PEARLS OF THYROID SURGERY

PROF . DR. ARUN V. JAMKAR*
Dr Bhagyashree Kulkarni,**

* Dean and Professor
** Chief Resident
Department of Surgery,
B.J.M.C. PUNE

Prof Dr. Arun Jamkar,
M.S. Ph.D. (Surgical Oncology),
FICS, FIAGES, FMAS, FAMS FAIMER fellow
Former Vice Chancellor,
Maharashtra university of Health sciences, Nashik
Consultant,
Persistent systems ltd, Pune
Distinguished Professor ;
Symbiosis International University,
Pune.
Director Academics,
Galaxy care hospitals, Pune

Dr Bhagyashree Kulkarni,**
Consultant Surgical
Oncologist, SMCW Lavale

Anatomy of Thyroid Gland

Anatomy of Thyroid Gland

HISTORY

- **Era of Doom**: Mortality rate unacceptably high - infection and bleeding. The French Academy of Medicine banned operations in 1850
- *Can the thyroid gland, when in a state of enlargement be removed with a reasonable hope of saving the patient? Experience emphatically answers no … no sensible man will … every stroke of a knife will be followed by a torrent of blood, and lucky will it be for him if his victim lives long enough to enable him to finish his horrid butchery …*

  Samuel Gross

Theodore Kocher (1841-1917) Father of Thyroid Surgery

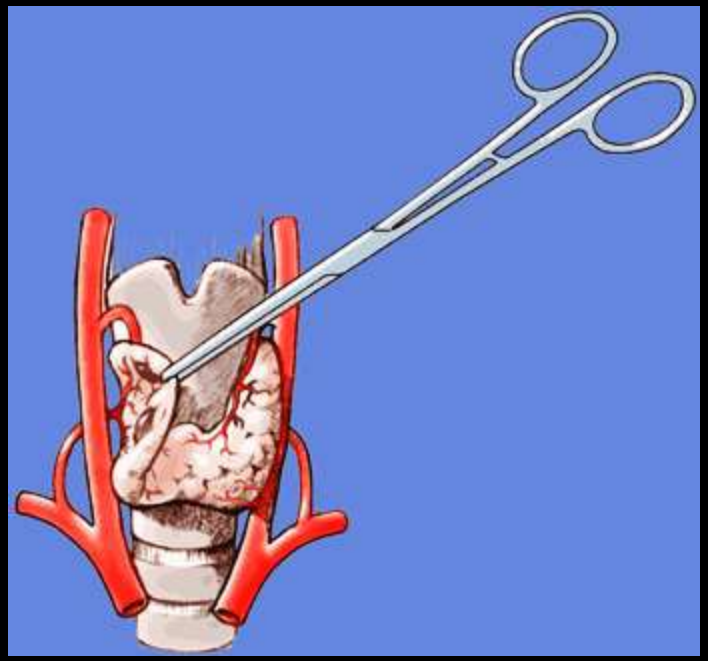
- Kocher (Berne, Switzerland) one of the first surgeons to operate successfully on patients with Graves' disease.
- Meticulous hemostatic technique, innate surgical dexterity and detailed knowledge of anatomy allowed him to perform 5000 Thyroidectomies with an operative mortality rate of 1%

- Kocher was awarded the Nobel Prize in 1909 for Medicine and Physiology for his work on the thyroid gland
- At the time of his death, he had performed more than 5000 thyroidectomies with an operative mortality rate of less than 1%

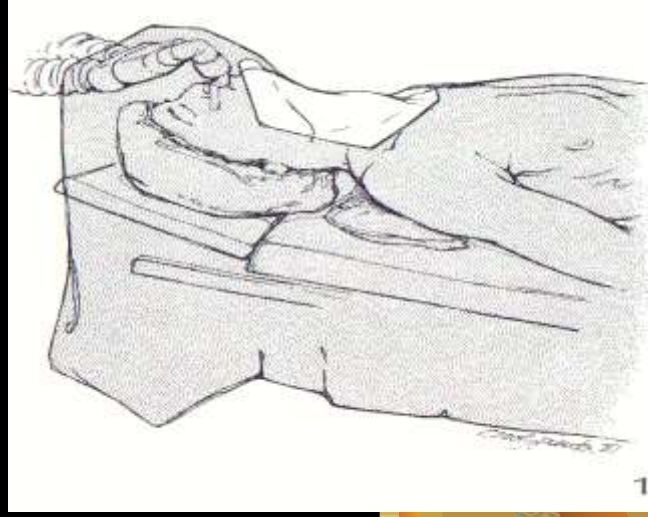
Now a cream surgery

- *The extirpation of the thyroid gland . . . typifies, perhaps better than any operation, the supreme triumph of the surgeon's art.... A feat which today can be accomplished by any competent operator without danger of mishap and which was conceived more than one thousand years ago.... There are operations today more delicate and perhaps more difficult.... But is there any operative problem propounded so long ago and attacked by so many . . . which has yielded results as bountiful and so adequate?*
- Dr. William S. Halsted, 1920 1

Surgical Techniques for Thyroid Surgery

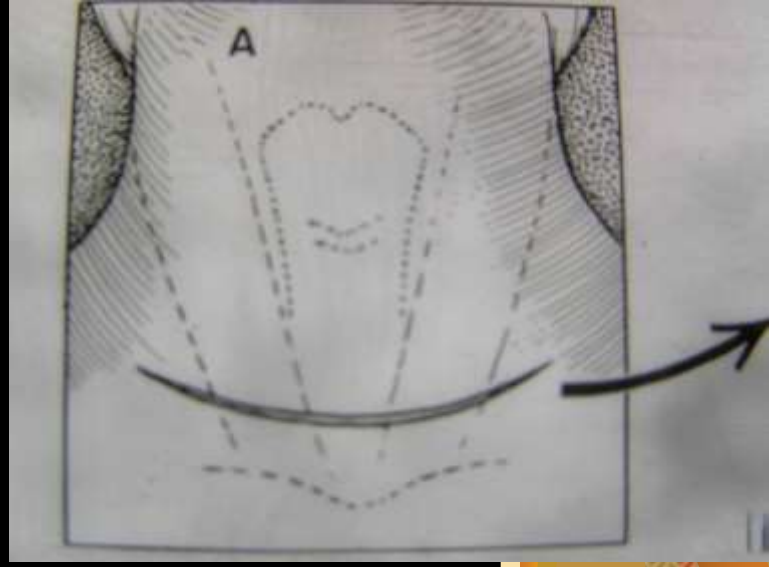


POSITION



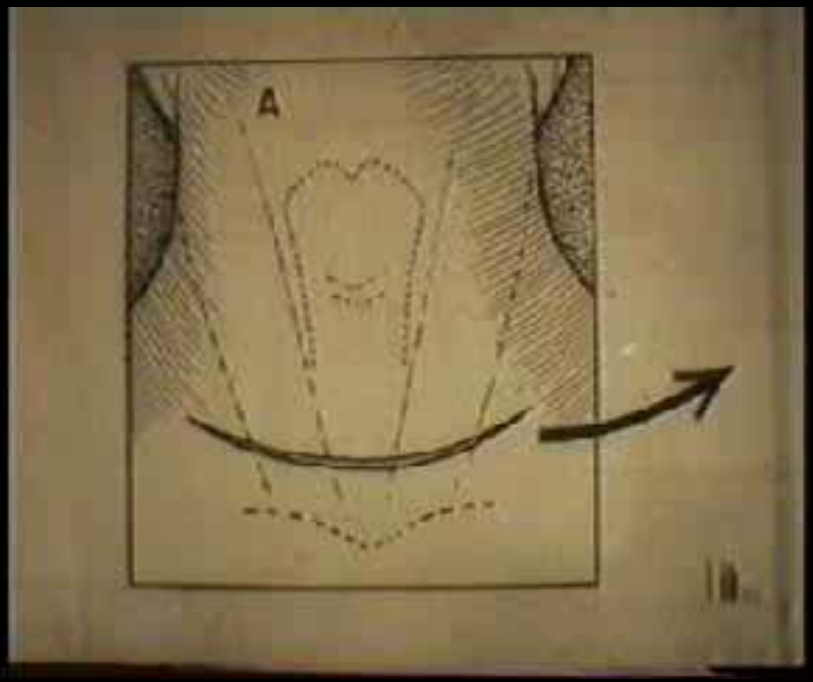
- Supine
- Hyperextension of neck achieved by pillow below scapulae
- All midline structures in one absolute straight line
- Head up – reverse Trendelenburg, till neck veins are collapsed
- *Good position = Good exposure + Good field*

INCISION



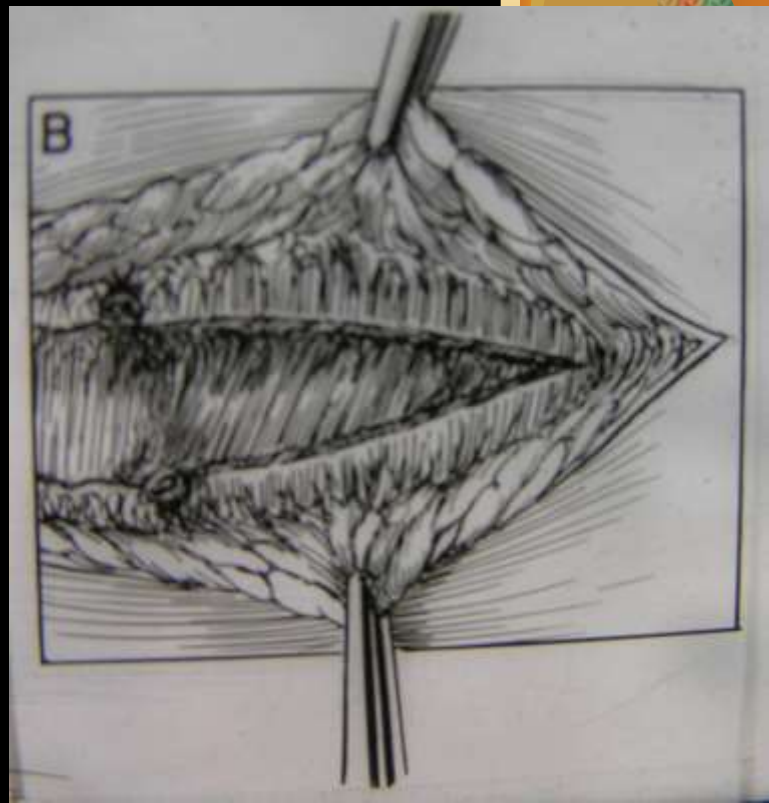
- *Complete*
- Lateral border of one SCM to the other
- Skin crease
- 2cm above the clavicle OR
- At maximum convexity of gland
- *Extension of incision taken superiorly and not beyond lateral border of SCM-will result in lymph edema*

