Parotid Surgery: Office to the OR



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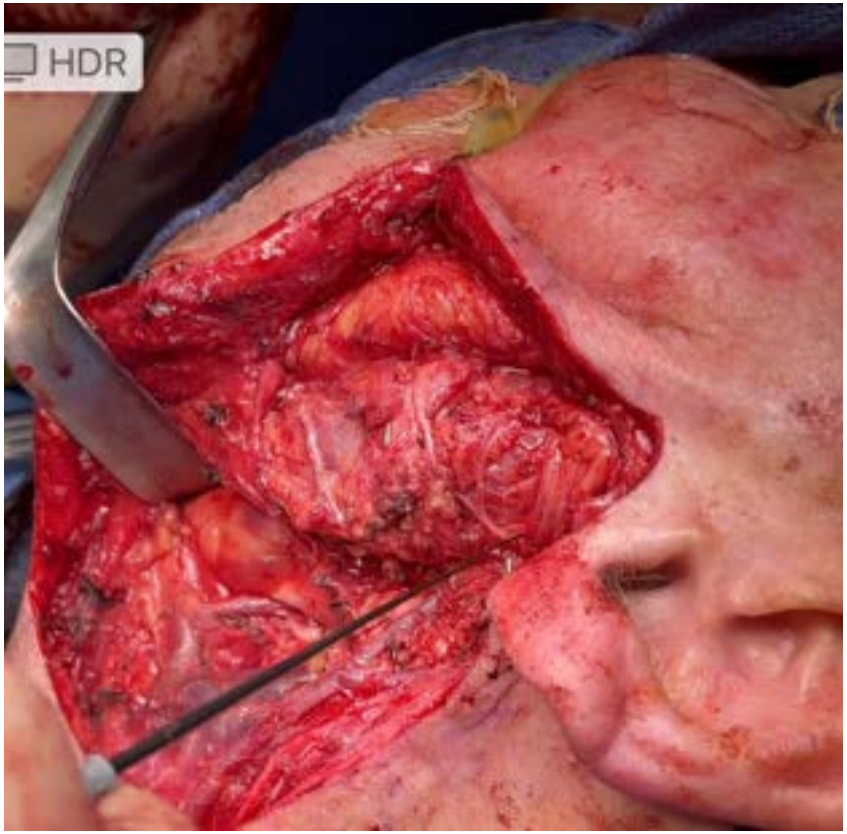
Disclosures

- None financial
- I love parotid surgery

Some Thoughts on Parotid Surgery

- Special place in OTO-HNS
- Facial nerve “intimidation”
- Advances over the years
- My personal approach is evolving



Teenager with a left parotid mass

Normal Facial Nerve

No Pain

Palpable fullness

CT neck

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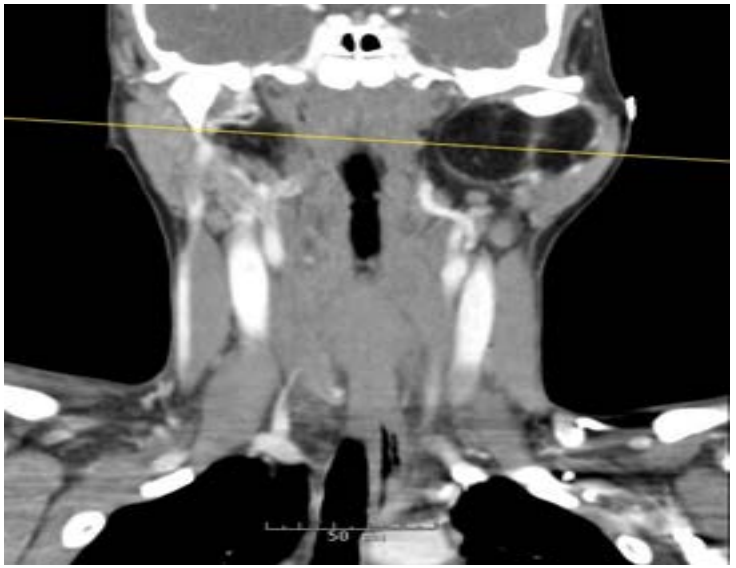
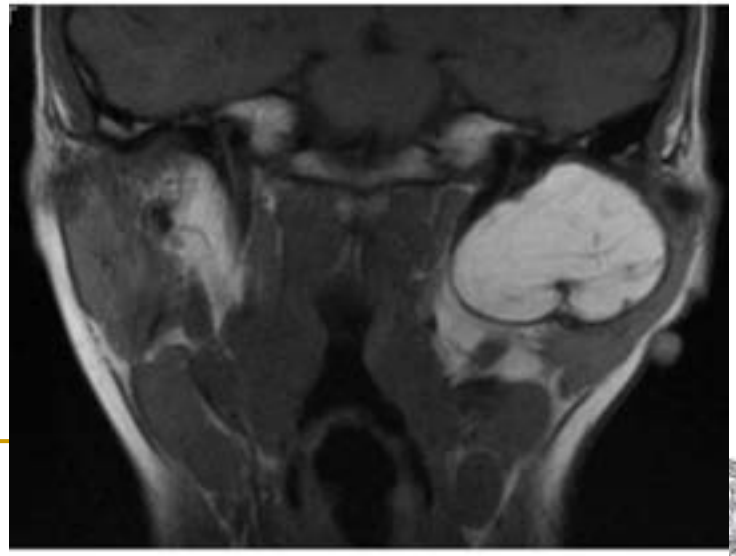
13 y/o with a left parotid mass





13 y/o with a left Deep Lobe Parotid Lipoma

- Plan For Surgery
- Goal
- Patient / Family Counseling
  - Facial Nerve
  - Pathology
  - Cosmetic
  - Wedding in 2 months

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Lipoblastoma Excised and All Parotid Tissue Preserved

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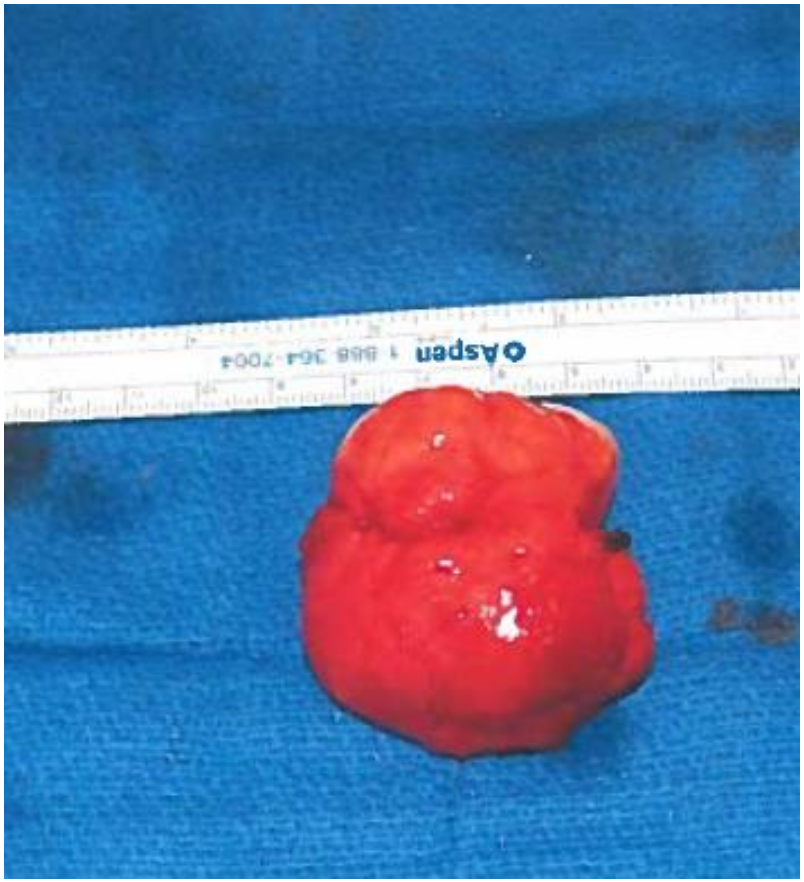
Superficial Lobe Preserved



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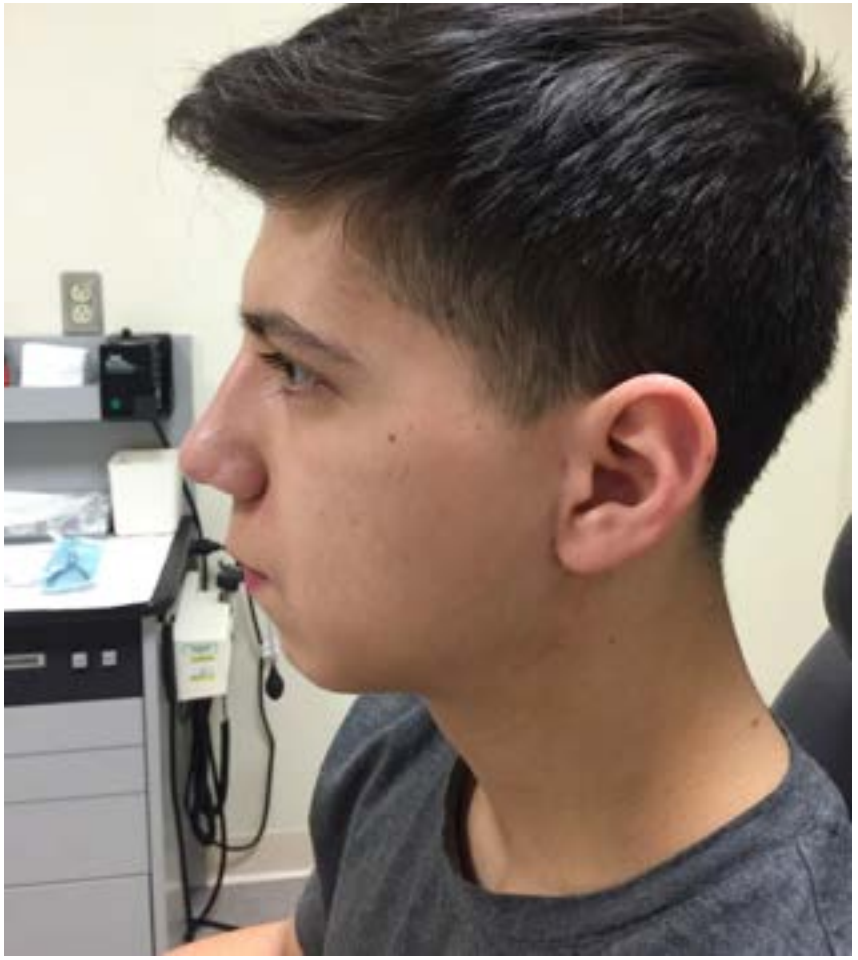
Jandali D, Heilingoetter A,Al-Khudari S. Large Parotid Gland Lipoblastoma in a Teenager. Front Pediatr. 2018 Mar 9;6:50.

