Thyroidectomy

DTC and PTMC

Dr Alibakhshi General Surgeon

Types of Thyroid Operations

- ***Total thyroidectomy:***
- A total thyroidectomy may be done for a variety of diseases including thyroid cancer, Graves' disease , multinodular goiter, and substernal goiter. In certain cases, the surgeon may choose to perform a

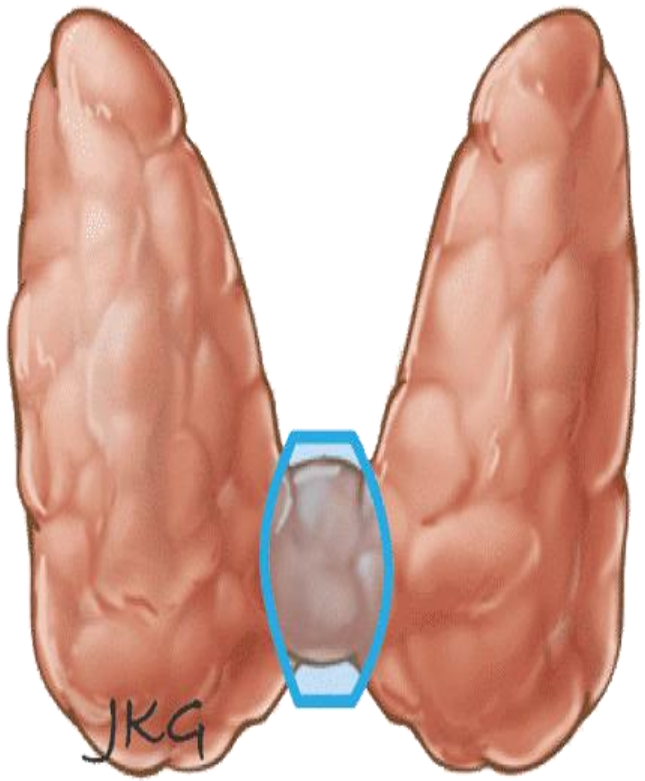
near-total thyroidectomy in which a small piece of thyroid tissue is left behind usually in the area of the parathyroid glands and recurrent laryngeal nerve in order to avoid damaging these structures

Thyroid lobectomy (hemithyroidectomy):

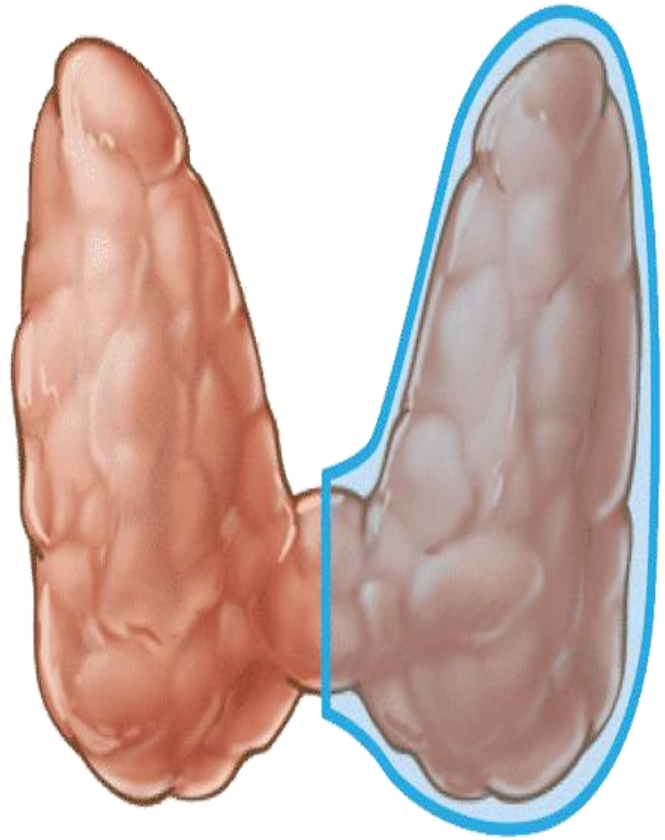
- A thyroid lobectomy may be done for a variety of diseases including indeterminate lesions on fine needle biopsy , a toxic nodule , substernal goiter, and an enlarging thyroid nodule.
- In cases of indeterminate lesions, some surgeons perform a thyroid lobectomy as a diagnostic lobectomy because the main purpose of the operation is to make a diagnosis.
- Approximately 70% of patients who have half of a normal thyroid gland left in place will not require thyroid hormone replacement pills. This percent decreases in older women, patients with a personal or family history of Hashimoto's thyroiditis or hypothyroidism, and patients with a family history of autoimmune disease.

Isthmusectomy

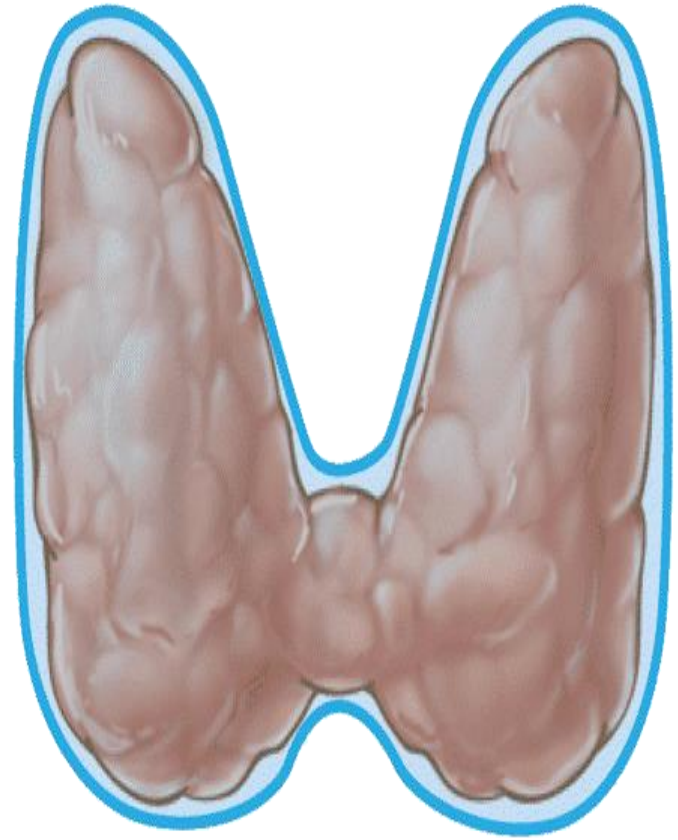
- Thyroid isthmusectomy is a safe alternative to thyroid lobectomy with isthmusectomy in patients who have nodules confined to the isthmus and pyramidal lobe.



