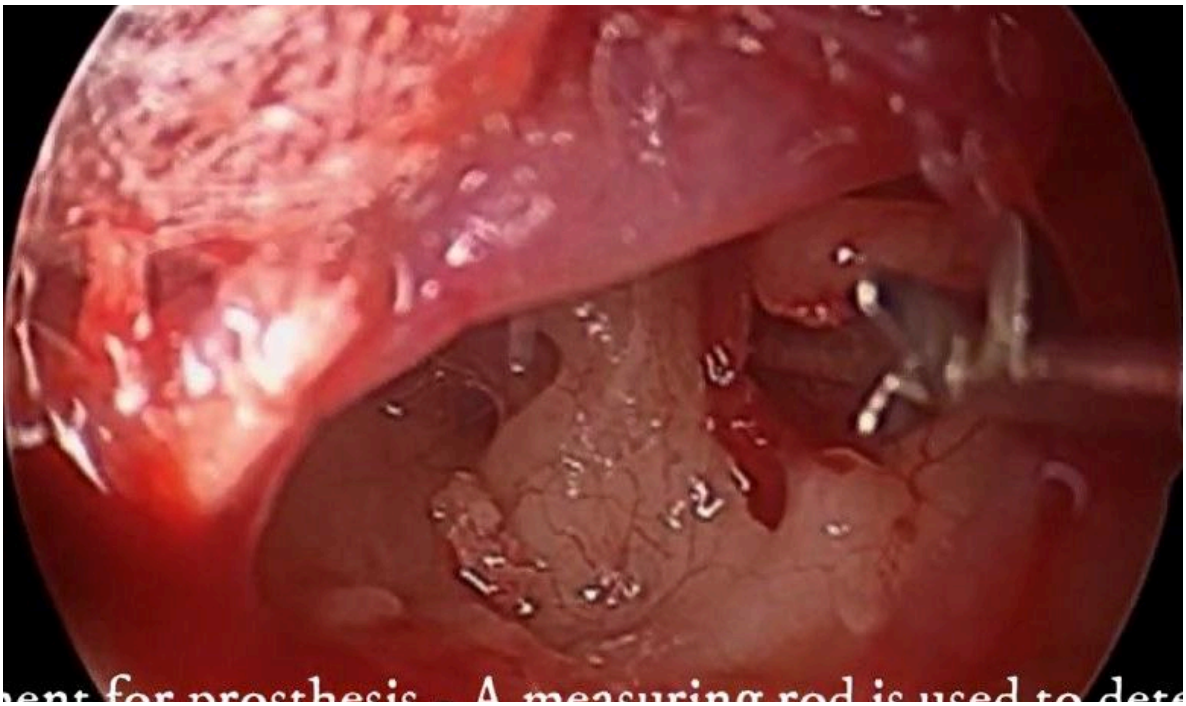
- **Remove every fibre of foreign material.** Retained fibres sustain inflammation and cause graft failure.
- **Anterior tucking for large perforations.** The graft is anchored where it is most likely to fail.
- **Counsel against cotton buds.** The commonest source of canal foreign bodies in adults.

CASE SUMMARY

Removal of an impacted cotton foreign body and endoscopic tympanoplasty with anterior tucking.

REFERENCES

1. Lim CY, Yeo BSY, Goh X, et al. Outcomes of endoscopic versus microscopic ossicular chain reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2025;135:1899–907. doi:10.1002/lary.31991
2. Alzahrani MA, Erwe IH, Alshehri MA, et al. Impact of surgical approach on taste dysfunction and quality of life in middle ear surgery: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2026;283:6165–78. doi:10.1007/s00405-026-10403-9



84

A piston through the footplate

Otosclerosis in a 24-year-old man: progressive moderate conductive hearing loss, intact drum, Carhart notch

Endoscopic stapedotomy with a piston prosthesis

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 24-year-old man had progressive moderate hearing loss. The right tympanic membrane was intact, Rinne negative, and audiometry showed conductive loss with a Carhart notch.

AUTHOR'S PERSPECTIVE

> Otosclerosis fixes the stapes footplate. A small-fenestra stapedotomy with a piston restores conduction with low risk to the inner ear; the endoscope gives a full view of the oval window niche.

APPROACH

Transcanal endoscopic approach, removal of scutum, separation of the incudostapedial joint, suprastructure fracture, measurement, footplate perforation and piston insertion.

OPERATIVE STEPS

1. Raise the tympanomeatal flap from 6 to 12 o'clock with a circular knife.
2. Expose the lateral process of the malleus and incus.
3. Remove the posterior scutum with a curette, protecting the chorda.
4. Separate the incudostapedial joint.
5. Down-fracture the stapes suprastructure towards the promontory.
6. Measure from the footplate to the long process of the incus.
7. Perforate the posterior footplate with a 0.4 mm manual perforator.
8. Insert a 4 mm piston, hook the loop over the incus and place gelfoam.

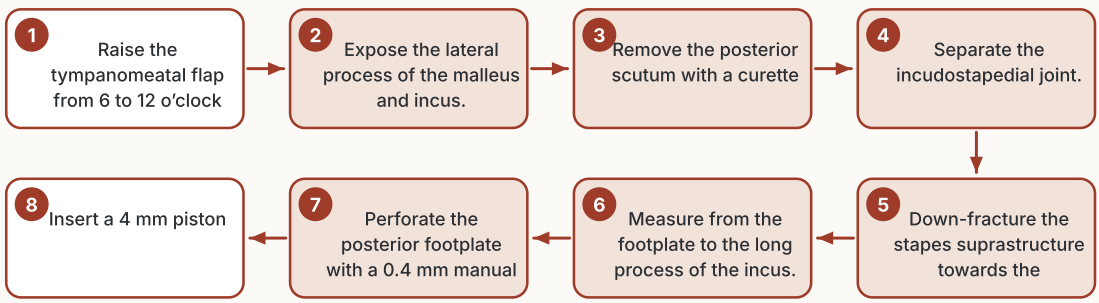
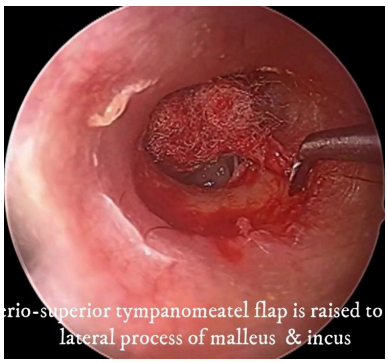


Figure 84.A Operative sequence.

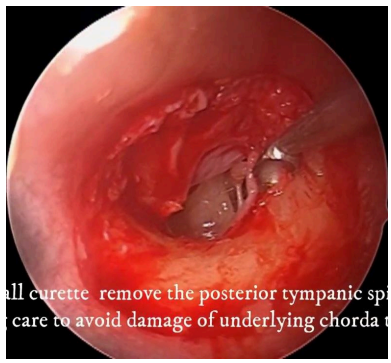
OPERATIVE RECORD



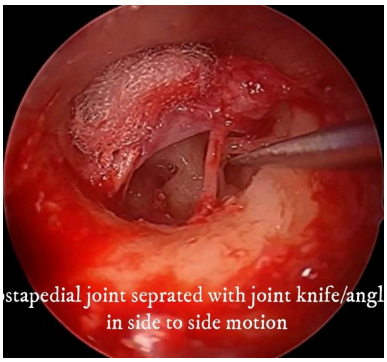
84.1 "Raising the tympanomeatal flap, 6 to 12 o'clock, 1.5 cm away from the tympanic membrane, with circular knife." Video 0:34



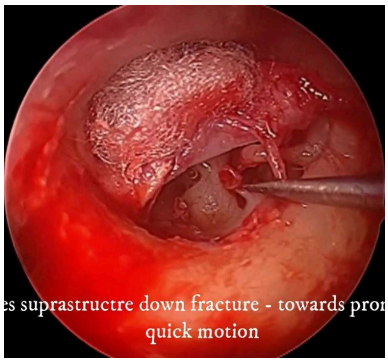
84.2 "Posterosuperior tympanomeatal flap is raised to expose lateral process of malleus and incus." Video 2:07



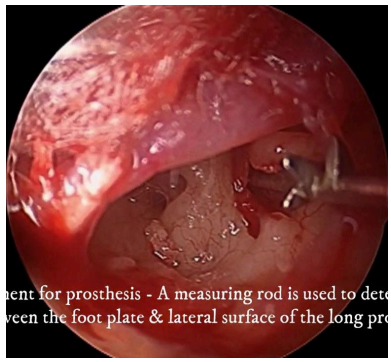
84.3 "With a small curette remove the posterior tympanic spine/scutum, taking care to avoid damage to the underlying chorda tympani." Video 2:54



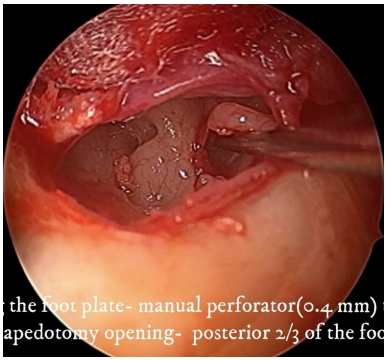
84.4 "Incudostapedial joint separated with joint knife/angled pick in side-to-side motion." Video 3:40



84.5 "Stapes suprastructure down fracture towards promontory, quick motion." Video 4:04



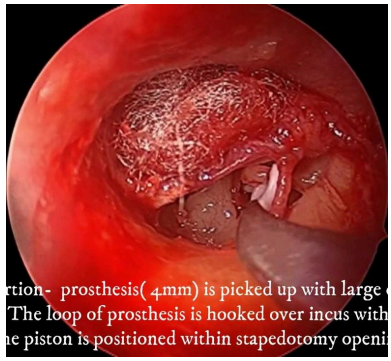
84.6 "Measurement for prosthesis: a measuring rod is used to determine the distance between the footplate and lateral surface of the long process of incus." Video 5:13



84.7 "Perforating the footplate: manual perforator (0.4 mm) used to make the stapedotomy opening, posterior 2/3 of the footplate." Video 5:36



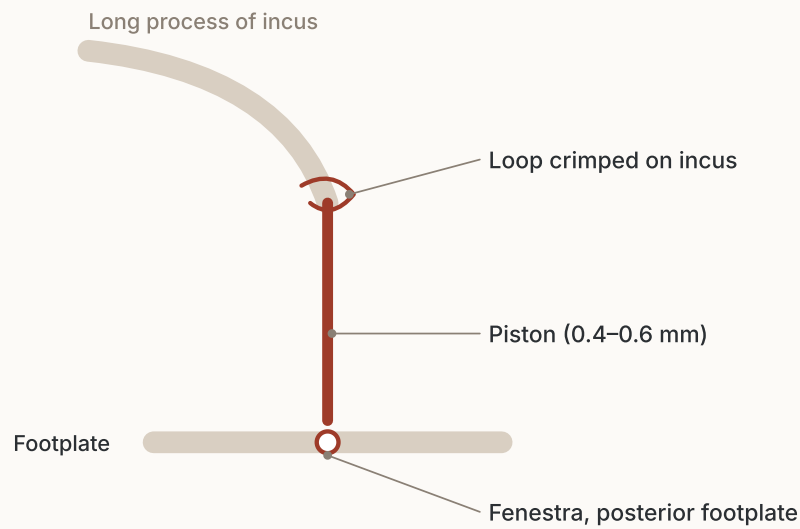
84.8 "Haemostasis achieved by gelfoam pledgets placed in oval window." Video 6:23



84.9 "Prosthesis insertion: prosthesis (4 mm) picked up with large crocodile forceps; loop hooked over incus, piston within stapedotomy opening." Video 7:33



84.10 "Antibiotic-soaked gelfoam pledgets placed in bony canal to secure the tympanomeatal flap." Video 8:19



Measure incus-to-footplate distance; piston projects ~0.25 mm into the vestibule.

Figure 84.B Small-fenestra stapedotomy with piston.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
The chorda tympani	The scutum was removed with care.
Floating footplate	A gentle manual perforator was used.

TEACHING POINTS

- **Measure before choosing the piston.** The incus-to-footplate distance determines prosthesis length.
- **Perforate the posterior footplate gently.** A manual perforator avoids a floating footplate.
- **Spare the chorda.** Careful scutum removal protects taste.

CASE SUMMARY

Endoscopic stapedotomy with a 4 mm piston for otosclerosis.

REFERENCES

1. Alzahrani MA, Erwe IH, Alshehri MA, et al. Impact of surgical approach on taste dysfunction and quality of life in middle ear surgery: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2026;283:6165–78. doi:10.1007/s00405-026-10403-9



85

Moving the malleus

Moderate conductive hearing loss with a small posterosuperior central perforation in a 23-year-old man

Tympanoplasty with malleus relocation and PORP ossiculoplasty

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A 23-year-old man presented with moderate hearing loss and intermittent left ear discharge. A small central perforation in the posterosuperior quadrant and moderate conductive loss were found.

AUTHOR'S PERSPECTIVE

> Exploration showed a fibrous band in place of the incudostapedial joint, with a mobile stapes. Relocating the malleus posteriorly and placing a PORP over the stapes head restores an efficient lever.

APPROACH

Transcanal approach, removal of the fibrous band, malleus relocation, overlay fascia and PORP.

OPERATIVE STEPS

1. Raise the tympanomeatal flap; identify the fibrous band between incus and stapes.
2. Confirm stapes mobility.
3. Free the tympanic membrane from the malleus handle.
4. Remove the fibrous band.
5. Relocate the malleus posteriorly.
6. Place temporalis fascia over the malleus (overlay).
7. Place the PORP on the stapes head under the malleus.

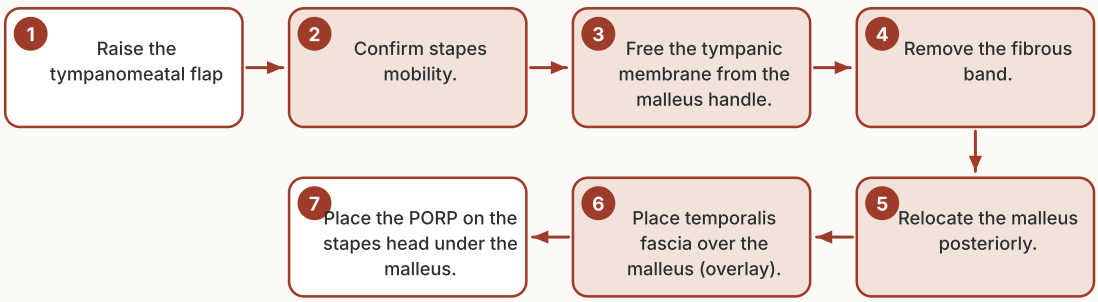
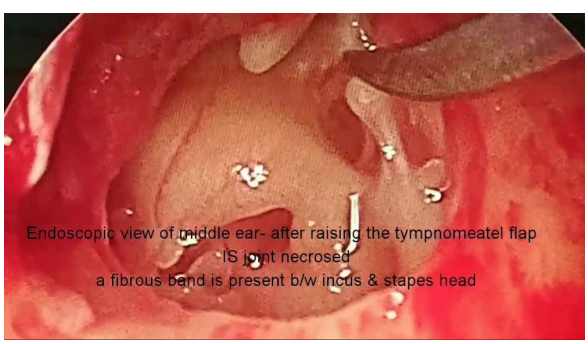


Figure 85.A Operative sequence.

OPERATIVE RECORD



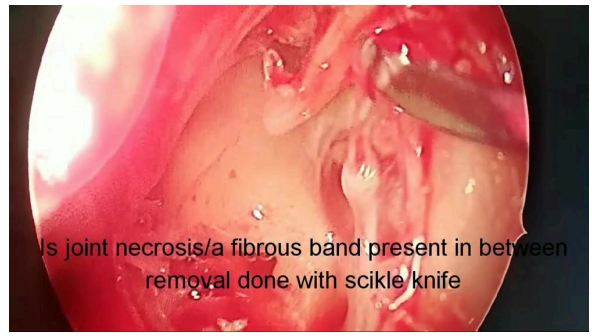
85.1 After raising the tympanomeatal flap: "a fibrous band is present between incus and stapes head." Video 0:27



85.2 "Stapes fixation is ruled out by palpation of stapes: mobility present." Video 0:49



85.3 “Tympanic membrane freed from handle of the malleus.” Video 1:00



85.4 “IS joint necrosis; fibrous band removal done with sickle knife.” Video 1:22



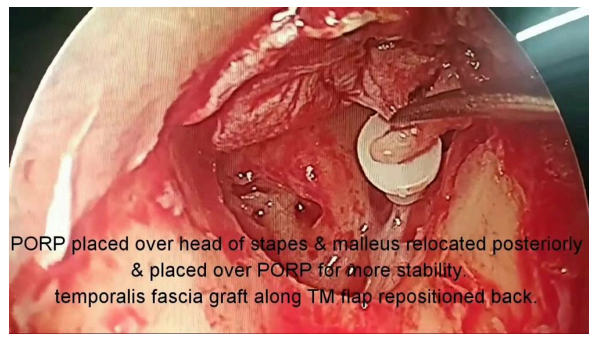
85.5 “Malleus is relocated posteriorly.” Video 1:44



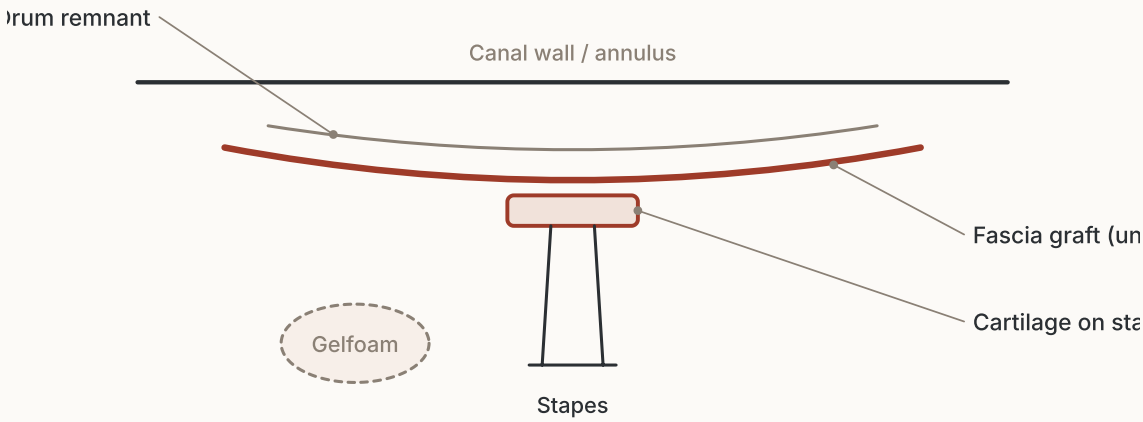
85.6 “Temporalis fascia placed over the malleus: overlay technique.” Video 2:17



85.7 “Tympanomeatal flap along temporalis fascia graft elevated/retracted anteriorly.” Video 3:02



85.8 “PORP placed over head of stapes; malleus relocated posteriorly and placed over PORP for more stability.” Video 3:57



Anterior tucking: graft edge passed beneath the anterior annulus.