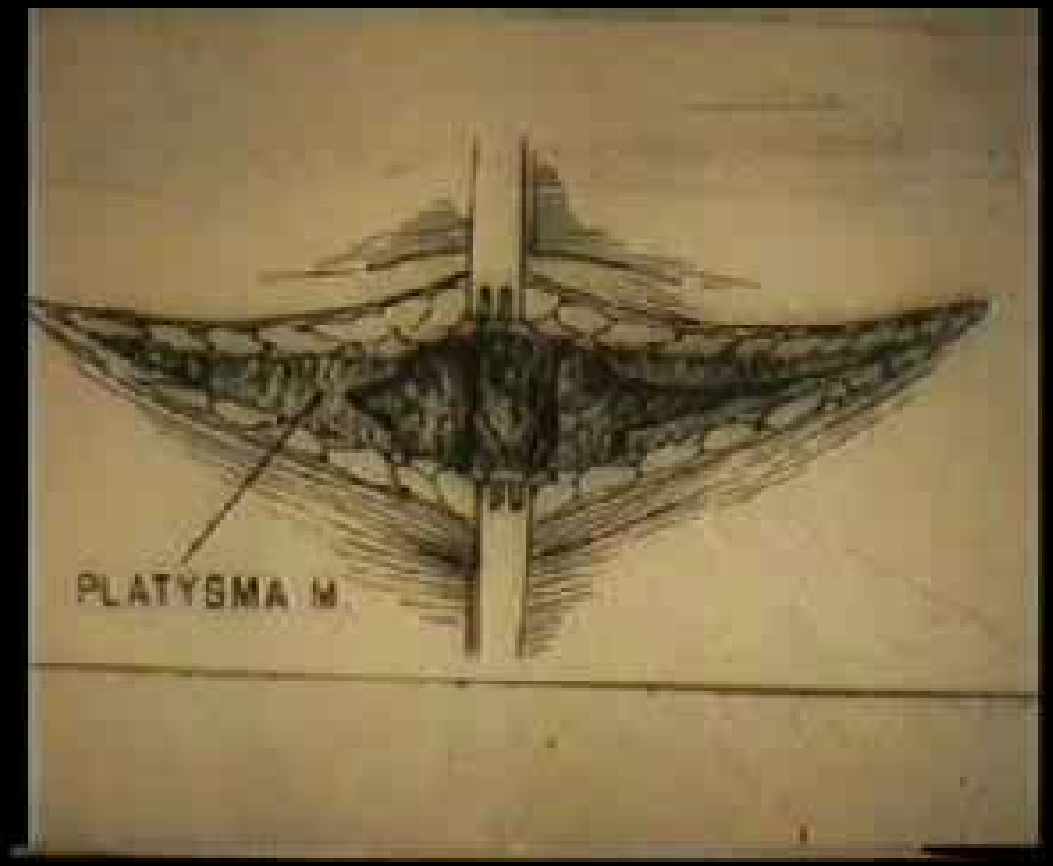
INCISION



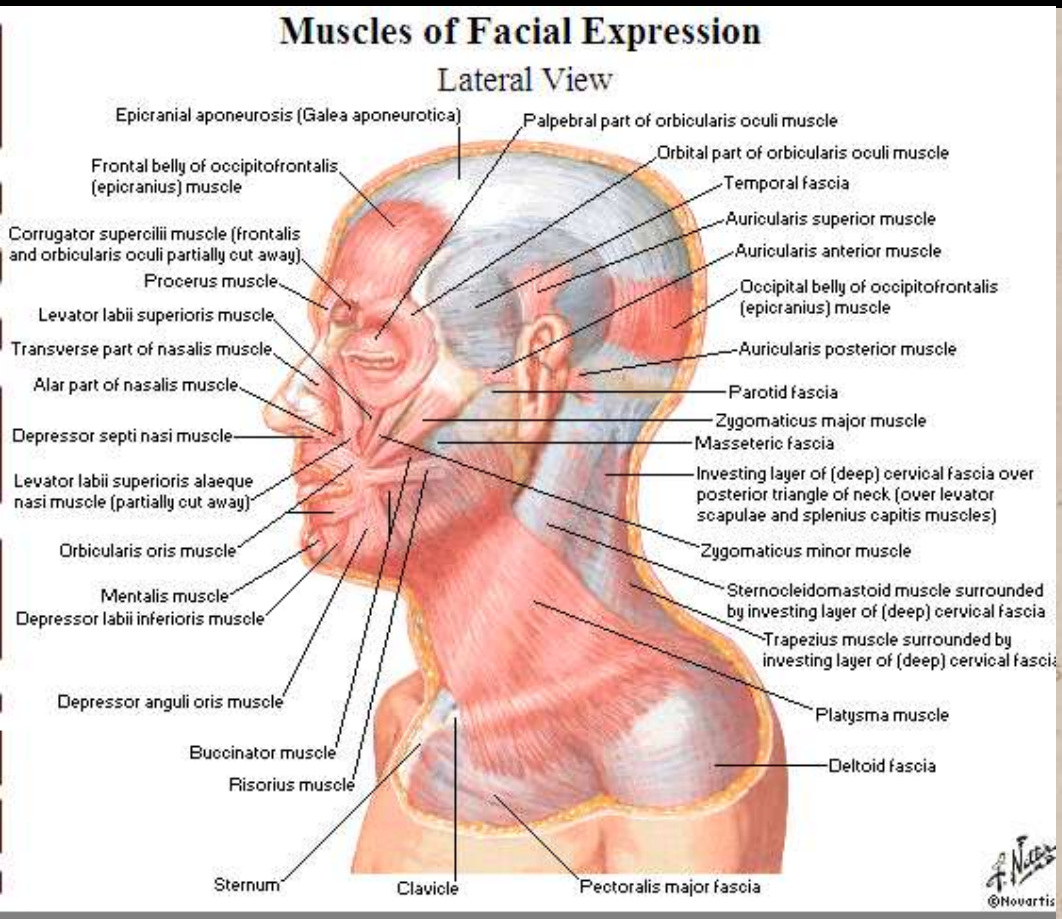
FLAPS

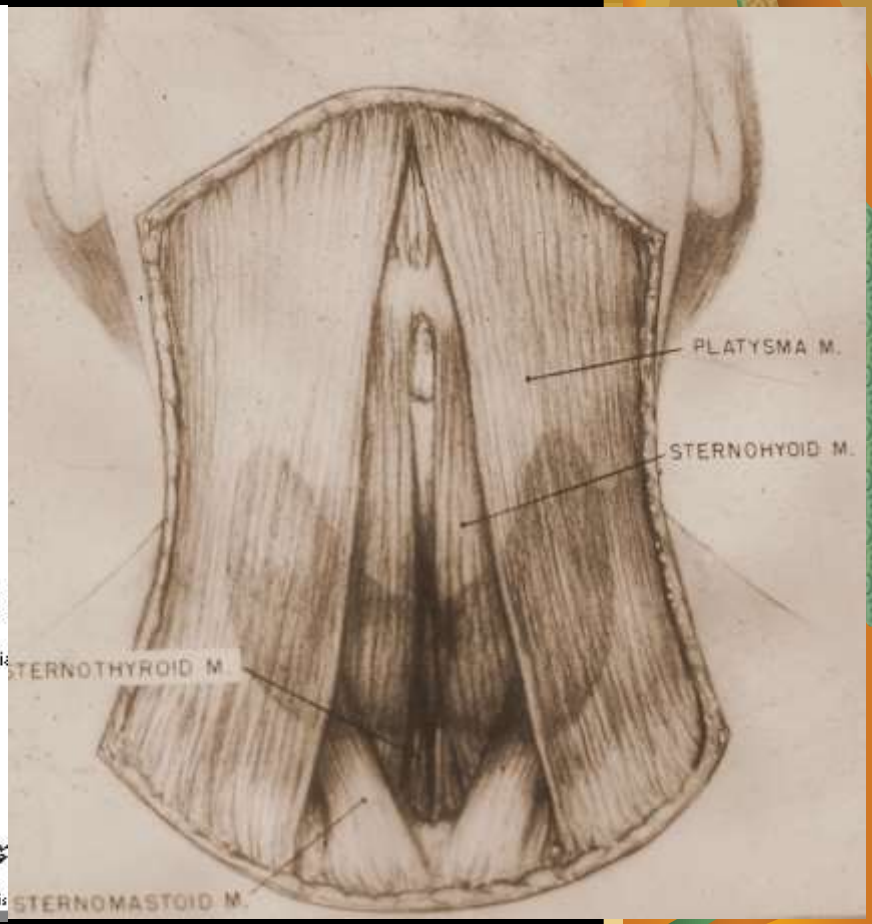
- Sub-platysmal – avascular plane
- *No platysma in midline*
- Skin incision deepened till platysma is cut
- *No hemostasis attempted for ooze from skin till platysma cut*
- Platysma retracts making bleeders obvious




PLATYSMA M

Platysma is absent in Midline

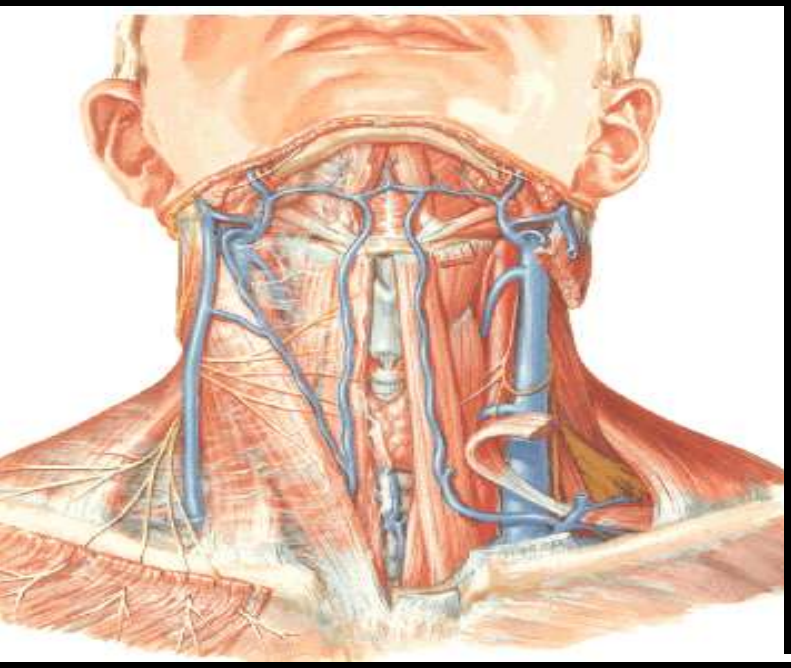


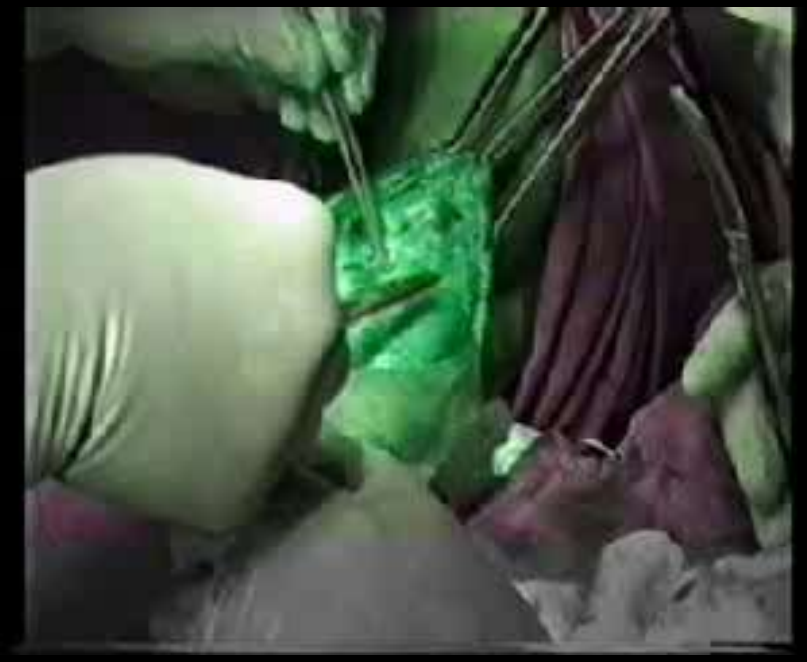


FLAPS

- Superiorly - thyroid Notch
- Inferiorly – supra sternal notch
- Hemostasis achieved by packing with a piece of wet roller gauze
- *Surgeon to shift position for raising the lower flap*

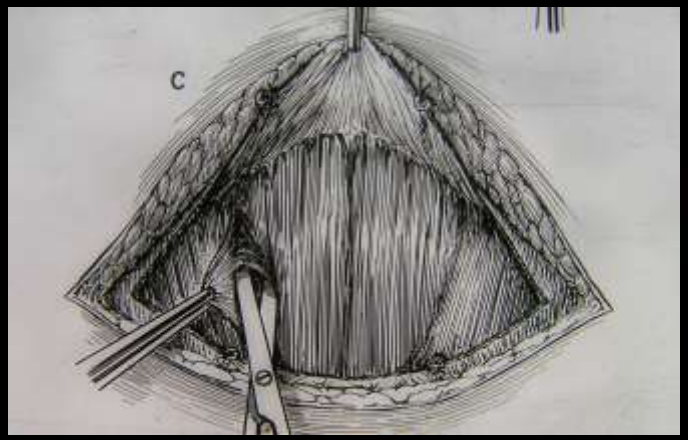
- AJV's, EJV's and their tributaries ligated at highest and lowest level of flap

