بسم الله الرحمن الرحيم

Mechanical Endonasal DCR (MEDCR)

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MUMS

Surgical approachs to lacrimal system

- External
- Endonasal
- Transcanalicular

Advantages of external DCR

- The lacrimal sac is fully exposed, intra-sac pathology identified and the valve of Rosenmuller clearly seen.
- The rhinostomy is large (at least 10 mm)
- Mucosal flaps are sutured

Disadvantages of external DCR:

- **Intra operative more hemorrhages**
- **Risk of SUMP syndrom if rhinosthomy too high**
- **Occasional incision scar**
- **Interference with lacrimal pump function because of medial canthal changes**
- **Ignorance of intranasal pathology**

different types of endonasal DCR:

- ***Endosurgical DCR***.

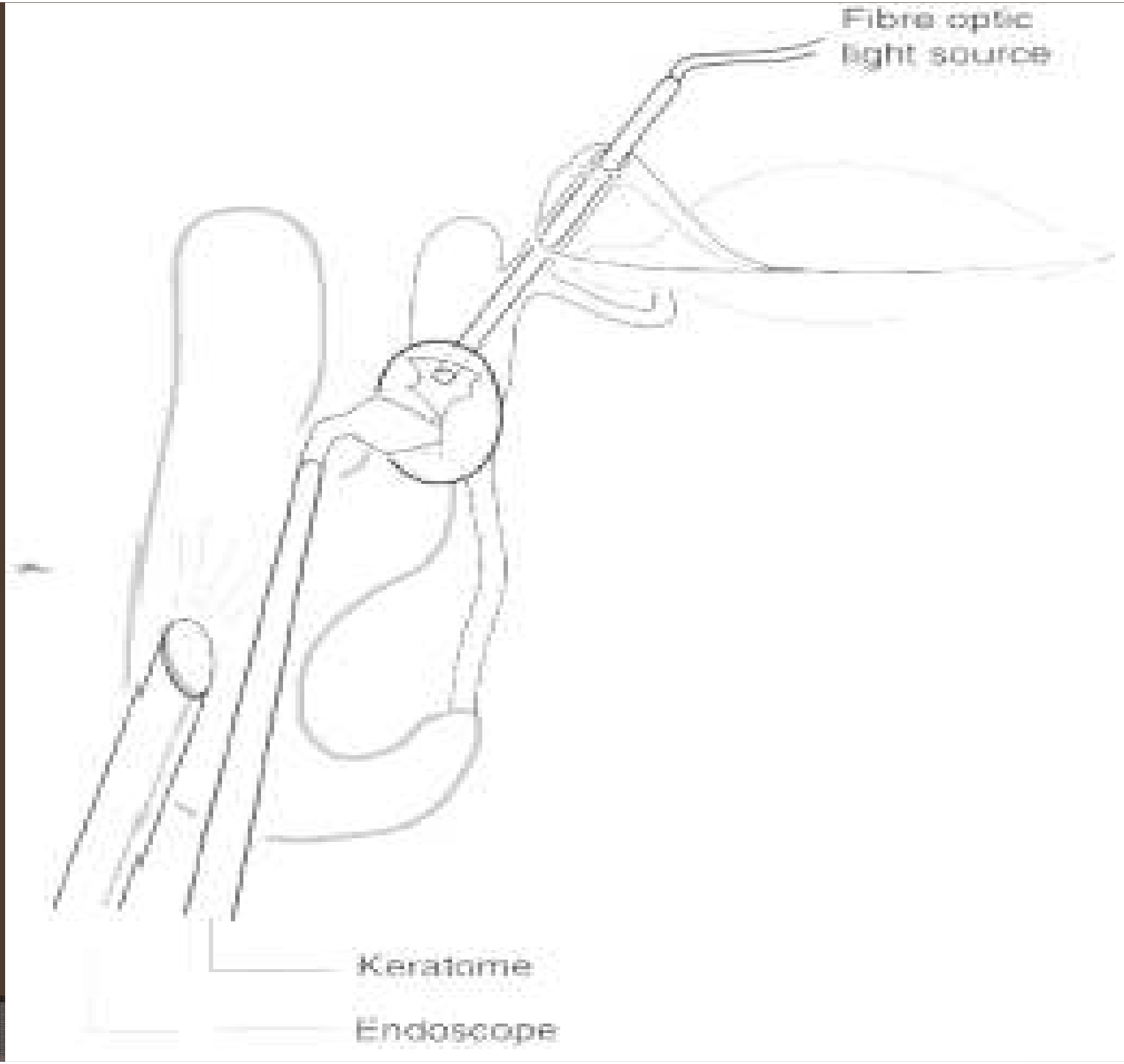
  Surgical instruments are used, e.g. Freer's elevator, Blakesley forceps, curette, DCR rongeur and keratome. Alternatively, powered tools are used, e.g. micro-drill or debrider.

- ***Endolaser DCR***.

  A laser is used to incise and ablate the mucosa and bone. The holmium: YAG or KTP laser are suitable, the latter having greater penetration for bone. The surgery can be entirely by laser.