Figure 85.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
A medialised malleus	The malleus was relocated posteriorly.
Prosthesis stability	The malleus rested on the PORP.

TEACHING POINTS

- **Confirm stapes mobility.** Palpation of the stapes excludes fixation before reconstruction.
- **A relocated malleus stabilises the prosthesis.** It rests on the PORP and keeps it centred.
- **Endoscopic reconstruction gives comparable hearing.** To microscopic ossiculoplasty.

CASE SUMMARY

Tympanoplasty with malleus relocation and PORP ossiculoplasty.

REFERENCES

1. Lim CY, Yeo BSY, Goh X, et al. Outcomes of endoscopic versus microscopic ossicular chain reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2025;135:1899–907. doi:10.1002/lary.31991



86

Freeing the nerve

Facial nerve palsy with chronic ear disease

Canal wall down mastoidectomy and facial nerve decompression

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording shows a canal wall down mastoidectomy with decompression of the facial nerve under the microscope.

AUTHOR'S PERSPECTIVE

> Where facial nerve compression or inflammation in chronic ear disease is not recovering, the nerve is decompressed through the mastoid.

APPROACH

Canal wall down mastoidectomy, identification of the facial canal and decompression of the affected segment.

OPERATIVE STEPS

1. Open the mastoid cavity under the microscope.
2. Identify the facial canal.
3. Decompress the affected segment.

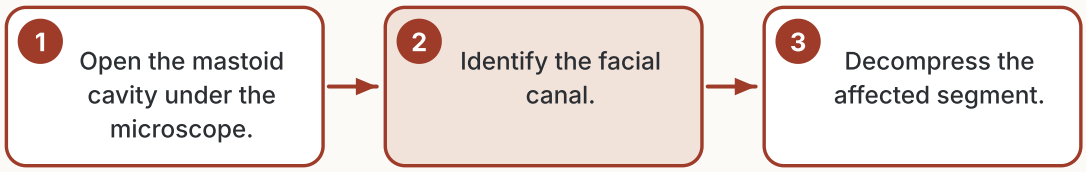
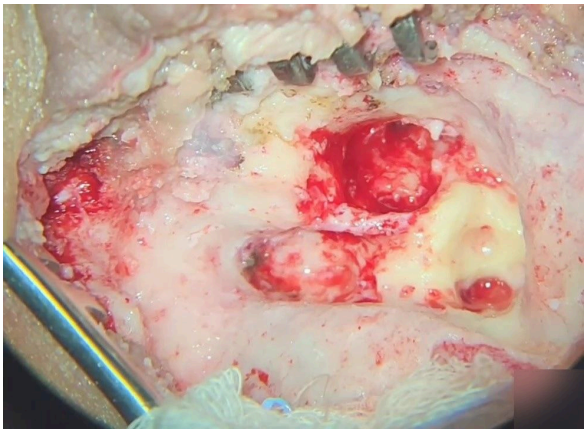
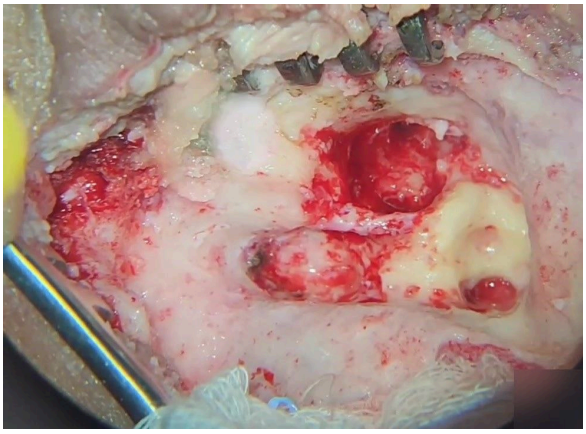


Figure 86.A Operative sequence.

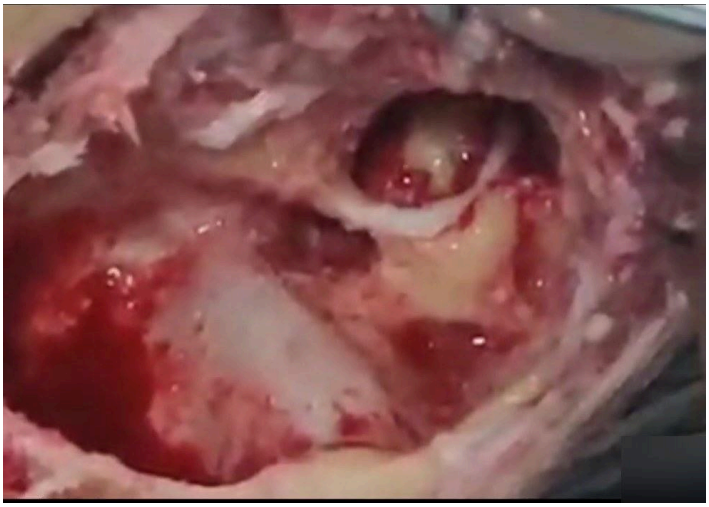
OPERATIVE RECORD



86.1 The open mastoid cavity under the microscope. Video 0:09



86.2 The facial canal identified. Video 0:13



86.3 The decompressed segment of the facial nerve. Video 0:25

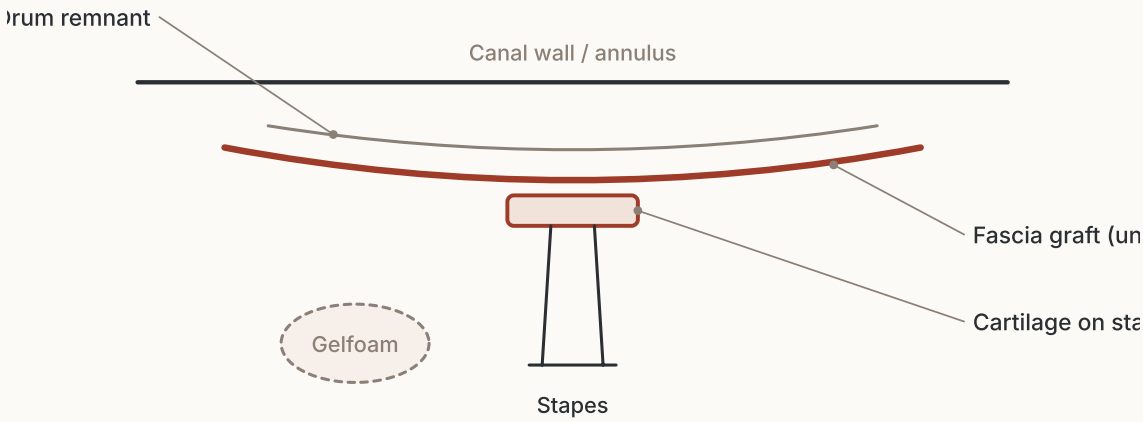


Figure 86.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Identifying the nerve in disease	Landmarks: lateral semicircular canal and digastric ridge.
Nerve trauma during drilling	Diamond burrs with irrigation.

TEACHING POINTS

- **Electrophysiology guides the decision.** Electroneuronography identifies nerves unlikely to recover spontaneously.
- **Diamond burr and irrigation near the nerve.** Thermal and mechanical injury are avoided.
- **Protect the eye during recovery.** Lubrication and taping prevent exposure keratitis.

CASE SUMMARY

Canal wall down mastoidectomy with facial nerve decompression.

REFERENCES

1. Natour A, Doyle E, DeDio R, Samy RN. Temporal bone fracture related facial palsy: efficacy of decompression with and without grafting. *Curr Opin Otolaryngol Head Neck Surg* 2024;32:294–300. doi:10.1097/MOO.0000000000001007



87

A drum through the endoscope

Central perforation of the tympanic membrane

Transcanal endoscopic tympanoplasty

PART VII · THE EAR Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the ear canal with the perforation, the tympanomeatal flap raised with a round knife and the middle ear exposed.

AUTHOR'S PERSPECTIVE

> The transcanal endoscopic route avoids an external incision. The tympanomeatal flap is raised with the annulus to give access to the middle ear for grafting.

APPROACH

Transcanal tympanomeatal flap from 6 to 12 o'clock, middle ear inspection and underlay graft.

OPERATIVE STEPS

1. Inspect the canal and the perforation.
2. Incise and elevate the tympanomeatal flap with a round knife.
3. Reflect the flap and expose the middle ear.

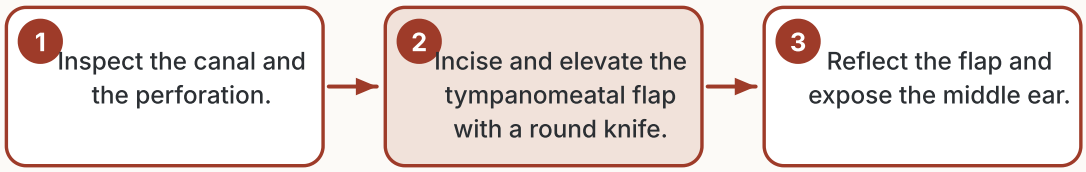


Figure 87.A Operative sequence.

OPERATIVE RECORD



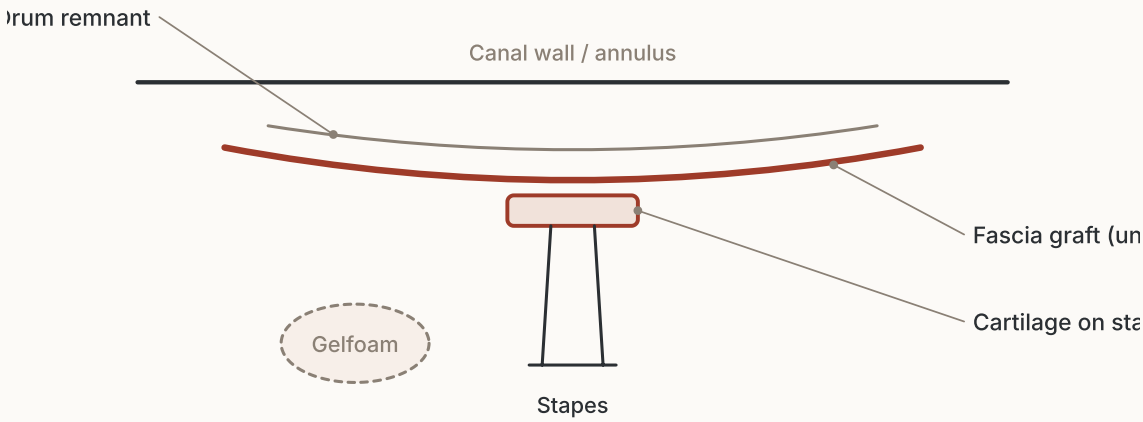
87.1 Endoscopic view of external auditory canal with canal skin and central perforation/middle ear area before flap elevation.



87.2 Endoscopic tympanomeatal flap elevation with round knife, annulus/bony canal visible.



87.3 Tympanomeatal flap reflected, middle ear cavity exposed (endoscopic).



Anterior tucking: graft edge passed beneath the anterior annulus.

Figure 87.B Underlay tympanoplasty with cartilage ossiculoplasty.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
A narrow or curved canal	Angled endoscopes compensated.
Bleeding in a one-handed technique	Adrenaline-soaked pledgets were used.

TEACHING POINTS

- **Raise the flap with the annulus.** This opens the middle ear without tearing the drum.
- **One-handed surgery needs a dry field.** Adrenaline-soaked pledgets and patience control bleeding.
- **Endoscopic tympanoplasty matches microscopic results.** With no external incision.

CASE SUMMARY

Transcanal endoscopic tympanoplasty.

REFERENCES

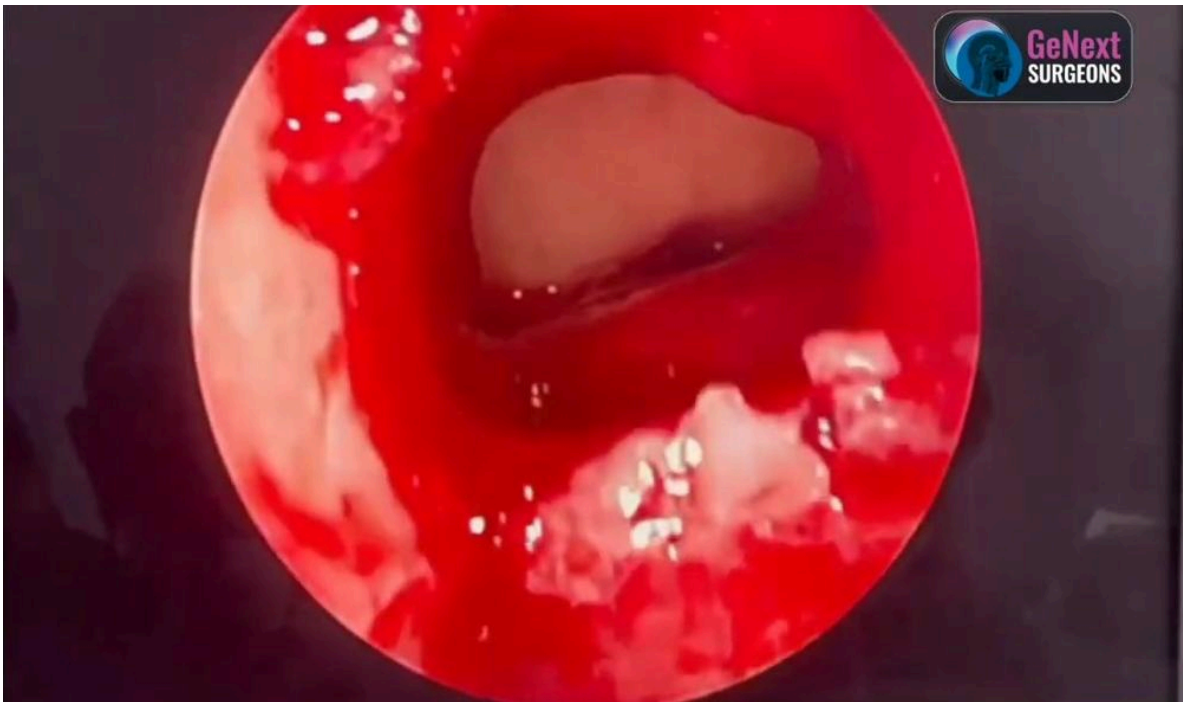
1. Lim CY, Yeo BSY, Goh X, et al. Outcomes of endoscopic versus microscopic ossicular chain reconstruction: a systematic review and meta-analysis. *Laryngoscope* 2025;135:1899–907. doi:10.1002/lary.31991
2. Alzahrani MA, Erwe IH, Alshehri MA, et al. Impact of surgical approach on taste dysfunction and quality of life in middle ear surgery: a systematic review and meta-analysis. *Eur Arch Otorhinolaryngol* 2026;283:6165–78. doi:10.1007/s00405-026-10403-9

PART VIII

Nose, sinuses and the endonasal laboratory

Sinus disease, a child's tumour and fibrous dysplasia, with the cadaveric dissections behind live surgery.

88 The polyps
89 The map
90 Frontal sinus to clivus
91 Above the sella
92 Learning on the dead
93 The headache that came late
94 A boy who could not breathe
95 Bone that kept growing
96 The axillary flap
97 The fungal ball



88

The polyps

Chronic rhinosinusitis with nasal polyposis

Functional endoscopic sinus surgery

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording shows endoscopic surgery for chronic rhinosinusitis with nasal polyposis.

AUTHOR'S PERSPECTIVE

> Surgery is indicated when appropriate medical therapy has failed. Complete opening of diseased cells and removal of polyps restores drainage and access for topical steroids.

APPROACH

Endoscopic polypectomy, uncinectomy, antrostomy and ethmoidectomy.

OPERATIVE STEPS

1. Display the polyps filling the nasal cavity.
2. Debulk the polyps.
3. Open the sinus cavities.
4. Clear the ethmoids.

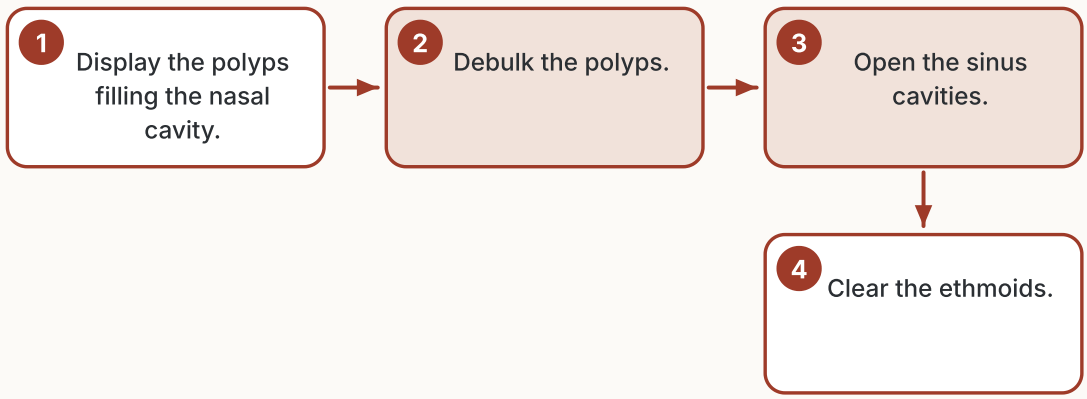
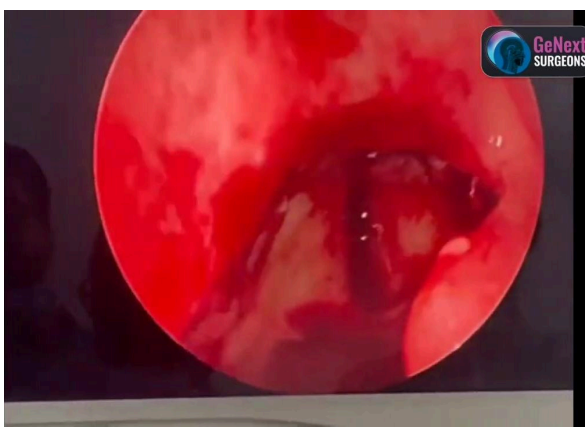
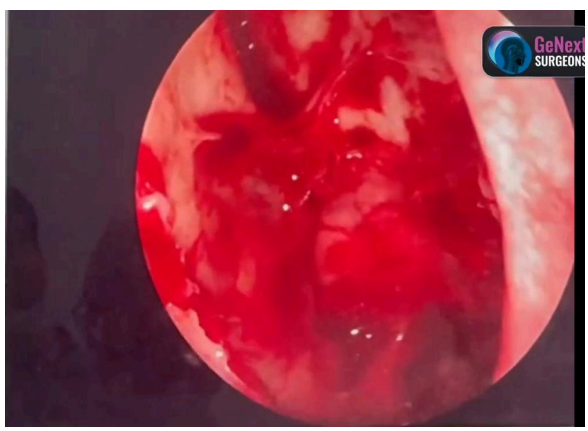


Figure 88.A Operative sequence.