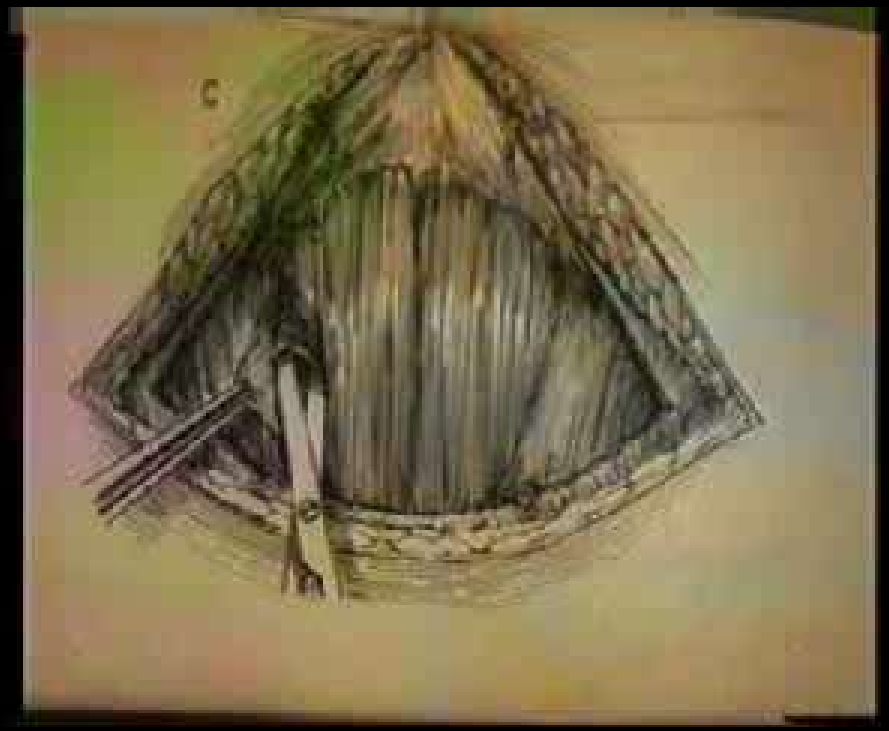




Sternomastoid Muscle

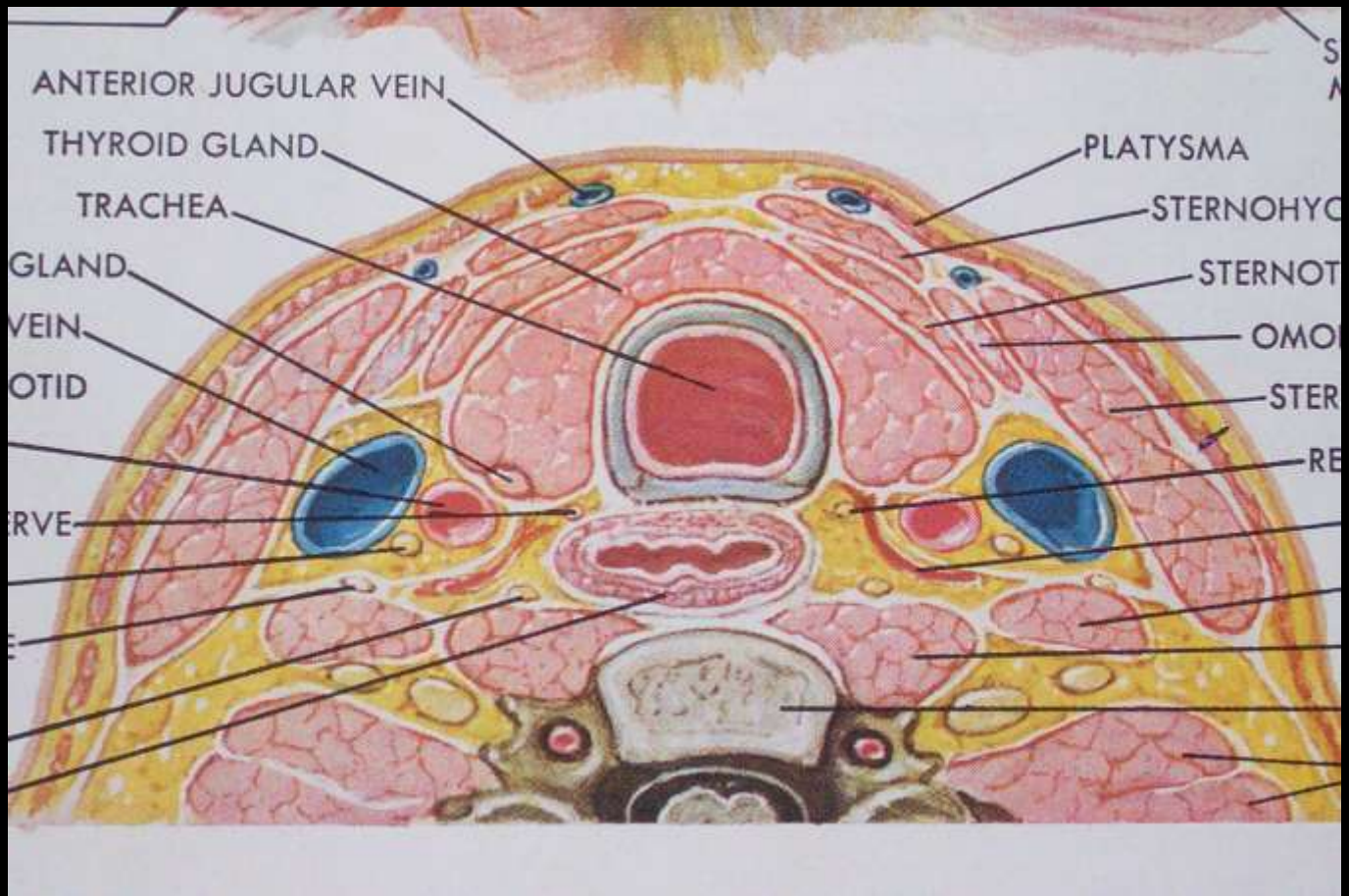
- Plane developed between strap muscles and medial border of SCM
- Not to dissect lateral to SCM – leads nowhere





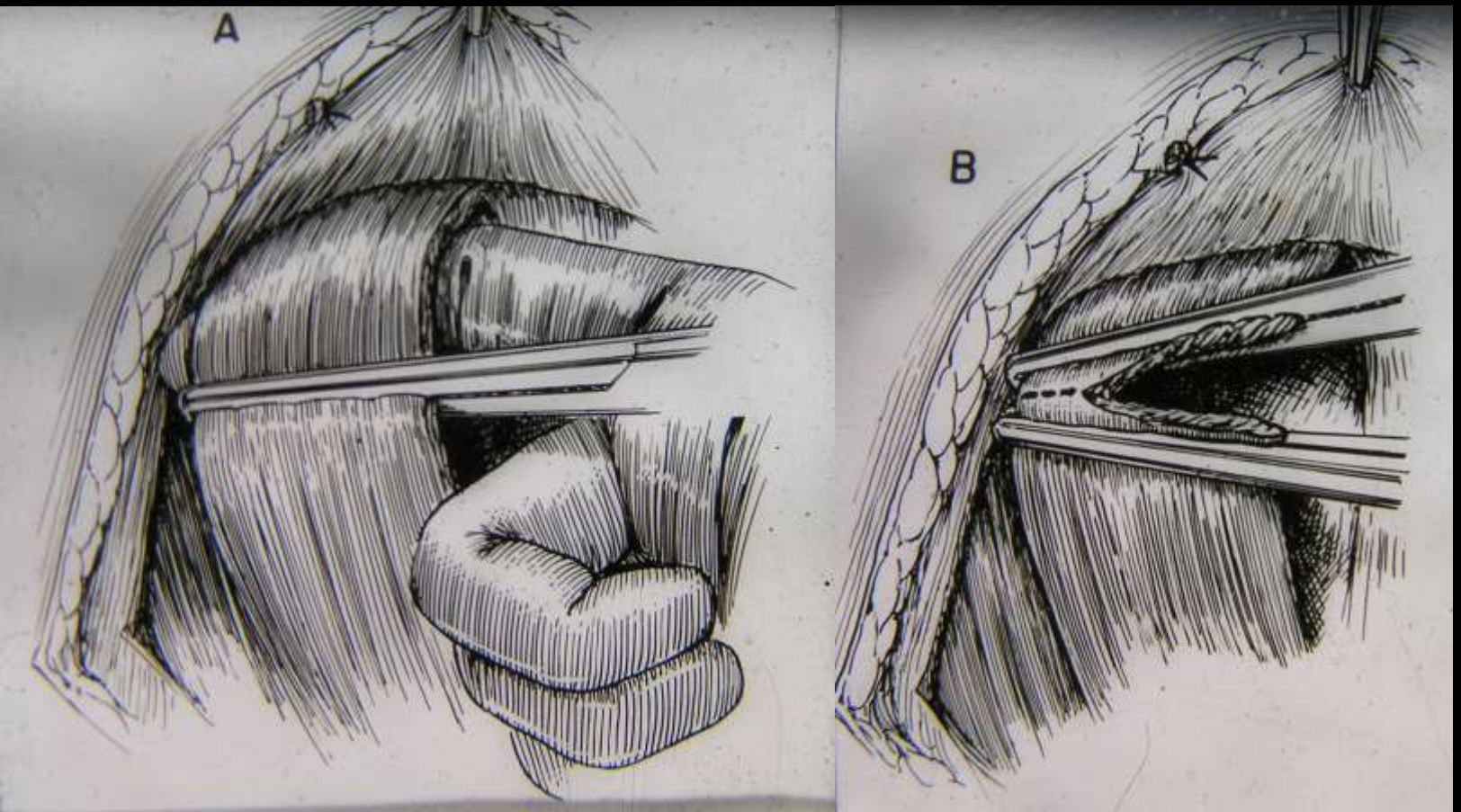
STRAP MUSCLES

- Open up the mid line
- SCM covers half of strap muscles so this dissection is necessary for dissecting strap muscles



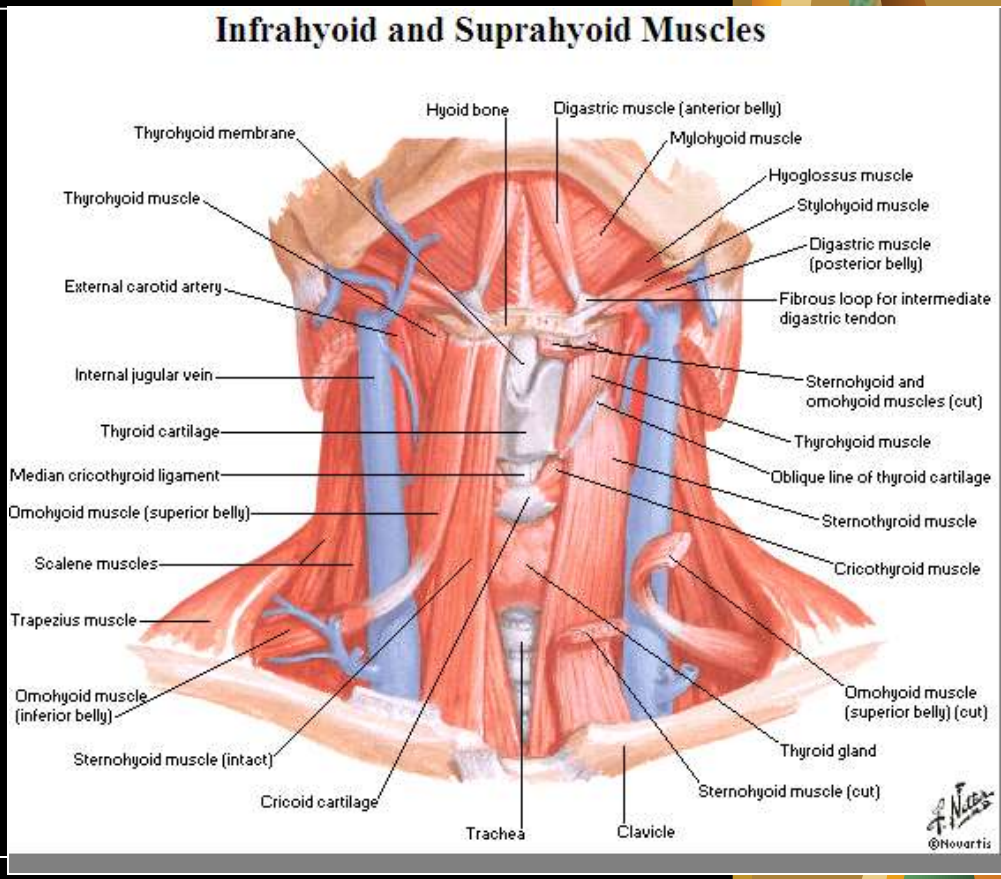
STRAP MUSCLES

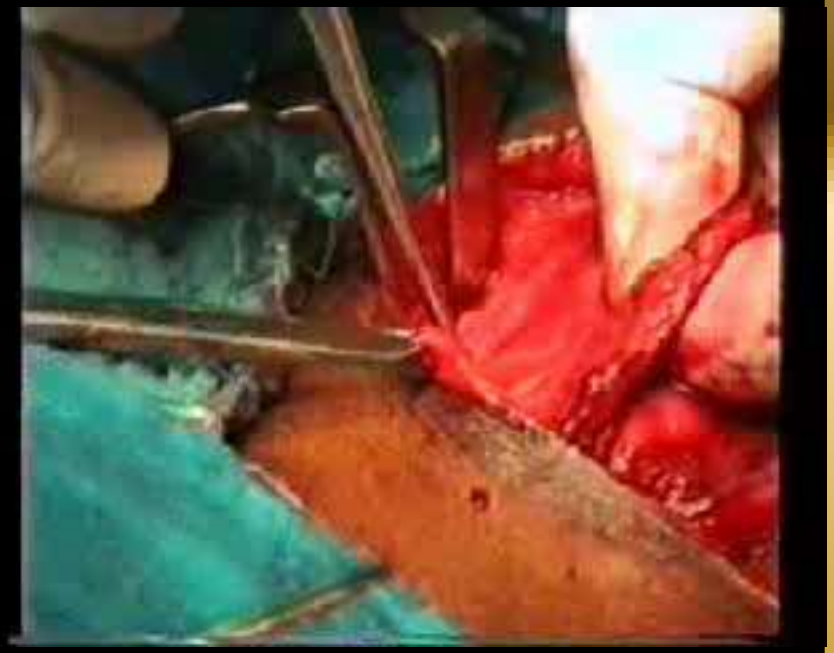
- Cut superiorly to preserve neurovascular supply as high as possible



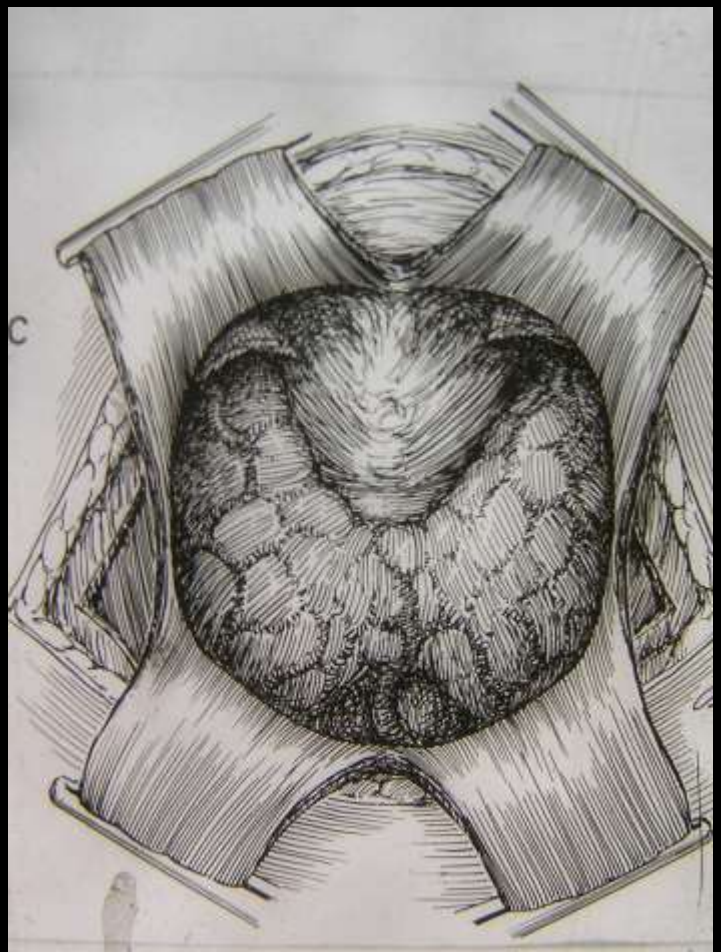
STRAP MUSCLES

- Strap muscles
  - Sterno-hyoid,
  - Sterno -thyroid,
  - Superior belly of omohyoid
- Dissect in two layers – anterior and posterior. If both attempted in one go- inadvertent damage to thyroid surface leading to troublesome bleeding