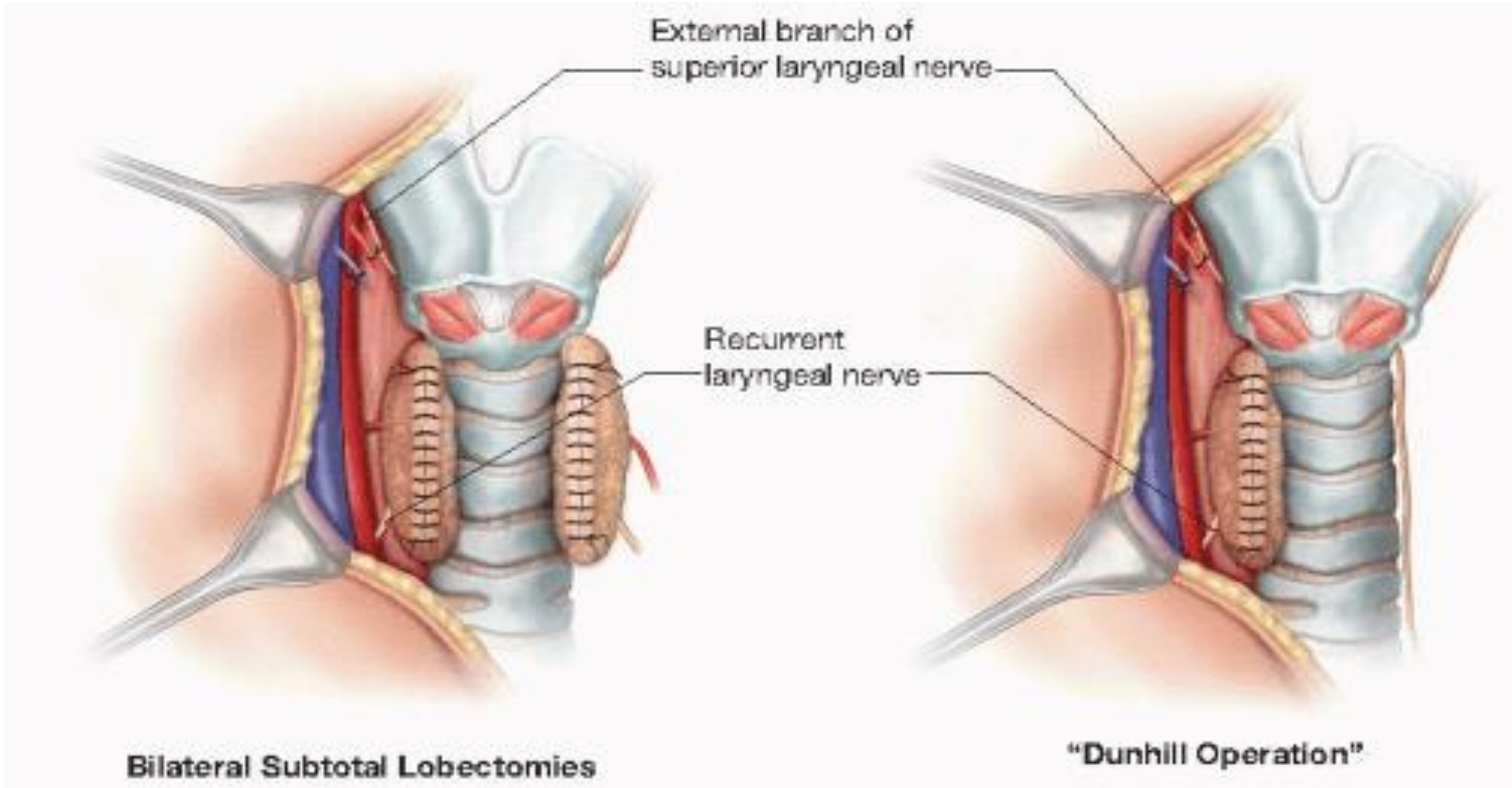
Isthmusectomy



Hemithyroidectomy



Total Thyroidectomy


External branch of
superior laryngeal nerve
Recurrent
laryngeal nerve
Bilateral Subtotal Lobectomies
"Dunhill Operation"

Subtotal vs Total Thyroidectomy

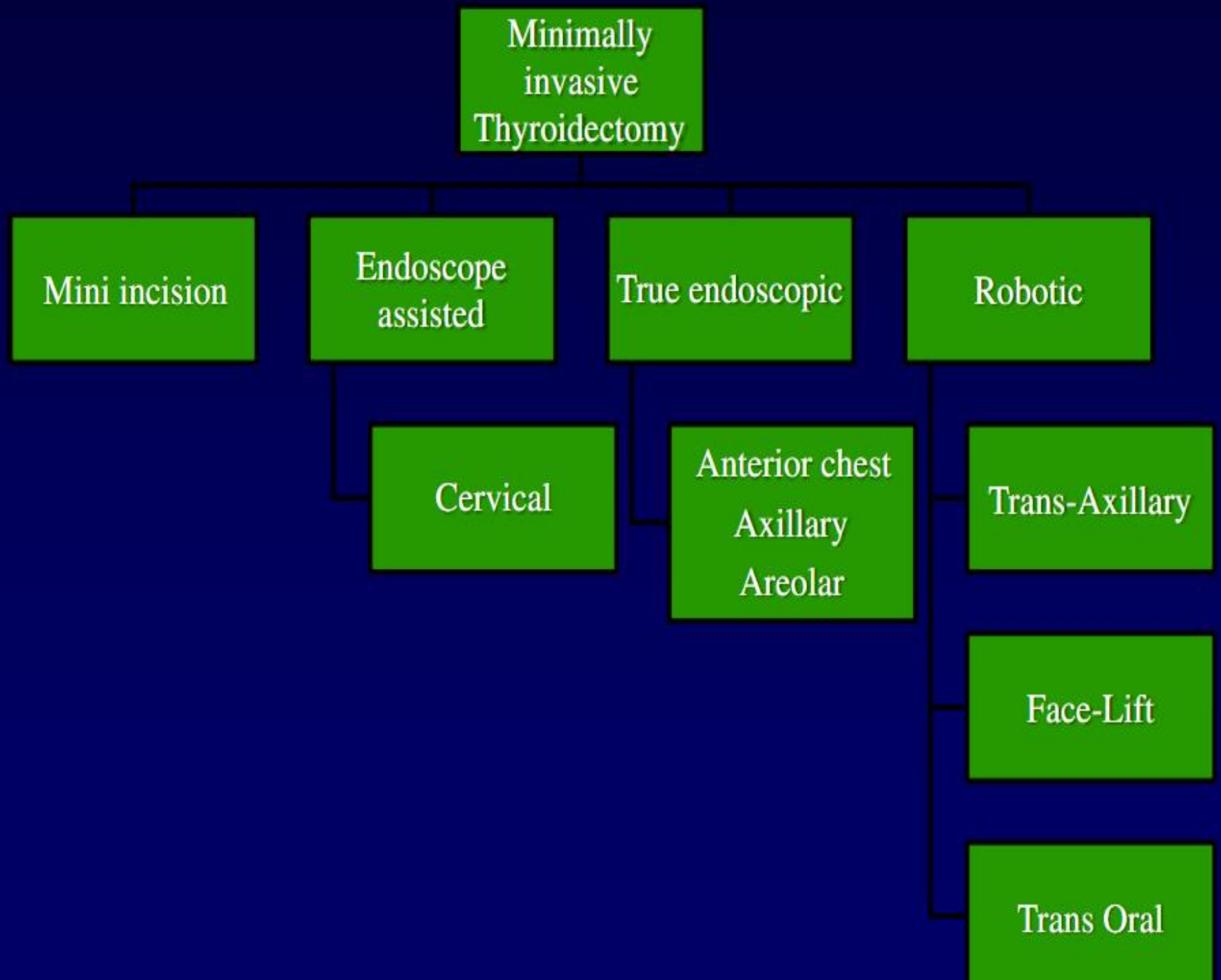
- Recurrence rate ?
- Complication rate ?