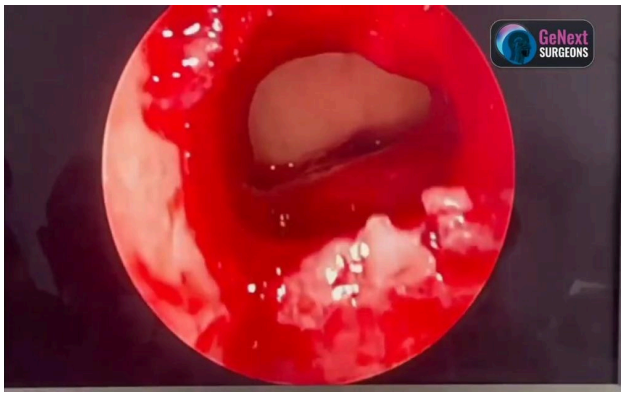
OPERATIVE RECORD



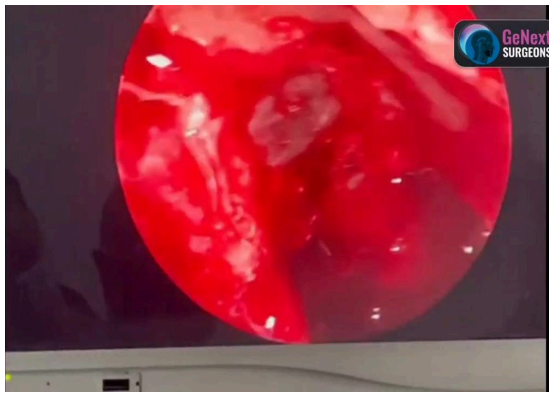
88.1 Polyps filling the nasal cavity. Video 0:06



88.2 Debulking the polyps. Video 0:10



88.3 Opened sinus cavity. Video 0:14



88.4 Ethmoid clearance. Video 0:23

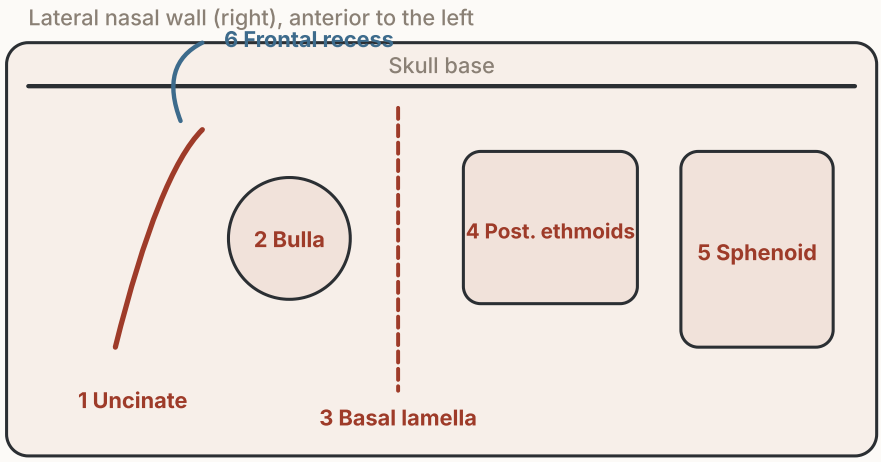


Figure 88.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Bleeding from inflamed mucosa	Topical vasoconstriction and controlled hypotension.
Loss of landmarks	The maxillary line and skull base were identified.

TEACHING POINTS

- **Medical therapy first.** Topical steroids and saline precede surgery under EPOS 2020.
- **Complete surgery reduces revision.** All diseased cells are opened.

- **Continue topical steroids after surgery.** Surgery improves their delivery but does not cure the disease.

CASE SUMMARY

Functional endoscopic sinus surgery for chronic rhinosinusitis with nasal polyposis.

REFERENCES

1. Fokkens WJ, Lund VJ, Hopkins C, et al. Executive summary of EPOS 2020 including integrated care pathways. *Rhinology* 2020;58:82–111. doi:10.4193/Rhin20.601



89

The map

Cadaveric endoscopic sinus surgery from frontal to sphenoid

Anatomical landmarks of the anterior skull base

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A labelled endoscopic dissection from the frontal sinus to the sphenoid.

AUTHOR'S PERSPECTIVE

> Safe sinus surgery depends on recognising the anterior ethmoidal artery, cribriform plate, lamina papyracea, posterior table of the frontal sinus, optic canal and sella.

APPROACH

Stepwise endoscopic dissection with labels at each landmark.

OPERATIVE STEPS

1. Identify the anterior ethmoidal artery, cribriform plate and lamina papyracea.
2. Display the frontal sinus and posterior table.
3. Expose the skull base from frontal to sphenoid.
4. Identify the optic canal, sella and parasellar internal carotid.

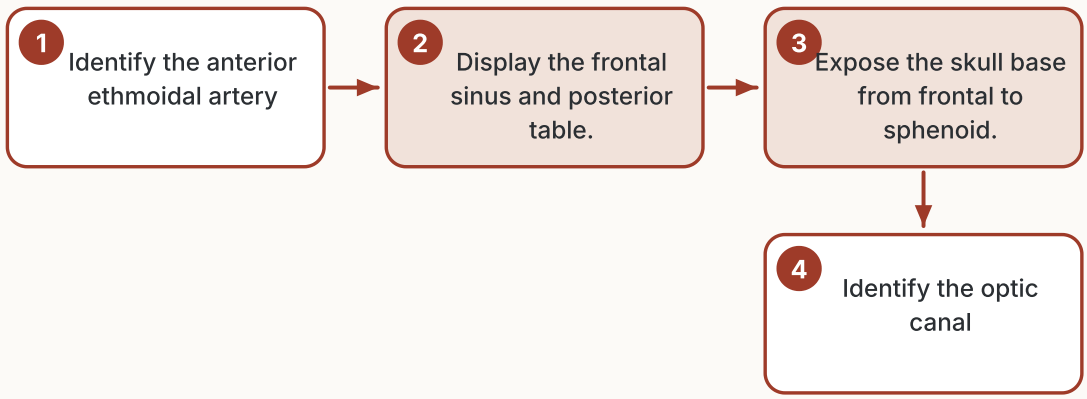
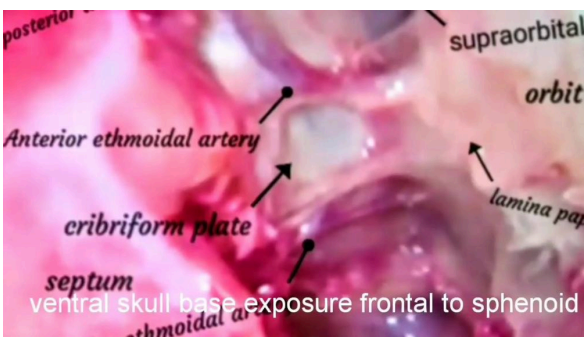
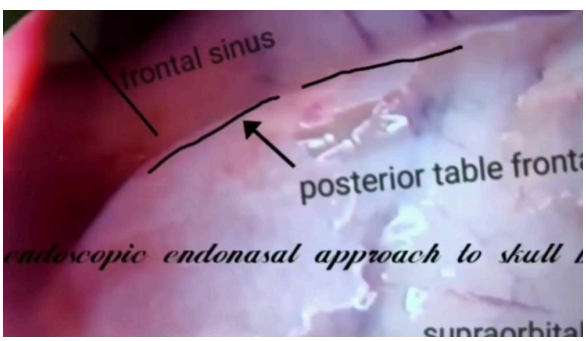


Figure 89.A Operative sequence.

OPERATIVE RECORD



89.1 Anterior ethmoidal artery, cribriform plate, supraorbital cell, orbit and lamina papyracea labelled. Video 0:07



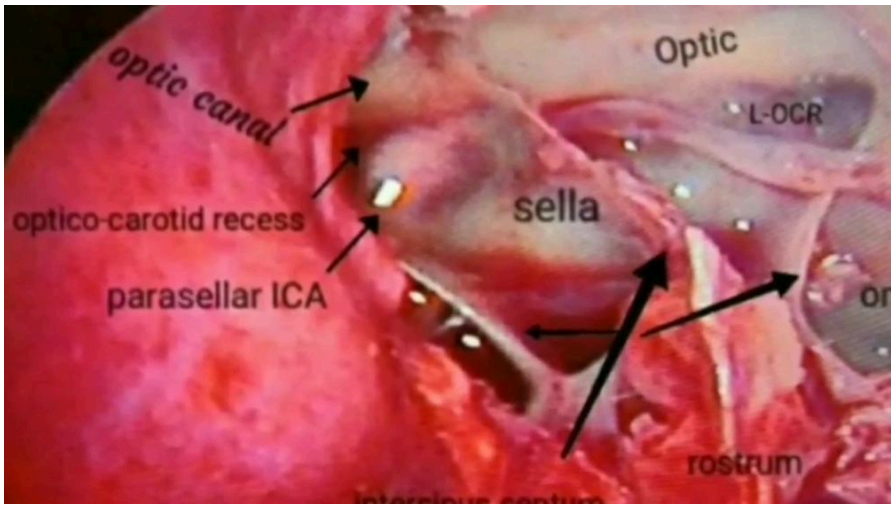
89.2 Frontal sinus and posterior table: "endoscopic endonasal approach to skull base." Video 0:12



89.3 "Ventral skull base, frontal to sphenoid, showing landmarks." Video 0:28



89.4 Skull base exposed from frontal to sphenoid. Video 0:43



89.5 Optic canal, sella, parasellar ICA and opticocarotid recess labelled. Video 0:58

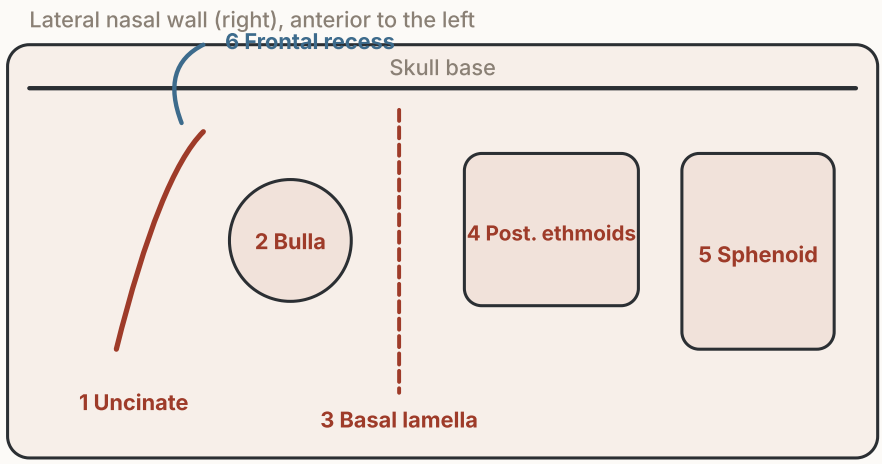


Figure 89.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Learning the three-dimensional map	Each landmark was labelled in sequence.

TEACHING POINTS

- **Find the skull base posteriorly and follow it forwards.** The skull base is highest and safest to identify in the sphenoid.

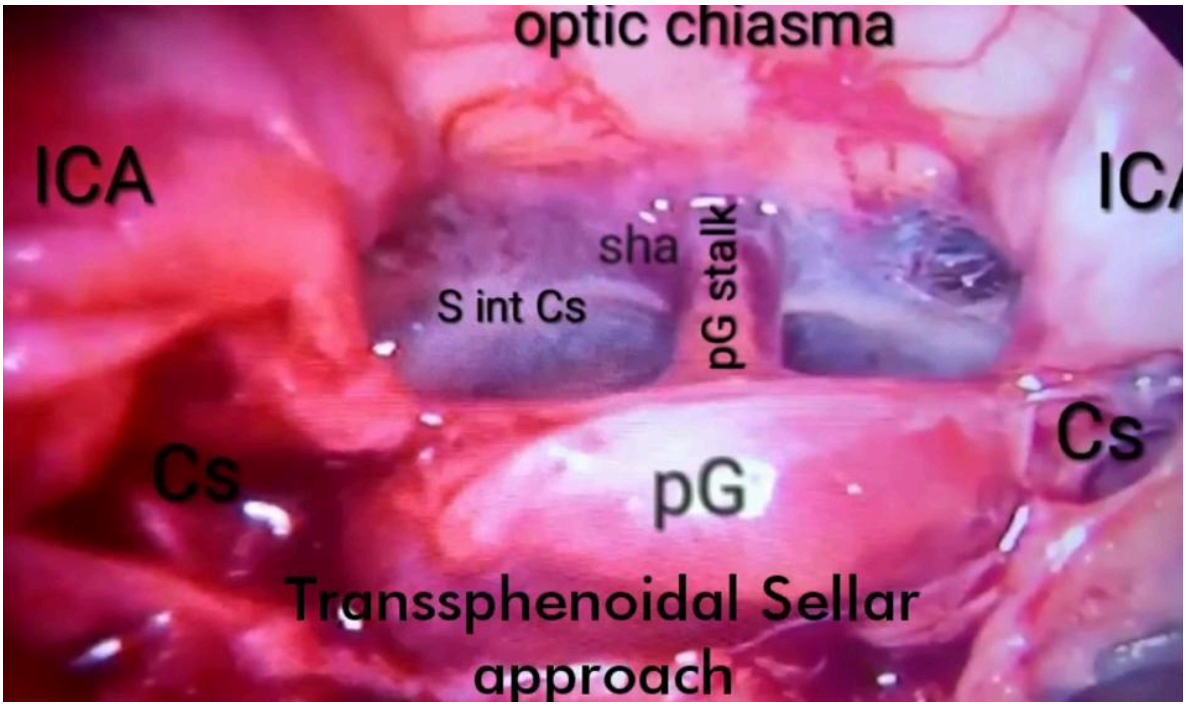
- **The anterior ethmoidal artery marks the frontal recess.** It lies just behind it in the skull base.
- **Know the optic–carotid recesses.** Before working on the lateral sphenoid wall.

CASE SUMMARY

A labelled cadaveric endoscopic dissection of the anterior skull base.

REFERENCES

1. Fokkens WJ, Lund VJ, Hopkins C, et al. Executive summary of EPOS 2020 including integrated care pathways. *Rhinology* 2020;58:82–111. doi:10.4193/Rhin20.601



90

Frontal sinus to clivus

Cadaveric endoscopic transnasal ventral skull base approaches

Draf III, transcribriform, transsellar, retrosellar and retroclival corridors

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A cadaveric dissection demonstrating each endonasal corridor along the ventral skull base.

AUTHOR'S PERSPECTIVE

> The sagittal plane from frontal sinus to clivus is reached through a series of corridors, each with its own landmarks and vascular risks.

APPROACH

Progressive endoscopic dissection from anterior to posterior.

OPERATIVE STEPS

1. Identify the anterior ethmoidal artery, cribriform plate and septum.
2. Display the posterior table of the frontal sinus.
3. Expose the anterior skull base after septectomy and ethmoidectomy.
4. Perform the Draf III / modified Lothrop.
5. Open the transsphenoidal sellar approach.
6. Display the suprasellar and supraschiasmatic areas.
7. Elevate the pituitary for the retrosellar area.
8. Open the retroclival approach to the basilar artery.

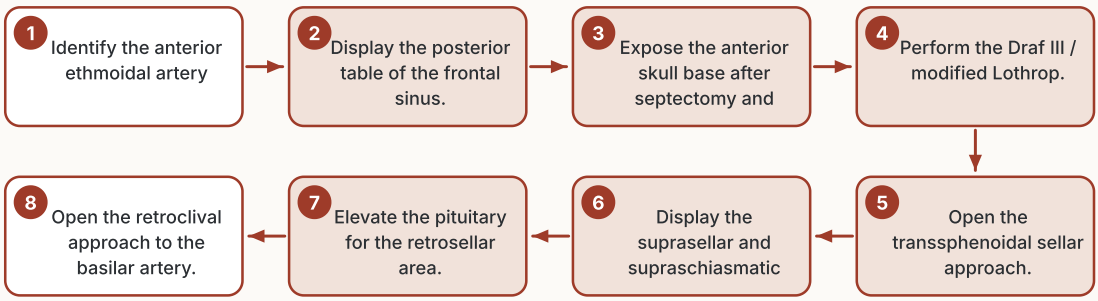
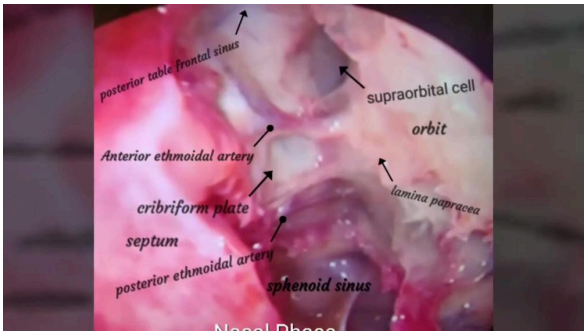
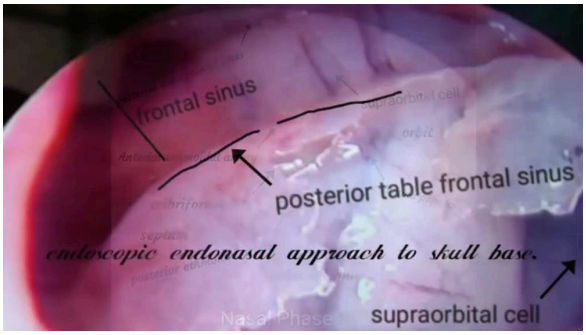


Figure 90.A Operative sequence.