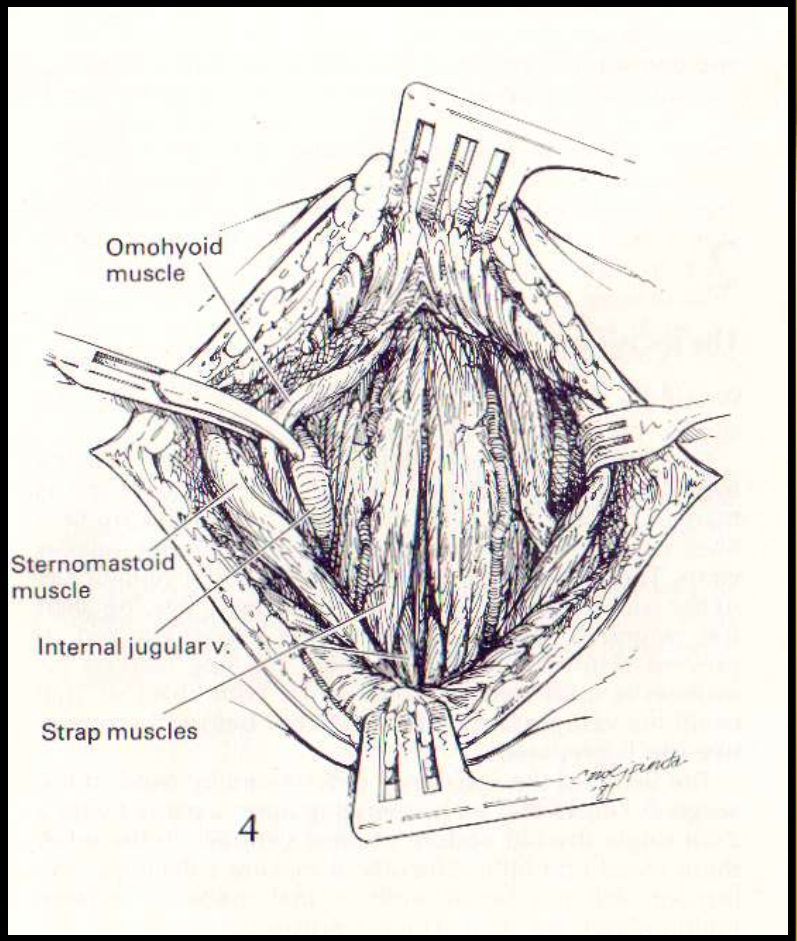


- Approach to superior pole better with strap muscles cut rather than retracted
- Cutting strap muscles is the key for successful ligation of superior pole



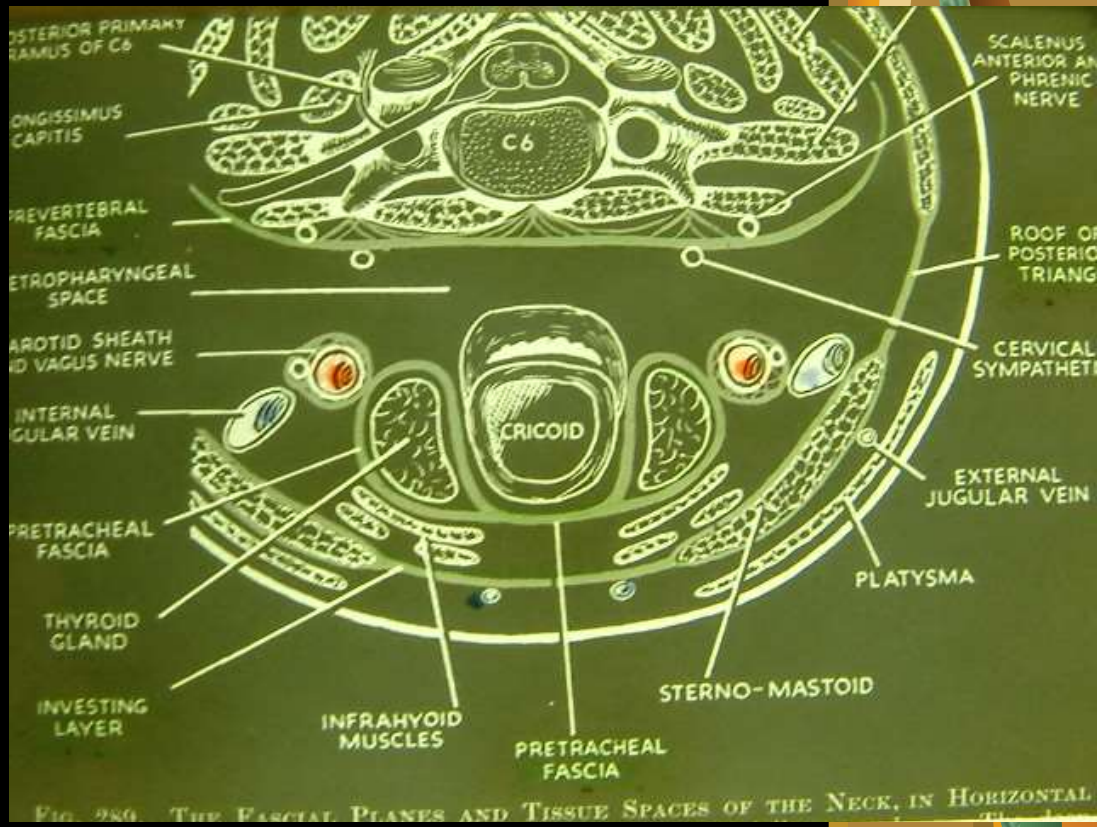
STRAP MUSCLES

- Must be cut for –
  - large glands
  - Re operation
- When not cut – approach is easier with inferior pole tackled first
- Dissecting superficial layer of strap muscles on not affected side facilitates palpation of gland over there



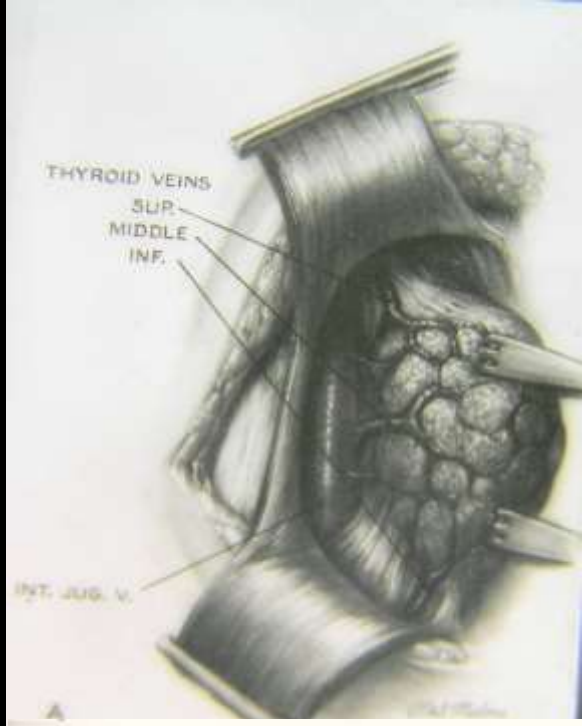
Pre tracheal Fascia

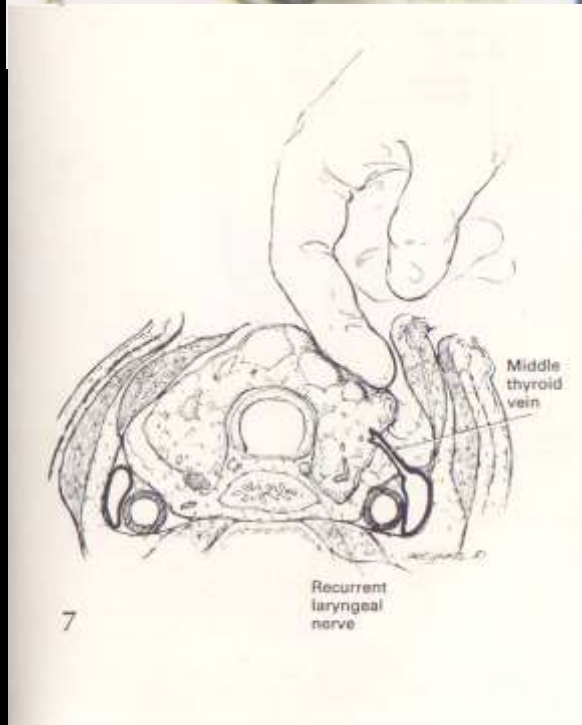
- Cut on similar lines like Strap muscles
- PTF forms False capsule and plane has to be produced between true capsule and False capsule

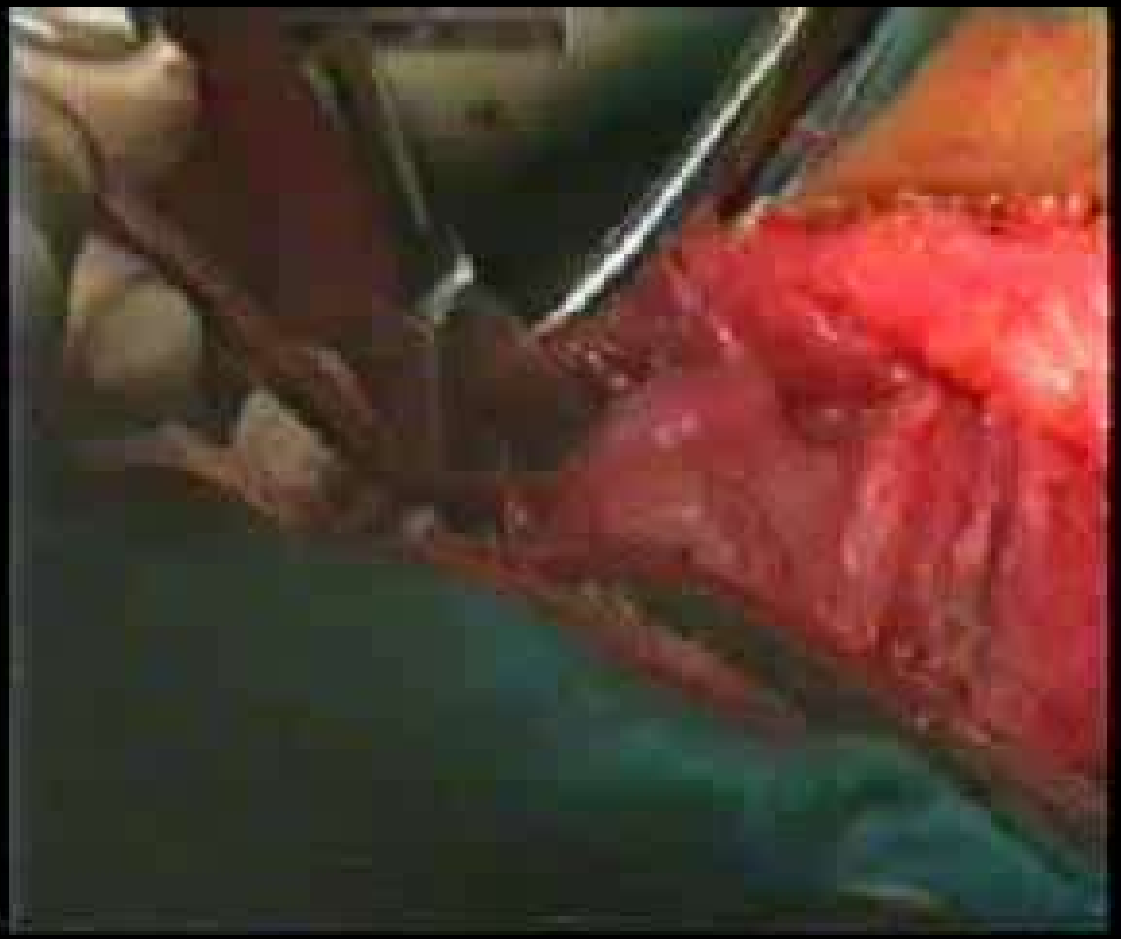


MIDDLE THYROID VEIN : Check whether present

- Present in 25 %
- Essential to rule out its presence
- If torn can lead to torrential bleeding from IJV or even air embolism