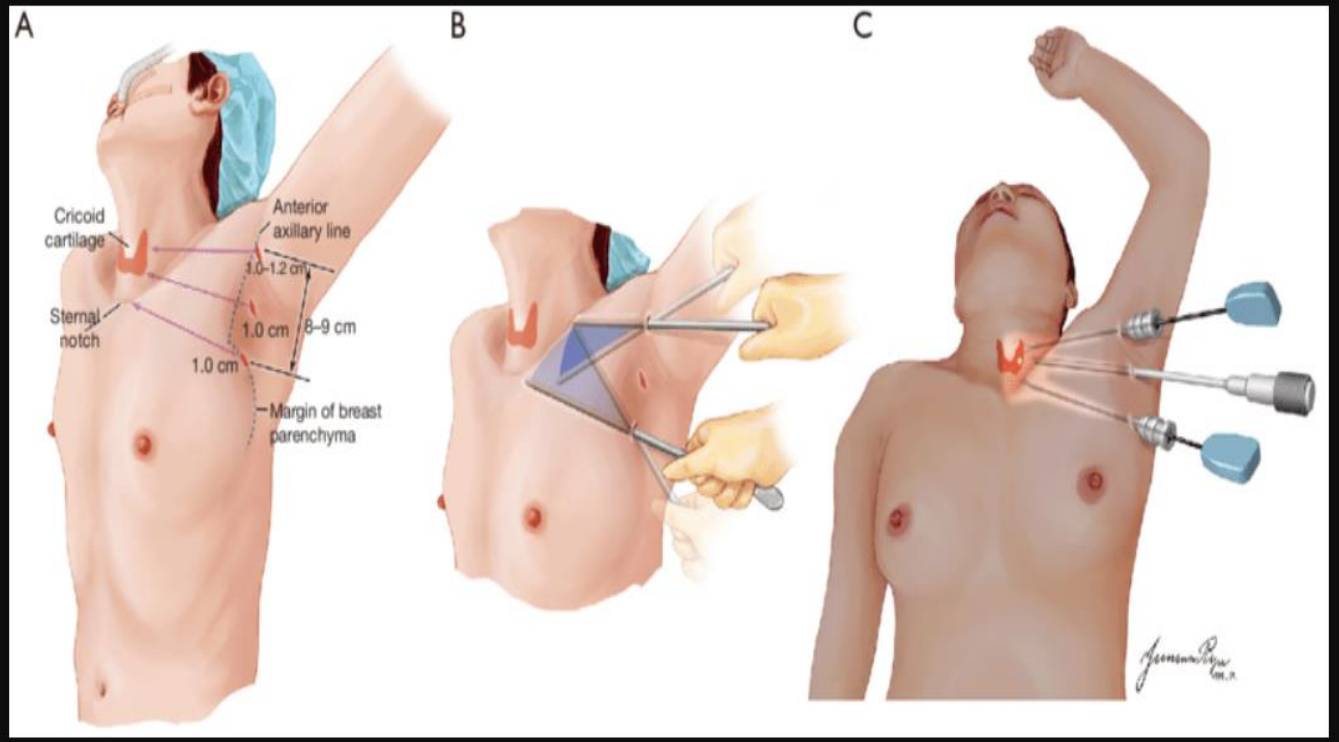
Technology in Thyroid Surgery

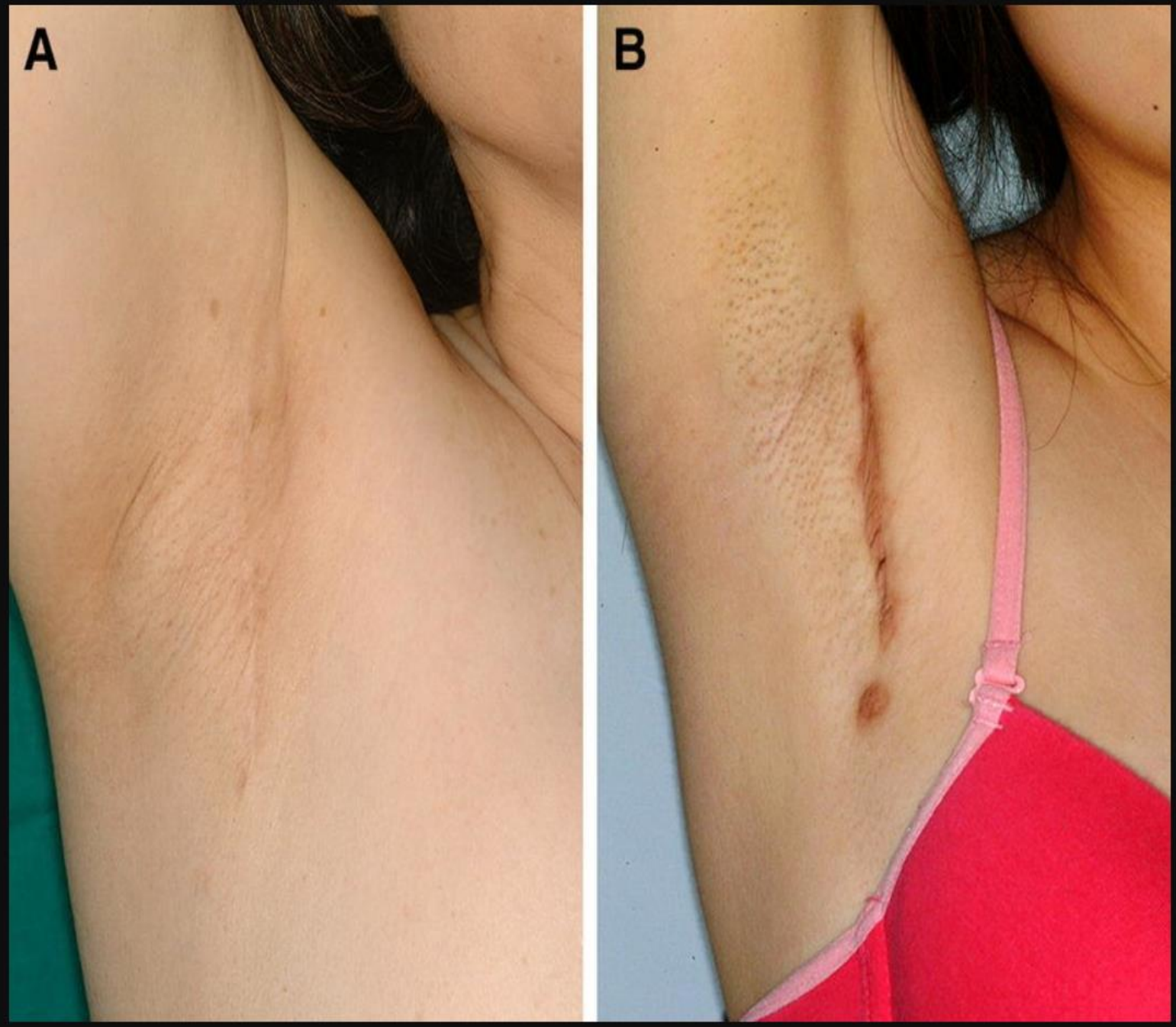
- • Harmonic / Ligasure
- • Nerve Monitor
- • Endoscopic Thyroidectomy
- • Robotic Thyroidectomy