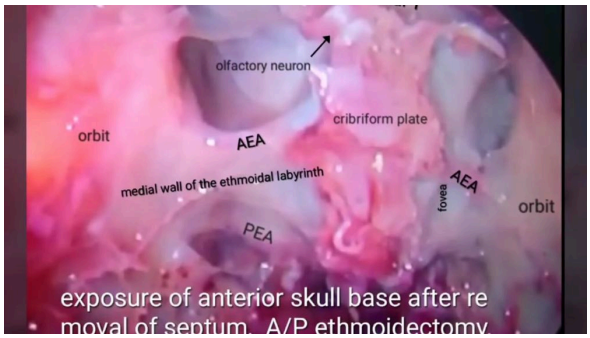
OPERATIVE RECORD



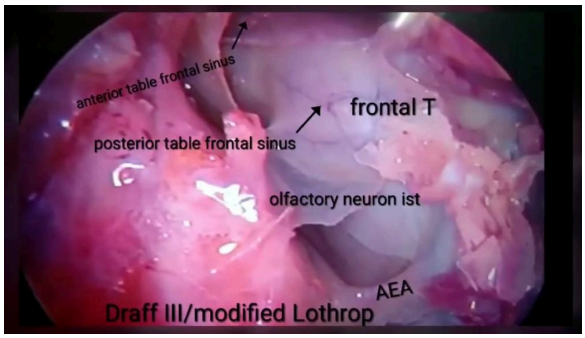
90.1 Anterior ethmoidal artery, cribriform plate and septum labelled. Video 0:10



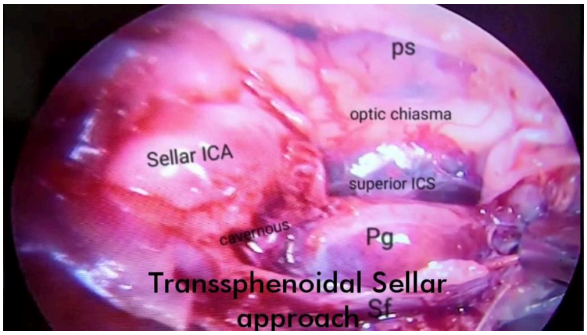
90.2 Posterior table of frontal sinus, supraorbital cell. Video 0:17



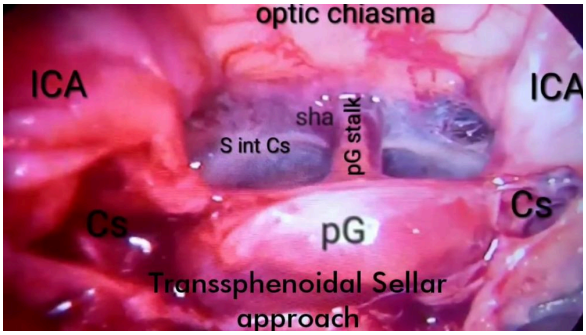
90.3 Exposure of the anterior skull base after removal of septum and ethmoids. Video 0:46



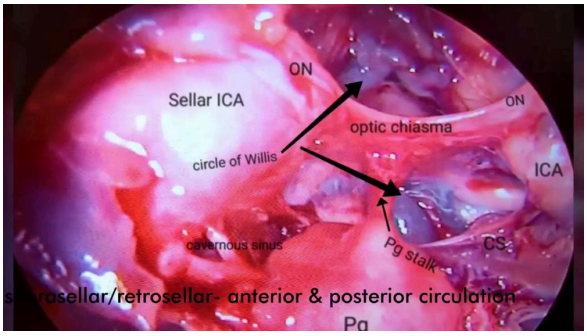
90.4 Draf III / modified Lothrop: frontal T, olfactory neuron, AEA. Video 1:00



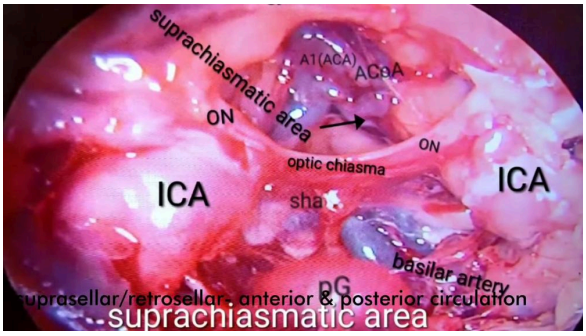
90.5 "Transsphenoidal sellar approach": sellar ICA, optic chiasma, pituitary gland. Video 1:15



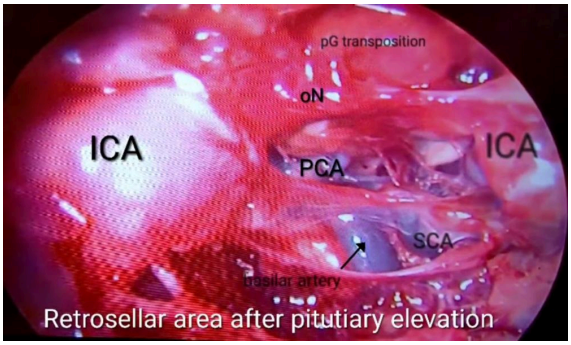
90.6 Sellar ICA, superior intercavernous sinus, cavernous sinus. Video 1:29



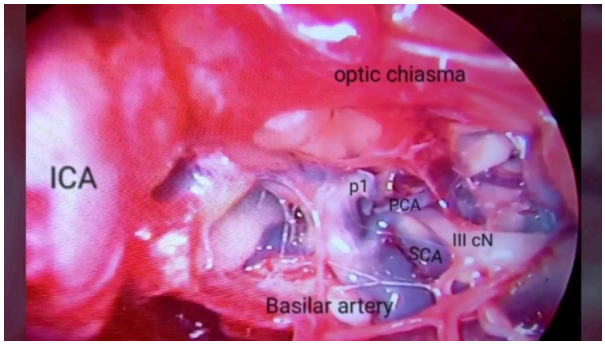
90.7 Suprasellar/retrochiasmatic area: anterior and posterior circulation. Video 1:36



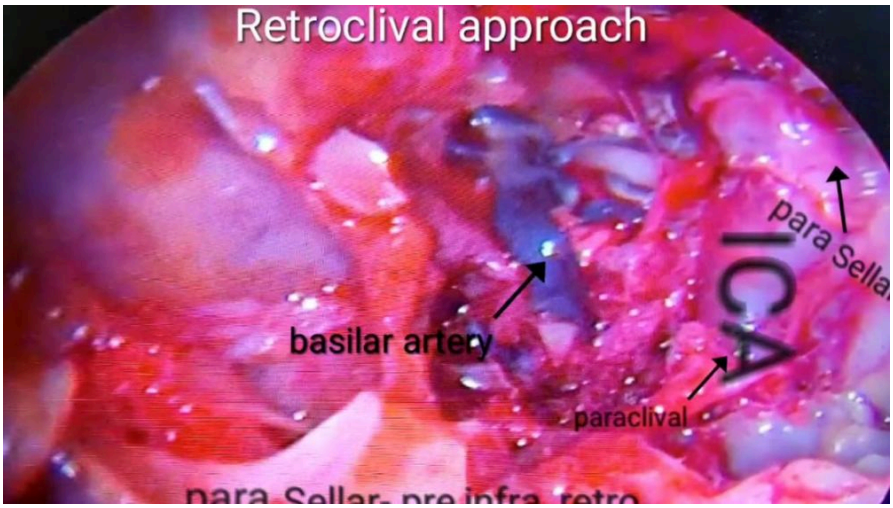
90.8 "Supraschiasmatic area": ICA, optic nerve, chiasma. Video 1:50



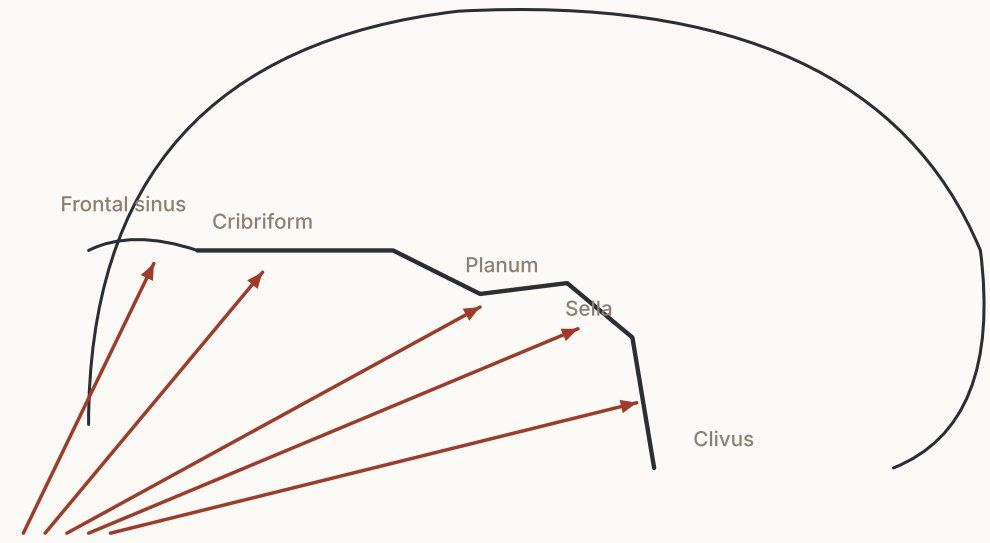
90.9 "Retrosellar area after pituitary elevation." Video 1:57



90.10 Basilar artery, optic chiasma and ICA. Video 2:12



90.11 "Retroclival approach": basilar artery and ICA. Video 2:33



Transfrontal · transcribriform · transplanum · transsellar · transclival

Figure 90.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Vascular landmarks in each corridor	The internal carotid, ophthalmic and basilar arteries were identified at each stage.

TEACHING POINTS

- **Know the paraclinoid and paraclival carotid.** They bound every corridor.

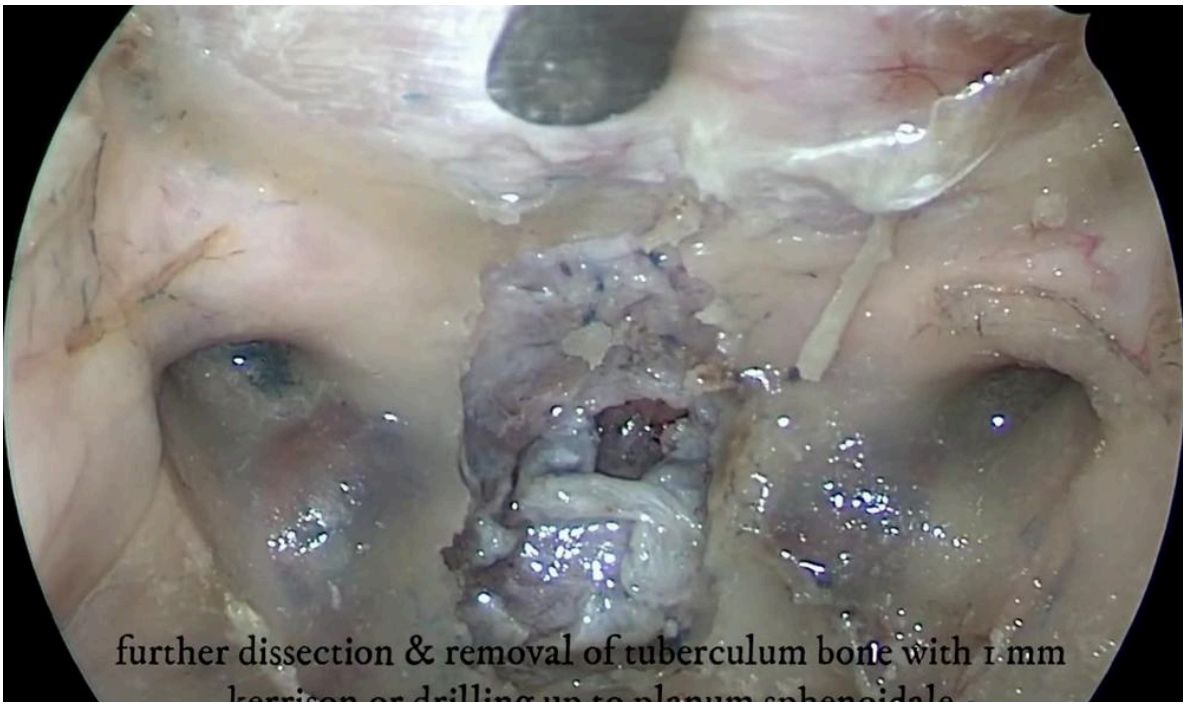
- **Raise the nasoseptal flap first.** Before the septum is removed.
- **Each corridor has its own landmark.** Frontal T, planum, tuberculum, sella and clival recess.

CASE SUMMARY

A cadaveric dissection of the ventral skull base corridors from frontal sinus to clivus.

REFERENCES

1. Hadad G, Bassagasteguy L, Carrau RL, et al. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope* 2006;116:1882–6. doi:10.1097/01.mlg.0000234933.37779.e4
2. Hanna E, DeMonte F, Ibrahim S, et al. Endoscopic resection of sinonasal cancers with and without craniotomy: oncologic results. *Arch Otolaryngol Head Neck Surg* 2009;135:1219–24. doi:10.1001/archoto.2009.173



91

Above the sella

Cadaveric extended endoscopic endonasal transsphenoidal approaches

Transsellar, transtuberculum and transplanum corridors

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A cadaveric dissection of the extended transsphenoidal approaches.

AUTHOR'S PERSPECTIVE

> Extending the opening above the sella, through the tuberculum and planum, opens the suprasellar space for tumours above the diaphragma.

APPROACH

Sellar exposure, removal of tuberculum and planum, dural opening and exploration of prechiasmatic and infrachiasmatic corridors.

OPERATIVE STEPS

1. Remove the sphenoid septae down to the clivus.
2. Expose the sella with the four blues.
3. Open the dura and expose the gland.
4. Extend the dissection superolaterally to the medial optico-carotid recess.
5. Remove the tuberculum and planum.
6. Open the dura over the tuberculum and planum.
7. Explore the infrachiasmatic and prechiasmatic corridors.
8. Hemitranspose the gland to expose the dorsum sellae.

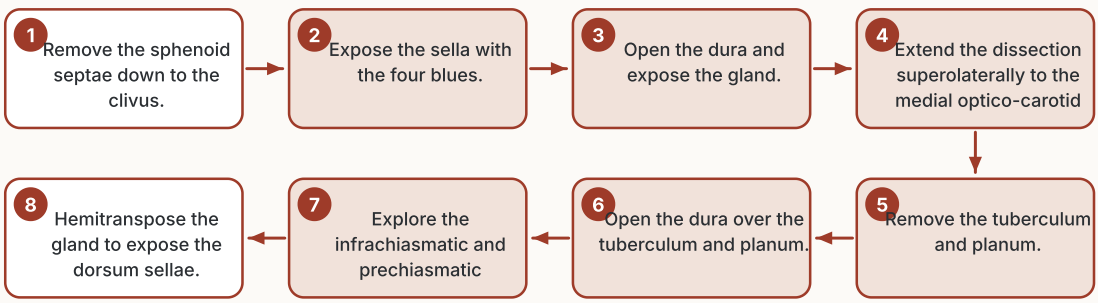
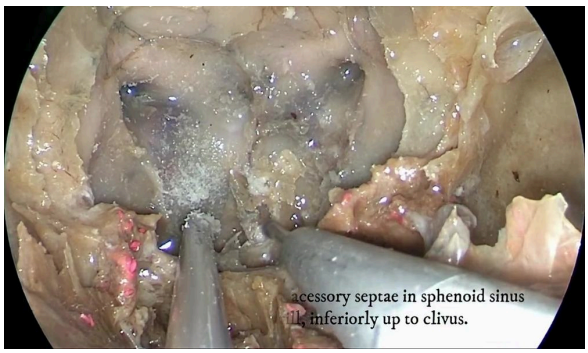
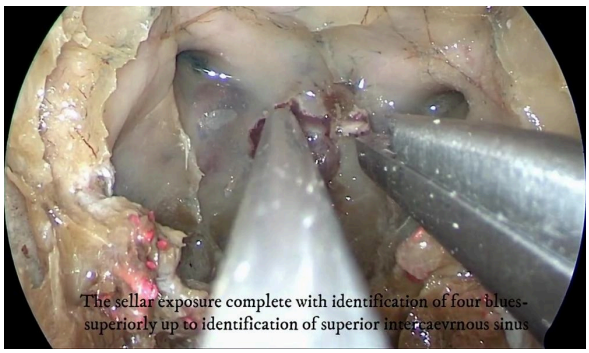


Figure 91.A Operative sequence.

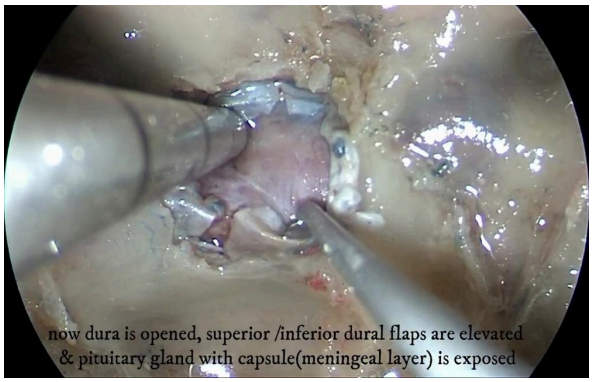
OPERATIVE RECORD



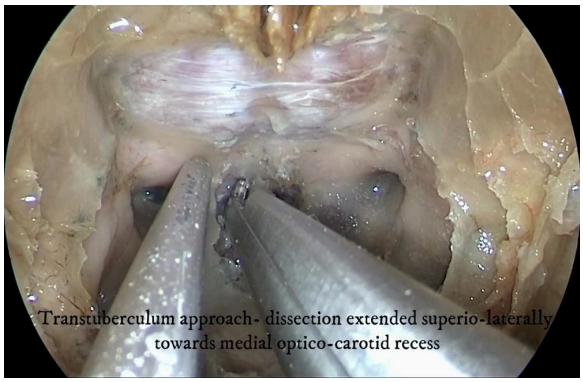
91.1 Sphenoid septae removed down to the clivus. Video 0:47



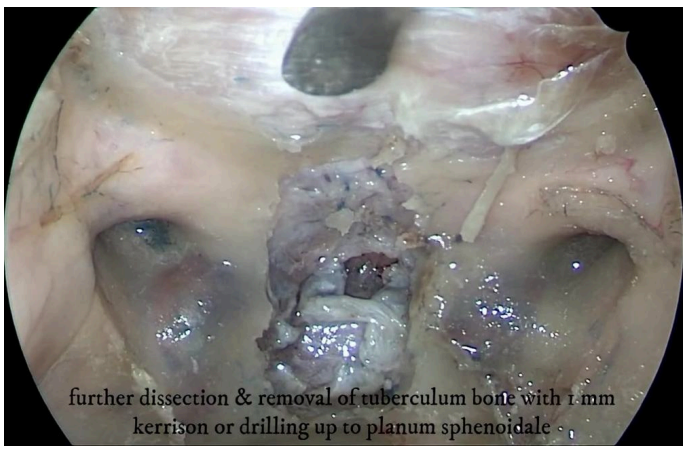
91.2 Sellar exposure complete, with identification of the four blues. Video 1:51



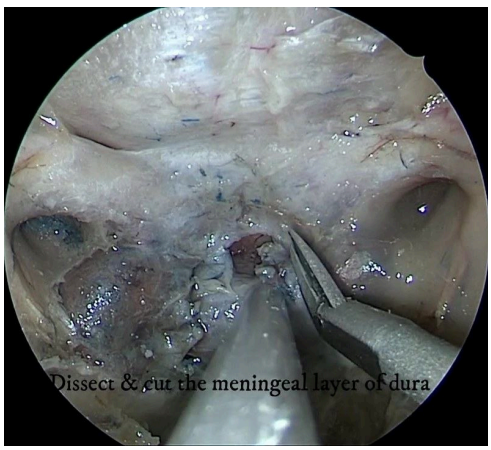
91.3 Dura opened; dural flaps elevated; pituitary gland exposed. Video 2:22



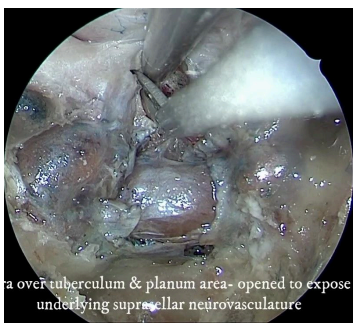
91.4 Transtuberculum approach: dissection extended superolaterally towards the medial opticocarotid recess. Video 4:29