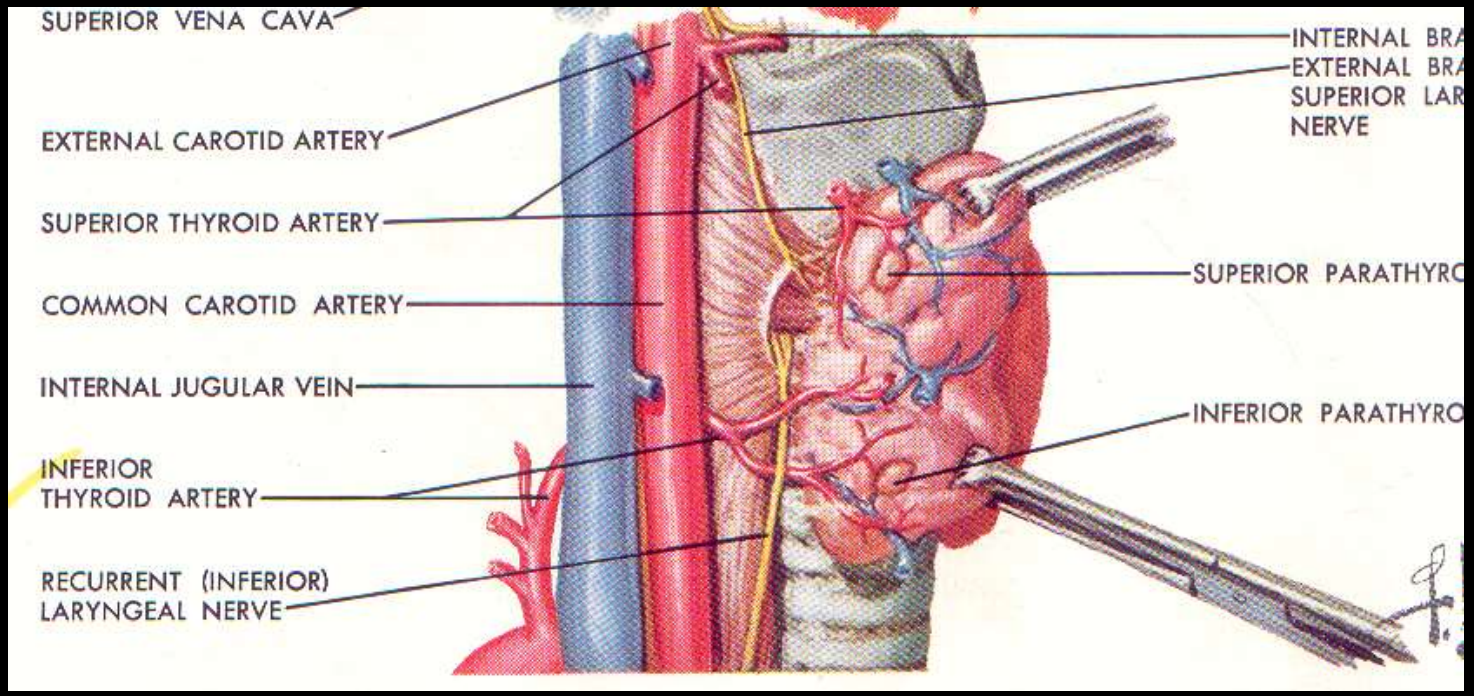


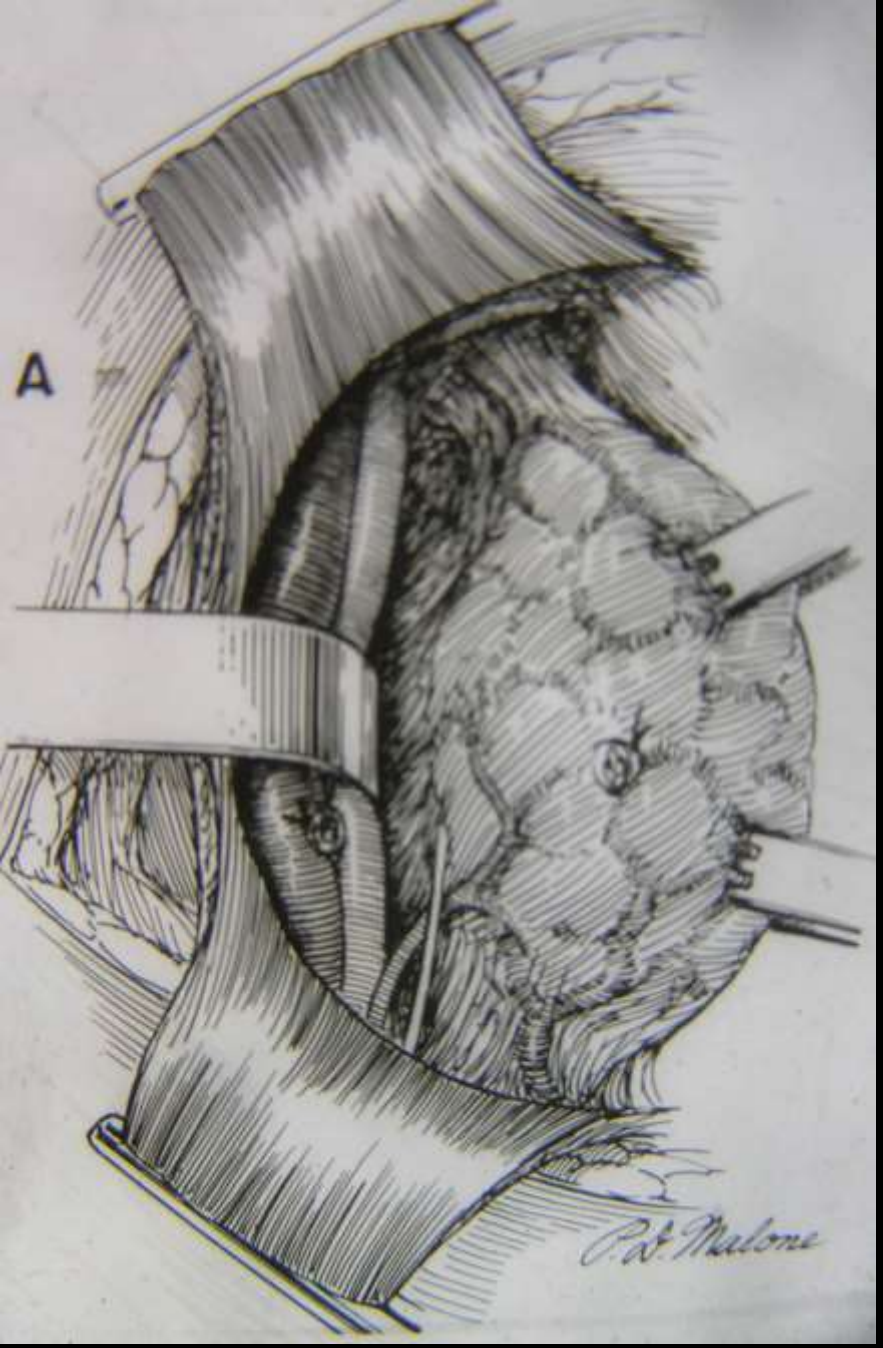


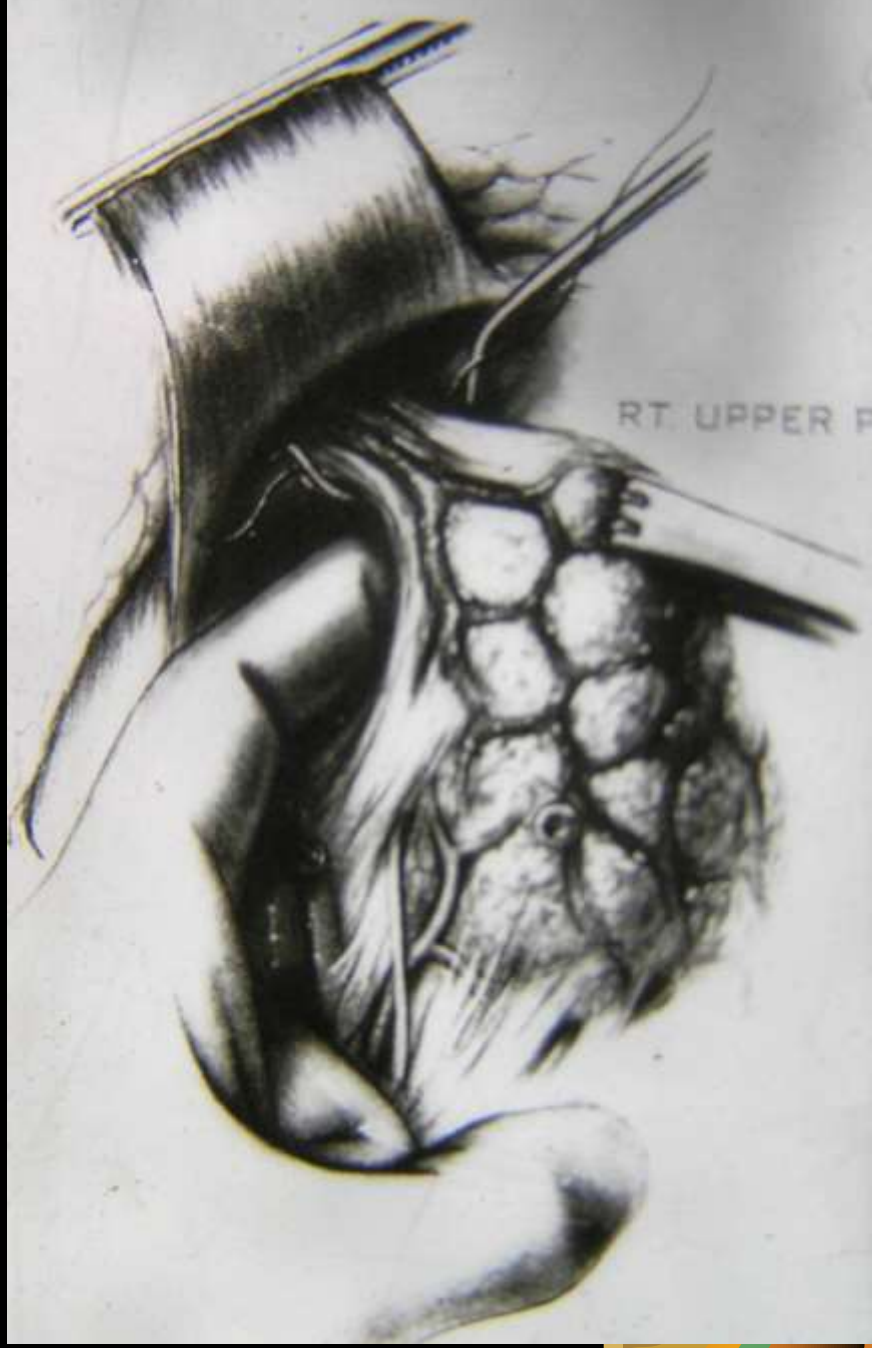


SUPERIOR POLE

- Superior thyroid artery *ligated as close to the thyroid as possible*
- Earlier in its course – close proximity to external branch of superior laryngeal nerve