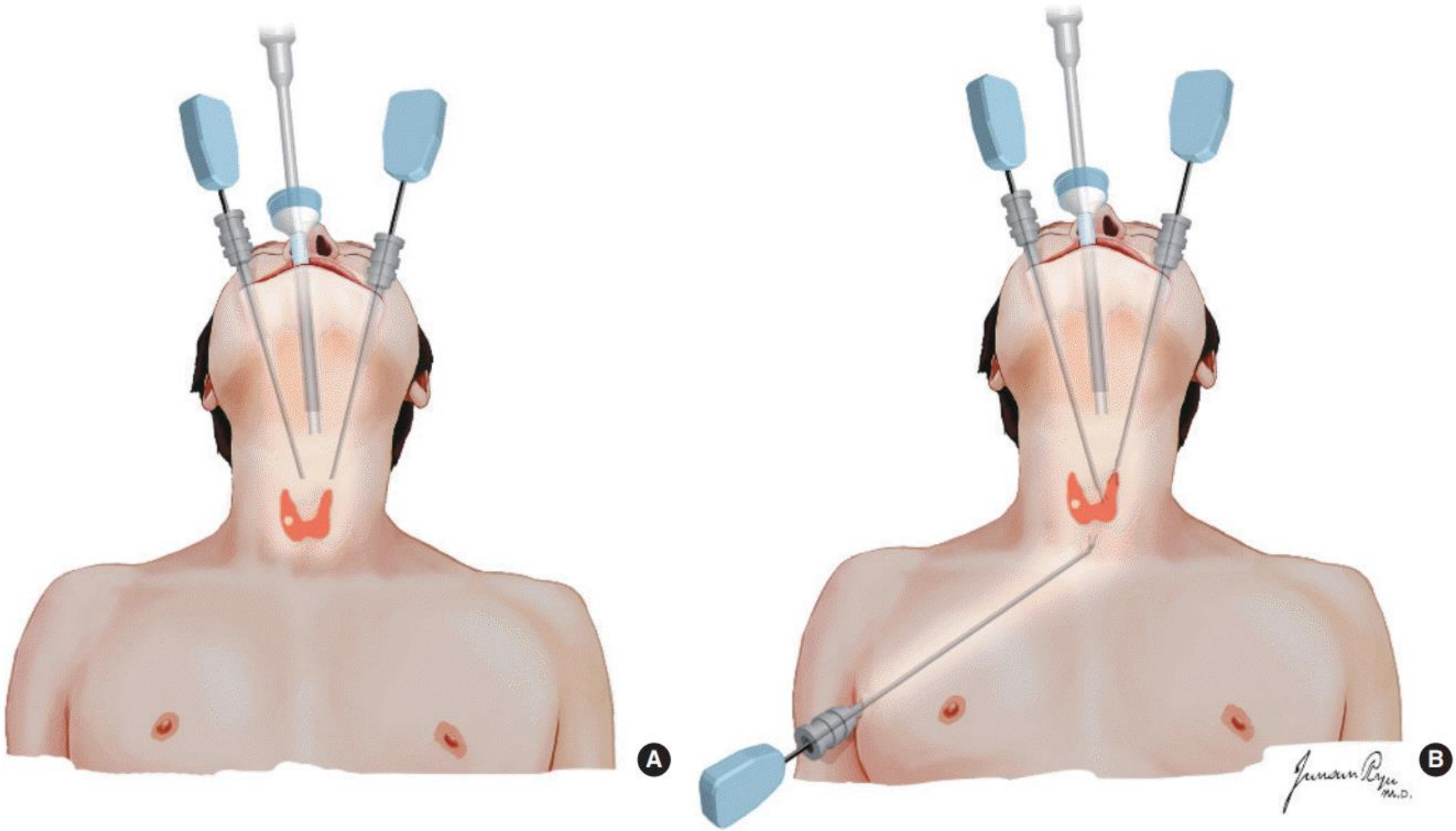

COVIDIEN

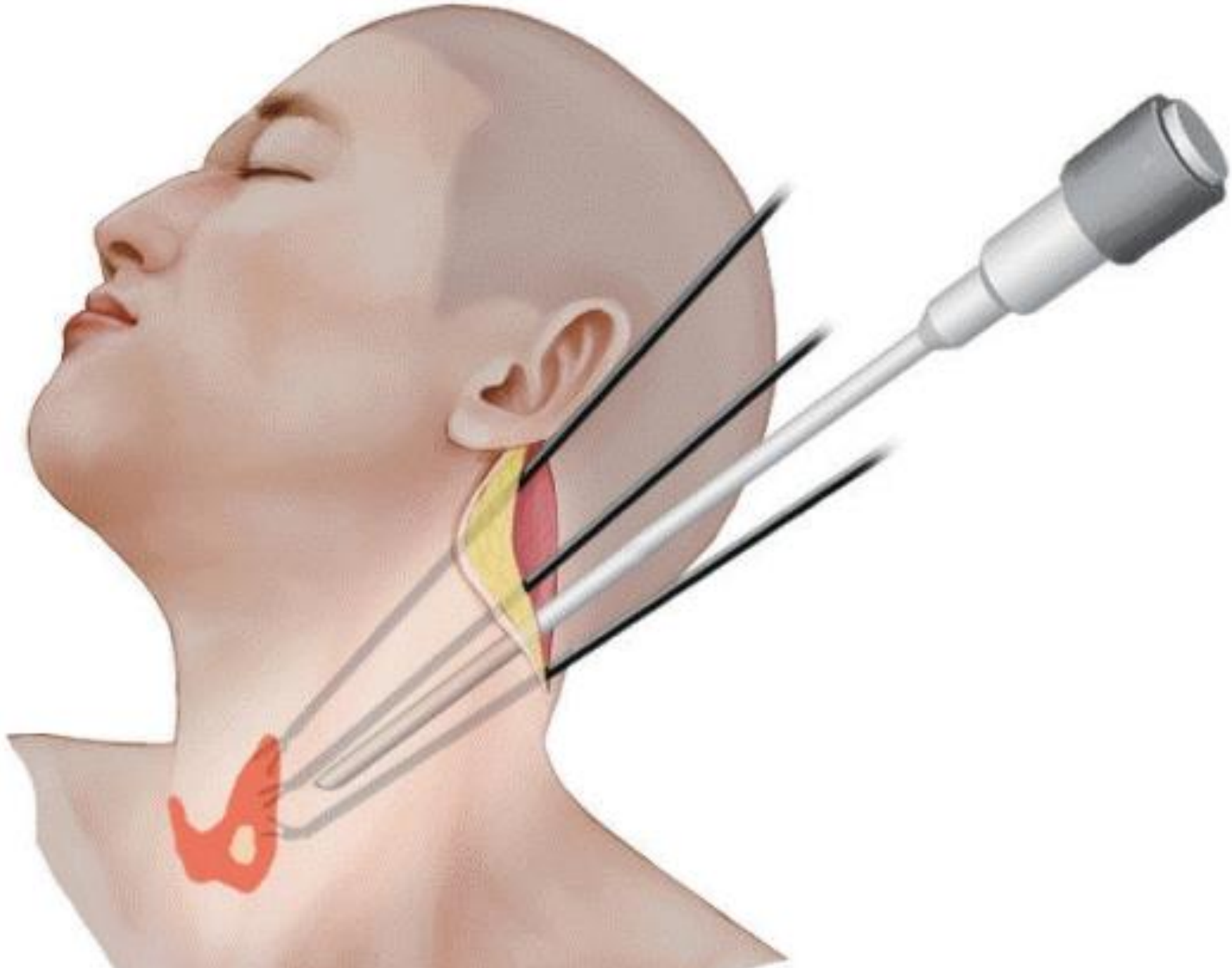

LIPG

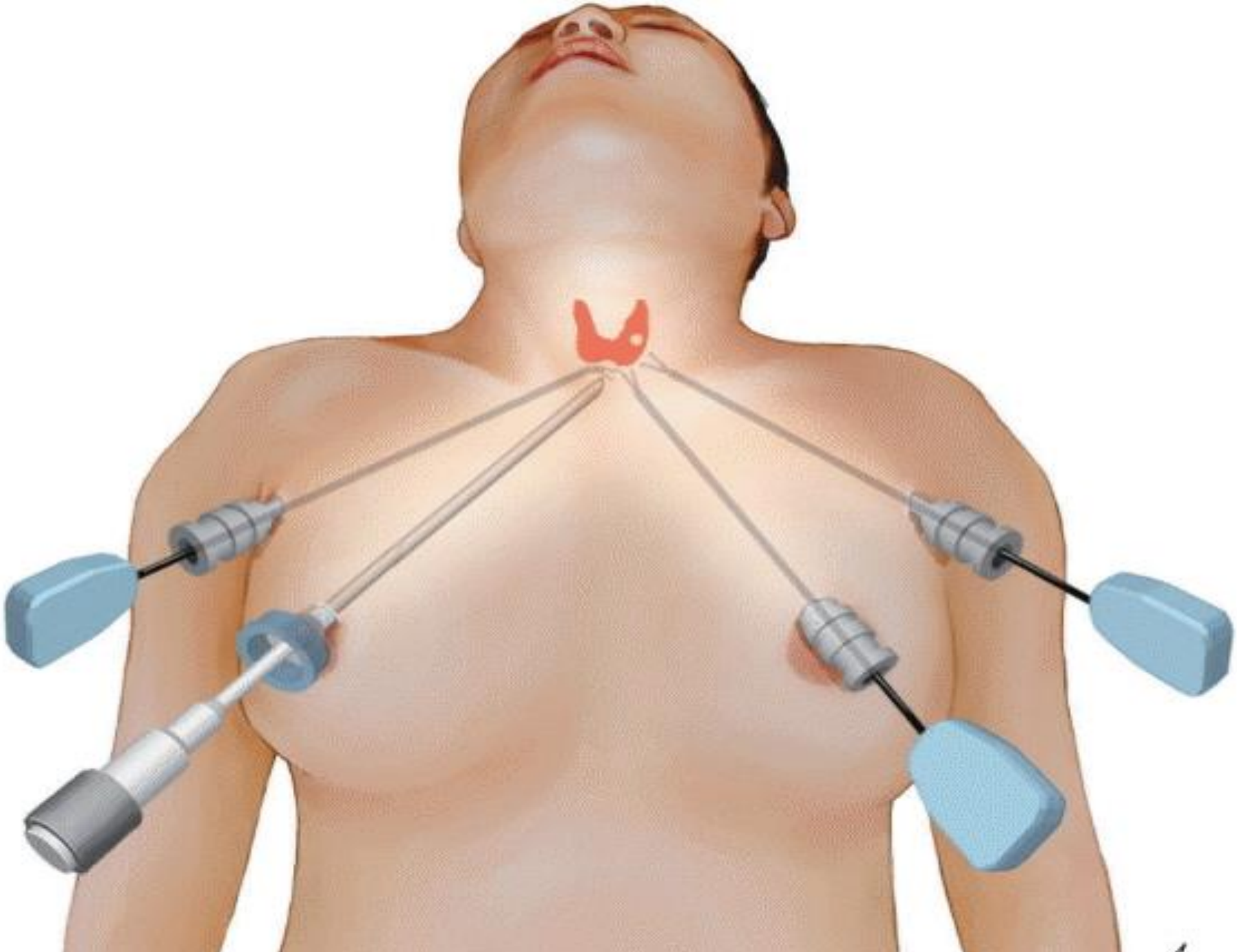

Minimally invasive Thyroidectomy
Mini incision
Endoscope assisted
True endoscopic
Robotic
Cervical
Anterior chest
Axillary
Areolar
Trans-Axillary
Face-Lift
Trans Oral


A
B
C
Cricoid cartilage
Anterior axillary line
1.0–1.2 cm
Sternal notch
1.0 cm
8–9 cm
1.0 cm
Margin of breast parenchyma


A
B


A
B

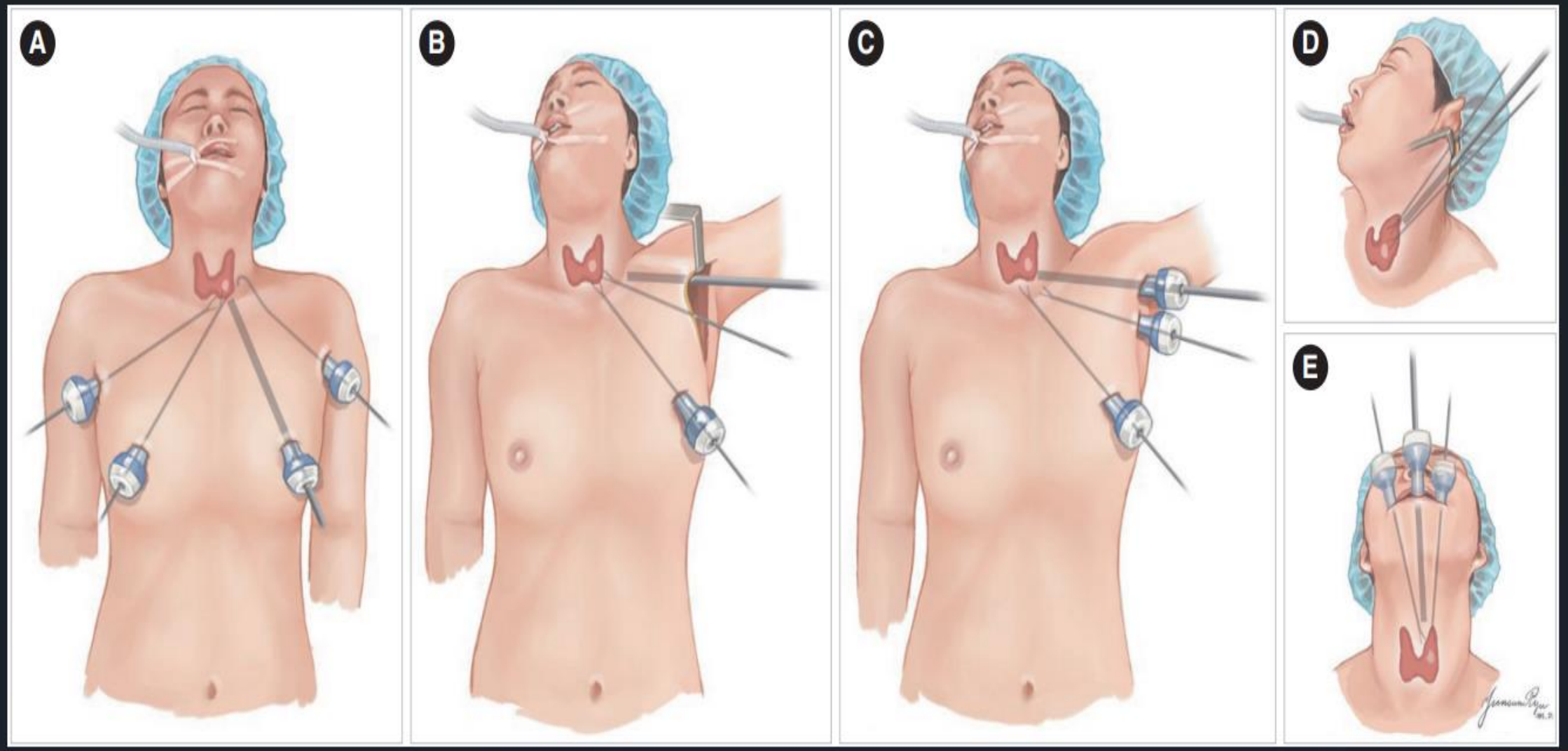





One month
post-op
Two month
post op
Three month
post op

Minimally Invasive Thyroid Surgery

- “The decision is more important than the incision.
- To be a good endoscopic surgeon one needs to be a better open surgeon!
- “When technology is the Master, the result is Disaster.”


A
B
C
D
E

Nerve MONITORING

- Routine visual identification of the recurrent laryngeal nerve (RLN) decreases the incidence of injury and is regarded as the standard of care in thyroid surgery.
- Intraoperative nerve monitoring is an adjunctive measure that can be used to identify the nerve with the goal of reducing the risk of nerve injury but should not be relied upon as a substitute for good surgical technique.

Intraoperative frozen section

- Frozen section analysis is no longer widely used and is only reserved for a few situations in which it could have an impact on surgical decision making
- To diagnose thyroid malignancies intraoperatively when the preoperative cytology was atypical or suspicious, thus potentially informing the need for a completion thyroidectomy
- To diagnose lymph node metastasis, which may help guide the decision to perform a therapeutic central compartment neck dissection.
- To confirm parathyroid tissue.

Inpatient versus outpatient surgery

- In a series of 1168 thyroidectomies, nearly 20 percent were performed as outpatient procedures, mostly by high volume surgeons at high-volume centers . In that series, the readmission rate after outpatient surgery was comparable to that of inpatient surgery (1.4 versus 2.4 percent).

High volume thyroid surgeon and center

- A cut-off of 35–40 thyroidectomies per year for single surgeon, and 90–100 thyroidectomies for single center appears reasonable for identifying an adequate activity. Concerning parathyroidectomy, we can consider reasonable a cut off at 10–12 operations/year.