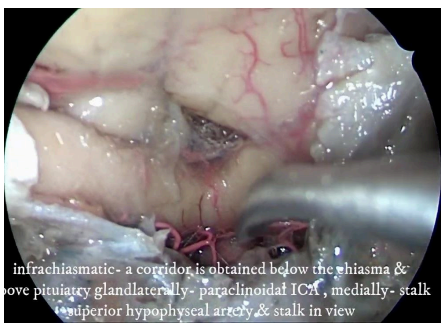
91.5 Removal of tuberculum bone with a 1 mm Kerrison or drill up to the planum sphenoidale. Video 5:33



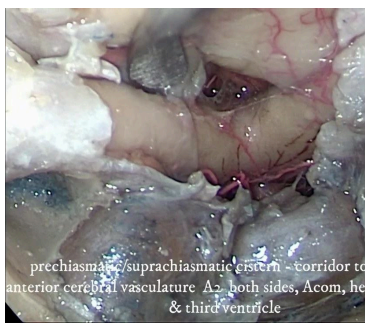
91.6 Dissect and cut the meningeal layer of dura. Video 7:40



91.7 Dura over tuberculum and planum opened to expose the suprasellar neurovasculature. Video 8:12



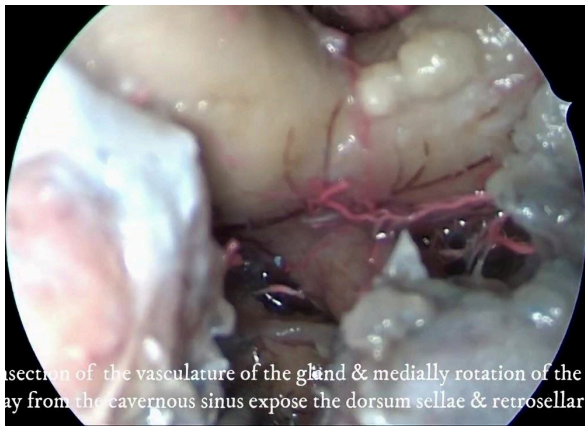
91.8 Infrachiasmatic corridor between chiasma and pituitary; stalk and superior hypophyseal artery in view. Video 9:15



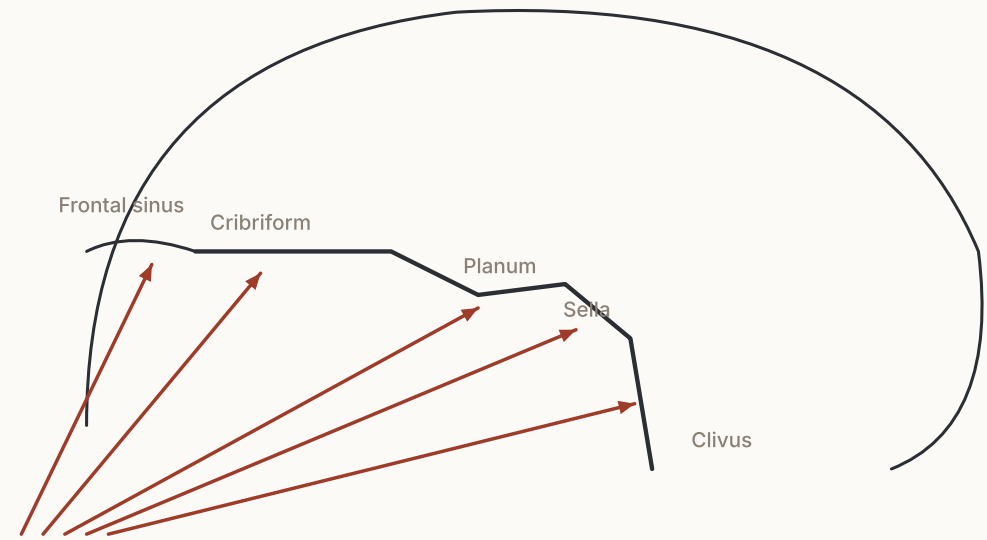
91.9 Prechiasmatic/suprachiasmatic corridor: anterior cerebral vasculature, A-com, Heubner's artery. Video 9:47



91.10 Superior hypophyseal artery branches to chiasma and stalk. Video 10:50



91.11 Hemitransposition of the gland to expose the dorsum sellae. Video 12:25



Transfrontal · transcribriform · transplanum · transsellar · transclival

Figure 91.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Superior hypophyseal arteries	They were identified and preserved.

TEACHING POINTS

- **The medial optico-carotid recess is the key landmark.** It marks the junction of optic canal and carotid.
- **Protect the superior hypophyseal arteries.** They supply the chiasma and stalk.

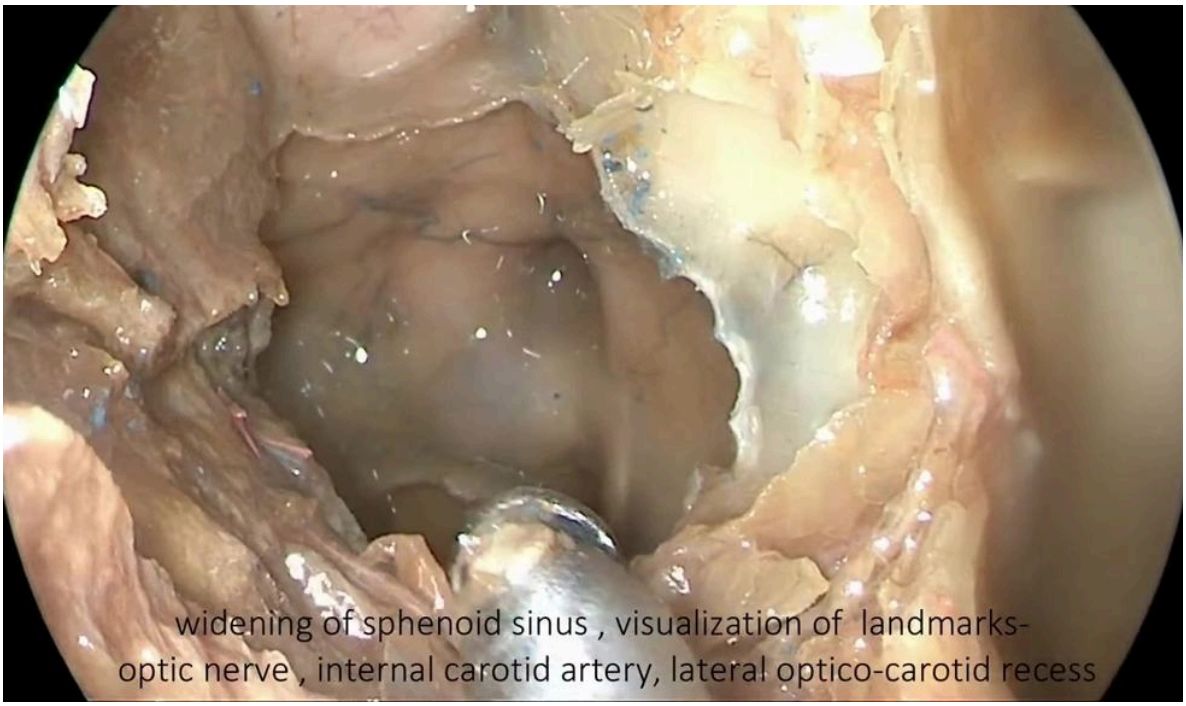
- **Endoscopic transsphenoidal surgery has fewer endocrine complications.** Compared with the microscope.

CASE SUMMARY

A cadaveric dissection of the transsellar, transtuberculum and transplanum approaches.

REFERENCES

1. Chen J, Liu H, Man S, et al. Endoscopic vs. microscopic transsphenoidal surgery for the treatment of pituitary adenoma: a meta-analysis. *Front Surg* 2022;8:806855. doi:10.3389/fsurg.2021.806855
2. Hadad G, Bassagasteguy L, Carrau RL, et al. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. *Laryngoscope* 2006;116:1882–6. doi:10.1097/01.mlg.0000234933.37779.e4



92

Learning on the dead

Cadaveric FESS dissection

Uncinectomy, bulla, posterior ethmoids, sphenoid, frontal recess and skull base

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A structured cadaveric endoscopic sinus dissection.

AUTHOR'S PERSPECTIVE

> A fixed sequence of dissection on the cadaver builds the skills and the anatomical map that keep a surgeon safe in live surgery.

APPROACH

Uncinectomy, agger nasi, bulla, basal lamella, posterior ethmoids, sphenoid, frontal recess and skull base.

OPERATIVE STEPS

1. Identify the uncinate process and hiatus semilunaris.
2. Perform the uncinectomy.
3. Open the agger nasi cell.
4. Remove the ethmoidal bulla.
5. Perforate the basal lamella and clear the posterior ethmoids.
6. Open the sphenoid and identify the optic nerve and carotid.
7. Expose the skull base and frontal recess.

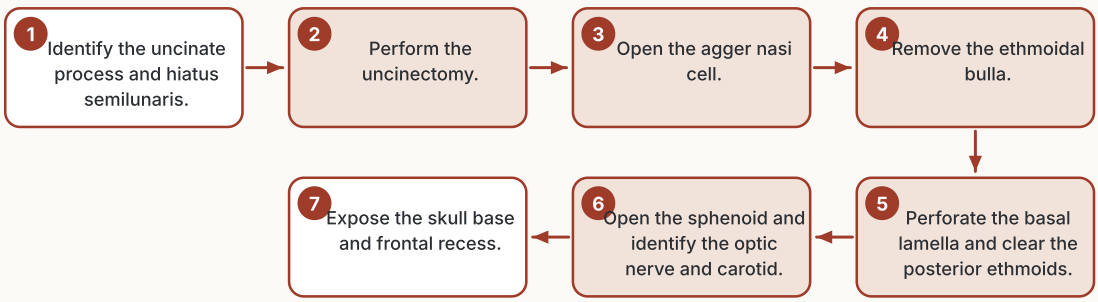
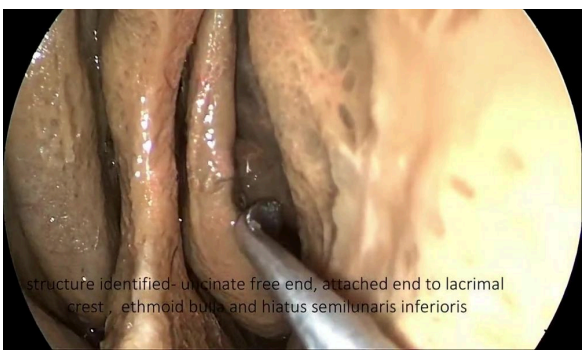
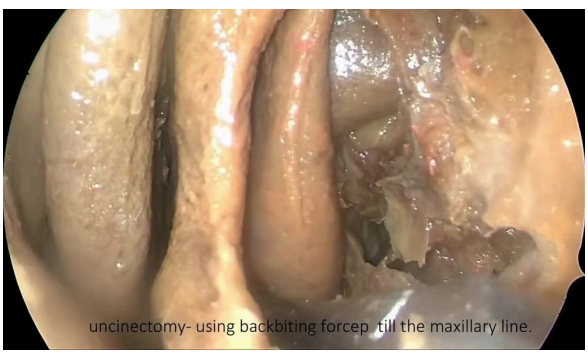


Figure 92.A Operative sequence.

OPERATIVE RECORD



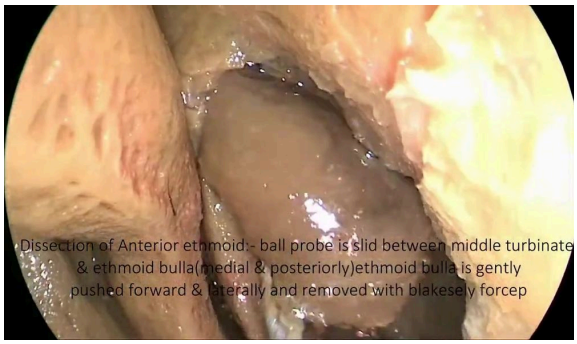
92.1 Uncinate process identified: free end, attached end, hiatus semilunaris. Video 0:20



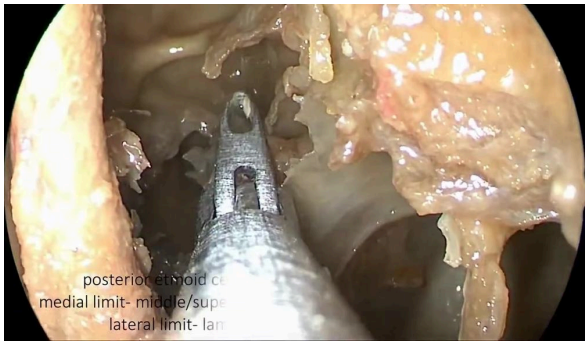
92.2 Uncinectomy with backbiting forceps. Video 1:43



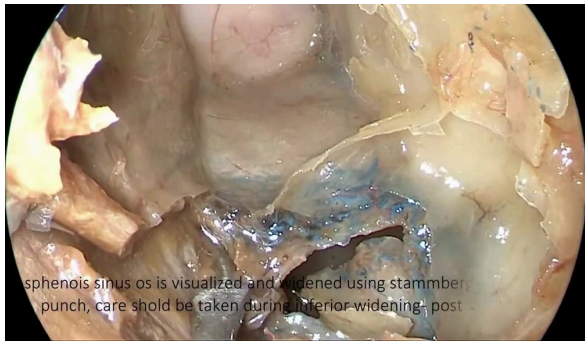
92.3 Agger nasi cell opened and removed with a curette. Video 3:06



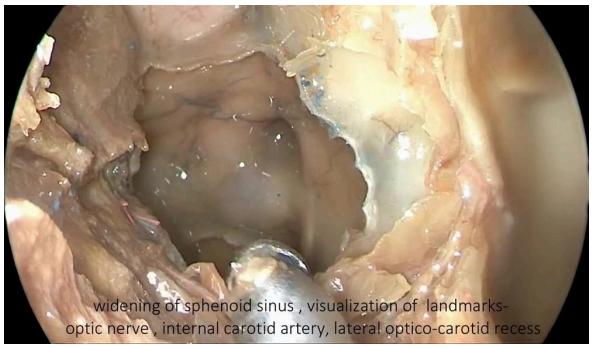
92.4 Ethmoidal bulla removed. Video 3:47



92.5 Basal lamella perforated; posterior ethmoid cells cleared. Video 5:52



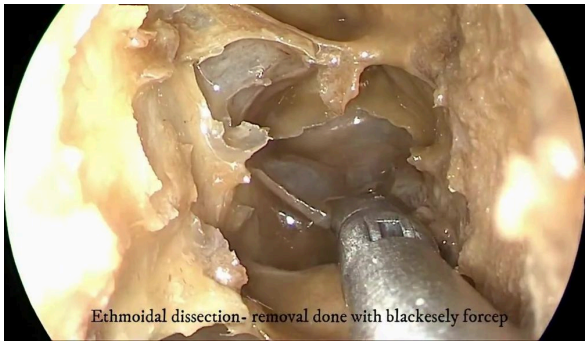
92.6 Sphenoid ostium visualised and widened. Video 7:56



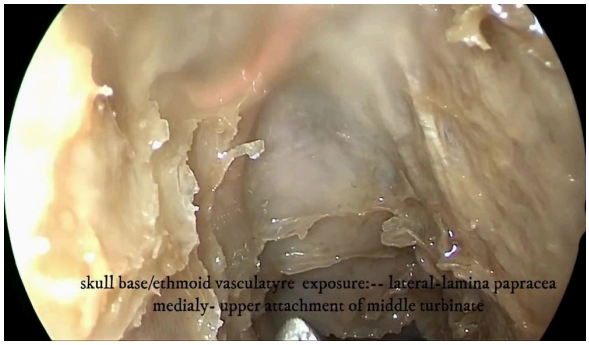
92.7 Sphenoid opened: optic nerve, internal carotid artery, lateral optico-carotid recess. Video 9:19



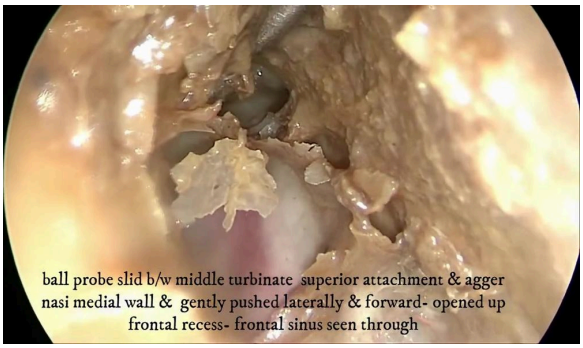
92.8 Uncinectomy, horizontal part, on the opposite side. Video 10:42



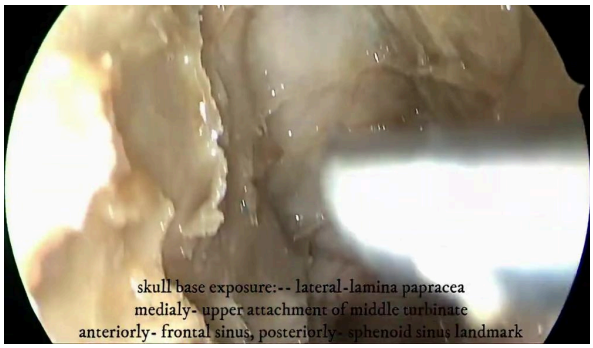
92.9 Ethmoidal dissection with Blakesley forceps. Video 12:46



92.10 Skull base exposure: lamina papyracea laterally, middle turbinate medially. Video 14:50



92.11 Frontal recess opened behind the agger nasi. Video 15:32



92.12 Completed skull base exposure. Video 16:13

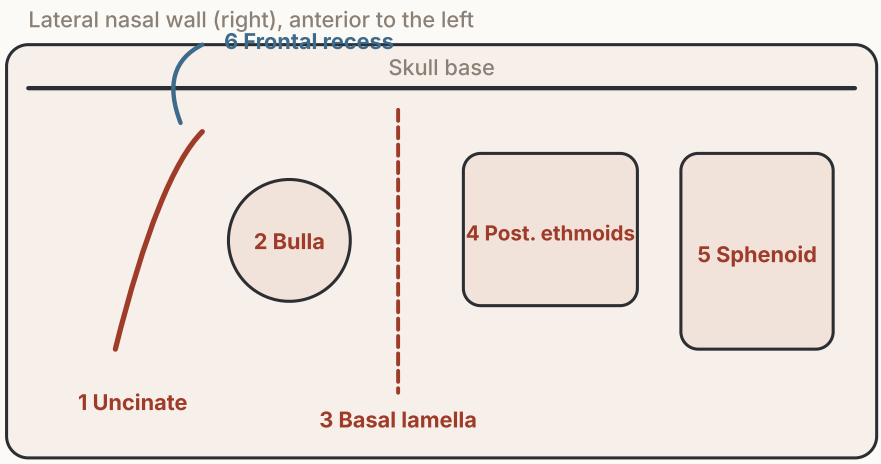


Figure 92.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Orientation in the posterior ethmoids	The skull base was found in the sphenoid and followed forward.