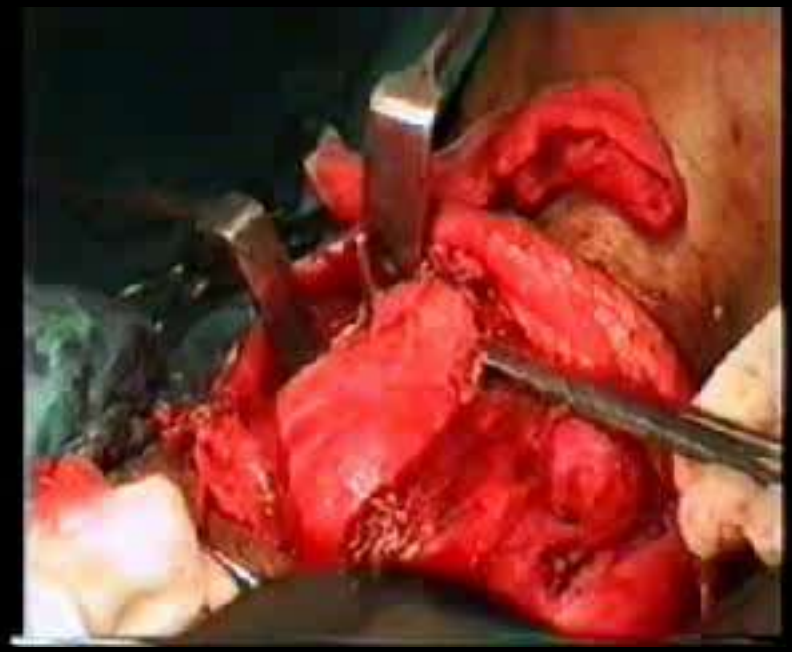



A
P. F. Malone


RT. UPPER

SUPERIOR POLE

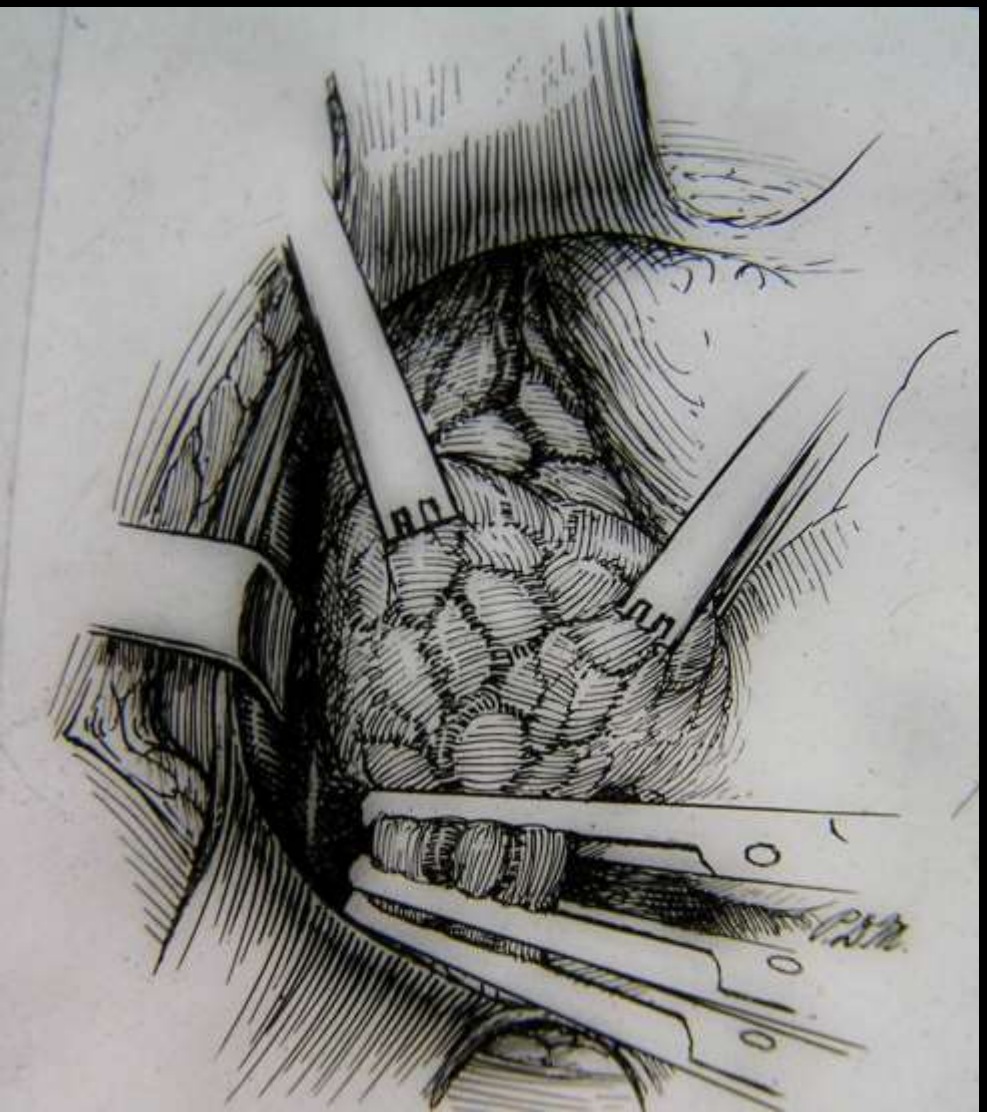
- Two branches to be taken care of – anterior as well as posterior
- Ligate vein and artery together
- Homesiller's knot – the superior pole is doubly ligated towards patient end with the second knot incorporating the first one
- Damage to External Laryngeal Nerve affects pitch of voice – so recognized more so in singers



Joll's (sterno-thyro-laryngeal) triangle

- Joll's (sterno-thyro-laryngeal) triangle
  - laterally : upper pole and vessels
  - superiorly : attachment of strap muscles to thyroid cartilage
  - Medially : Midline
- Contains the external branch of superior laryngeal nerve

Inferior Thyroid Veins



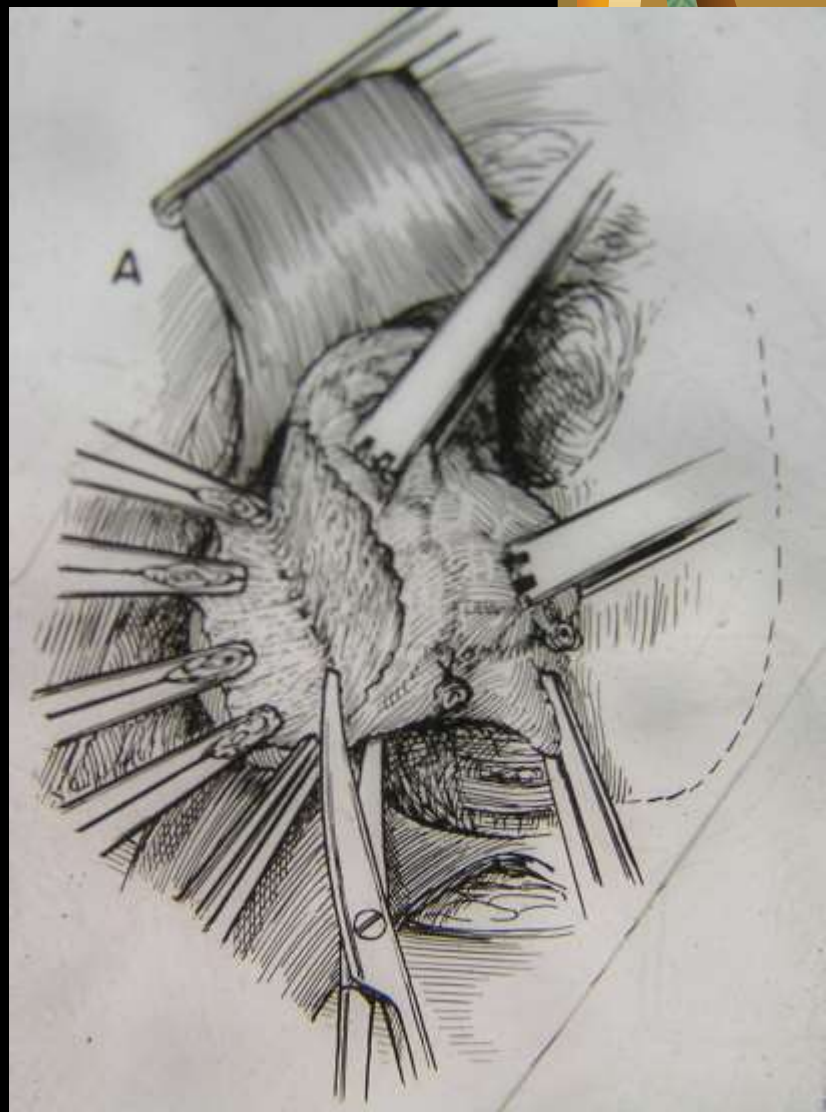
- Inferior Thyroid veins ligated at lower pole
- Usually a leash of veins
- Look out for thyroidea ima (3 %)

Inferior Thyroid Artery

Three approaches –

- Don’t ligate , Don’t look for it, Ostrich Approach
- Ligate in situ ,away from gland
- BE BOLD, Dissect RLN and Ligate after branch to Inferior Para thyroid given

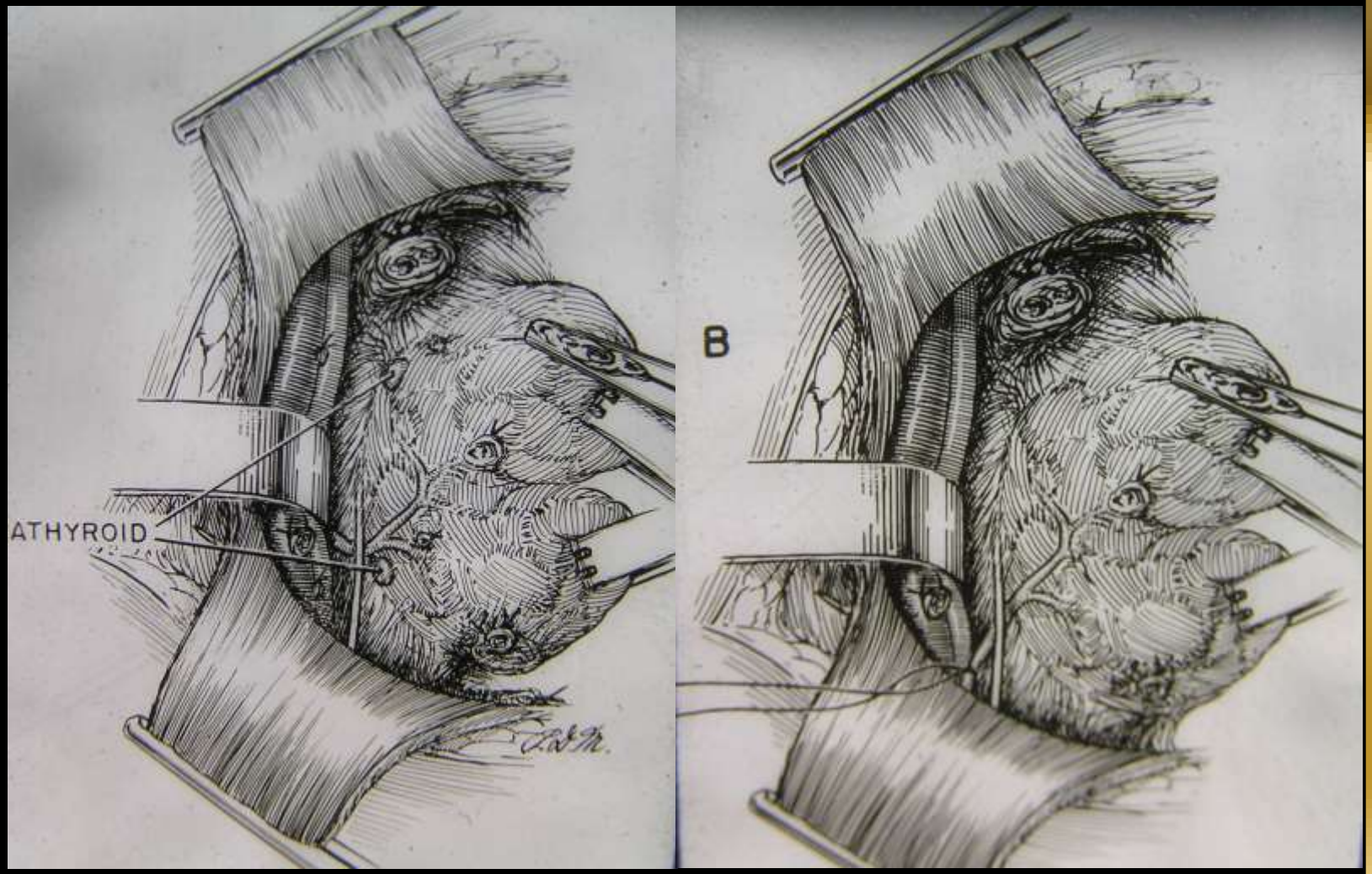
Don’t Ligate , Don’t Look For It, Ostrich Approach Useful For Sub Total Thyroidectomy



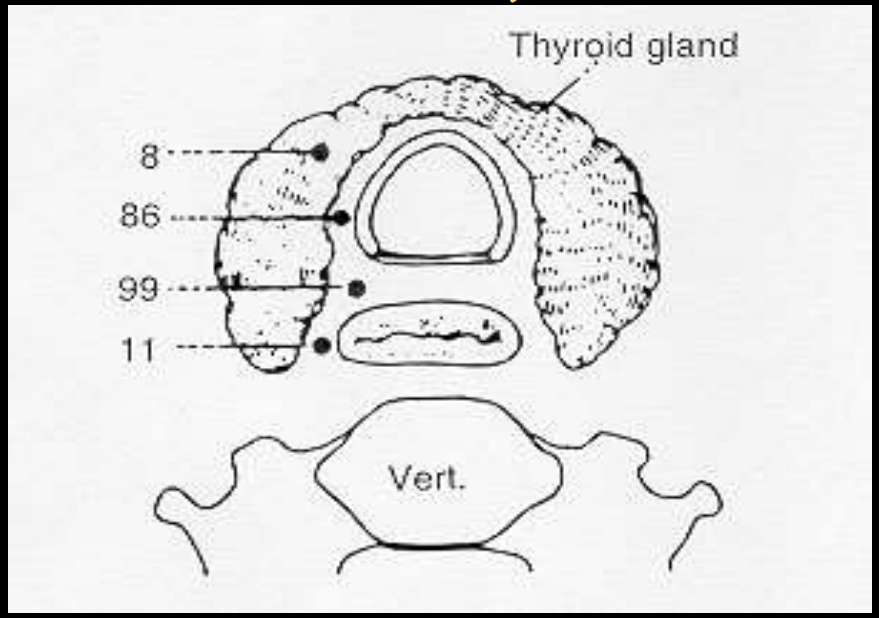
Inferior Thyroid Artery Ligate In Situ,Away From Gland

- Near the gland inferior thyroid artery is in close proximity to RLN
- Artery tied away from gland and that too in situ, And Don't cut
- Look for a separate pulsation behind the carotid
- Will jeopardize blood supply of Para thyroid

Inferior Thyroid Artery to be ligated in situ



Location of RLN



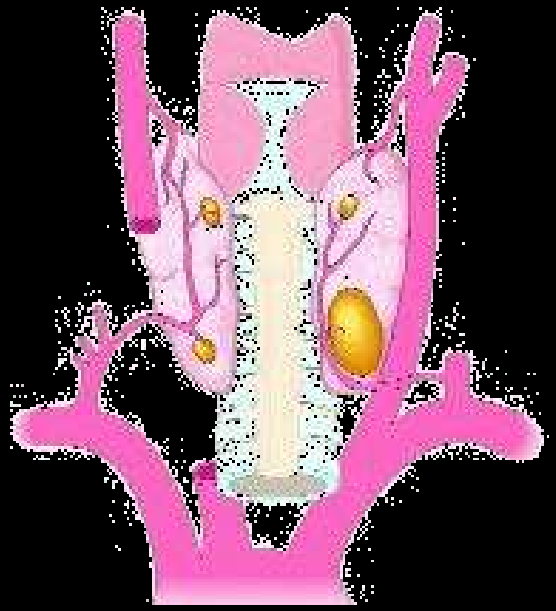
- The location of 204 recurrent laryngeal nerves in dissection of 102 cadavers. Note that the recurrent laryngeal nerve was found *anterior* to the trache-oesophageal groove in 42 percent of cases and *within* the thyroid gland in 3.9 percent of cases.
- In both of these locations, the nerve is more prone to be damaged if its course is not carefully visualized by the surgeon.