8 years Later



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What I learned from this case

I don’t have to take all the benign parotid tissue

Saving the parotid fascia is helpful for contour

Strive for normal facial nerve function immediately after deep surgery

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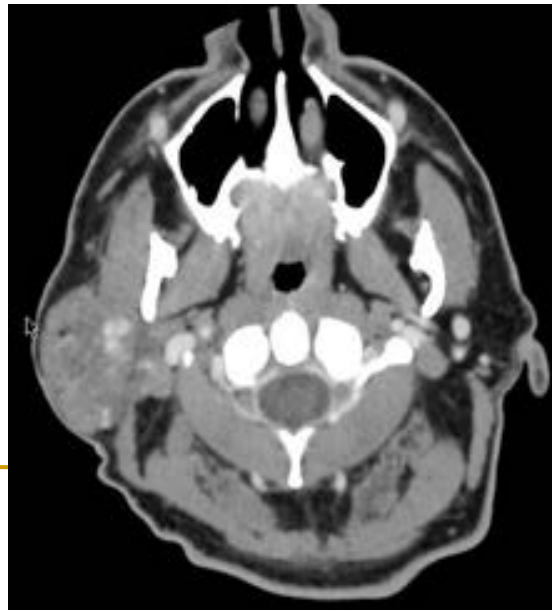
Parotid Lesions

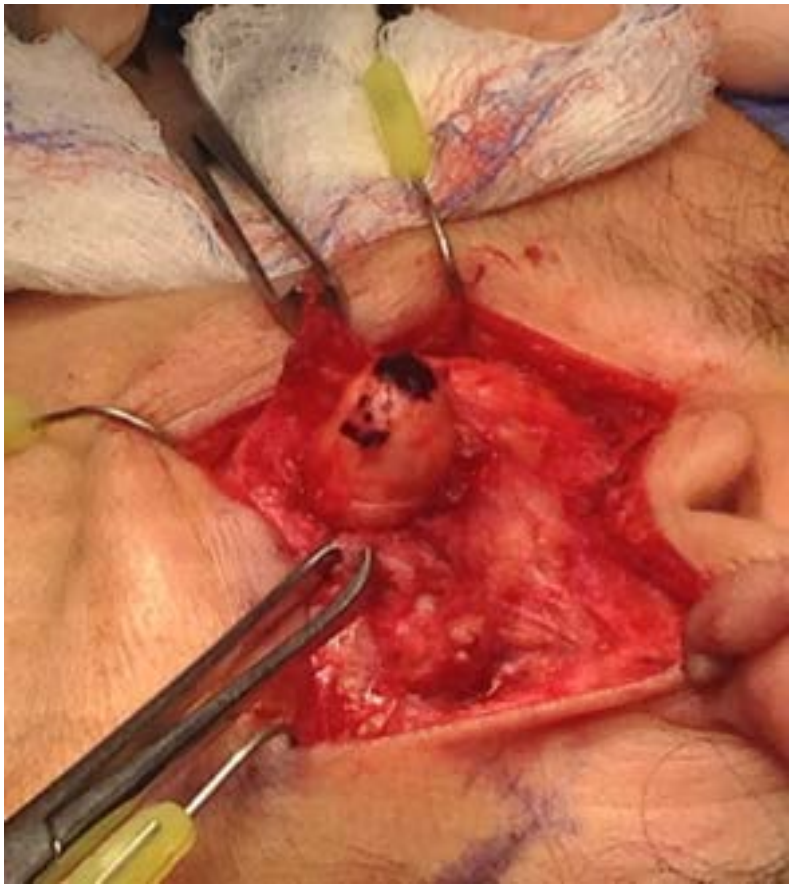
- History and Physical Key
  - Age
  - Pain
  - Fixed and firm
  - Rapidly changing
  - Facial nerve weakness



Parotid Gland Neoplasms

- 3% of head and neck tumors
- 0.6% of all tumors in the body
- 80% of the parenchyma lateral
- 80%of parotid tumors occur in the inferior aspect



- The World Health Organization in 2005 recognized 24 different malignant salivary gland cancers

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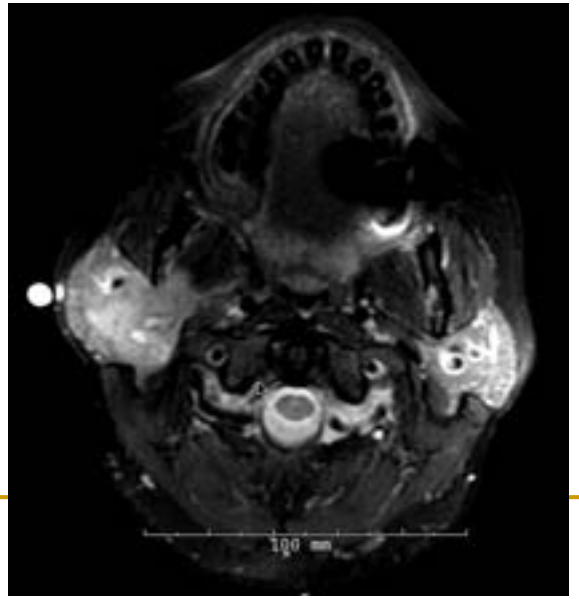
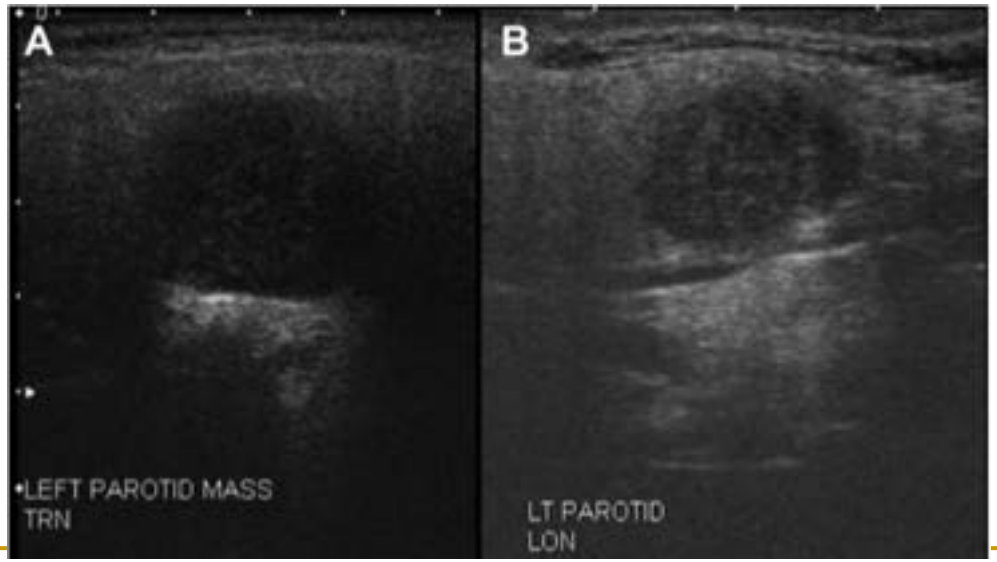
Imaging of Parotid Lesions

- CT
- MRI
  - *DWI*
- PET



Imaging of Parotid Lesions

- Clinical picture should guide imaging
- Ultrasound
  - In-office vs. Radiology
  - Allows for accurate serial measurements
  - Allows for guided sampling



Posterior echogenicity enhancement in a pleomorphic adenoma (left) and mucoepidermoid carcinoma (right)

Tissue Sampling of Parotid Lesions

- Possible seeding related to core needle biopsy
- Allows for patient counseling
- Surgical planning
- Sensitivity and specificity in differentiating between benign and malignant lesions are 80% and 97%

Estimates of the Diagnostic Characteristics of Parotid FNA.[a]

	Sensitivity	I^2 Sensitivity	Specificity	I^2 Specificity
All studies	0.780 (0.733, 0.821)	72.4 (65.5, 79.3)	0.977 (0.966, 0.985)	78.6 (73.6, 83.6)
Prospective design	0.882 (0.509, 0.982)	87.8 (78.5, 97.0)	0.995 (0.960, 0.999)	0 (0, 100)
Consecutive series of patients	0.745 (0.642, 0.826)	75.6 (64.5, 86.8)	0.979 (0.954, 0.991)	83.1 (76.1, 90.1)
With technical description	0.785 (0.724 0.835)	71.2 (61.3, 81.1)	0.965 (0.946, 0.977)	72.9 (63.7, 82.1)
General population[b]	0.787 (0.740, 0.827)	74.1 (67.5, 80.7)	0.976 (0.964, 0.984)	80.1 (75.4, 84.8)
FNA, ultrasound guidance	0.848 (0.760, 0.908)	14.7 (0, 72.7)	0.980 (0.951, 0.992)	57.6 (26.2, 89.0)

Otolaryngology Head Neck Surg. 2016 January ; 154(1): 9–23

Milan Grading System

Diagnostic Category	Risk of Malignancy	Usual Management
Non-Diagnostic	25%	Clinical and radiologic correlation/repeat FNA
Non-Neoplastic	10%	Clinical follow-up and radiologic correlation
Atypia of Undetermined Significance (AUS)	20%	Repeat FNA or surgery
Neoplasm		
Benign	< 5%	Conservative surgery or clinical follow-up
Salivary Gland Neoplasm of Uncertain Malignant Potential (SUMP)	35%	Conservative surgery*
Suspicious for malignancy	60%	Surgery*
Malignant	> 90%	Surgery* (extent dependent on type and grade of malignancy)