TEACHING POINTS

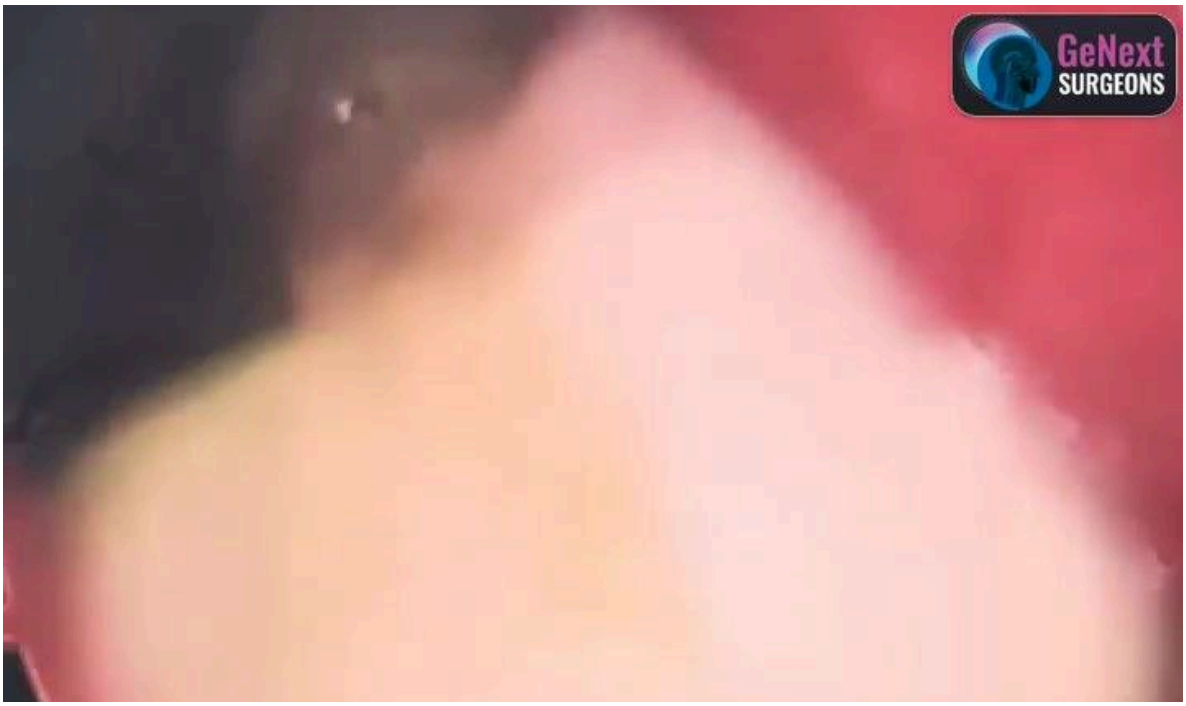
- **The agger nasi is the key to the frontal recess.** Its removal reveals the drainage pathway.
- **Enter the sphenoid medially and inferiorly.** Away from the optic nerve and carotid.
- **Follow the skull base from back to front.** The safest direction of dissection.

CASE SUMMARY

A structured cadaveric FESS dissection from uncinectomy to frontal recess.

REFERENCES

1. Fokkens WJ, Lund VJ, Hopkins C, et al. Executive summary of EPOS 2020 including integrated care pathways. *Rhinology* 2020;58:82–111. doi:10.4193/Rhin20.601



93

The headache that came late

Isolated sphenoid sinusitis due to aspergillus, with delayed post-operative headache

Endoscopic sphenoidotomy and follow-up

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording includes pre-operative MRI and post-operative endoscopic follow-up of an isolated sphenoid aspergillus infection.

AUTHOR'S PERSPECTIVE

> Isolated sphenoid disease presents with nonspecific headache and is often diagnosed late.
> Endoscopic sphenoidotomy with complete removal of fungal material is curative for a fungal ball.

APPROACH

Endoscopic transnasal sphenoidotomy with removal of fungal debris and widening of the ostium.

OPERATIVE STEPS

1. Review the MRI.
2. Approach the sphenoid endoscopically.
3. Remove the fungal debris.
4. Widen the sphenoid opening.
5. Inspect the sphenoid at follow-up.

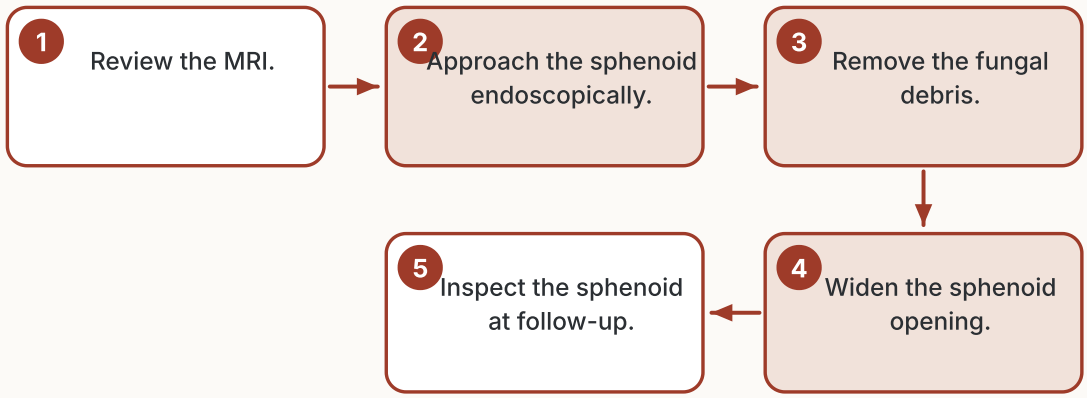
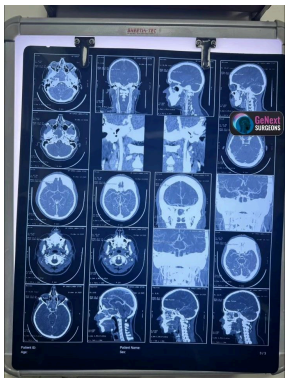
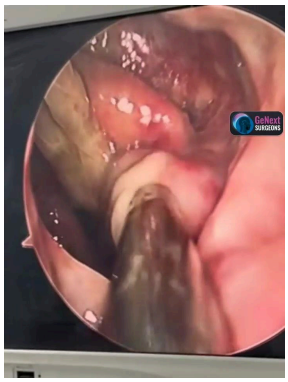


Figure 93.A Operative sequence.

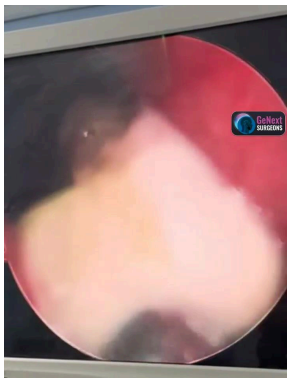
OPERATIVE RECORD



93.1 MRI film series. Video 0:12



93.2 Endoscopic approach to the sphenoid. Video 0:27



93.3 Fungal debris in the sphenoid. Video 0:38



93.4 Sphenoid cavity at follow-up. Video 0:48



93.5 Widely open sphenoid. Video 0:58

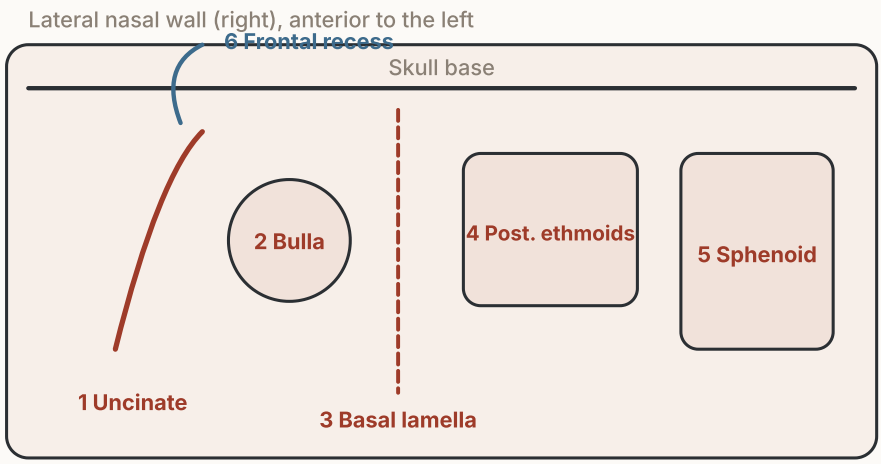


Figure 93.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Delayed headache after surgery	Endoscopic review confirmed an open, healing sphenoid.

TEACHING POINTS

- **Consider the sphenoid in unexplained headache.** Isolated disease is often missed.

- **Remove all fungal debris.** Residual material causes recurrence.
- **Follow up endoscopically.** Confirms an open sphenoid ostium.

CASE SUMMARY

Endoscopic sphenoidotomy for isolated sphenoid aspergillus infection.

REFERENCES

1. Hu L, Wang D, Yu H. Isolated sphenoid fungal sinusitis and vision loss: the case for early intervention. *J Laryngol Otol* 2009;123:e8. doi:10.1017/S0022215109004241



94

A boy who could not breathe

Paediatric sinonasal tumour; histology suggestive of chondromyxoid fibroma

Endoscopic transnasal excision

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

A boy with a sinonasal tumour underwent endoscopic excision. Histology was suggestive of chondromyxoid fibroma.

AUTHOR'S PERSPECTIVE

> In children, endoscopic surgery avoids facial incisions and growth-centre injury. A benign cartilaginous tumour can be removed completely through the nose.

APPROACH

Endoscopic transnasal excision.

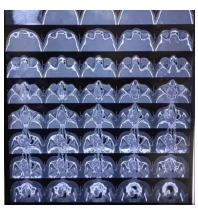
OPERATIVE STEPS

1. Review the CT.
2. Confirm the histology.
3. Expose the tumour endoscopically.
4. Excise the tumour and inspect the cavity.

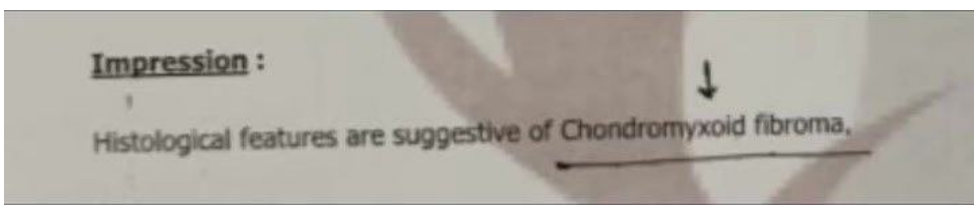


Figure 94.A Operative sequence.

OPERATIVE RECORD



94.1 CT film series. Video 0:07



94.2 "Histological features are suggestive of chondromyxoid fibroma." Video 0:13



94.3 Endoscopic view of the tumour. Video 0:18



94.4 Nasal cavity after excision. Video 0:23

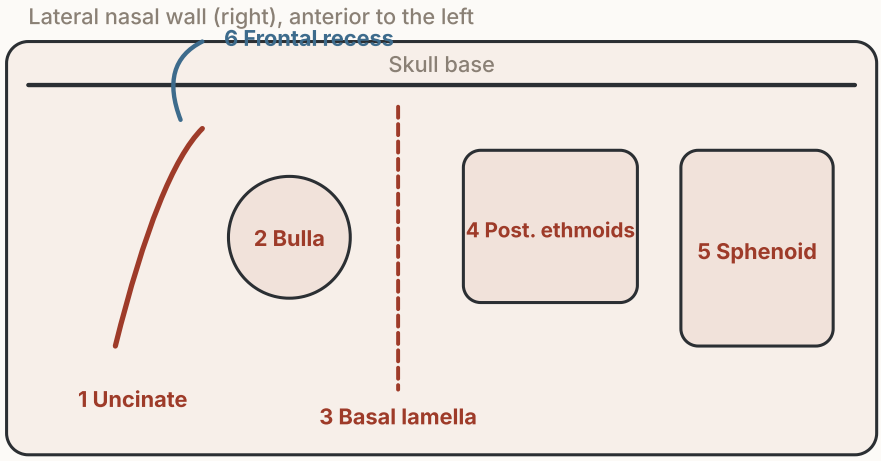


Figure 94.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
A small nasal cavity	Paediatric endoscopes and instruments.

TEACHING POINTS

- **Histology before radical surgery.** Benign and malignant sinonasal tumours look alike on imaging.
- **Avoid facial growth centres.** Endoscopic surgery spares growing facial skeleton in children.
- **Endoscopic follow-up for recurrence.** Combined with imaging where needed.

CASE SUMMARY

Endoscopic excision of a paediatric sinonasal chondromyxoid fibroma.

REFERENCES

1. Hanna E, DeMonte F, Ibrahim S, et al. Endoscopic resection of sinonasal cancers with and without craniotomy: oncologic results. *Arch Otolaryngol Head Neck Surg* 2009;135:1219–24. doi:10.1001/archoto.2009.173



95

Bone that kept growing

Fibrous dysplasia of the ventral skull base

Endoscopic skull base surgery with six-month follow-up

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

The recording shows CT of a fibro-osseous lesion and the endoscopic appearance at six months.

AUTHOR'S PERSPECTIVE

> Fibrous dysplasia is treated surgically for symptoms. Endoscopic drilling with navigation can debulk the lesion through the nose while protecting the optic canal.

APPROACH

Endoscopic drilling of the dysplastic bone.

OPERATIVE STEPS

1. Review CT for extent.
2. Drill the dysplastic bone endoscopically.
3. Inspect the cavity at six months.

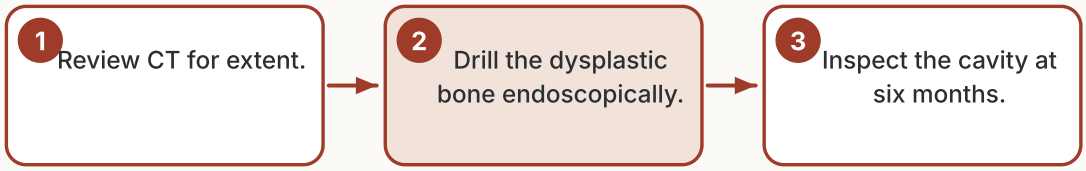
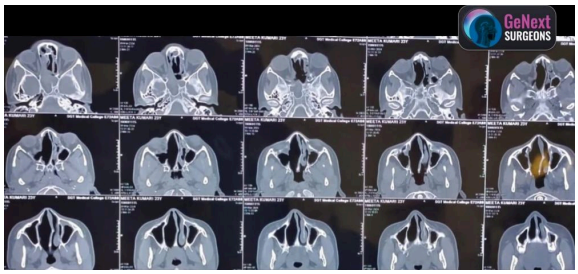


Figure 95.A Operative sequence.

OPERATIVE RECORD



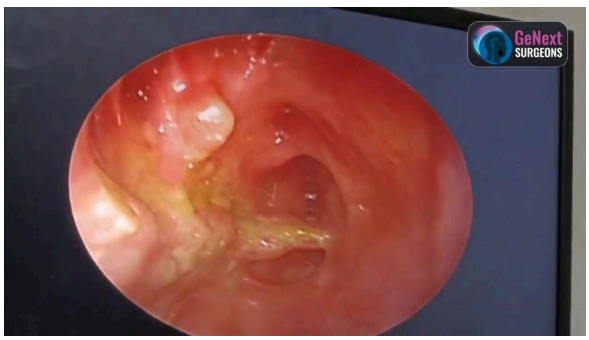
95.1 CT: the fibro-osseous lesion. Video 0:35



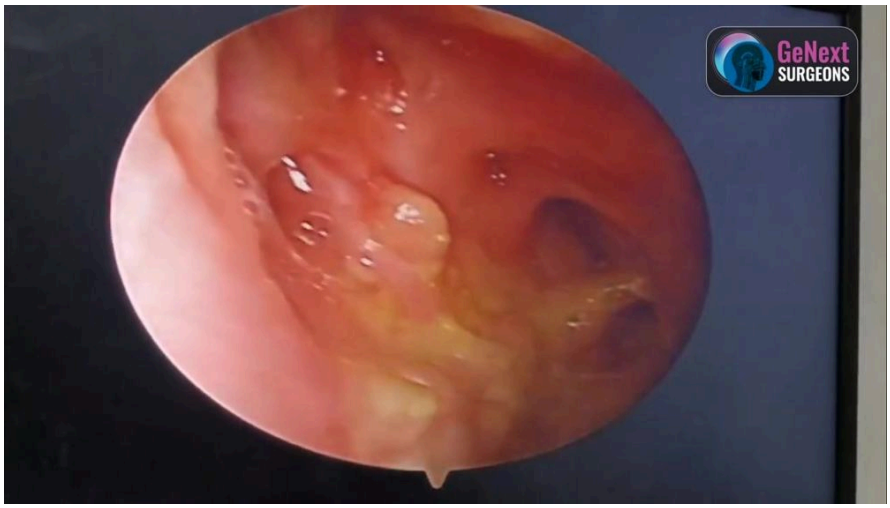
95.2 Coronal CT. Video 0:41



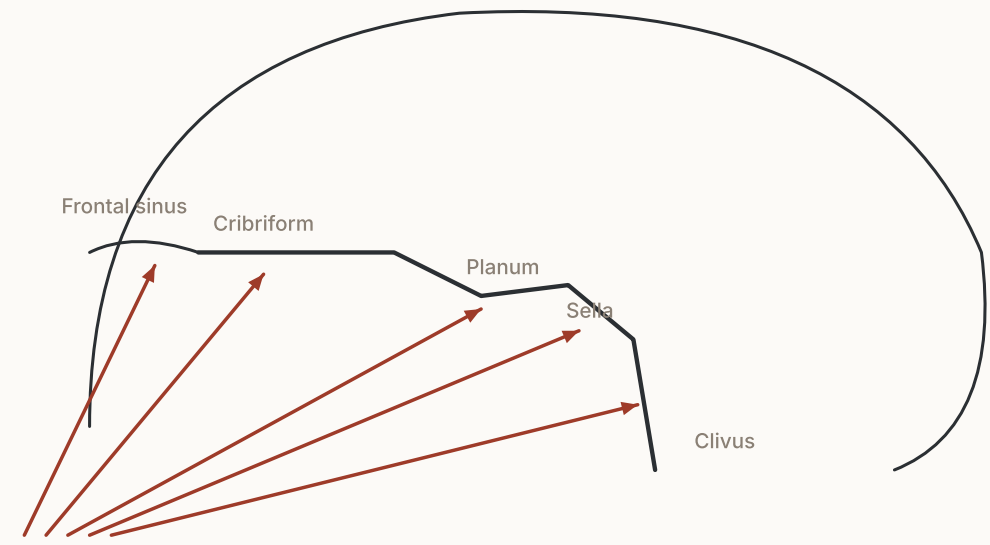
95.3 “6 months follow-up.” Video 0:13



95.4 Endoscopic view at follow-up. Video 0:19



95.5 The drilled cavity healed. Video 0:24



Transfrontal · transcribriform · transplanum · transsellar · transclival

Figure 95.B Endonasal corridors along the ventral skull base (sagittal plane).