Thyroidectomy in DTC : Total

- High-risk differentiated thyroid cancer
- Tumor ≥4 cm
- Gross extrathyroidal extension,
- Clinically apparent metastatic lymph nodes
- Distant metastases,
- Prior radiation to the head and neck
- Family history of DTC in a first-degree relative

Thyroidectomy in DTC

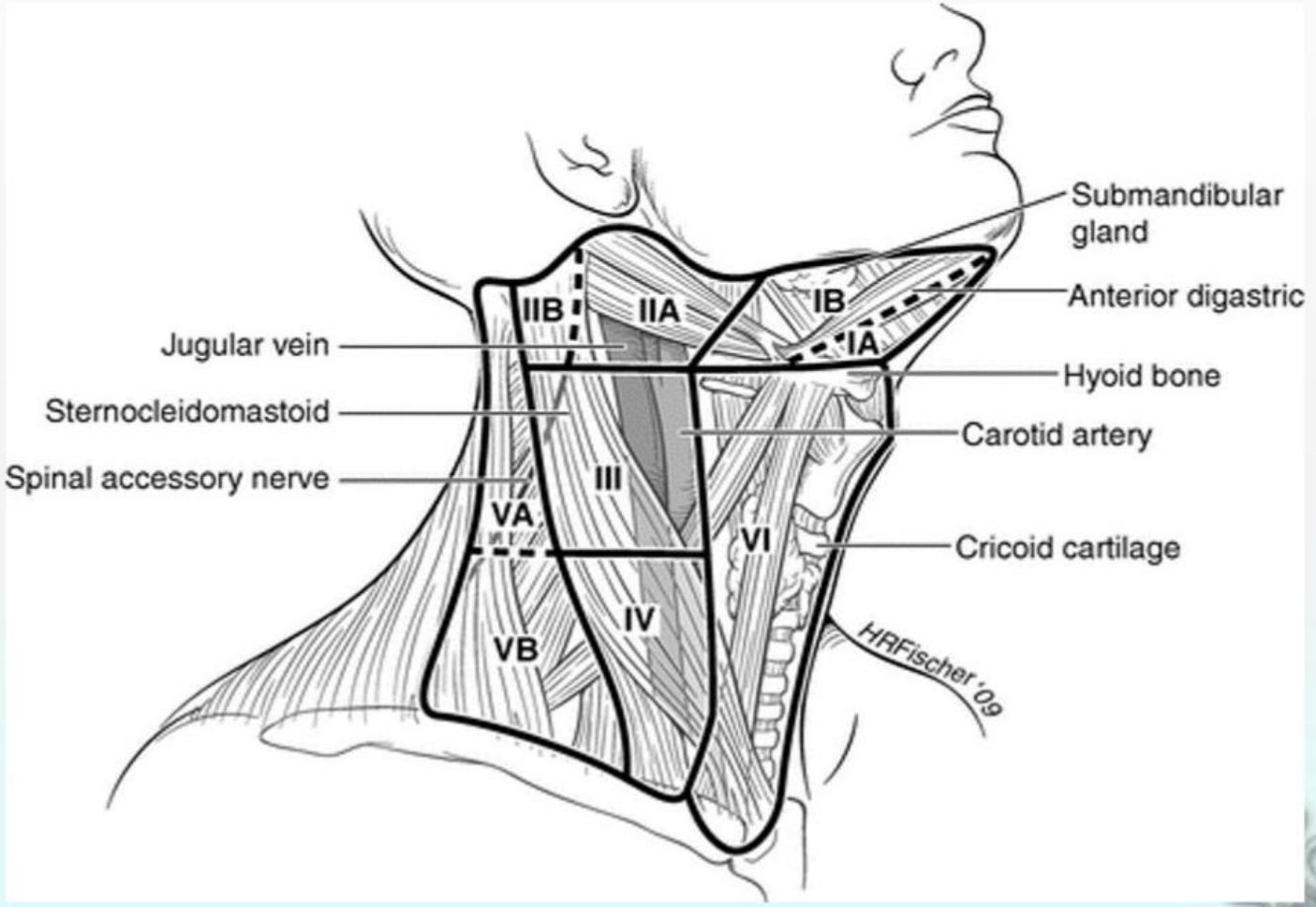
Either a **Total** or **Lobectomy**

- low-risk differentiated thyroid cancer including :
- Tumor between 1 and 4 cm without gross evidence of extrathyroidal extension or clinical evidence of central or lateral compartment lymph node and distant metastasis.

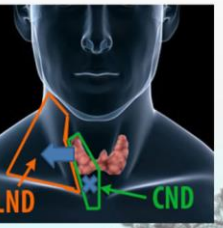
The Best Aide For Thyroid Surgeon

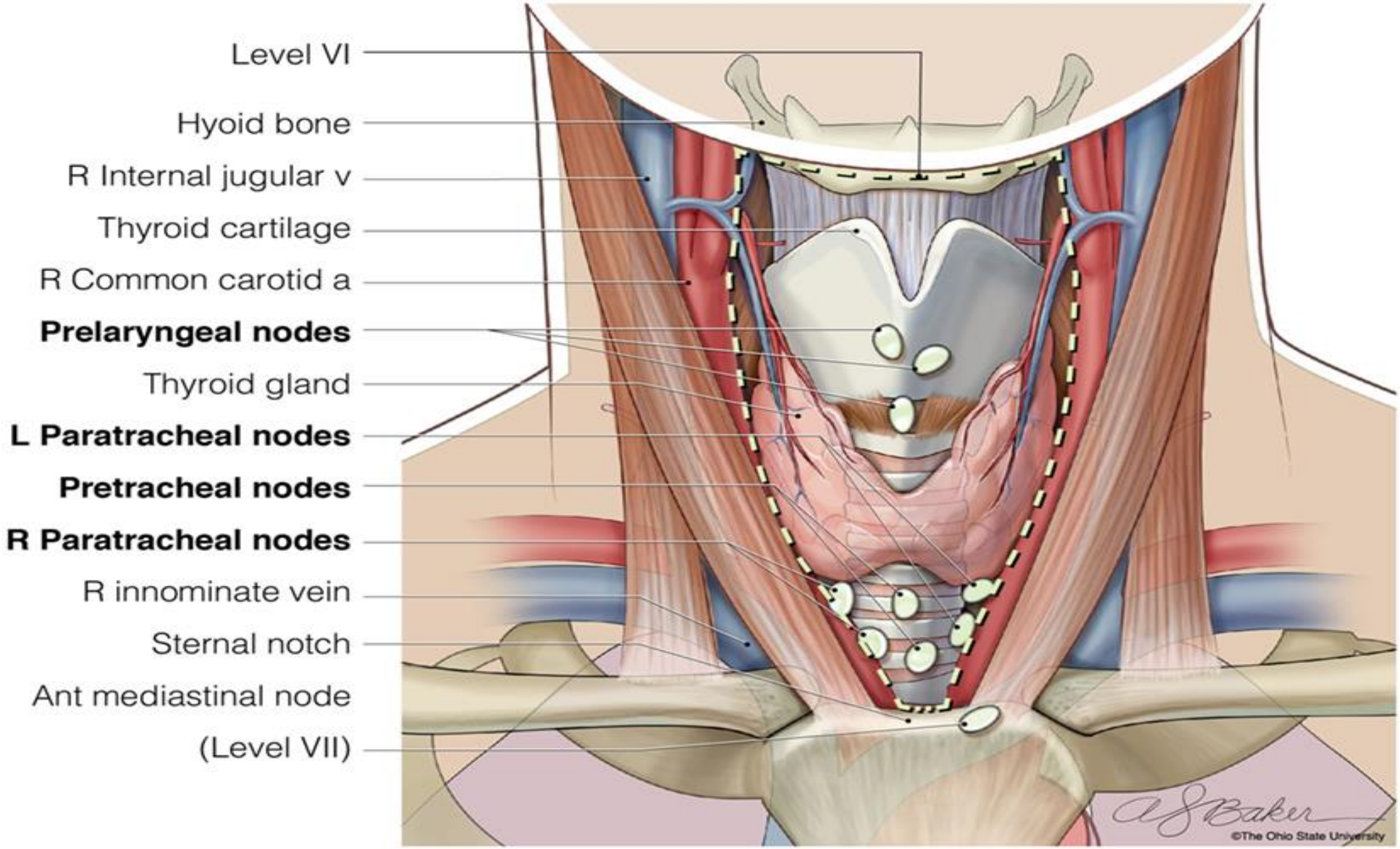
Accurate Ultrasound

Anatomy of Cervical Lymphatic



al Metastases




Level VI
Hyoid bone
R Internal jugular v
Thyroid cartilage
R Common carotid a
Prelaryngeal nodes
Thyroid gland
L Paratracheal nodes
Pretracheal nodes
R Paratracheal nodes
R innominate vein
Sternal notch
Ant mediastinal node
(Level VII)
©The Ohio State University