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Parotid Surgery

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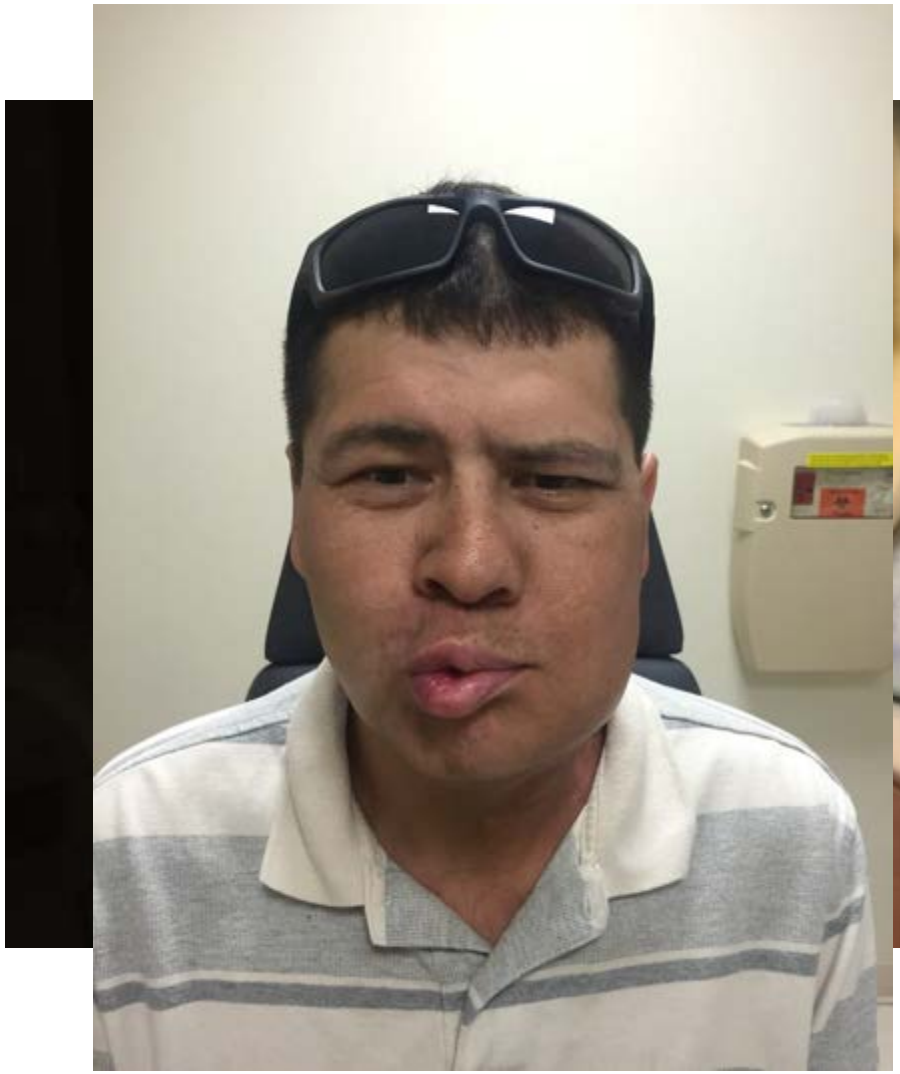

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Pathology- Key to management stratagey

- Benign
  - Pleomorphic Adenoma
  - Warthin's
- Malignant
  - Mucoepidermoid
  - Adenoid Cystic Carcinoma
  - Carcinoma Ex-pleomorphic
  - ACC
  - Epithelial myoepithelial

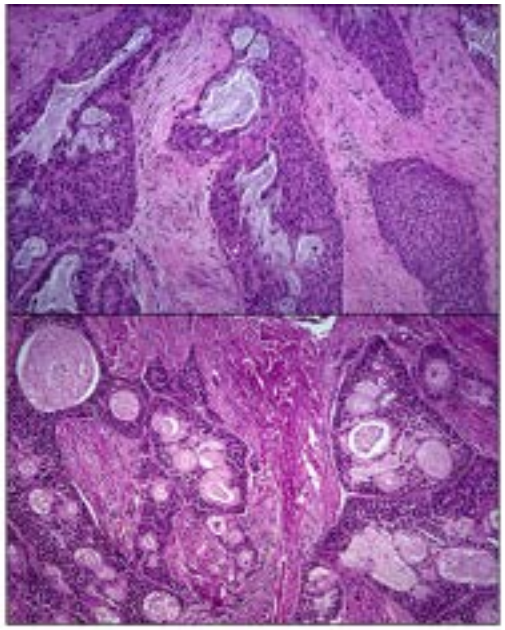
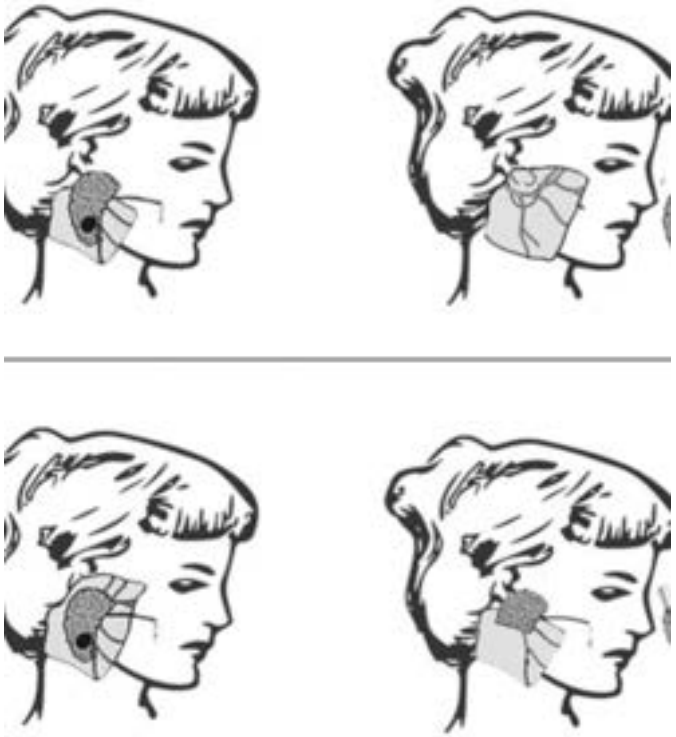


Figure 25. Mucoepidermoid Carcinoma

Types of Parotidectomy



- Superficial
- Partial (“functional”) Parotidectomy
  - Extra capsular with FN dissection
- Total
- Deep lobe
- Extra-capsular vs. Enucleation
- Near-total
- Radical (Nerve Sacrifice, Skin)
- Parapharyngeal space involvement

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Complications of Parotid Surgery

- First Bite Syndrome
- Frey's
- Greater auricular nerve
- **Aesthetic changes**
- Facial nerve weakness
- Sialocele
- Seroma

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Young actor with a 4 CM parotid mass

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Extracapsular Dissection with FN Dissection

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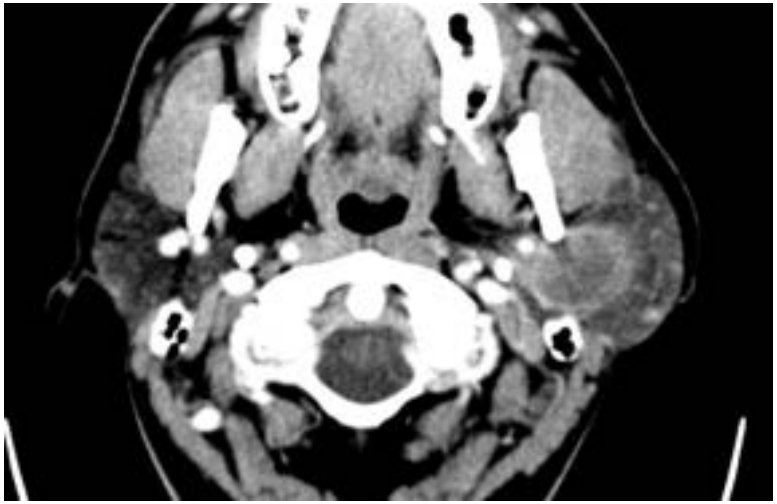
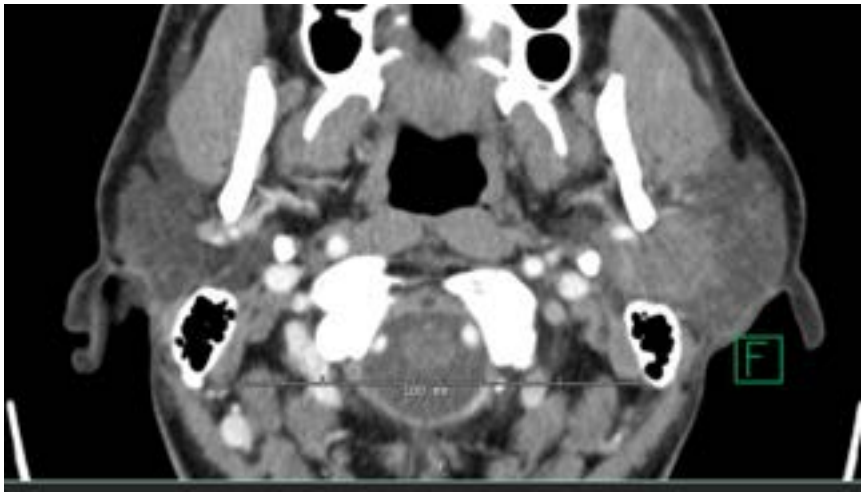
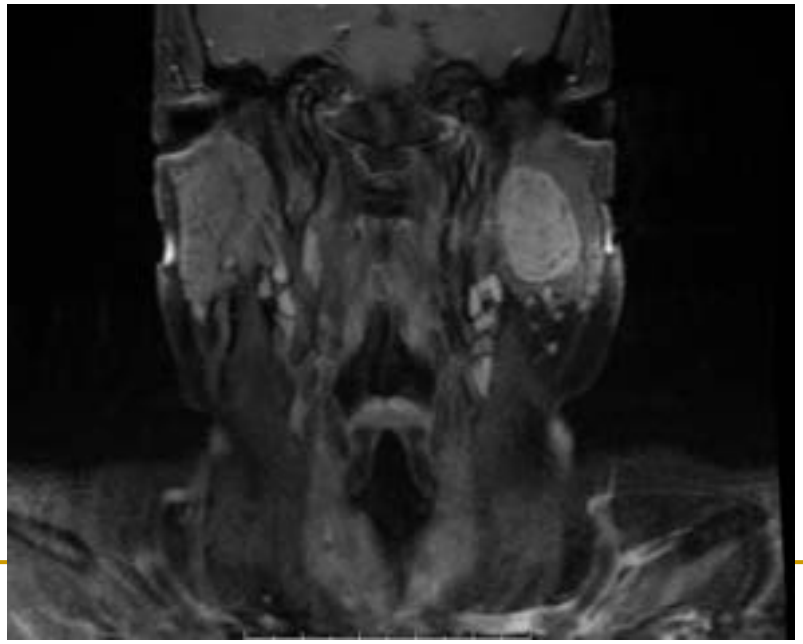
FINAL DIAGNOSIS
A. (Right parotid mass; parotidectomy):
Pleomorphic adenoma, two nodules, measuring 4 cm and 1 cm respectively; margins are free.
One lymph node, negative for tumor.