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Proximity to the optic canal	Navigation guided drilling.

TEACHING POINTS

- **Operate for symptoms.** Fibrous dysplasia is treated for obstruction, visual threat or deformity.

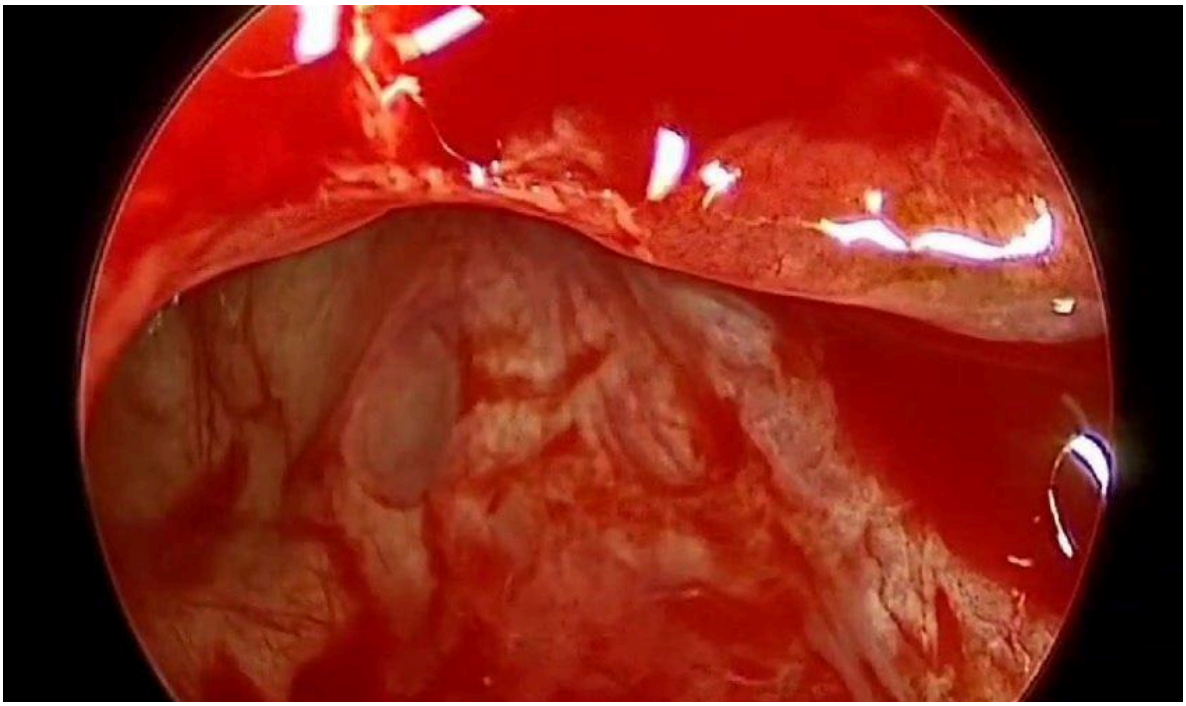
- **Navigation near the optic canal.** Drilling is guided precisely in dysplastic bone.
- **Long-term follow-up.** The lesion may grow until skeletal maturity.

CASE SUMMARY

Endoscopic debulking of ventral skull base fibrous dysplasia, healed at six months.

REFERENCES

1. Youda M, Tosaka M, Asano H, et al. Impact of endoscopy and related technologies on indications for transsphenoidal pituitary surgery in McCune-Albright syndrome: illustrative case. *J Neurosurg Case Lessons* 2026;12(7). doi:10.3171/CASE26521



96

The axillary flap

Frontal sinus disease

Endoscopic frontal sinus surgery with axillary flap

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the axillary flap raised over the agger nasi, the opened frontal recess cells and the frontal sinus marked "F".

AUTHOR'S PERSPECTIVE

> The axillary flap preserves mucosa at the front of the frontal recess and exposes the agger nasi and frontal cells, so that the drainage pathway can be cleared and re-lined.

APPROACH

Axillary flap at the attachment of the middle turbinate, removal of the agger nasi and frontal cells, and replacement of the flap.

OPERATIVE STEPS

1. Raise the axillary flap.
2. Open the frontal recess cells.
3. Remove the cell partitions.
4. Display the frontal sinus.

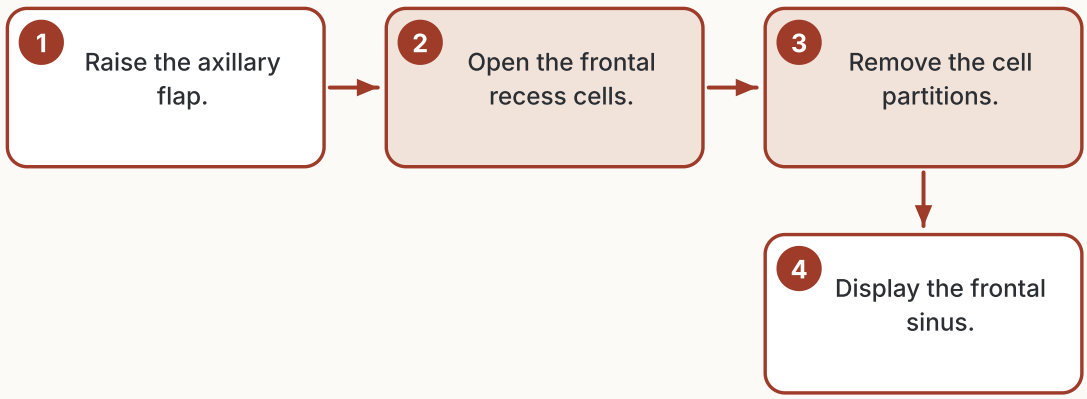
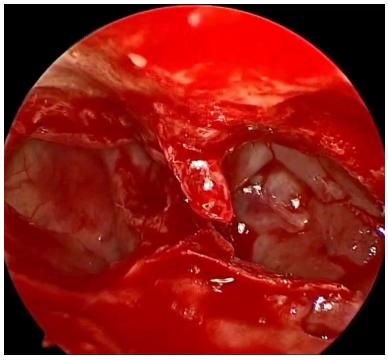
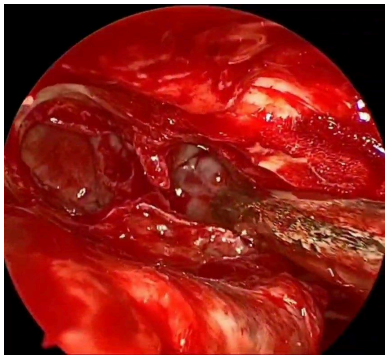


Figure 96.A Operative sequence.

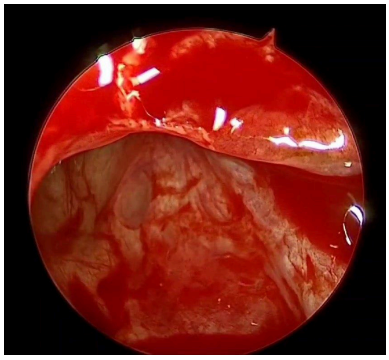
OPERATIVE RECORD



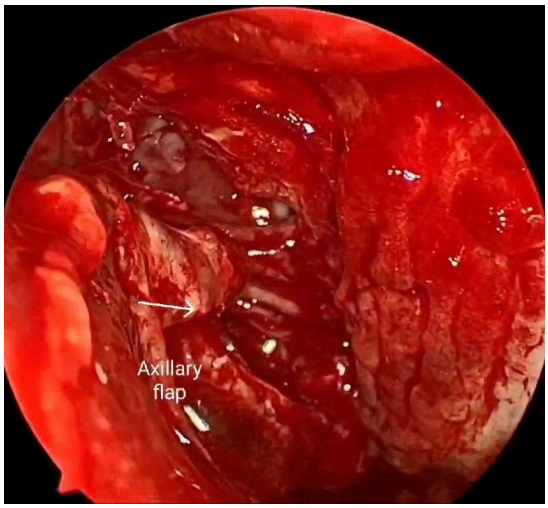
96.1 Opened frontal recess cells after axillary flap, bony partitions and mucosa clearly seen.



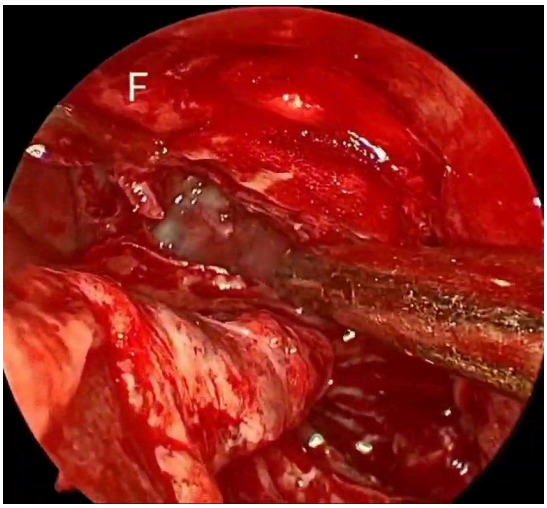
96.2 Instrument at frontal recess cell partition during dissection.



96.3 Endoscopic view of pale membranous tissue/mucosa with vessels after dissection.



96.4 Endoscopic frontal recess: axillary flap raised, agger nasi/frontal cells exposed.



96.5 Frontal recess with mucosal flap reflected and drill/instrument; 'F' label marks frontal region.

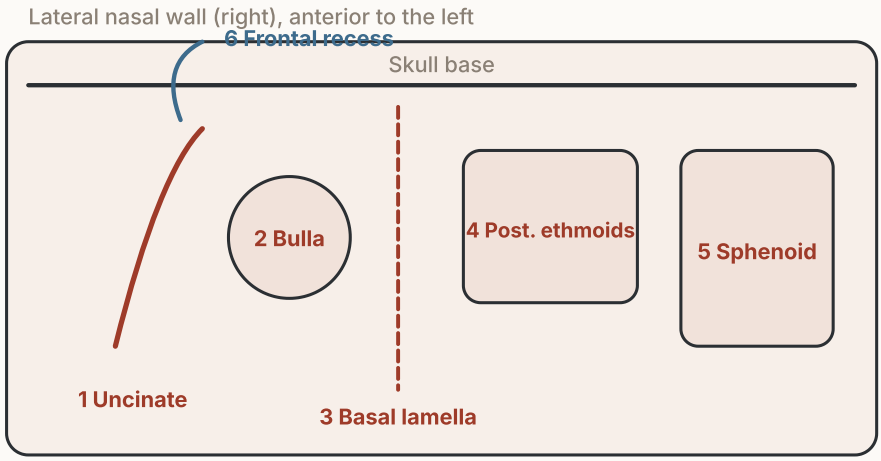


Figure 96.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Restenosis of the frontal recess	Mucosa was preserved with the axillary flap.

TEACHING POINTS

- **The axillary flap preserves mucosa.** Mucosal preservation reduces scarring of the frontal recess.

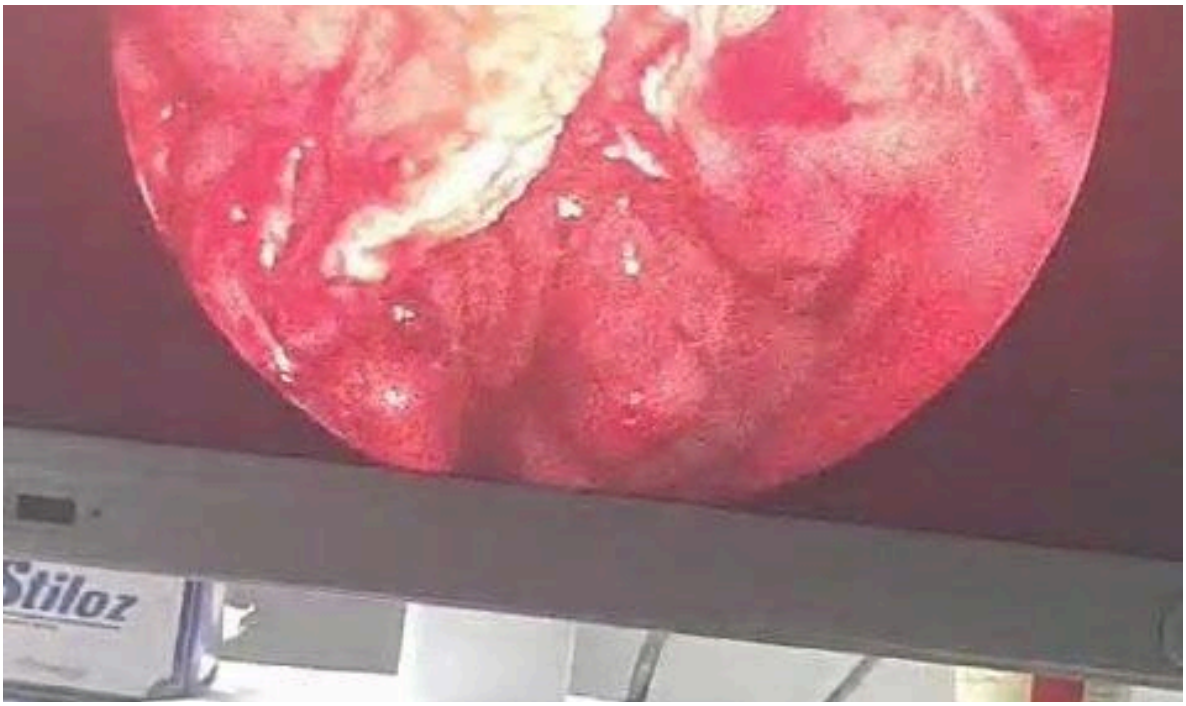
- **Remove the agger nasi.** It is the anterior wall of the frontal recess.
- **Do not strip mucosa in the recess.** Denuded bone osteitis leads to stenosis.

CASE SUMMARY

Endoscopic frontal sinus surgery with an axillary flap.

REFERENCES

1. Fokkens WJ, Lund VJ, Hopkins C, et al. Executive summary of EPOS 2020 including integrated care pathways. *Rhinology* 2020;58:82–111. doi:10.4193/Rhin20.601
2. Abuzeid WM, Vakil M, Lin J, et al. Endoscopic modified Lothrop procedure after failure of primary endoscopic sinus surgery: a meta-analysis. *Int Forum Allergy Rhinol* 2018;8:605–13. doi:10.1002/alr.22055



97

The fungal ball

Sinus fungal ball

Endoscopic removal

PART VIII · NOSE, SINUSES AND THE ENDONASAL LABORATORY

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the pale fungal material being separated and removed from the sinus.

AUTHOR'S PERSPECTIVE

> A fungal ball is a non-invasive collection of fungal material. Complete endoscopic removal and a wide ostium are curative.

APPROACH

Endoscopic antrostomy or sinusotomy with removal of fungal debris.

OPERATIVE STEPS

1. Expose the sinus endoscopically.
2. Separate the fungal material with suction.
3. Remove all debris; place haemostatic packing.

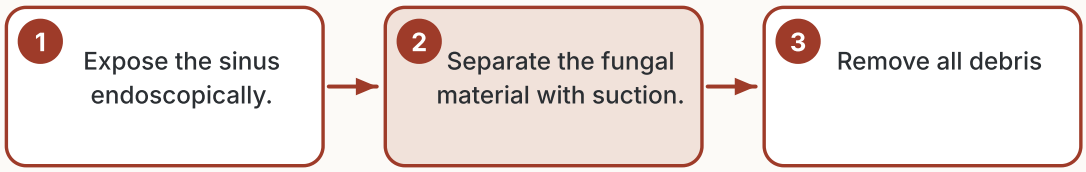


Figure 97.A Operative sequence.

OPERATIVE RECORD



97.1 Endoscopic dissection of pale yellow-white lesion in sinus cavity with instrument; nature unclear.



97.2 Endoscopic view of pale lesion/fungal-ball-like material being separated with suction from surrounding mucosa.



97.3 Endoscopic nasal cavity with absorbable haemostatic sponge (gelatin-type) placed against mucosa.

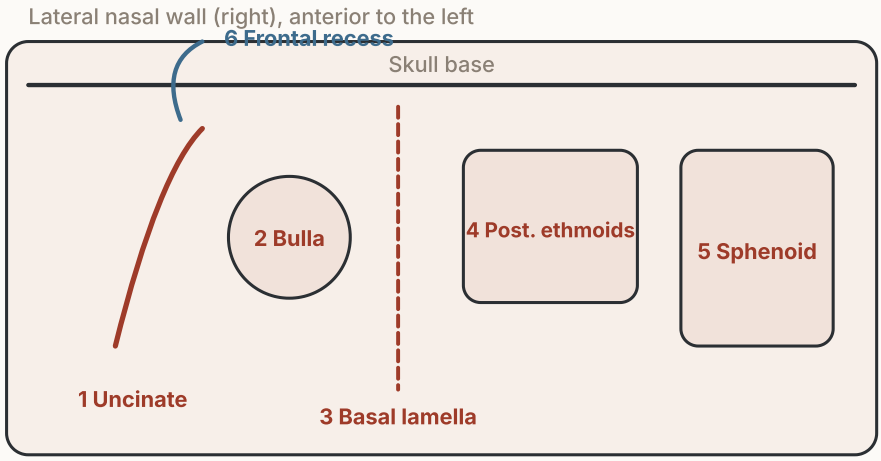


Figure 97.B Endoscopic sinus surgery: order of dissection.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Residual debris in recesses	Angled endoscopes and curved suction.

TEACHING POINTS

- **Non-invasive.** A fungal ball does not need antifungal therapy after complete removal.
- **Remove all debris.** Irrigation and curved suction clear the recesses.
- **Wide ostium for follow-up.** Allows endoscopic surveillance and irrigation.

CASE SUMMARY

Endoscopic removal of a sinus fungal ball.