Management of Neck in Thyroid Cancer Clinically and sonography Negative

- Intraoperative Management
- Look for TE groove nodes
- Look for superior mediastinal nodes
- If any of these enlarged - do the respective clearance

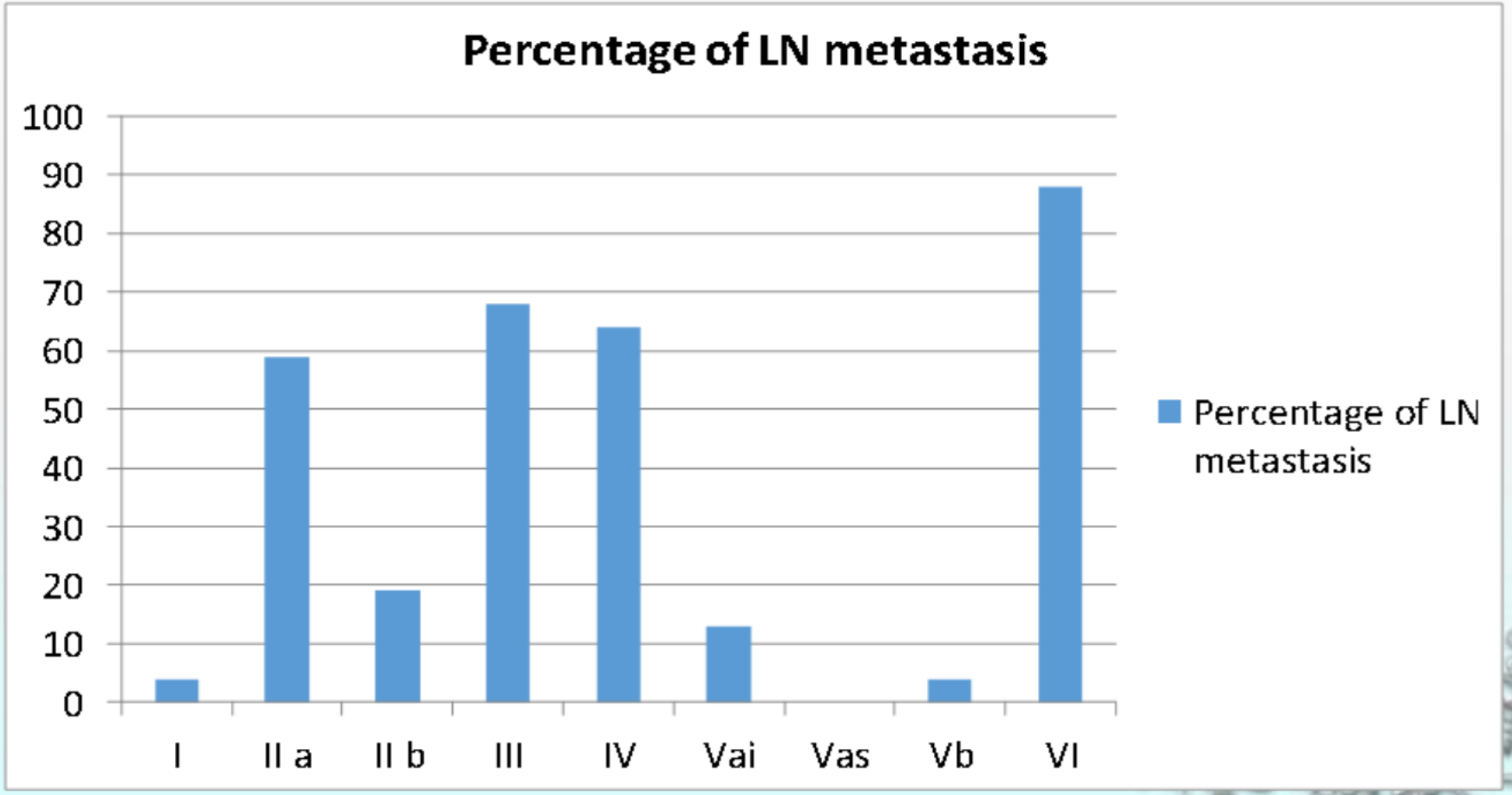
Management of Neck in Thyroid Cancer Clinically positive

- Berry picking" not recommended,(higher incidence of neck recurrence).
- Modified neck dissection Preserving SCM , IJV ,Accessory nerve , Submandibular sal gland (Level I)
- RND - rarely indicated

Table 1
Location of lymph node metastases at MRND in patients with DTC and positive lateral nodes[a]

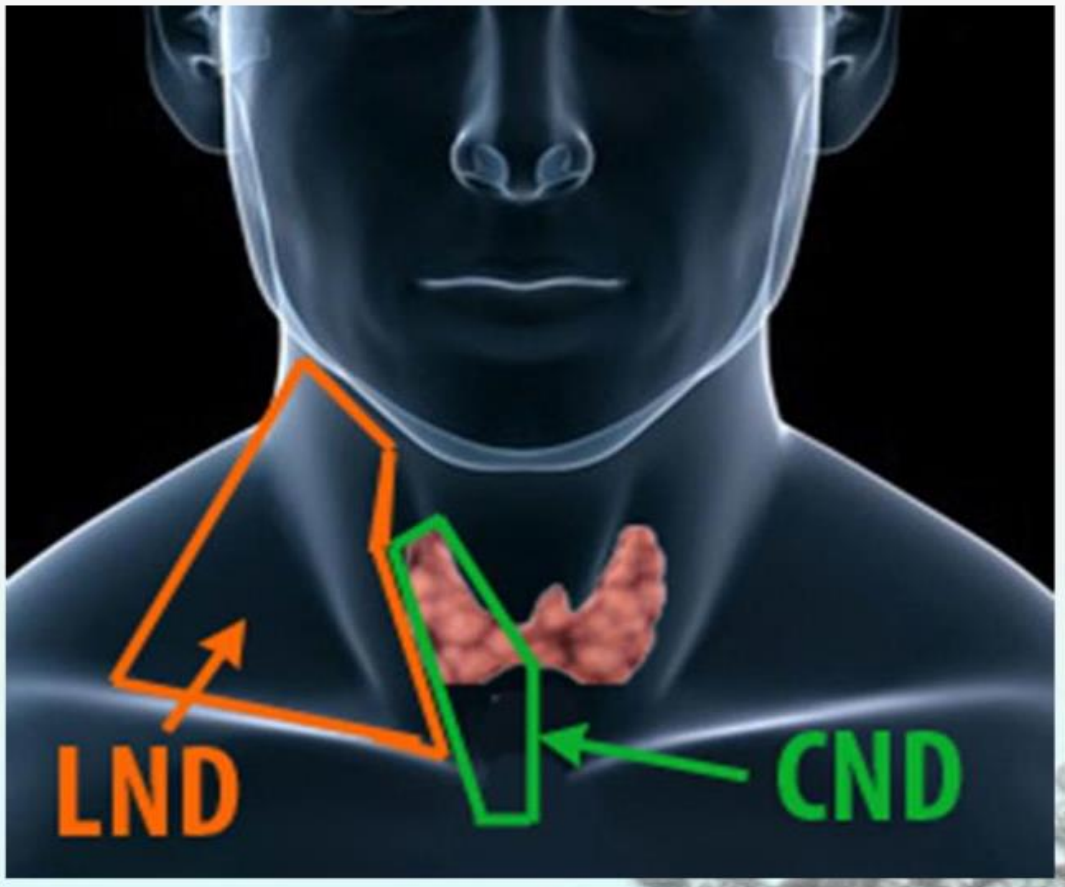
	I	Ia	Ib	II	IIa	IIb	III	IV	V	Vai	Vas	Vb	VI	Skip Mets[b]
Pingpank[17] (n = 44)	38	—	—	49	43	21	76	59	28	—	—	—		
Roh[16] (n = 52)	—	—	4		72	17	72	76		13	0	4	90	10
Yanir[18] (n = 27)	—	—	—	54	—	—	68	57	20	—	—	—	95	5
Mirallie[8] (n = 72)	—	—	—	28	—	—	61	61	36	—	—	—	83	17
Average	38	—	4	39	59	19	68	64	31	13	0	4	88	12

[a] Values indicate the % of patients with positive lymph nodes at each level.
[b] Metastases to lateral nodes without evidence of central compartment involvement.