B. (Superficial parotid tissue; parotidectomy):
Salivary gland tissue with no significant pathologic findings.

43 y/o with Left Parotid Mass







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Coordinated with a Mastoidectomy

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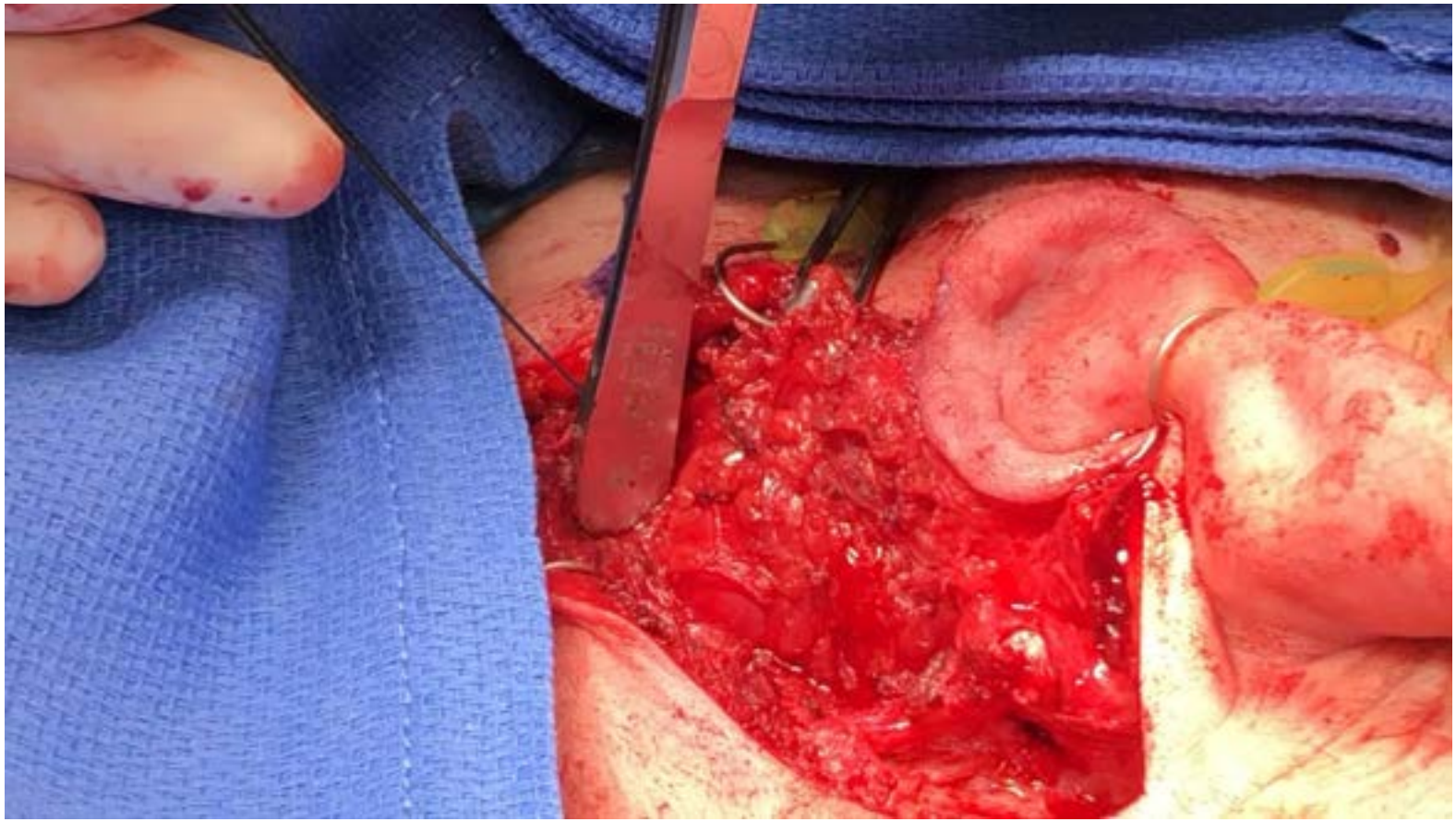

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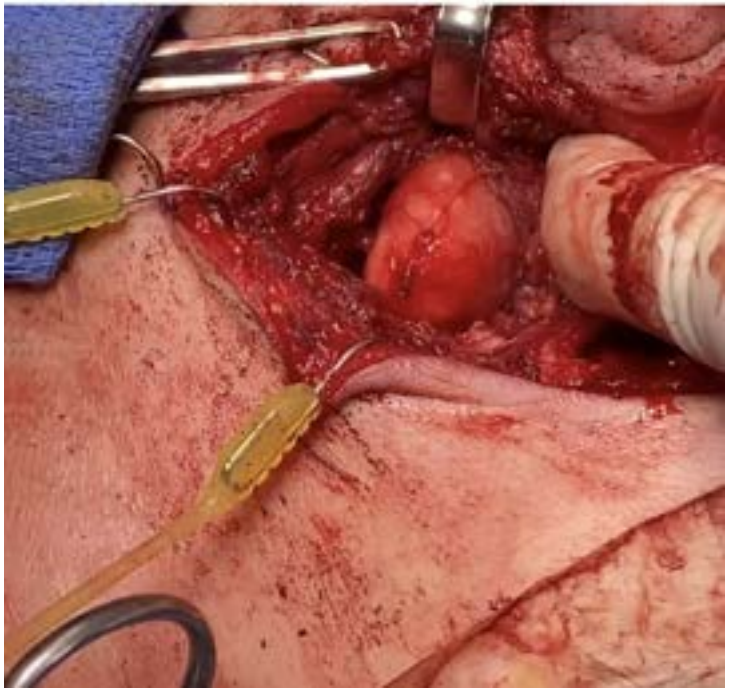
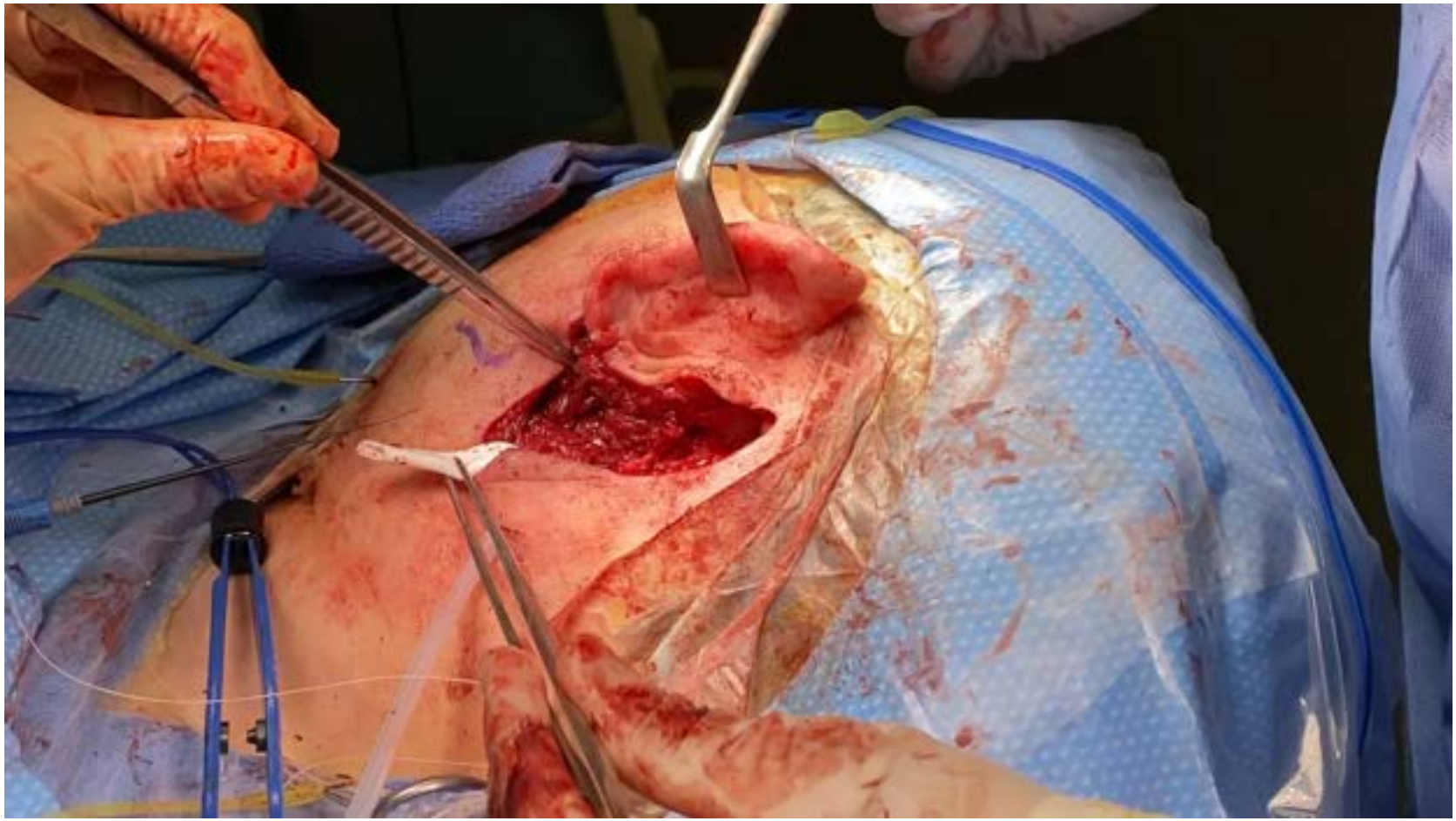
Extracapsular Dissection For Removal