REFERENCES

1. Hu L, Wang D, Yu H. Isolated sphenoid fungal sinusitis and vision loss: the case for early intervention. *J Laryngol Otol* 2009;123:e8. doi:10.1017/S0022215109004241
2. Fokkens WJ, Lund VJ, Hopkins C, et al. Executive summary of EPOS 2020 including integrated care pathways. *Rhinology* 2020;58:82–111. doi:10.4193/Rhin20.601

PART IX

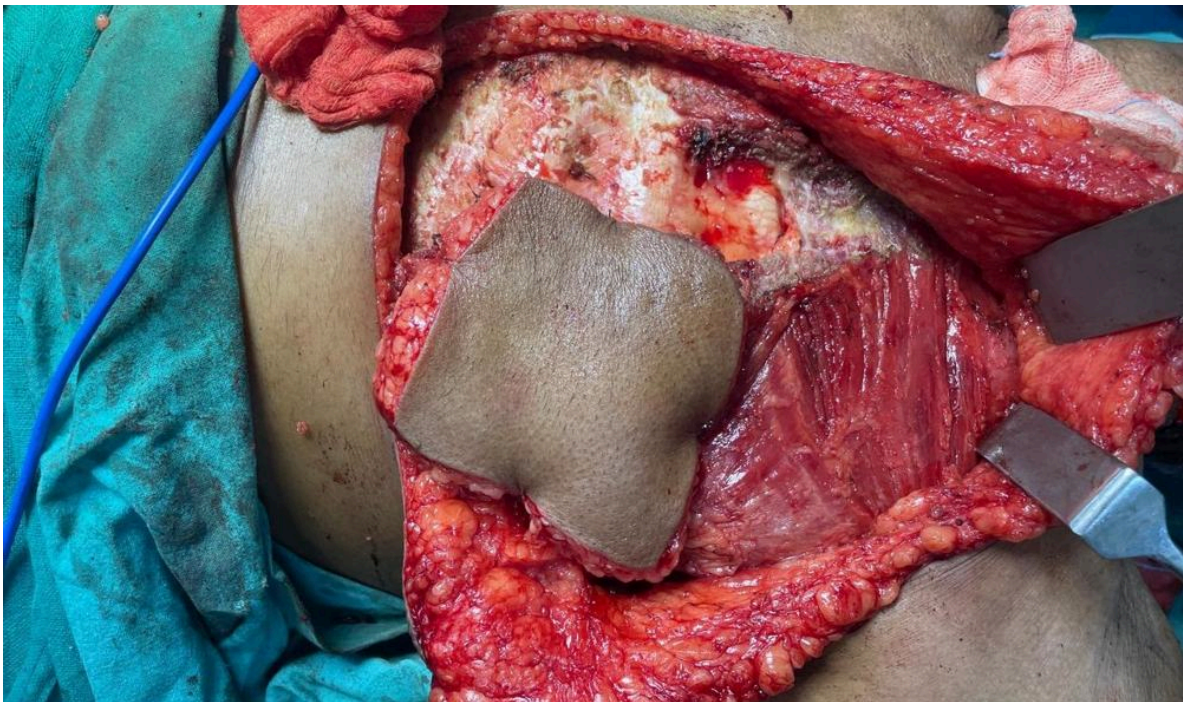
Reconstruction

The pedicled flaps on which much of this book depends.

98 Raising the pectoralis

99 A neopharynx from the shoulder

100 Behind the ear and down the neck



98

Raising the pectoralis

Defect requiring pedicled flap reconstruction

Pectoralis major myocutaneous flap harvest

PART IX · RECONSTRUCTION

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows the skin paddle incised, the flap elevated off the chest wall and the pedicle raised toward the clavicle and rotated to the neck.

AUTHOR'S PERSPECTIVE

> The pectoralis major myocutaneous flap remains the most widely used pedicled flap in head and neck surgery, reliable for large defects when free flaps are not possible.

APPROACH

Skin paddle over the muscle, elevation in the plane beneath pectoralis major on the thoracoacromial pedicle, and tunnelling over the clavicle.

OPERATIVE STEPS

1. Incise the skin paddle on the chest.
2. Elevate the flap off the chest wall.
3. Raise the pedicle towards the clavicle.
4. Inspect the donor site.
5. Rotate the flap towards the neck.

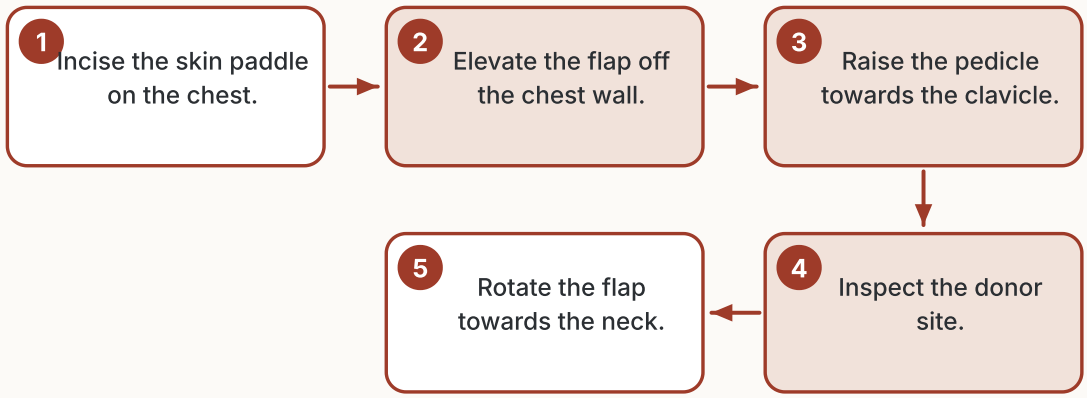


Figure 98.A Operative sequence.

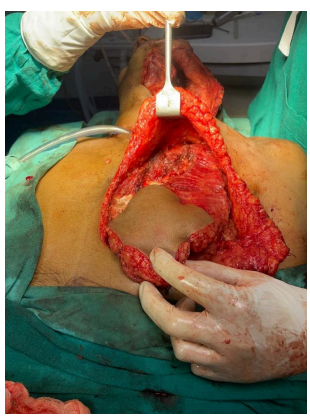
OPERATIVE RECORD



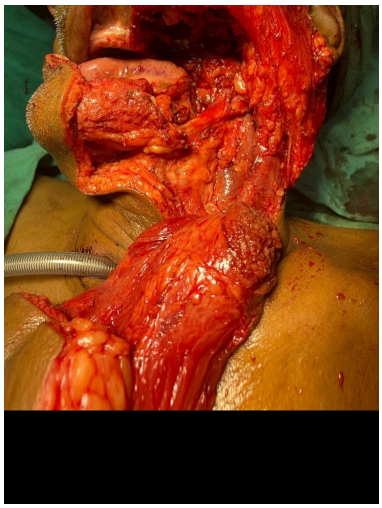
98.1 Pectoralis major myocutaneous flap elevated off chest wall.



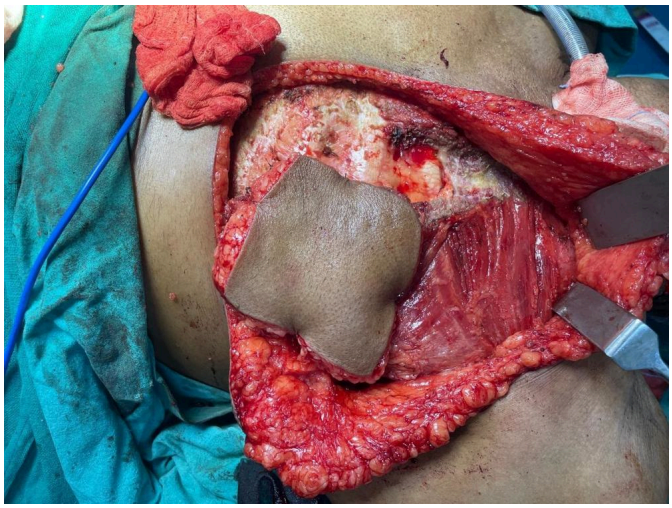
98.2 PMMC skin paddle incised on chest.



98.3 PMMC flap pedicle raised toward clavicle.



98.4 Muscle flap pedicle rotated toward neck.



98.5 Chest wall flap donor site with skin paddle and muscle.

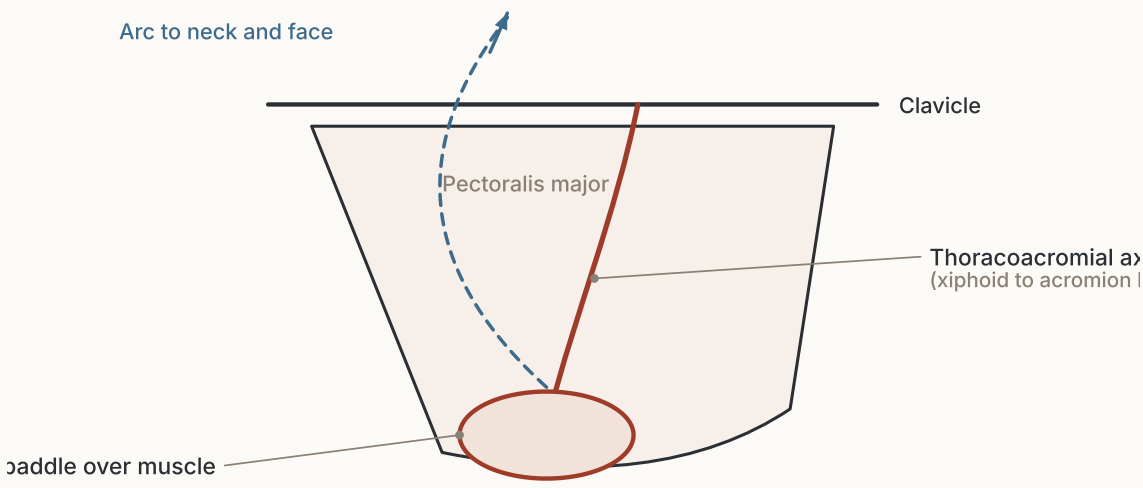


Figure 98.B Pectoralis major myocutaneous flap: design and arc of rotation.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Paddle viability	The paddle was placed over the muscle.
Pedicle length	The pedicle was dissected to the clavicle.

TEACHING POINTS

- **The thoracoacromial artery runs on the undersurface.** It is protected by keeping the muscle attached to the paddle.
- **Paddle over the muscle.** Skin beyond the muscle edge is poorly perfused.
- **Close the donor site primarily.** Undermining allows closure of most paddles.

CASE SUMMARY

Harvest of a pectoralis major myocutaneous flap.

REFERENCES

1. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



99

A neopharynx from the shoulder

Pharyngeal defect

Supraclavicular artery island flap neopharynx

PART IX · RECONSTRUCTION

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows a neopharynx made from a supraclavicular flap tubed around a pharyngeal tube.

AUTHOR'S PERSPECTIVE

> The supraclavicular artery island flap is thin and pliable, harvested near the neck, and can be tubed for the pharynx.

APPROACH

Flap raised on the supraclavicular artery, tubed around a pharyngeal tube and inset.

OPERATIVE STEPS

1. Raise the supraclavicular flap.

2. Tube it around the pharyngeal tube.

3. Inset as the neopharynx.

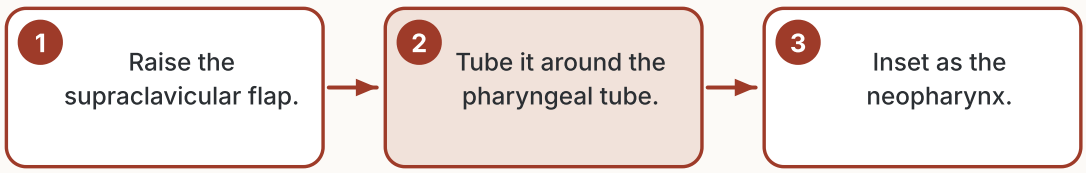


Figure 99.A Operative sequence.

OPERATIVE RECORD



99.1 Neopharynx made of supraclavicular flap around pharyngeal tube.

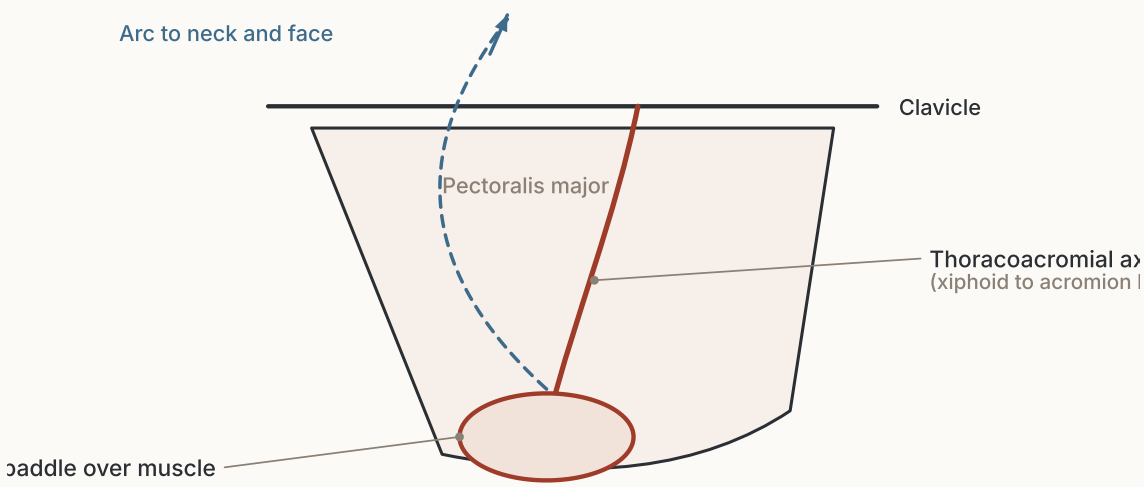


Figure 99.B Pectoralis major myocutaneous flap: design and arc of rotation.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Pedicle in a dissected neck	The pedicle was preserved.

TEACHING POINTS

- **Map the pedicle in the supraclavicular triangle.** The artery arises from the transverse cervical artery.
- **Thin and pliable.** Suitable for tubing around a stent.
- **Low complication rate.** But caution in a previously dissected lower neck.

CASE SUMMARY

Supraclavicular artery island flap neopharynx.

REFERENCES

1. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z



100

Behind the ear and down the neck

Malignancy of the parotid and periauricular region

Postauricular–transcervical approach with PMMC reconstruction

PART IX · RECONSTRUCTION

Patient consent taken · eyes and identifying details masked

CLINICAL PRESENTATION

This record shows positioning with the postauricular–transcervical incision marked, the sutured cheek and preauricular flap, and the pectoralis major flap inset in the neck.

AUTHOR'S PERSPECTIVE

> A postauricular–transcervical incision gives access to the parotid, mastoid and upper neck in continuity. The defect after radical resection is covered with a pectoralis major flap.

APPROACH

Postauricular–transcervical incision, resection, neck dissection and PMMC inset.

OPERATIVE STEPS

1. Position and mark the incision.
2. Perform the resection and neck dissection.
3. Close the cheek and preauricular flap with a drain.
4. Inset the pectoralis major flap.

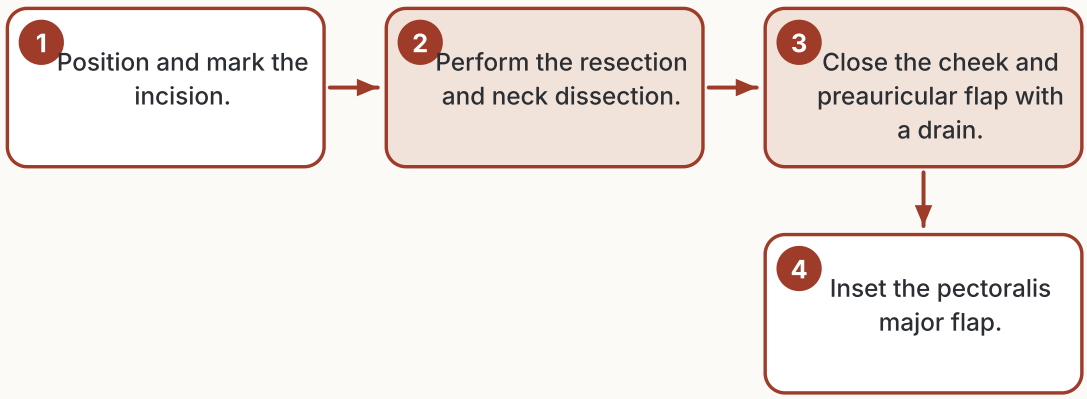


Figure 100.A Operative sequence.

OPERATIVE RECORD



100.1 Positioning and marked postauricular-transcervical incision, surgeon holding pinna.



100.2 Patient on table with postauricular-cervical incision marked, intubated.



100.3 Post-op sutured cheek/preauricular flap with drain.



100.4 Post-op: PMMC flap inset in neck with sutured chest donor site, tracheostomy.

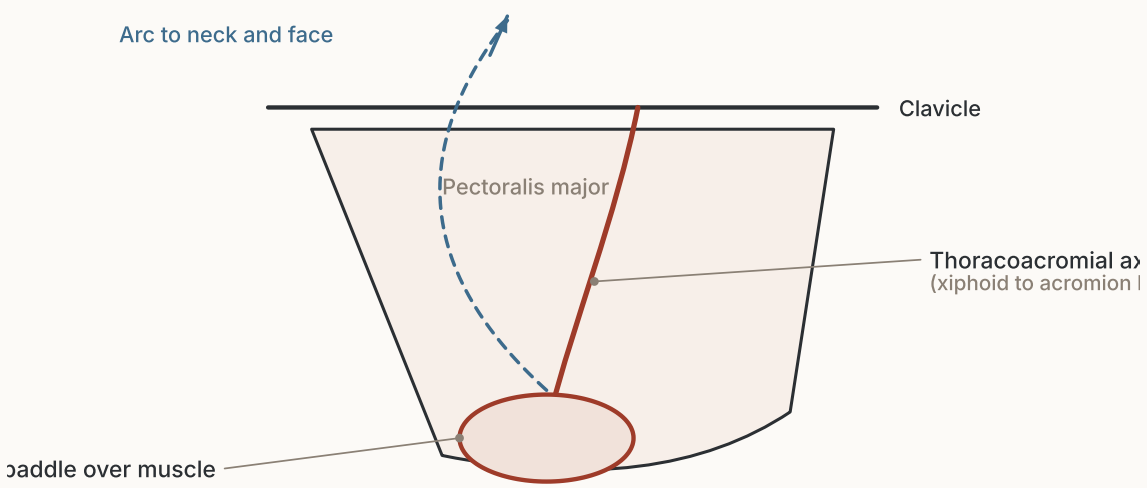


Figure 100.B Pectoralis major myocutaneous flap: design and arc of rotation.

CHALLENGES AND HOW THEY WERE ADDRESSED

Challenge	How it was addressed
Exposure	The incision combined access to ear, parotid and neck.
Coverage	The pectoralis major flap covered the defect.

TEACHING POINTS

- **Combine approaches through one incision.** The postauricular and cervical limbs give access to ear, parotid and neck.
- **Cover the great vessels.** Vascularised tissue protects the carotid after radical dissection.
- **Protect the airway.** A tracheostomy secures it when swelling or flap bulk is expected.

CASE SUMMARY

Postauricular–transcervical approach with pectoralis major reconstruction.

REFERENCES

1. Ariyan S. Further experiences with the pectoralis major myocutaneous flap for the immediate repair of defects from excisions of head and neck cancers. *Plast Reconstr Surg* 1979;64:605–12.
2. Accorona R, Cremasco A, Dallari V, et al. Head and neck reconstruction with distant axial and pedicled flaps: summarizing the options. Systematic review of the literature. *J Maxillofac Oral Surg* 2025;25:1549–66. doi:10.1007/s12663-025-02774-z