Percentage of LN metastasis
100
90
80
70
60
50
40
30
20
10
0
I
II a
II b
III
IV
Vai
Vas
Vb
VI
Percentage of LN metastasis

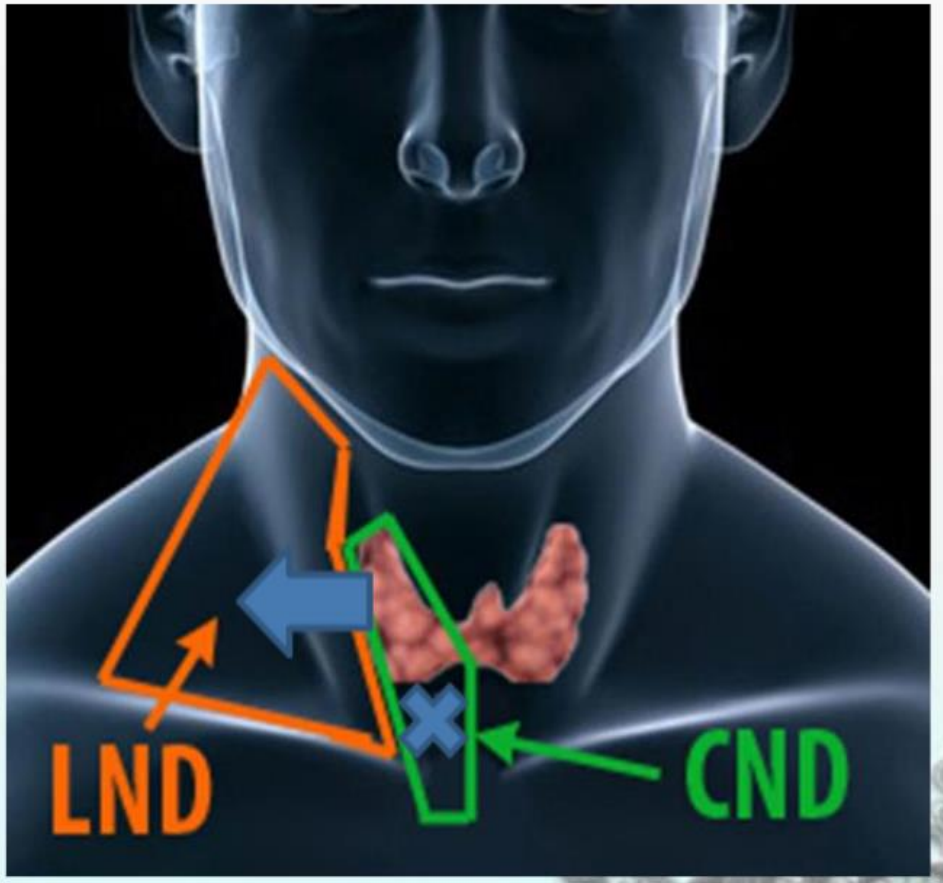
LND in PTC

- Papillary thyroid cancer (PTC)
- Lateral neck dissection (LND)
  - To dissect/ not to dissect
  - Extent of dissection



Patterns of Nodal Metastases

- 7%-19% skip metastasis



PTMC

- Indications for surgery
- Which type of surgery is appropriate lobectomy or total
- Central and lateral compartment exploration
- Completion thyroidectomy
- Classic vs endoscopic

Active Surveillance should not be used in the following scenarios 1

- Patient preference.
- Children and adolescent .
- Patient characteristics: Unable or unwilling to follow-up for surveillance.
- Physician characteristics: Lack of experience and confidence in the use of neck ultrasound Surveillance Strategy.

Active Surveillance should not be used in the following scenarios 2

- **Tumor characteristics**:

- Aggressive histology such as tall cell variant;
- Invasion of recurrent laryngeal nerve, trachea, or esophagus;
- visible extrathyroidal extension;
- regional or distant metastases; tumor near posterior capsule.
- Multifocal or bilateral.

Transitioning *PTMC* to *Surgery* after Active surveillance

- Patient preference ,
- New biopsy-proven lymph node metastases;
- Distant metastases;
- Invasion into recurrent laryngeal nerve, trachea, or esophagus;
- Radiologic evidence of extrathyroidal extension.
- Cancer growth by 3 mm in any dimension or a 50% volume increase was also an indication for surgical consultation

Total Thyroidectomy PTMC Indications

- Patient Preference
- Hashimoto and Hypothyroidism
- Tumor characteristic
- Intra operative findings
- Familial and Radiation History

Special Considerations

- Familial History
- Radiation History
- Hashimoto and Hypothyroidism
- Contralateral lobe Nodules
- Isthmus location
- Upper pole

Intraoperative Findings

- Gross Capsular invasion
- Extra thyroidal extention
- Invasion to othrer structures
- Central lymph nodes evaluation
- All of above to decrease risk of **completion**

Completion thyroidecyomy : PTMC

- Lymphatic and vascular invasion
- Macroscopic multifocal disease (>1 cm) •
- Poorly differentiated
- Gross positive resection margins
- Gross extra-thyroidal extension
- Completion of thyroidectomy is not required for incidental small volume pathologic N1A metastases (less than 2 mm).
- optimally performed within **two weeks** of the initial surgery to avoid the formation of dense scarring.

Central Lymph Node Metastase in PTMC

- Male gender
- younger age (<45 years)
- larger tumor size (>5 mm)
- positive CLN metastases via ultrasound
- multifocality
- extrathyroidal extension are independent risk factors for CLN metastases.
- Location of tumor : isthmus is a challenging area

Risk factors for lymph node metastasis in papillary thyroid microcarcinoma (PTMC)

Papillary thyroid microcarcinoma

Tumor ≤ 1 cm

↑↑↑
INCIDENCIA

Metastatic lymph nodes

- Difficult preoperative assessment
- Indication for lymphadenectomy is controversial

Identify factors associated with the presence of metastatic lymph nodes

N = 161

Metastatic lymph nodes: 9.3% (n=15)

Central lymph nodes (VI): 73.3% (n=11)

Lateral lymph nodes (II-IV): 46.6% (n=7)

Factors associated with metastatic lymph nodes

- Multifocal
(OR 5.284, 95%CI 1.056 – 26.443; *P*=.043)

- Extracapsular invasion
(OR 7.687; 95%CI1.405 – 42.050; *P*=.019)

Factors associated with metastatic lymph nodes

-Multifocal

-Extracapsular invasion

RAI indications NCCN

- **RAI selectively recommended (if any present):**
- • Largest primary tumor 2–4 cm • High-risk histologyt • Lymphatic invasion • Cervical lymph node metastases • Macroscopic multifocality (one focus >1 cm) • Postoperative unstimulated Tg 1–10 ng/mLr • Microscopic positive margins
- **RAI typically recommended (if any present):**
- • Significant N1b disease • Gross extrathyroidal extensionu • Primary tumor >4 cm • Postoperative unstimulated Tg >10 ng/mLr,v • Bulky or >5 positive lymph nodes • Vascular invasion