Anatomy of Thyroid Gland

- Beahr's triangle – a pointer to the RLN
  - RLN in the tracheo-esophageal groove
  - Inferior thyroid artery
  - Common carotid artery

INFERIOR POLE

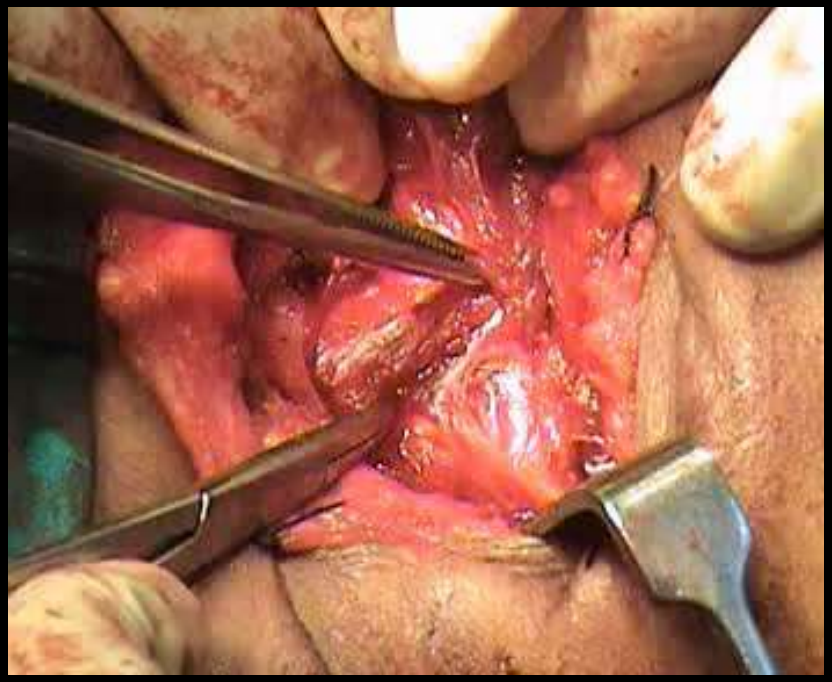
- **BE BOLD**
- RLN looked for
- Inferior thyroid artery ligated near the thyroid after it gives branch to para thyroid



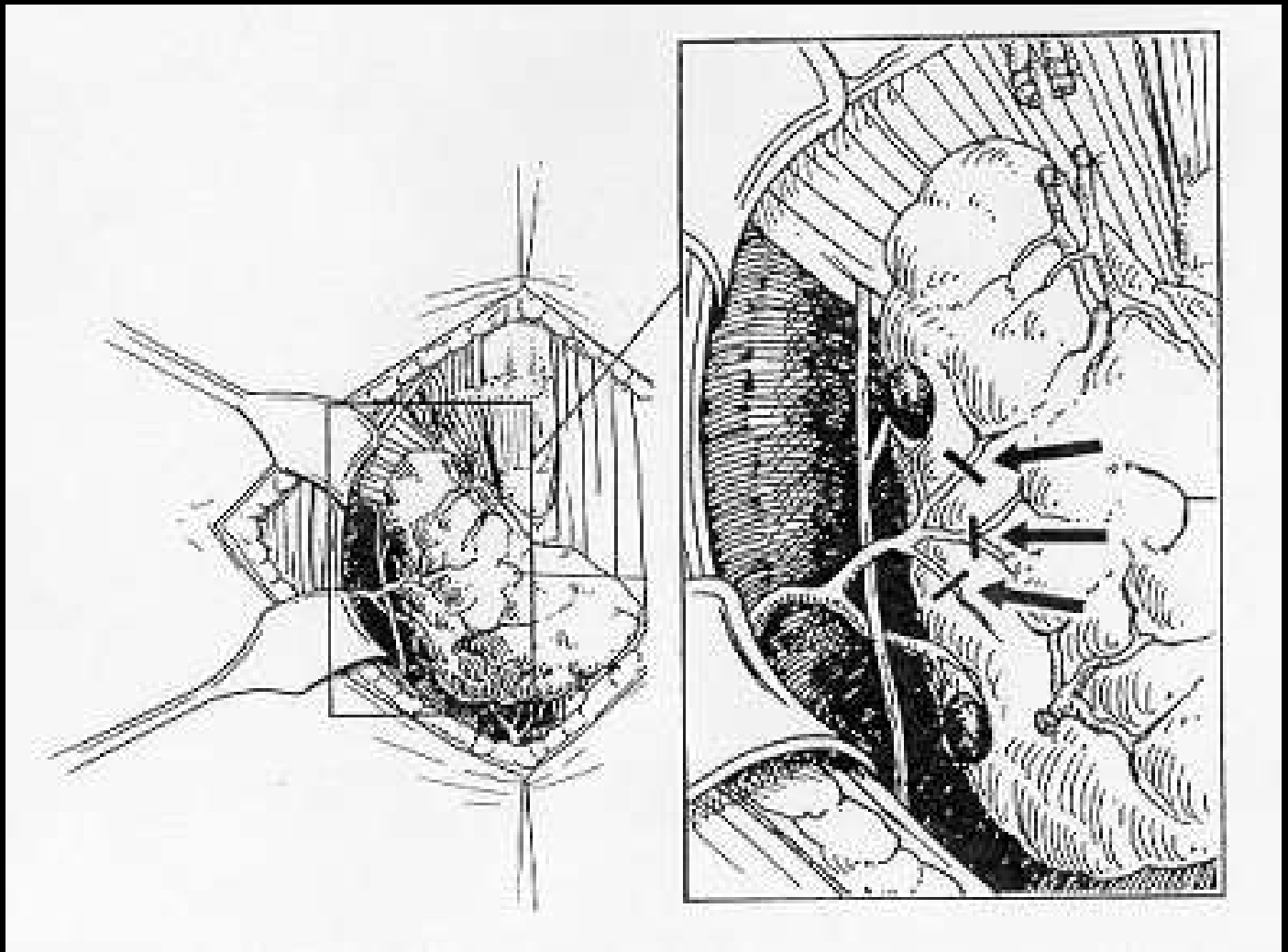
Inferior Thyroid Artery Dissection of Recurrent Laryngeal Nerve

- Alternative method – dissect from medial to lateral
- *The RLN is identified at the crico -thyroid joint - the only place where it is fixed*
- Begin dissection along thyroid capsule
- Facilitates findings branches of RLN
- Preserves soft tissue that houses the blood supply to parathyroid

The RLN is identified at the crico -thyroid joint - the only place where it is fixed



Inferior Thyroid Artery and its terminal branches

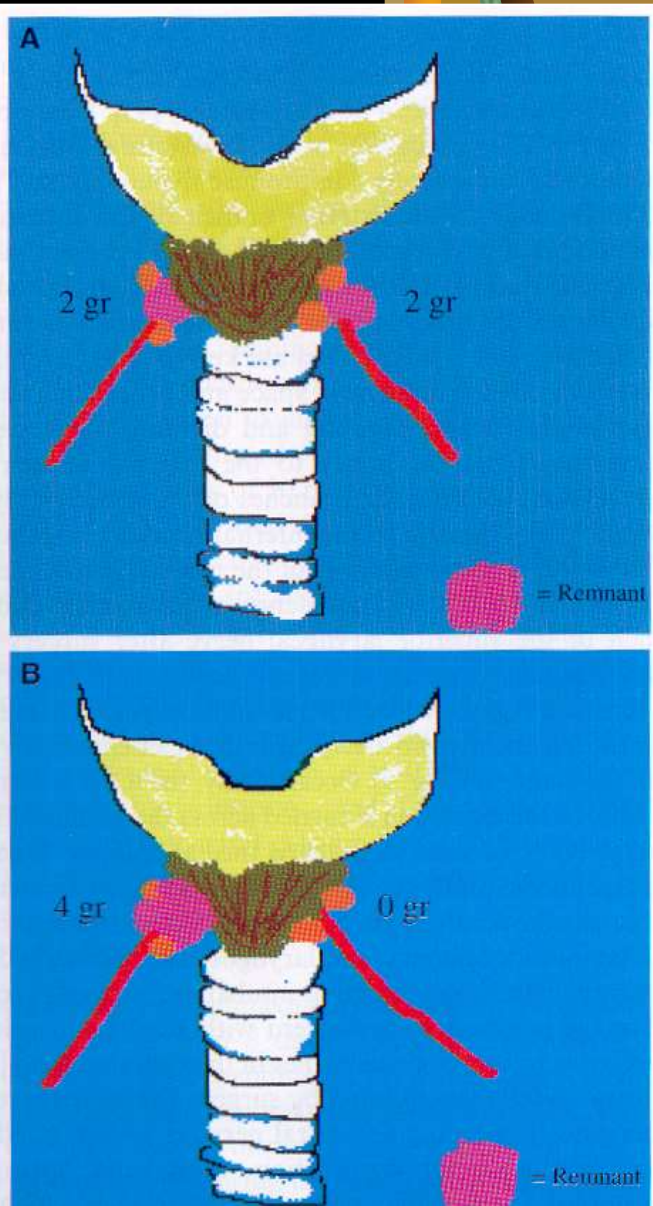


ISTHMUS

- Dealt with in every procedure
- Majority blood supply only from superiorly – tracheal vessels
- Pyramidal lobe if present spared or removed as the procedure demands
- Should always be ligated and cut
- Isthmus sutured with absorbable material to achieve hemostasis

Decide what is to be done

- Lobectomy
- Hemi-Thyroidectomy
- Near Total Thyroidectomy
- Sub Total Thyroidectomy
- Hartley-Dunhill Procedure

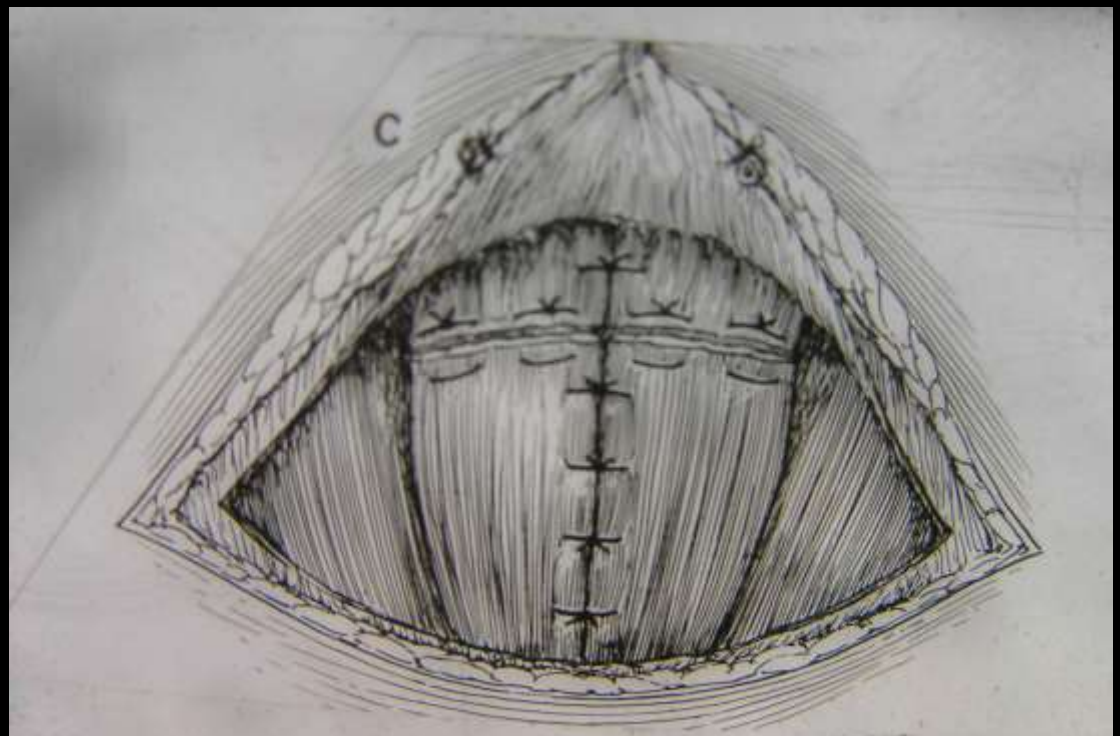


FINAL STEPS…

- Gland to be delivered out by blunt and sharp dissection between the thyroid and trachea
- Irrigate field with normal saline
- Confirm hemostasis
- Ask anesthetist to get the blood pressure up to the pre – induction range