No Reconstruction Needed



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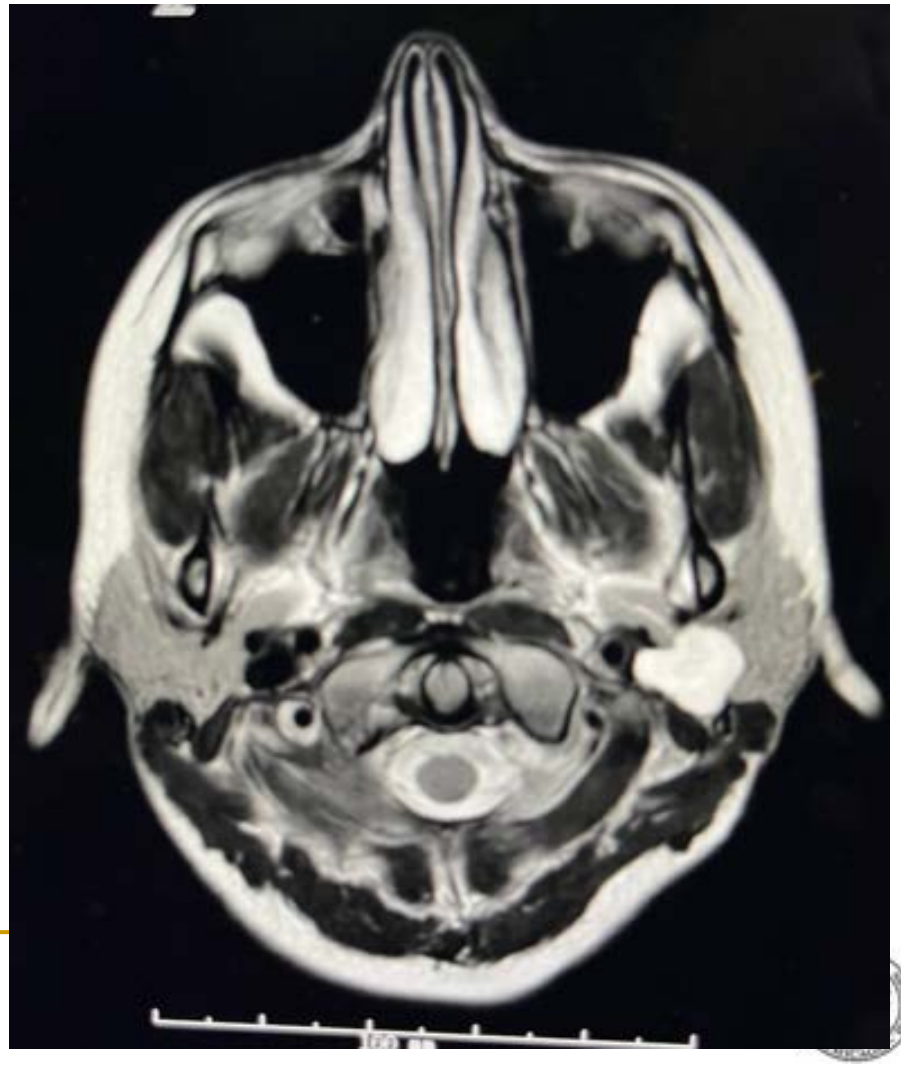
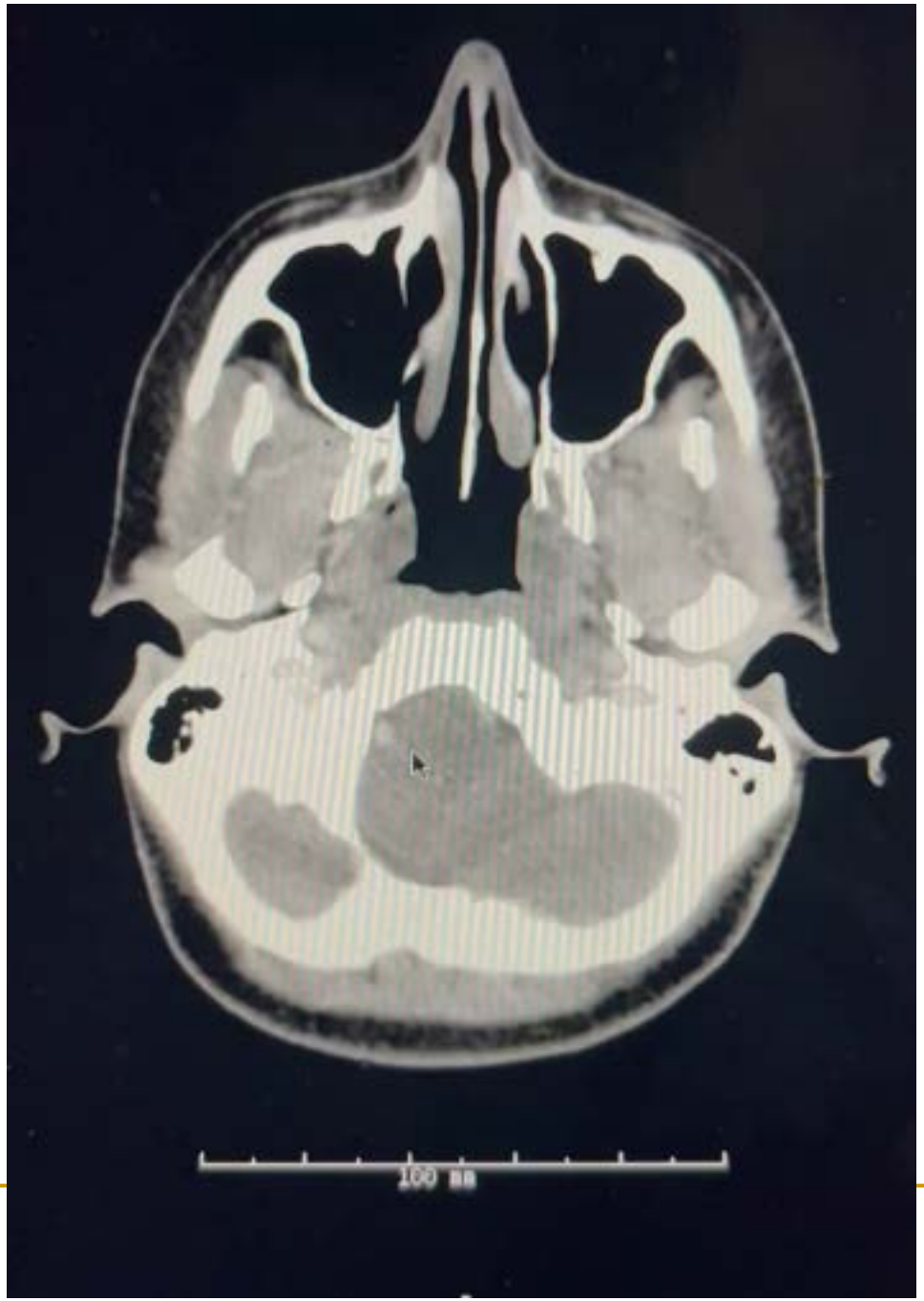
3.9 cm Pleomorphic Adenoma

29 y/o with a Left Parotid Mass on Headache Workup





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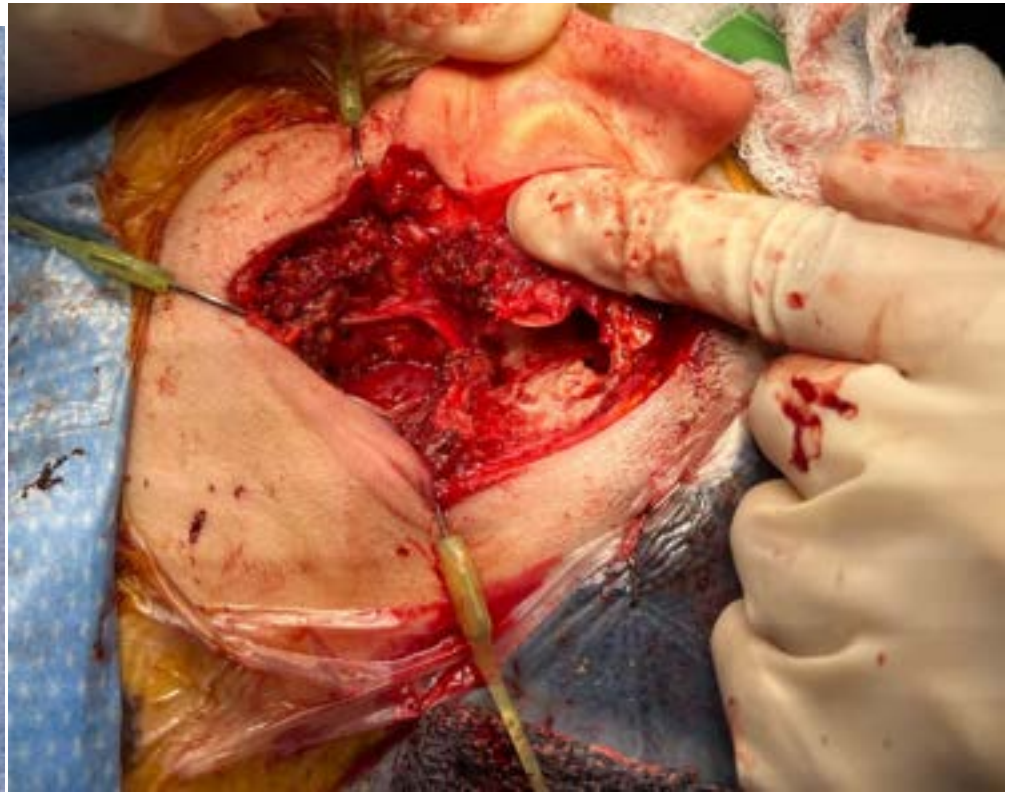

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Path and post op

- Deep parotid mass, parotidectomy
  - Pleomorphic adenoma, 2.3 cm, marginally excised

77 y/o with hx of CNS Lymphoma and left parotid mass

- Asymptomatic and incidental
- Stable for > 2 years
- FNA- Malignant
- Renal Failure
- Preop facial asymmetry

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77 y/o with hx of CNS Lymphoma and left parotid mass

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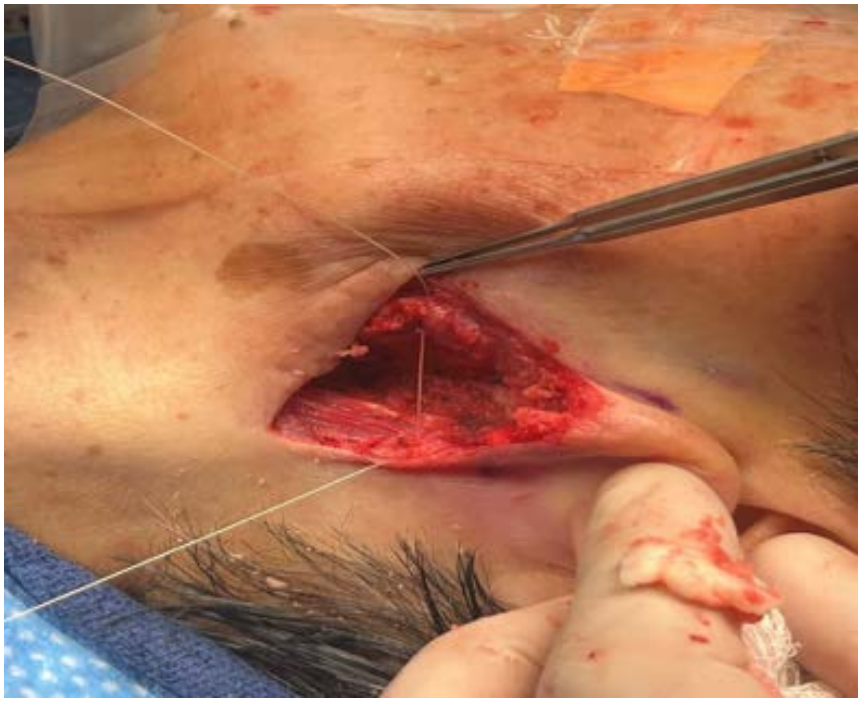

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PATH #:S23-23523
SPECIMEN DATE: 09/05/2023
SUBMITTED BY: AL-KHUDARI, SAMER
Department of Pathology
Rush University Medical Center
University Pathology Diagnostics
1750 W Harrison St, Room 570 Jelke
Chicago, IL 60612

Final
Electronic Medical Record* This report may not match the original report format
REPORT DATE: 9/18/2023

FINAL DIAGNOSIS
A. Left parotid mass; parotidectomy:
- Low grade adenocarcinoma, not otherwise specified, measuring 1.9 cm, limited
to the parotid gland
- Margins negative for neoplasm (tumor is <0.1 cm from the closest inked margin)
- Negative for lymphovascular and perineural invasion
- Pathologic stage: pT1 N0
- See note

B. Inferior parotid; parotidectomy:
- Parotid gland tissue, negative for neoplasm

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ORIGINAL ARTICLE

Facial Nerve Function After Parotidectomy

Luc P. Bron, MD; Christopher J. O'Brien, MS, FRACS

- Risk of facial nerve injury is proportional to the extent of the resection
- Increased weakness
  - parotitis, deep lobe, neck dissection
- Normal facial movement returned in less than 6 months in most

Facial Nerve Function Following Parotidectomy With Nerve Preserved and Normal Preoperative Function

Operation	No. (%) With Initial Postoperative Weakness	No. (%) With Permanent Weakness
Limited superficial parotidectomy		
Benign tumor (n=91)	15 (16.5)	0 (0)
Malignant tumor (n=31)	4 (13)	0 (0)
Complete superficial parotidectomy		
Sialadenitis (n=13)	4 (30)	0 (0)
Near-total parotidectomy		
Sialadenitis (n=31)	10 (34)	1 (4)
Benign deep lobe tumor (n=32)	10 (31)	0 (0)
Malignant deep lobe tumor (n=3)	3 (100)	0 (0)
Parotidectomy with neck dissection (n=23)	19 (83)	10 (43)
Patient with a previous operation (n=6)	2 (33)	2 (33)
Total (N=230)	**67** (29)	**13** (5.6)

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Arch Otolaryngol Head Neck Surg. 1997;123:1091-1096

Systematic Review

AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY FOUNDATION

Otolaryngology–Head and Neck Surgery
2015, Vol. 152(4) 631–637

DOI: 10.1177/0194599814568779
http://otojournal.org
SAGE

Facial Nerve Monitoring during Parotidectomy: A Systematic Review and Meta-analysis

Amit J. Sood, MD[1], Jeffrey J. Houlton, MD[1,2], Shaun A. Nguyen, MD, MA[1], and M. Boyd Gillespie, MD[1]

Table 4. Incidence of Facial Nerve Weakness in FNM vs Unmonitored Patients, No. (%).