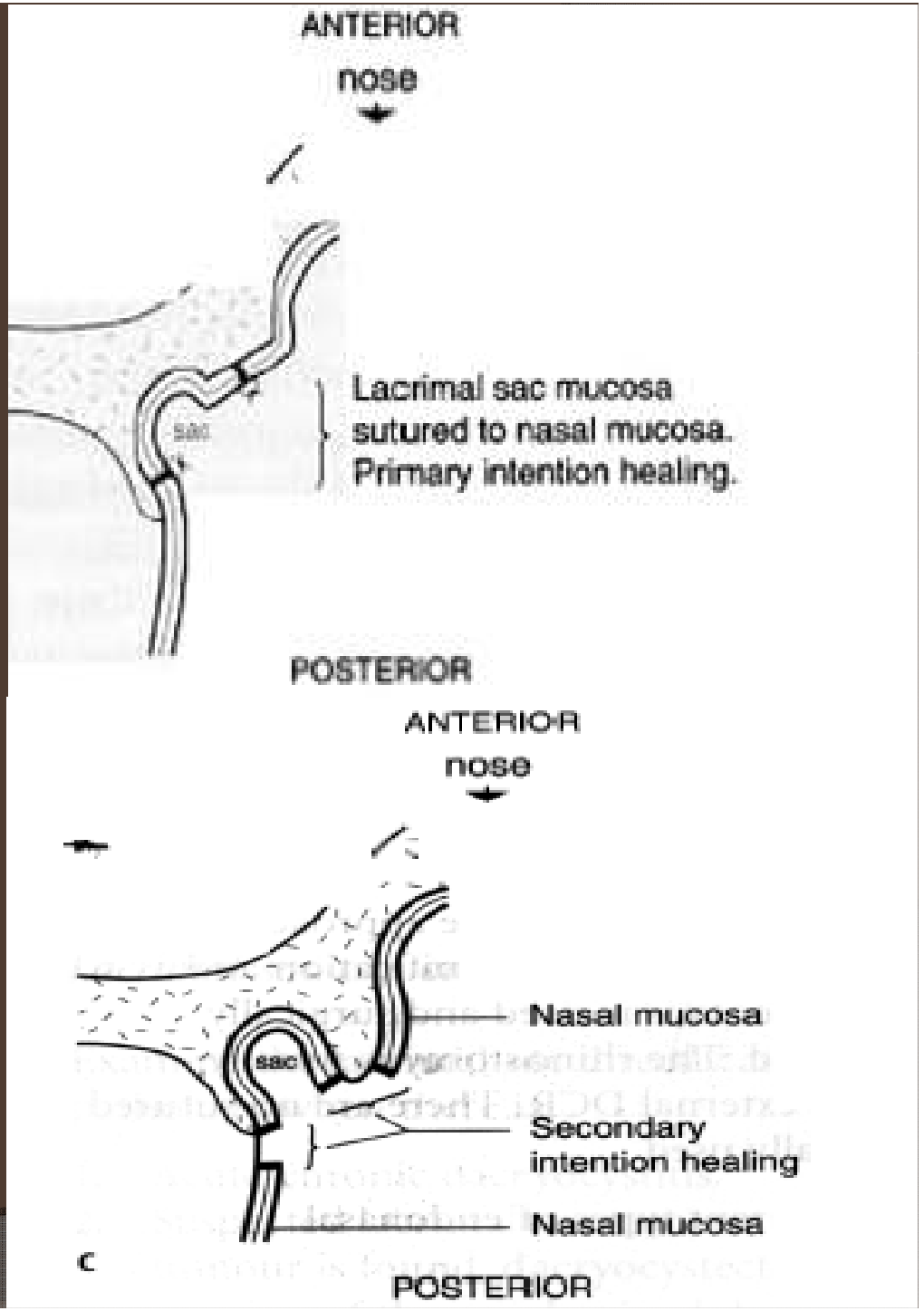
Endonasal (intranasal, transnasal) approach DCR in brief

- The nasal mucosa and lacrimal sac are approached via the nose using an endoscope for magnification and illumination.
- The mucosa is incised and surgically excised or laser ablated.
- The rhinostomeis usually smaller than, that of external DCR.
- There are no sutured flaps. Tubes are usually used.