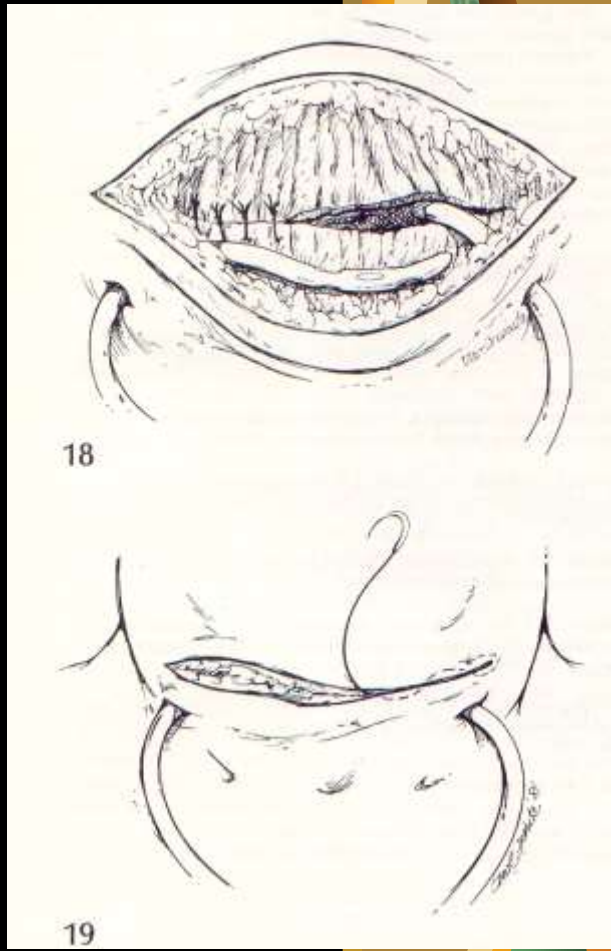
CLOSURE

- Resuture the cut strap muscles in layers and approximate sternohyoid in midline with intermittent sutures



CLOSURE

- Subcutaneous layer sutured with intermittent burying sutures
- The function of the suction drain and subsequent healing depends on this step
- Well taken sutures give good cosmesis
- Skin – subcuticular sutures



DRAIN

- According to surgeon preference
- Must keep for large glands
- Suction drain of not more than 12 F
- Precludes need for compression dressing
- Avoid compression dressing, as it –
  - hides a hematoma
  - worsens pressure effects if a hematoma occurs

SURGICAL PROCEDURES

- Enucleation to be condemned

Resection Enucleation
Partial Lobectomy
Subtotal lobectomy

Solitary Nodule which is benign on FNAC

Lobectomy
Hemithyroidectomy

Follicular Carcinoma RAI not available
Minimal Papillary Carcinoma.
Low Risk Papillary carcinoma

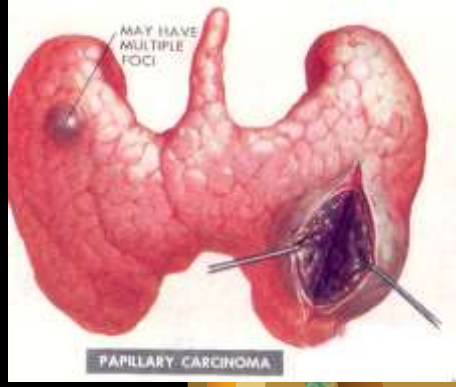
- Near Total Thyroidectomy
- Hartley Dunhill procedure
  - Papillary Carcinoma
  - High Risk Papillary and Follicular Carcinoma
  - Advanced Papillary Carcinoma (ET + MET)
  - Follicular Carcinoma (Beir-Walt Re)
  - Medullary Carcinoma
  - Early Resectable Anaplastic.

Radical Near Total
(Extra Cap)
Thyroidectomy

SURGICAL PROCEDURES FOR LN METASTASIS

- Berry Picking
- Mod. Radical Neck Dissection. Type 3
- Inter jugular LN Dis.
- Mediastanal Dissection

Papillary Carcinoma



Slow course, Multicentric, TSH Dependent, Lymphatic spread, Low I uptake

- LOW RISK GROUP
- Age M < 40 F < 50
- TUMOUR SIZE < 5 CMS
- NO DISTANT METS
- NO CAPSULAR – INVASION
- ADHESIONS – INVASION

→ HEMITHYROIDECTOMY
LOWER HALF OF LOBE
LOWER 1/3 OF OPPOSITE LOBE

HIGH RISK GROUP
AGE M >40 f >50
TUMOUR > 5 CMS
EXTRATHYROIDAL SPREAD
METASTASIS

→ Near Total Thyroidectomy
Modified Radical Neck Dissection
(Inter Jugular Node Dissection)

II ry of Papillary ca – Takes up I 131
THYROGLOBULIN – TUMOUR MARKER

RAI Therapy
TSH suppression

FOLLICULAR CARCINOMA

- UNICENTRIC, GOOD SPREAD
- HIGH IODINE UPTAKE,
- TSH NONDEPENDENT

LOCAL TUMOUR : Hemithyroidectomy
METASTATIC Ca : Near Total Thyroidectomy without I 131 Therapy
IF FACILITY IS AVAILABLE BEIRWALT REGIME FOR BOTH

HIGH RISK GROUP
Old Pts
Gross capsular invasion
Vascular invasion
Metastatic disease
Solid cluster of Tumour cells
(INSULAR CA)

→ BEIRWALT Regime
Thyroglobulin monitoring

LOW RISK GROUP
Young patients
Minimal vascular invasion
Localised disease

→ Hemithyroidectomy

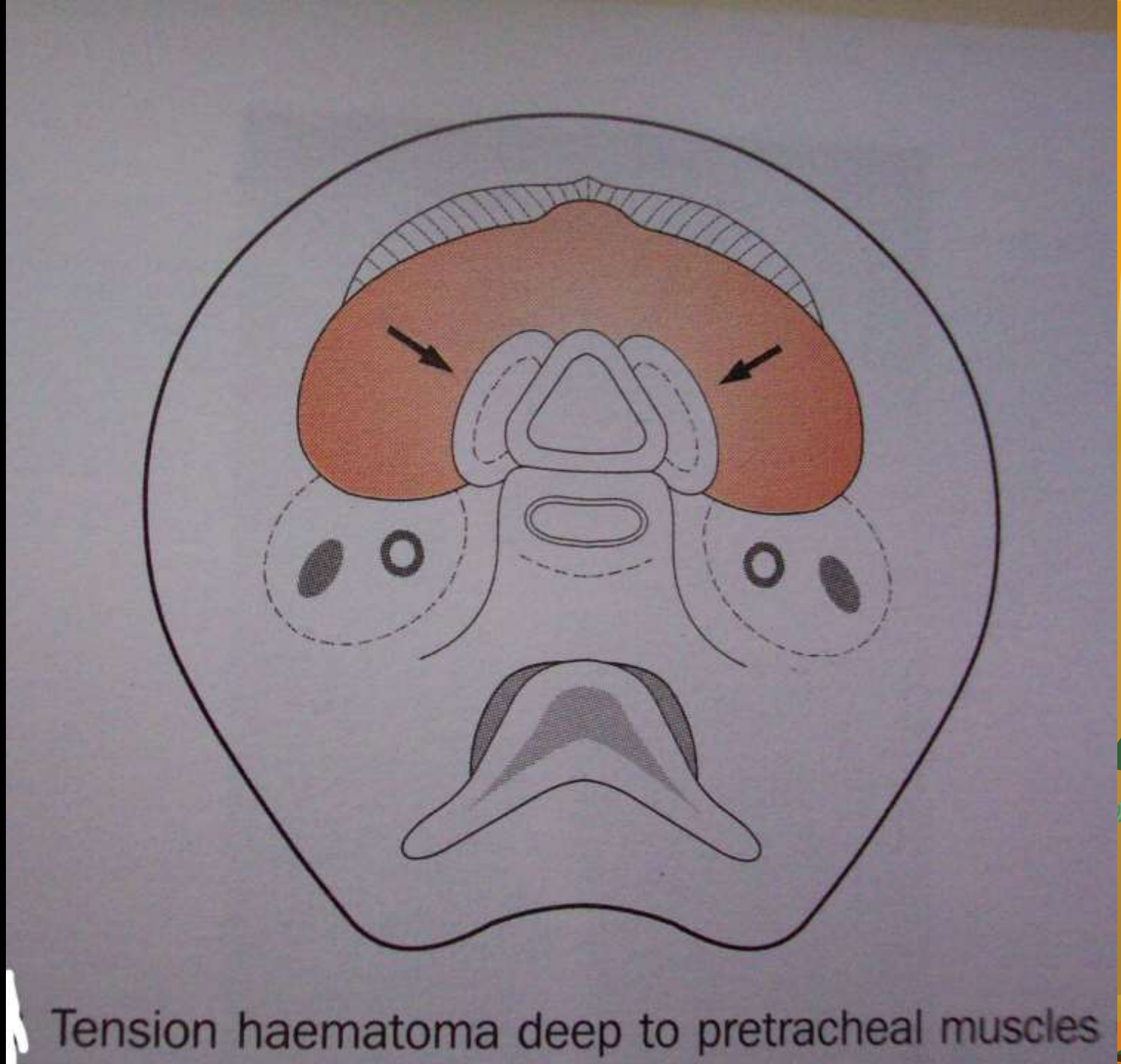
Postoperative Complications

1. Wound Comp. : a. Haematoma
   b. Abcess
   c. Fistula, Sinus
   d. Lymphedema
   e. Scar, Keloid formation

2. Hemorrhage
   a. early – Tension Hematoma – Primary, Reactionary H'age
   b. Delayed : Secondary H'age

3. Respiratory obstruction – cyanosis
   1. Laryngeal edema : Intubation Injury
   2. Tension Hematoma – Evacuation, Intubation, steroids Tracheotomy
   3. Collapse or kinking of trachea
   4. Recurrent laryngeal nerve palsy

d. Recuurent Lary N Palsy Transient occurs in 3% 3 week to 3 months



Tension haematoma deep to pretracheal muscles

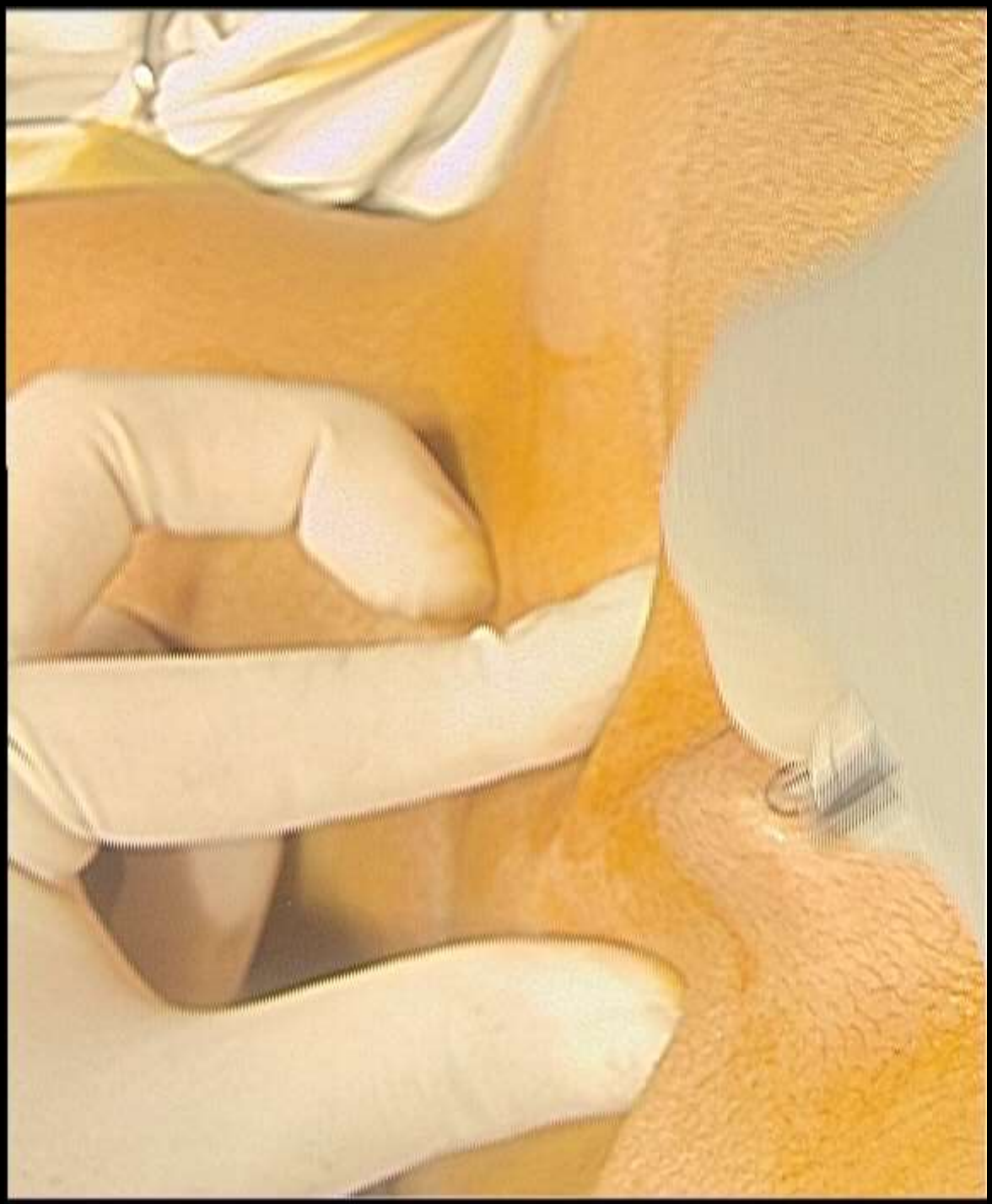
Minimum Invasive Surgery

Minimum Invasive Video assisted Thyroid Surgery

Minimum Invasive
Video assisted Thyroid Surgery

- Patient
- Team
- Equipment

- supine position without neck hyperextension;
- conventional neck preparation and draping;
- a sterile drape covering the skin.



Thank you!!!