	FNM			Unmonitored		
Author	PAROT	IMMED	PERM	PAROT	IMMED	PERM
Deneuve[21]	46	3 (6.5)	0 (0.0)	41	5 (12.1)	1 (2.4)
Yuan[22]	65	4 (6.1)	0 (0.0)	44	9 (20.4)	2 (4.5)
Pons[23]	42	11 (26.1)	3 (7.1)	23	6 (26.1)	2 (8.7)
Grosheva[6]	50	19 (38.0)	4 (8.0)	50	22 (44.0)	2 (4.0)
López[24]	25	18 (36.0)	1 (4.0)	27	19 (70.4)	8 (29.6)
Witt[25]	20	4 (20.0)	0 (0.0)	33	5 (15.2)	0 (0.0)
Terrell[26]	40	13 (33.0)	4 (10.0)	40	23 (57.5)	3 (7.5)
Weighted total	288	22.5%	3.9%	258	34.2%	7.1%

Abbreviations: FNM, facial nerve monitoring; IMMED, immediate postoperative weakness; PAR, parotidectomies; PERM, permanent outcome weakness.

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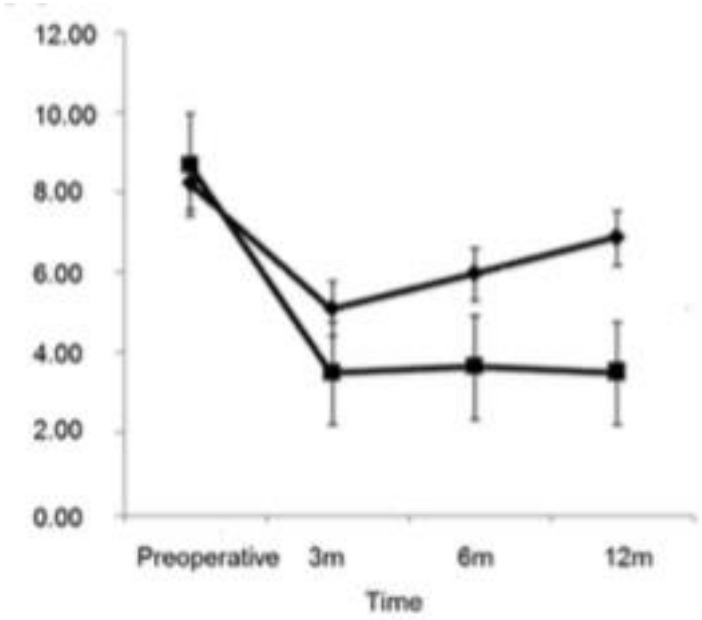
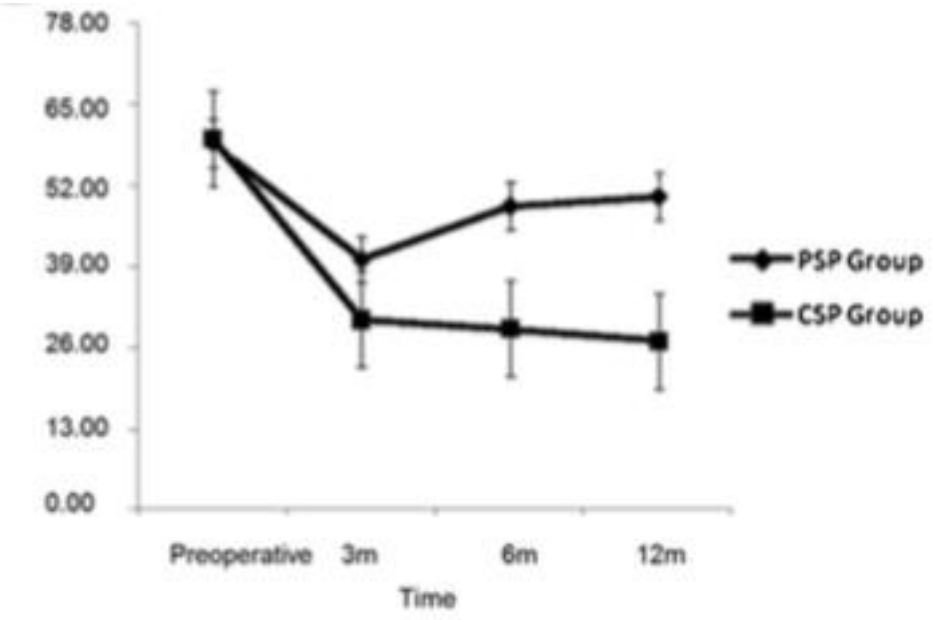
The Rationale for Less Normal Parotid Removal

- Cosmetic
- Functional
- Less may require more surgeon experience
- Stenson duct ligation





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Oral Surg Oral Med Oral Pathol Oral Radiol. 2016 Oct;122(4):385-91

The Laryngoscope
Lippincott Williams & Wilkins, Inc., Philadelphia

CANDIDATE'S THESIS

The Significance of the Margin in Parotid Surgery for Pleomorphic Adenoma

Robert L. Witt, MD

- 60 patients mobile, superficial , and < 4 cm
- TP, PSP, or ECD

Not significantly altered by surgical approach

- Capsular exposure
- Capsular rupture
- Recurrence
- Permanent facial nerve dysfunction

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CANDIDATE'S THESIS

The Significance of the Margin in Parotid Surgery for Pleomorphic Adenoma

Robert L. Witt, MD

- Capsular rupture does result in a significantly higher rate of recurrence (5%) and did not vary among surgical approaches
- Greater tissue sacrifice results in higher rates of transient dysfunction and Frey syndrome
- Focal capsular exposure is a universal finding regardless of surgery
- Enucleation not recommend due to pseudopods

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Functional outcomes after extracapsular dissection with partial facial nerve dissection for small and large parotid neoplasms

Samuel R. Auger [a], Dallas E. Kramer [a], Brendan Hardy [a], Danny Jandali [a], Kerstin Stenson [b], Mehmet Kocak [c], Samer Al-Khudari [b,*]

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[b] Department of Otorhinolaryngology – Head and Neck Surgery, Rush University Medical Center, Chicago, IL, USA
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ARTICLE INFO

Keywords:
Extracapsular dissection
Parotid surgery complications
Parotid gland
Neoplasm
Facial nerve
Parotidectomy

ABSTRACT

Purpose: Multiple surgical options exist for benign parotid tumors without agreement upon a single, best approach. We evaluated the short-term outcomes and rate of complications using the ECD-FND technique for small and large parotid neoplasms involving the superficial and deep lobes of the parotid gland using a categorical approach.

Material and methods: A single surgeon retrospective cohort study with analysis of patient demographics, outcomes, and complication rates was conducted of patients undergoing the ECD-FND for benign parotid neoplasm. Cases from May 2014 to May 2020 with at least 6 months follow up were considered. Complications were

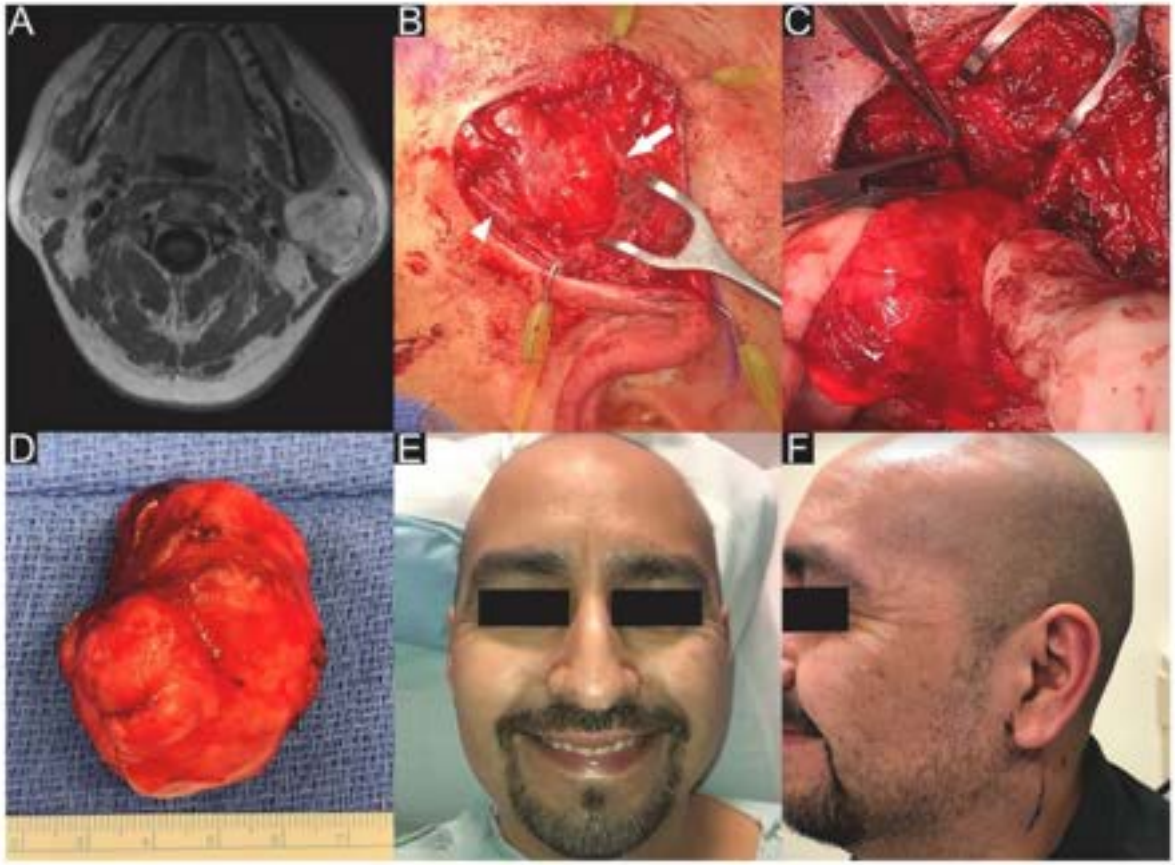

Fig. 1. 39 y/o male with left parotid pleomorphic adenoma involving deep lobe.
Legend – [A] Axial MRI T1 left parotid mass; [B] Capsule of tumor exposed after superficial exposure, greater auricular nerve (arrowhead) and facial nerve (arrow) preserved; [C] McCabe forceps dissecting the ECS plane deep with adjacent FN branches; [D] 6 cm parotid mass excised with intact capsule; [E] Immediate FN function in the recovery room; [F] 1 week post-operative appearance.