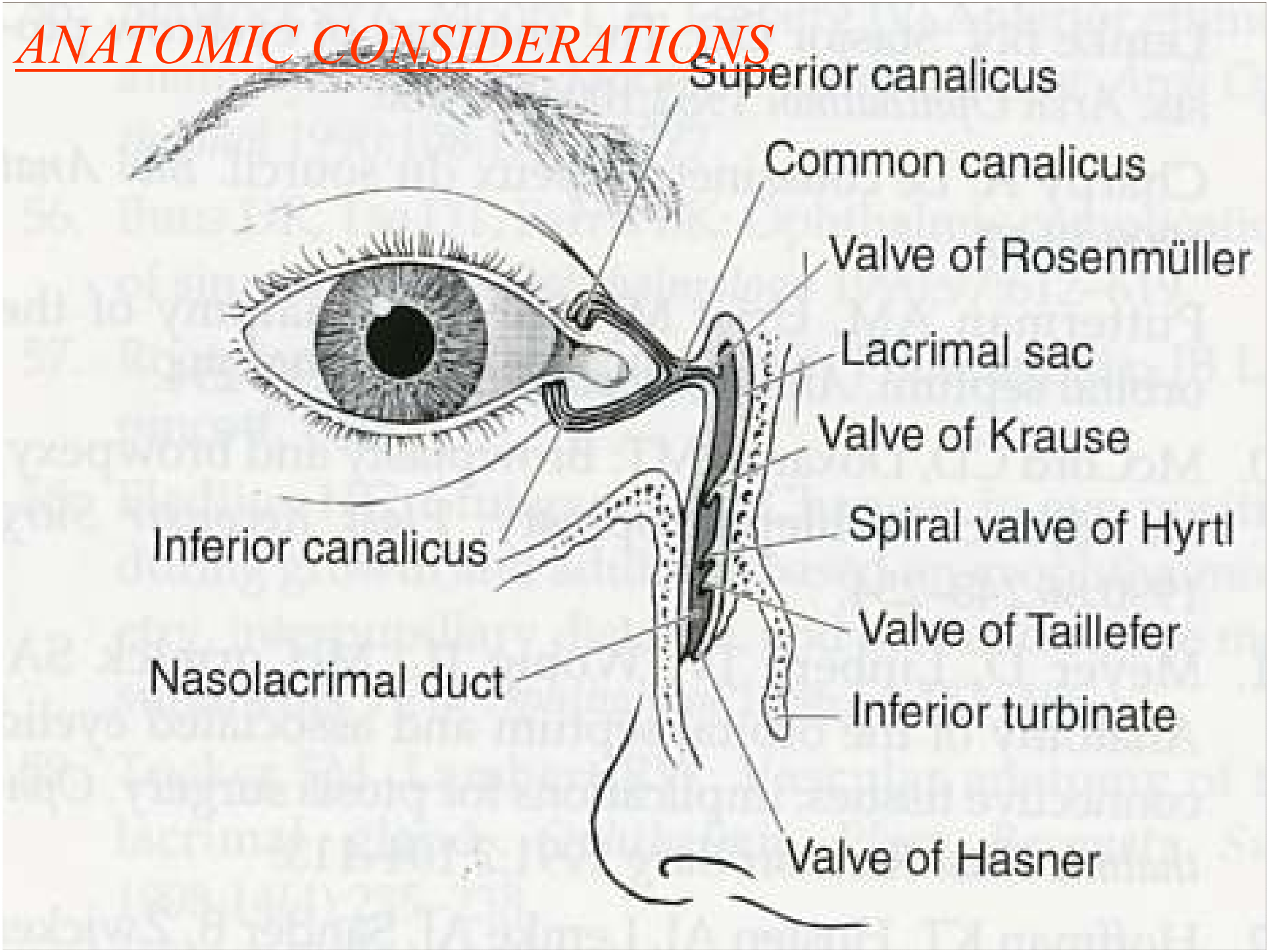

Fibre optic
light source
Keratome
Endoscope

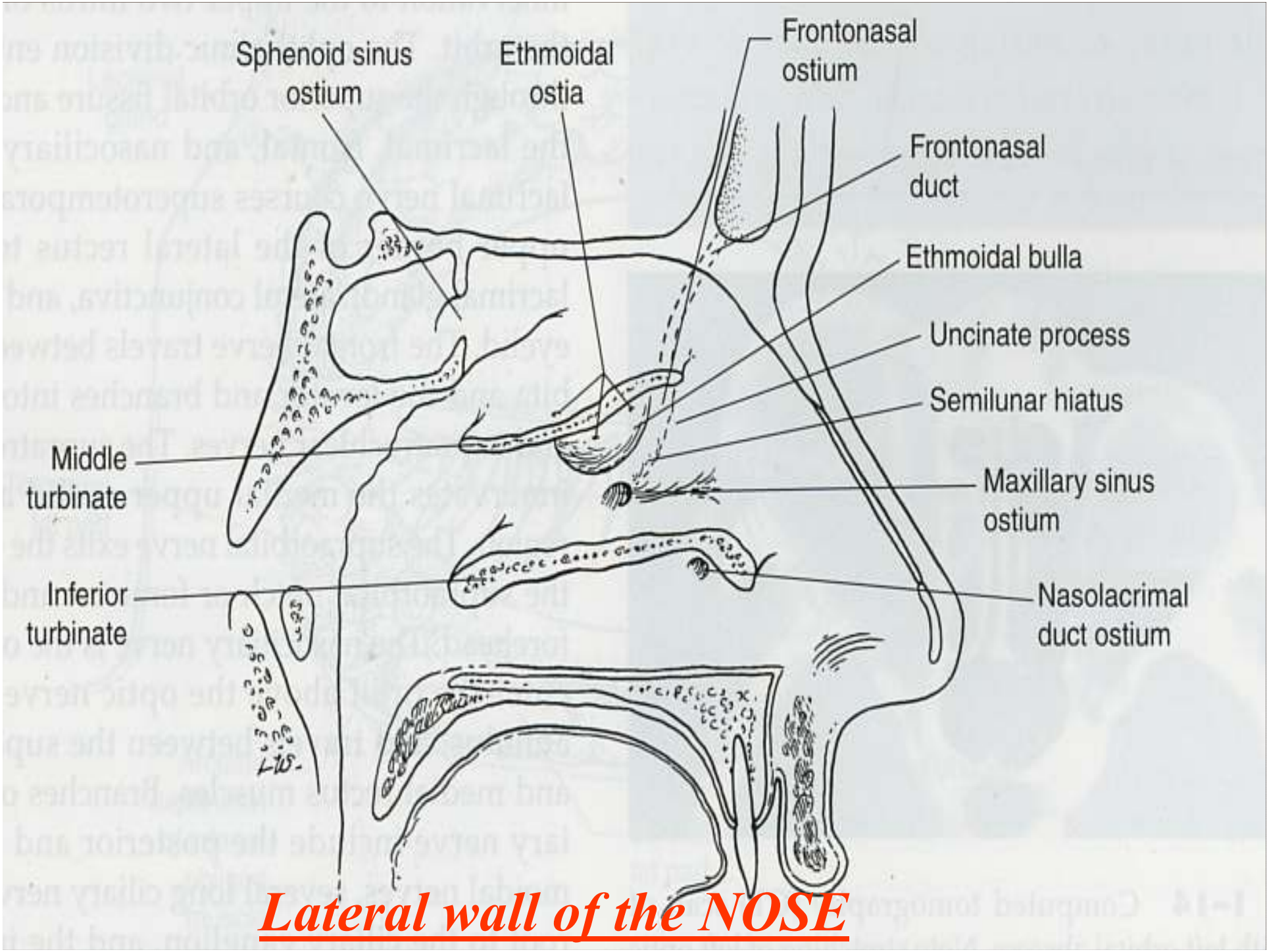
The thick maxilla bone as well as thin lacrimal bone is removed in ***external approach DCR,*** and the two mucosas are sutured

Mainly thin lacrimal bone is removed in ***endonasal DCR,*** and the mucosa are not sutured.