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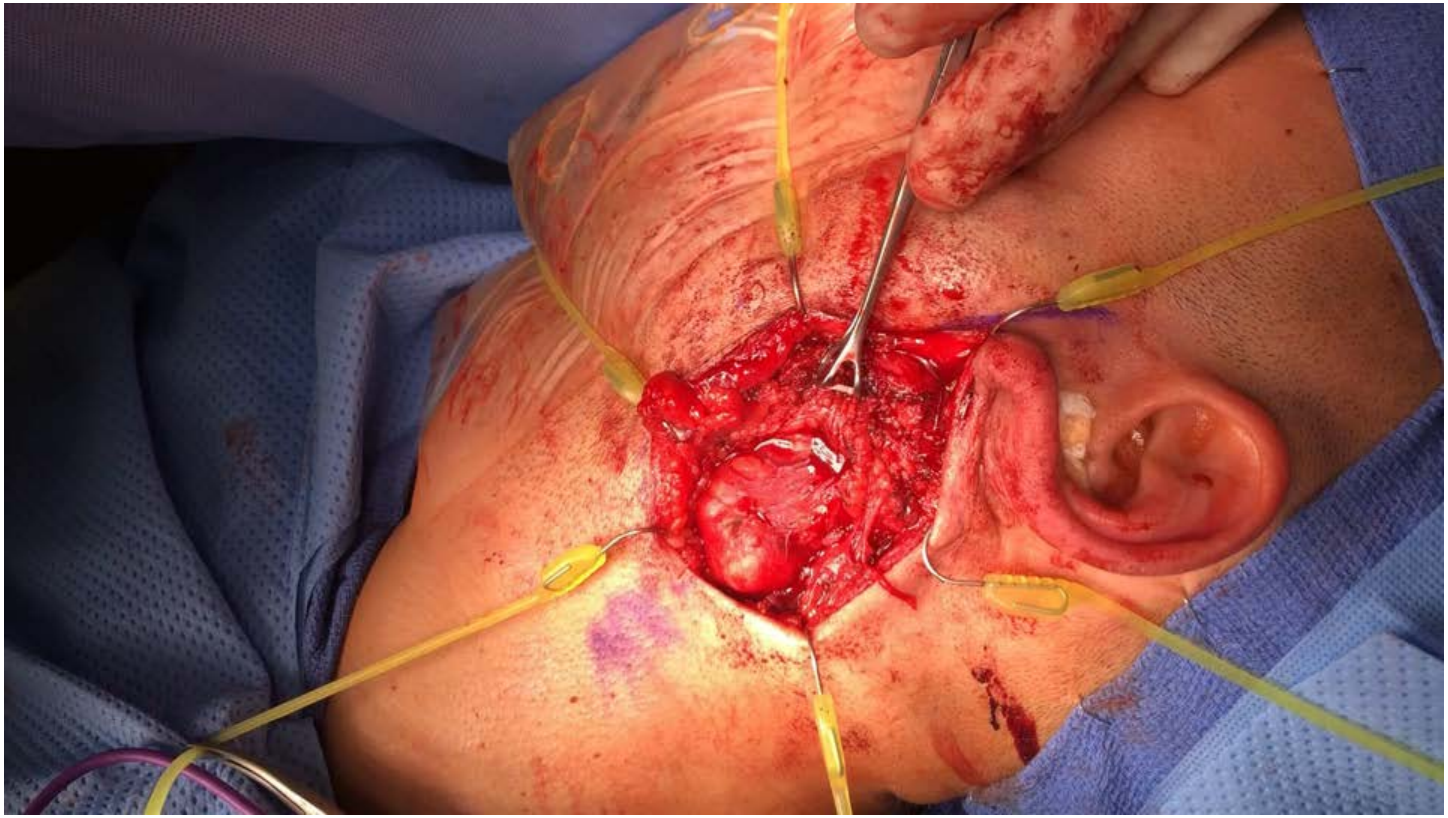

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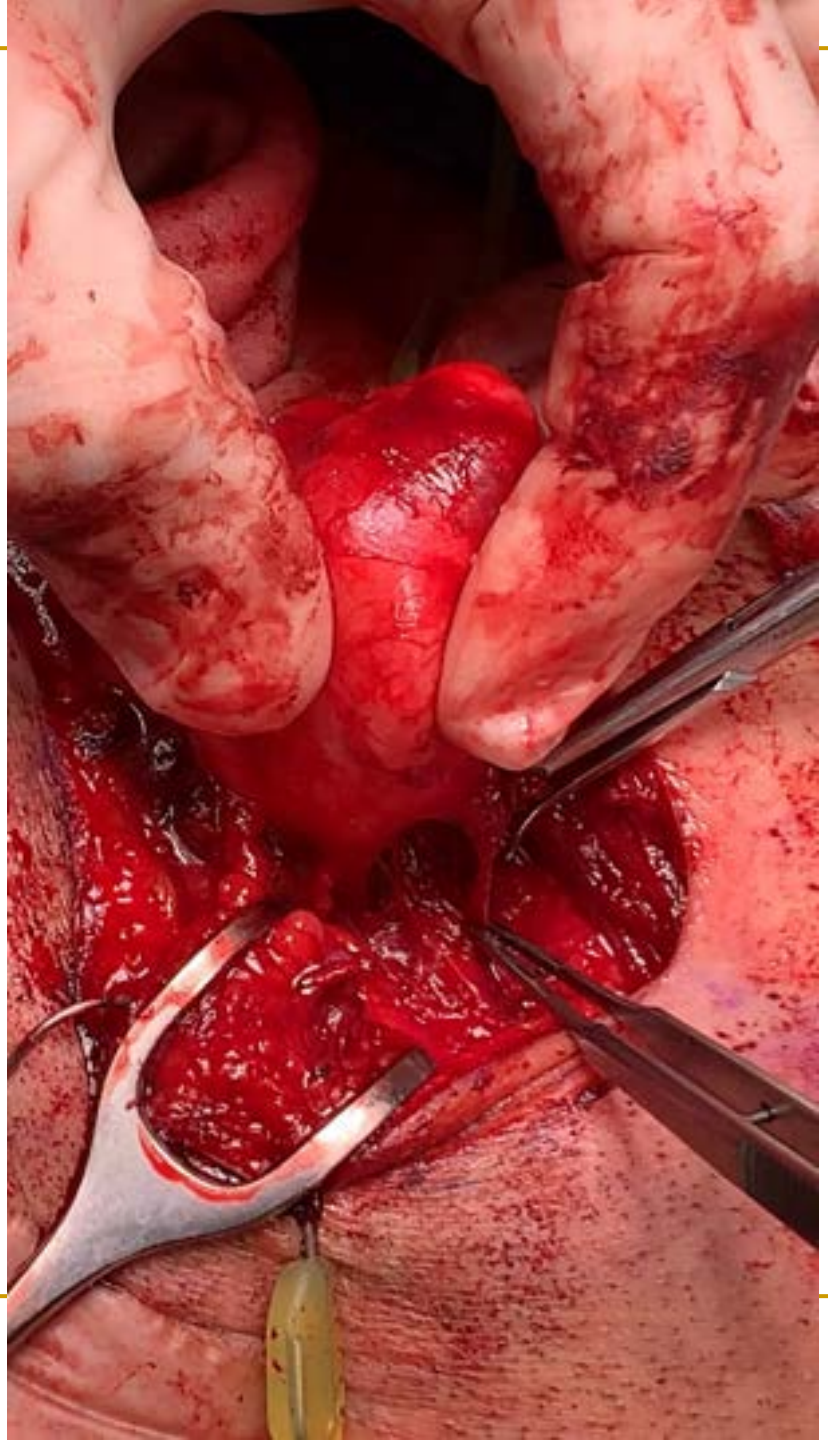

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Received: 30 August 2021 | Revised: 6 October 2021 | Accepted: 25 October 2021

DOI: 10.1002/lio2.694

ORIGINAL RESEARCH

Laryngoscope Investigative Otolaryngology

Prospective study on complications using different techniques for parotidectomy for benign tumors

Rubens Thölken MD[1] | Monika Jering MD[1] | Marcel Mayer MD[1] | Stefan Schiele MSc[2] | Gernot Müller MD[2] | Johannes Zenk MD[1]

[1]Department of Otorhinolaryngology and Head and Neck Surgery, University Hospital Augsburg, Augsburg, Germany

[2]Institute of Mathematics, Augsburg University, Augsburg, Germany

Correspondence
Rubens Thölken, MD, Department of

Abstract

Objectives: Long-term prospective studies on procedure-related complications after parotid surgery for benign neoplasms (BNs) are scarce. This is the first prospective study on the use of extracapsular dissection (ECD) for BNs, and it aimed to examine the incidence of postoperative complications after parotid surgery for BN.

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TABLE 2 Facial palsy according to operation, HB grade, and time after surgery

Variable	ECD patients[a] (n = 190) N (%)	PP patients[b] (n = 41) N (%)	SP patients[c] (n = 35) N (%)	TP patients[d] (n = 34) N (%)	*P*-value
Transient facial palsy					<.001
No	179 (94.2)	29 (70.7)	28 (80.0)	19 (55.9)	
Yes	11 (5.8)	12 (29.3)	7 (20.0)	15 (44.1)	
Permanent facial palsy					<.001
No	189 (99.5)	36 (87.8)	31 (88.6)	33 (97.1)	
Yes	1 (0.5)	5 (12.2)	4 (11.4)	1 (2.9)	
Age (years), mean ± SD	58.3 ± 12.6	61.0 ± 14.2	57.5 ± 10.7	53.12 ± 21.4	.102
≤45 years	24 (12.6)	4 (9.8)	4 (11.4)	10 (29.4)	.123
45 to 65 years	102 (53.7)	22 (53.7)	23 (65.7)	14 (41.2)	
>65 years	64 (33.7)	15 (36.6)	8 (22.9)	10 (29.4)	
No. of lesions					<.001
1	183 (96.3)	37 (90.2)	31 (88.6)	26 (76.5)	
≥2	7 (3.7)	4 (9.8)	4 (11.4)	8 (23.5)	
Lesion size (mm)					.002
<28	117 (61.6)	22 (53.7)	12 (34.3)	12 (35.3)	
≥28	73 (38.4)	19 (46.3)	23 (65.7)	22 (64.7)	
Av. time of surgery (min)					<.001
≤120	165 (86.8)	26 (63.4)	8 (22.9)	2 (5.9)	
>120	25 (13.2)	15 (36.6)	27 (77.2)	32 (94.1)	

Abbreviations: ECD, extracapsular dissection; HB, House-Brackmann Facial Nerve Grading System; PP, partial parotidectomy; SD, standard deviation; SP, superficial parotidectomy; TP, total parotidectomy.