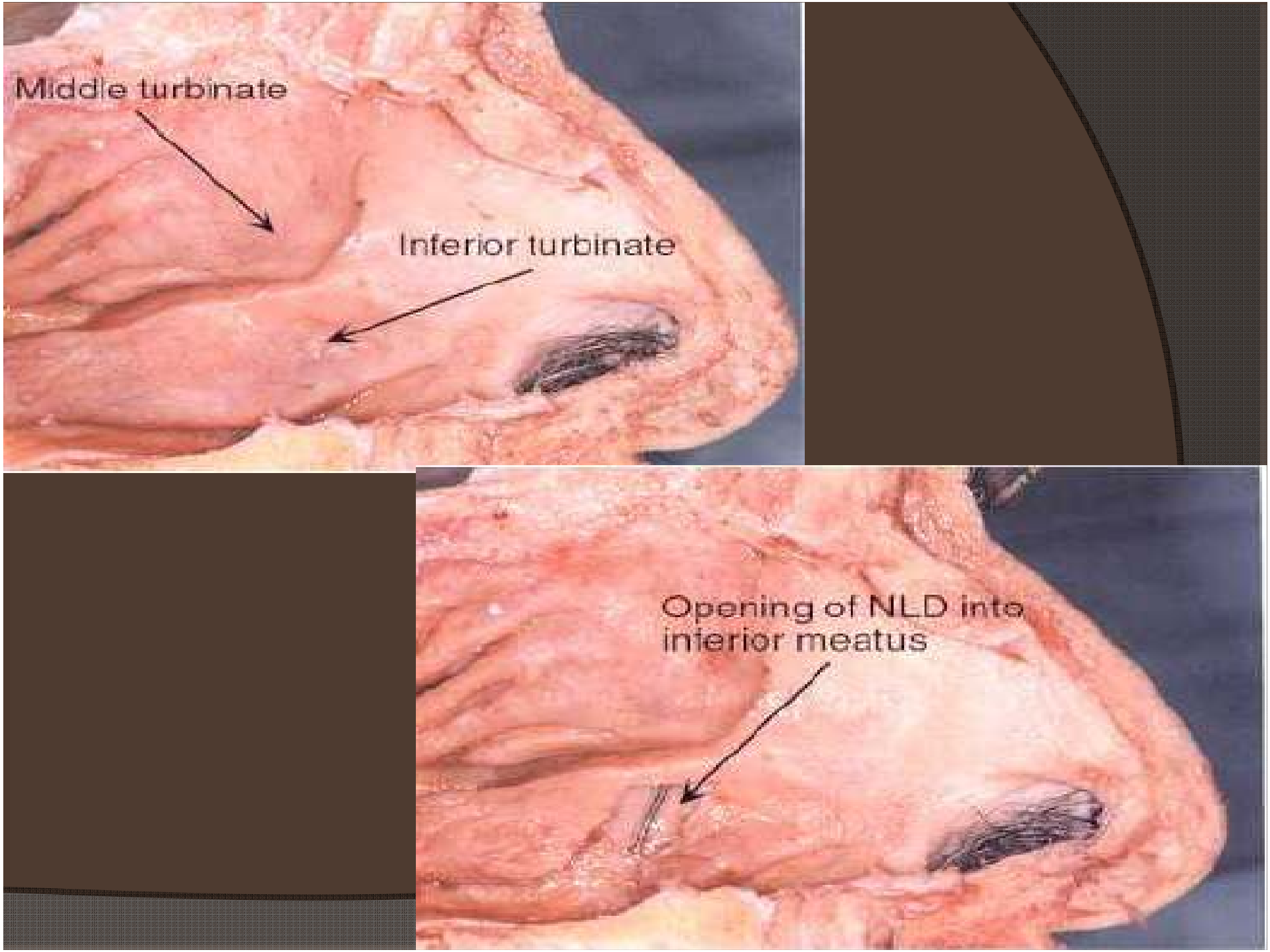


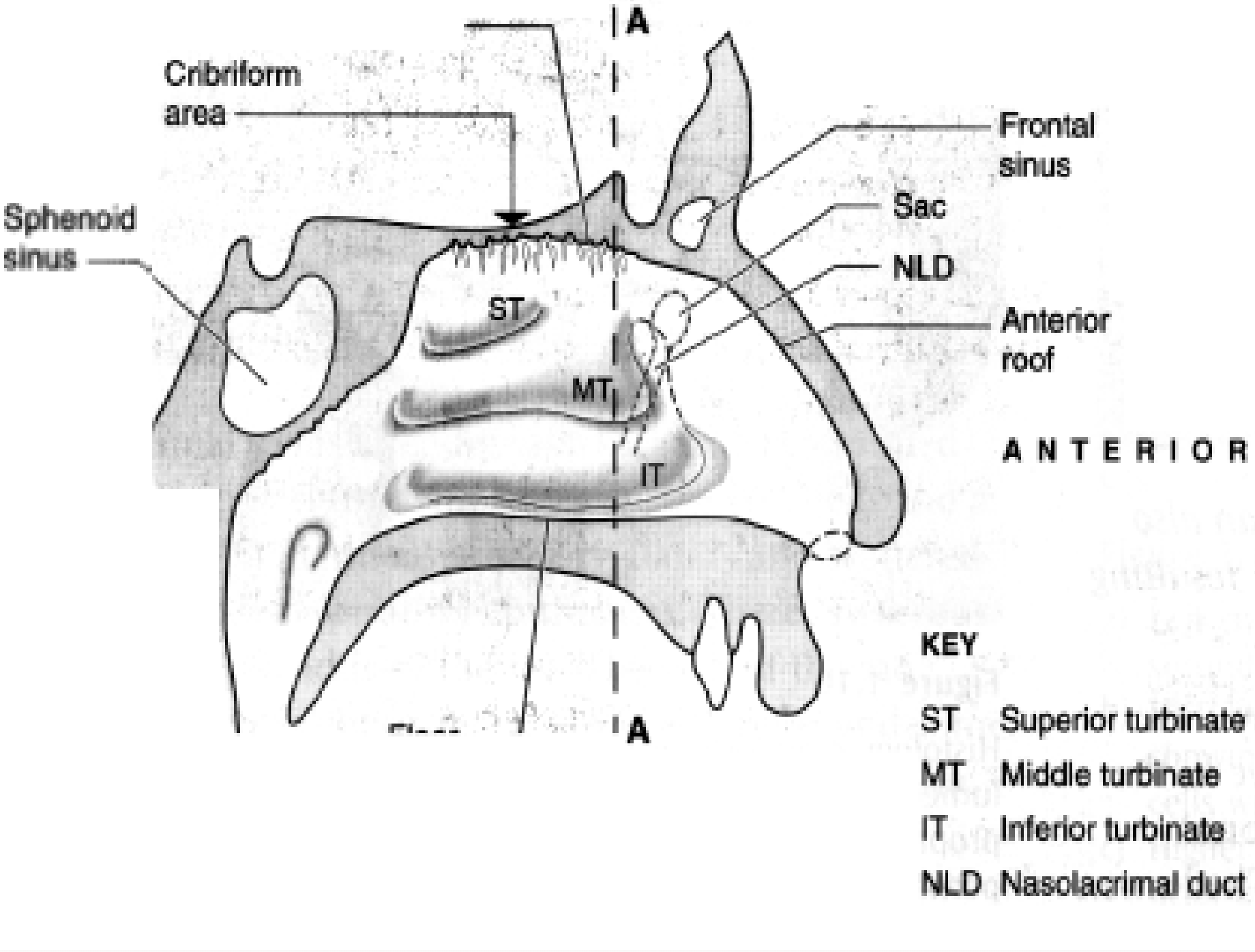
ANATOMIC CONSIDERATIONS

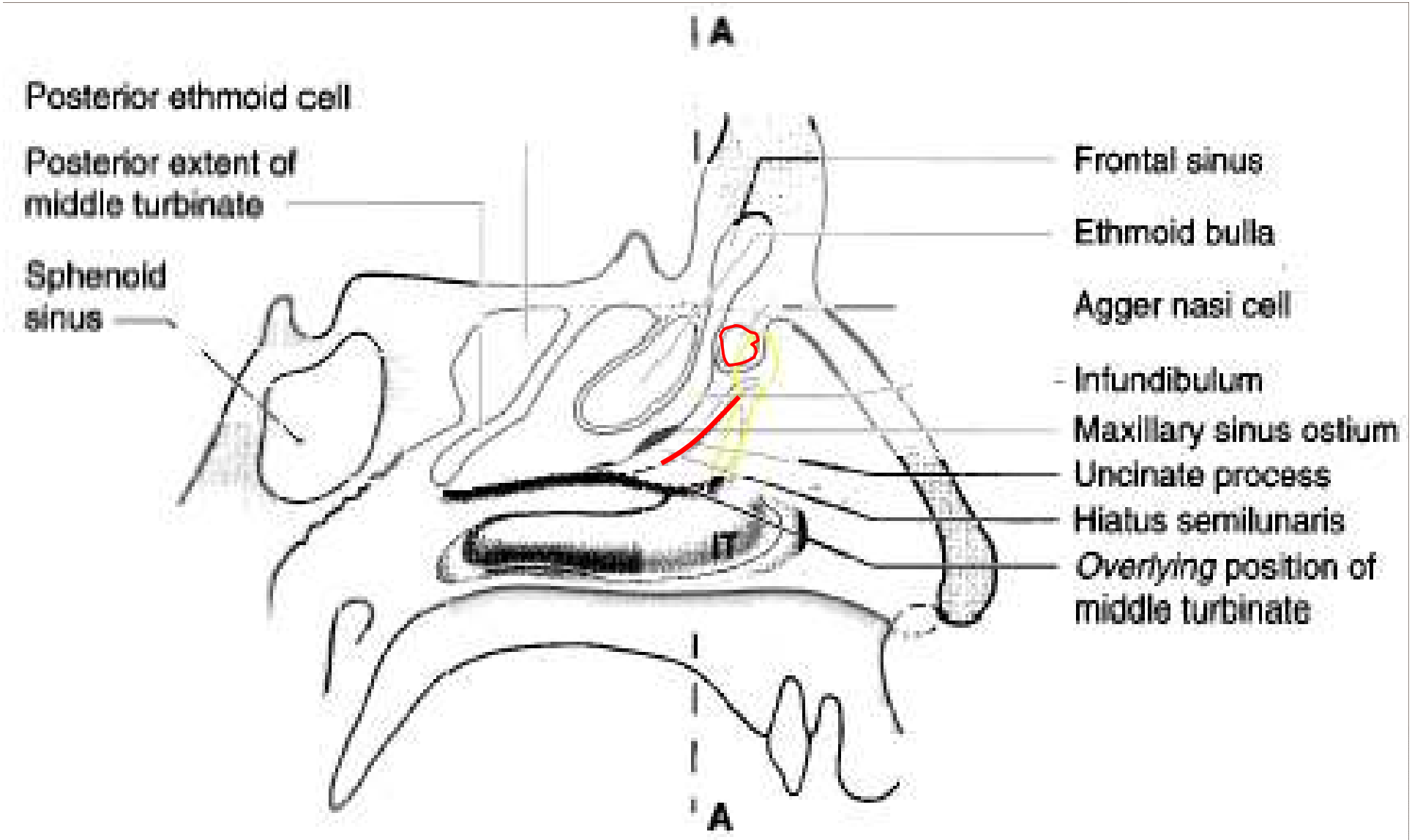




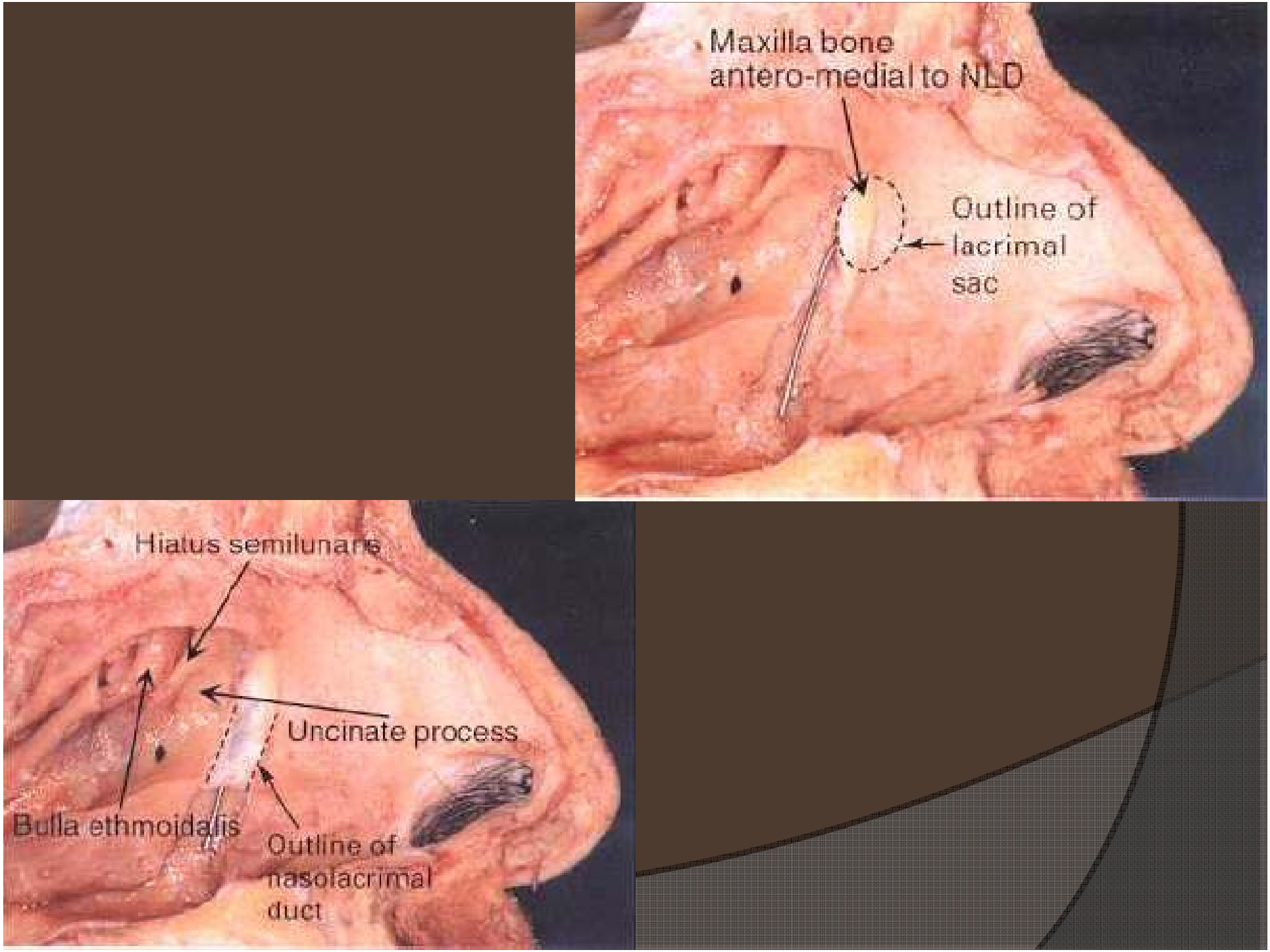
Lateral wall of the NOSE

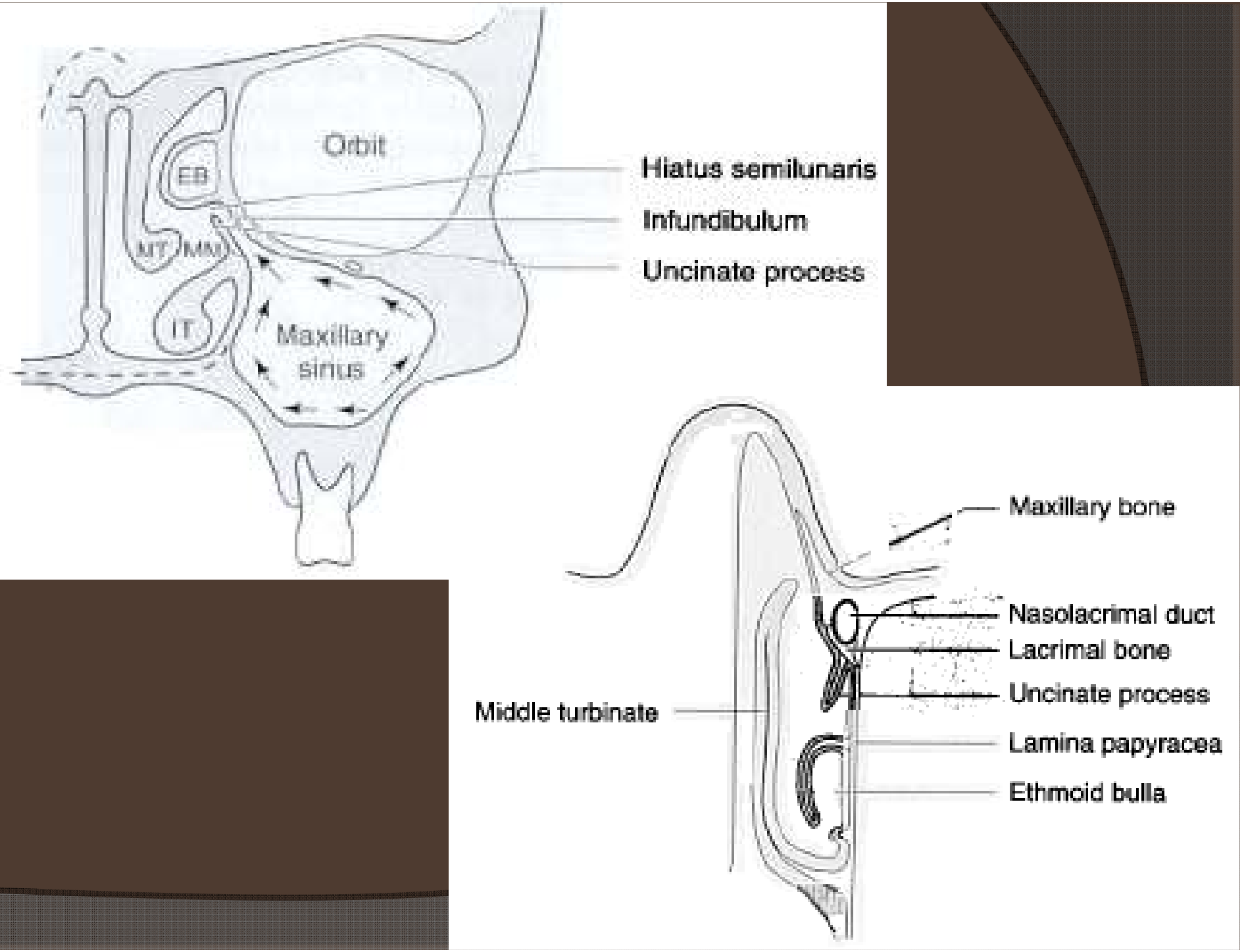

Middle turbinate
Inferior turbinate
Opening of NLD into inferior meatus

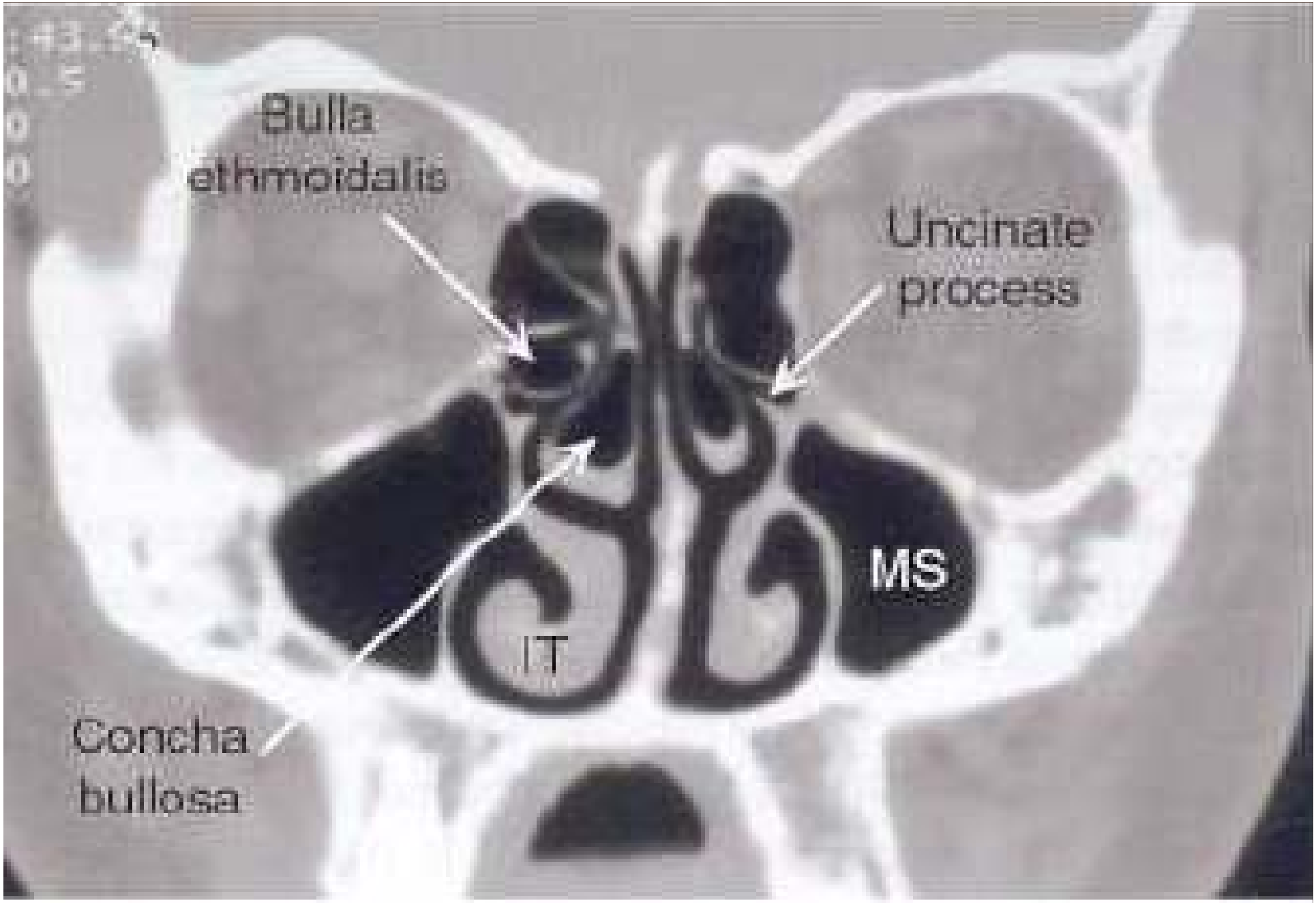

A
Cribriform area
Frontal sinus
Sac
Sphenoid sinus
NLD
ST
Anterior roof
MT
ANTERIOR
IT
A
KEY
ST Superior turbinate
MT Middle turbinate