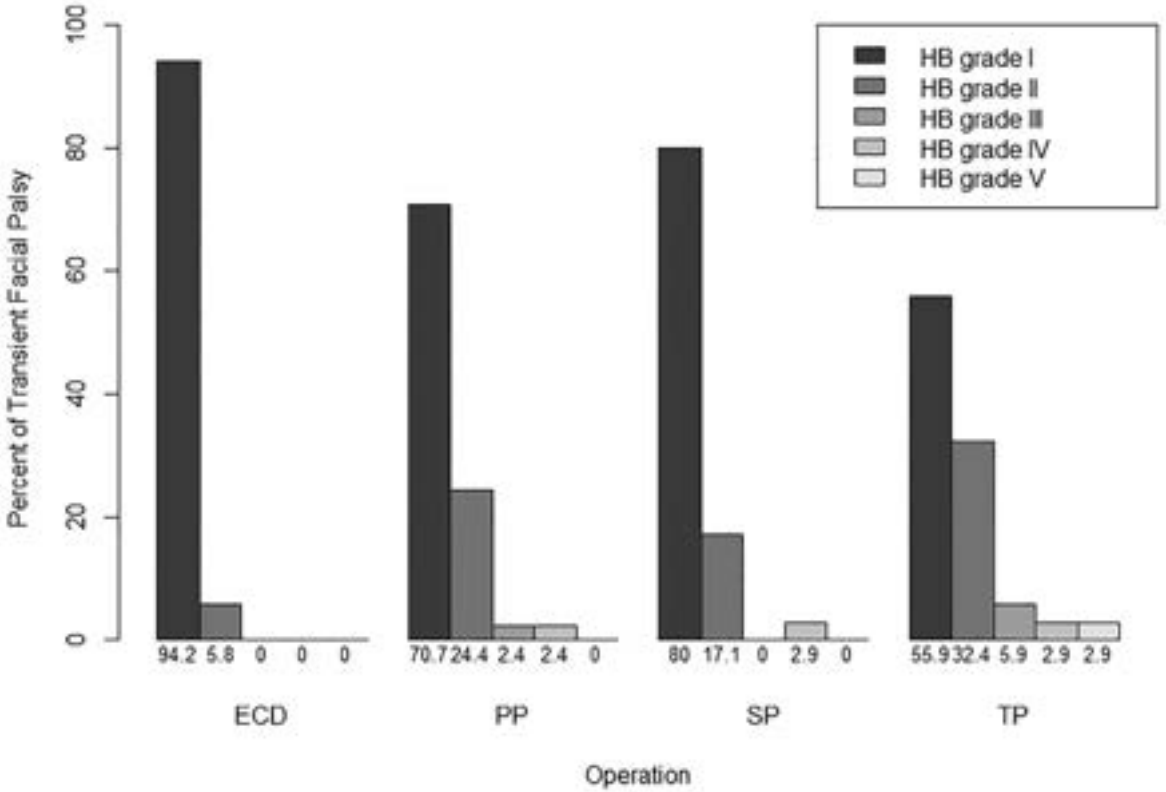

FIGURE 1 The immediate risk of transient postoperative palsy differed between the surgery types

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Randomized clinical trial

Randomized clinical trial comparing partial parotidectomy *versus* superficial or total parotidectomy

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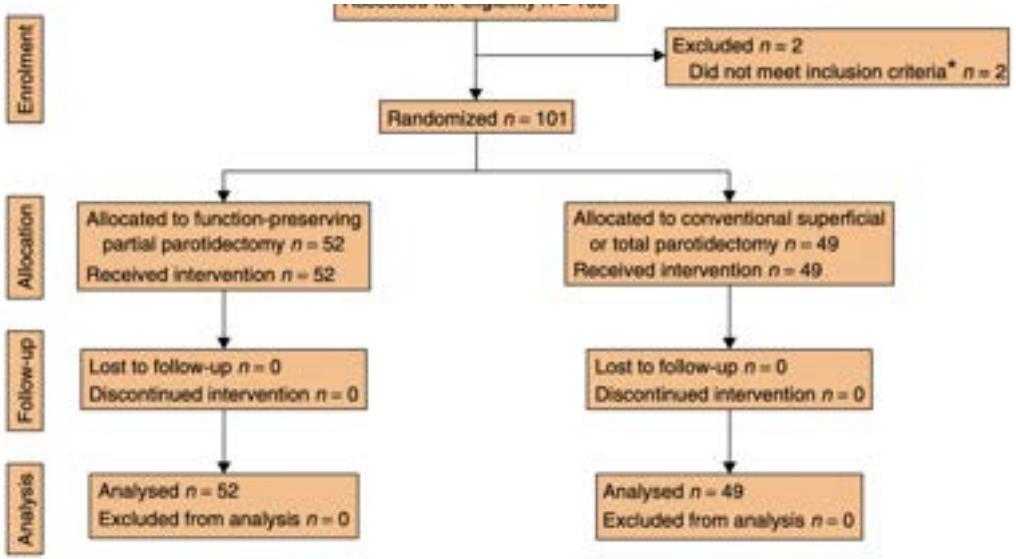

Fig. 1 Profile of randomized clinical trial comparing function-preserving *versus* conventional surgery for benign parotid tumours. *The two patients excluded had malignant tumours

Table 2 Operative and pathology data in patients undergoing parotidectomy

	Functional surgery ($n = 52$)	Conventional surgery ($n = 49$)	P^*
Incision			< 0·001
Modified Blair	0	49	
Facelift	52	0	
Preservation of GAN posterior branch	49	0	< 0·001
Primary tumour			
Mean(s.d.) size (cm)	2·7(1·8)	2·9(1·9)	0·588†
Location			0·763
Superficial	48	45	
Deep	3	2	
Both lobes	1	2	
Close proximity with FN	7	8	0·900
Capsular rupture	0	2	0·449
Positive resection margin	0	0	
Damage of FN branch	0	1	0·976
Coverage of exposed parotid parenchyma			< 0·001
Primary closure of residual parotid tissues	49	0	
Rotation of superior-based SCM flap	3	49	
Mean(s.d.) duration of operation (h)	1·4(0·9)	2·1(1·5)	< 0·001†

GAN, greater auricular nerve; FN, facial nerve; SCM, sternocleidomastoid muscle. *χ^2 test unless indicated otherwise; †t test.

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Table 3 Complication rates after parotidectomy

	Functional surgery ($n = 52$)	Conventional surgery ($n = 49$)	P*
Postoperative			
Decreased sensation	16 (31)	49 (100)	< 0·001
Transient facial weakness	6 (12)	17 (33)	0·011
Wound infection	1 (2)	2 (4)	0·958
Sialocele	0 (0)	2 (4)	0·449
1 year after surgery			
Decreased sensation	1 (2)	8 (16)	0·028
Frey's syndrome	3 (6)	4 (8)	0·935
Local pain	0 (0)	2 (4)	0·449
Permanent facial nerve paralysis	0 (0)	1 (2)	0·449

Values in parentheses are percentages. *χ^2 test.

Table 4 Stimulated parotid salivary flow rate (ml/min) before and 1 year after surgery

	Functional surgery ($n = 52$)			Conventional surgery ($n = 49$)			
	Operated	Contralateral	P*	Operated	Contralateral	P*	P†
Preoperative	0·57(0·24)	0·60(0·29)	0·567	0·58(0·32)	0·62(0·28)	0·505	0·287
1 year after surgery	0·41(0·21)‡	0·56(0·32)	0·006	0·12(0·10)‡	0·64(0·36)	< 0·001	< 0·001

Values are mean(s.d.). *Paired t test between operated and contralateral sides; †t test between operated sides of two groups; ‡$P < 0·001$ *versus* preoperative value in same group (paired t test).

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Table 1. Publications in partial surgery for parotid malignant tumors.

Year	Authors	Number of Cases. Complementary Treatment	Histolo-Gical Type	Local Control (LC) and Survival
1999	Renehan et al. [13]	24 extracapsular dissection (ECD) (13 post-op radiotherapy)	No specific information	79% LC (5 recurrences). 68% 10 years overall survival.
1999	Witt [14]	1 PLL (low-grade, < 3 cm) (No information on complementary treatment)	1 MEPCA	100% LC No data on survival
2003	McGurk et al. [15]	12 ECD in selected cases (discrete, mobile, and less than 4 cm in diameter) (7 post-op radiotherapy)	1 ACC 1 AdCC 7 MEPCA 3 others (no specified)	91.7% LC (1 recurrence) 100% The 10-year cancer-specific survival
2005	Lim et al. [11]	43 "conservative parotidectomy" (less than superficial) (10 post-op radiotherapy)	Low-grade: 11 ACC 9 MEPCA 6 BCC 1 AdCC High-grade: 5 MEPCA 4 AdCC 3 CEPA 2 ADC 2 SCC	90.5% LC (4 recurrences) 88% 5 years overall survival
2016	Cockerill et al. [16]	11 Enucleation (No information on complementary treatment)	No specific information	36% LC (7 recurrences)
2017	Stodulski et al. [17]	2 PLL (II) low-intermediate grade, (one T1 and one T2) with close margins (No post-op radiotherapy)	1 AdCC 1MEPCA	100% LC 100% cancer-specific survival
2019	Mantsopoulos et al. [12,18,19]	14 ECD low grade (13 T1 and one T2). Free margins (No post-op radiotherapy)	4 ACC 1 BCC 2 CEPA 7 MEPCA	100% LC 100% cancer-specific survival
TOTAL CASES	PLL	46 cases (10 post-op radiotherapy)		91% (4 recurrences)
TOTAL CASES	ECD	50 cases (20 post-op radiotherapy)		88% LC (6 recurrences)
	Enucleation	11 cases (no information on radio)		36% LC (7 recurrences)

ACC, acinic cell carcinoma; ADC, adenocarcinoma; AdCC, adenoid cystic carcinoma; CEPA, carcinoma ex pleomorphic adenoma; BCC, basal cell adenocarcinoma; ED, extracapsular dissection; MEPCA, mucoepidermoid carcinoma; PLL, partial superficial parotidectomy; SCC, squamous cell carcinoma.

Conclusions

- Think about all these options for your next parotid surgery
- While most lesions are benign potential long terms effects from surgery are significant and a limited approach maybe helpful

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Thanks!

Questions?

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