IT Inferior turbinate
NLD Nasolacrimal duct



- Diagram showing dissected left lateral nasal wall with middle turbinate removed to reveal the structures in the middle meatus, which include the uncinate process, hiatus semilunaris and infundibulum. These important structures to be avoided lie posterior to line AA.


Maxilla bone
antero-medial to NLD
Outline of
lacrimal
sac
Hiatus semilunaris
Uncinate process
Bulla ethmoidalis
Outline of
nasolacrimal
duct


Orbit
EB
MT
MAI
IT
Maxillary sinus
Hiatus semilunaris
Infundibulum
Uncinate process
Maxillary bone
Nasolacrimal duct
Lacrimal bone
Uncinate process
Middle turbinate
Lamina papyracea
Ethmoid bulla



Coronal scan showing concha bullosa of middle turbinate

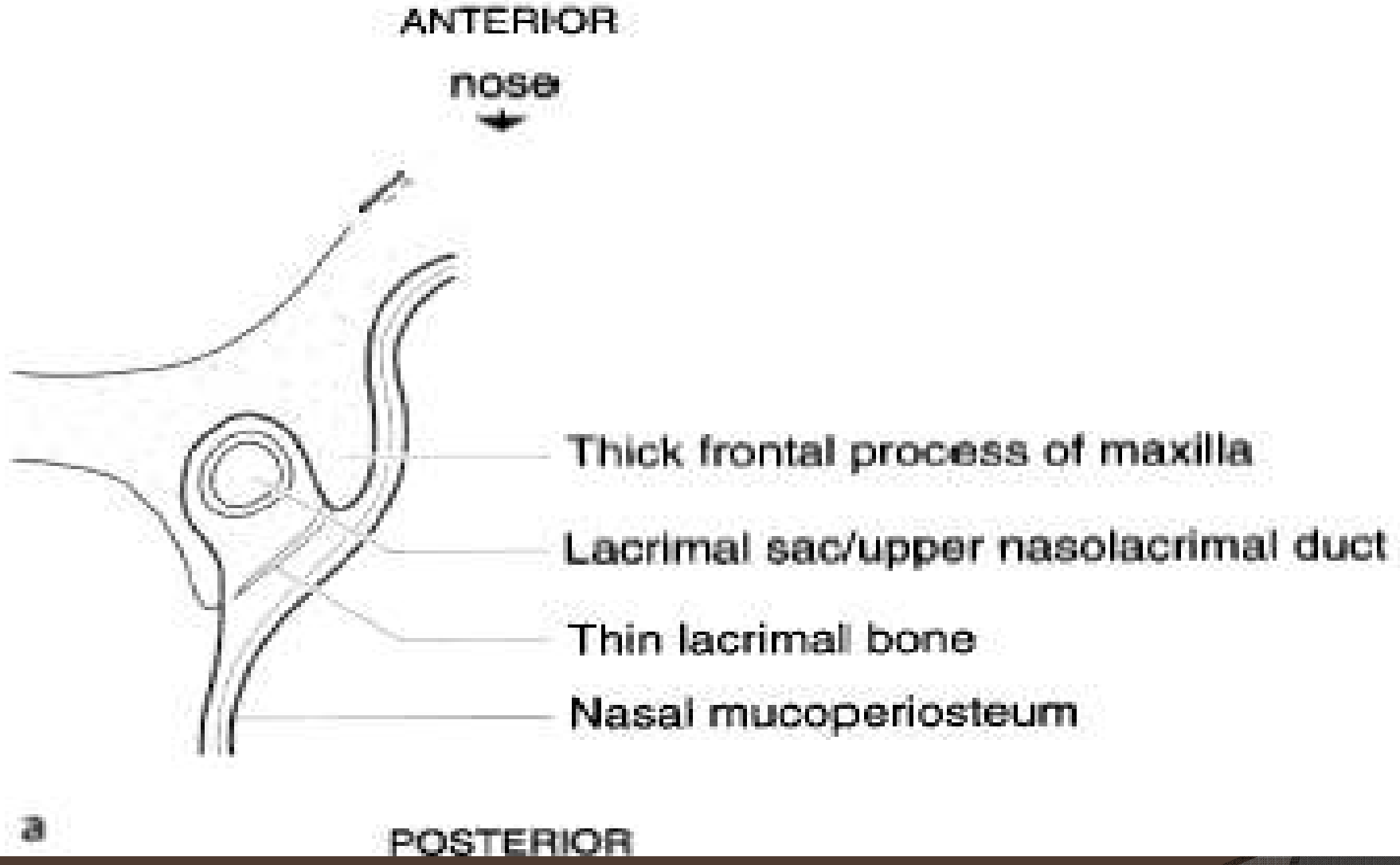
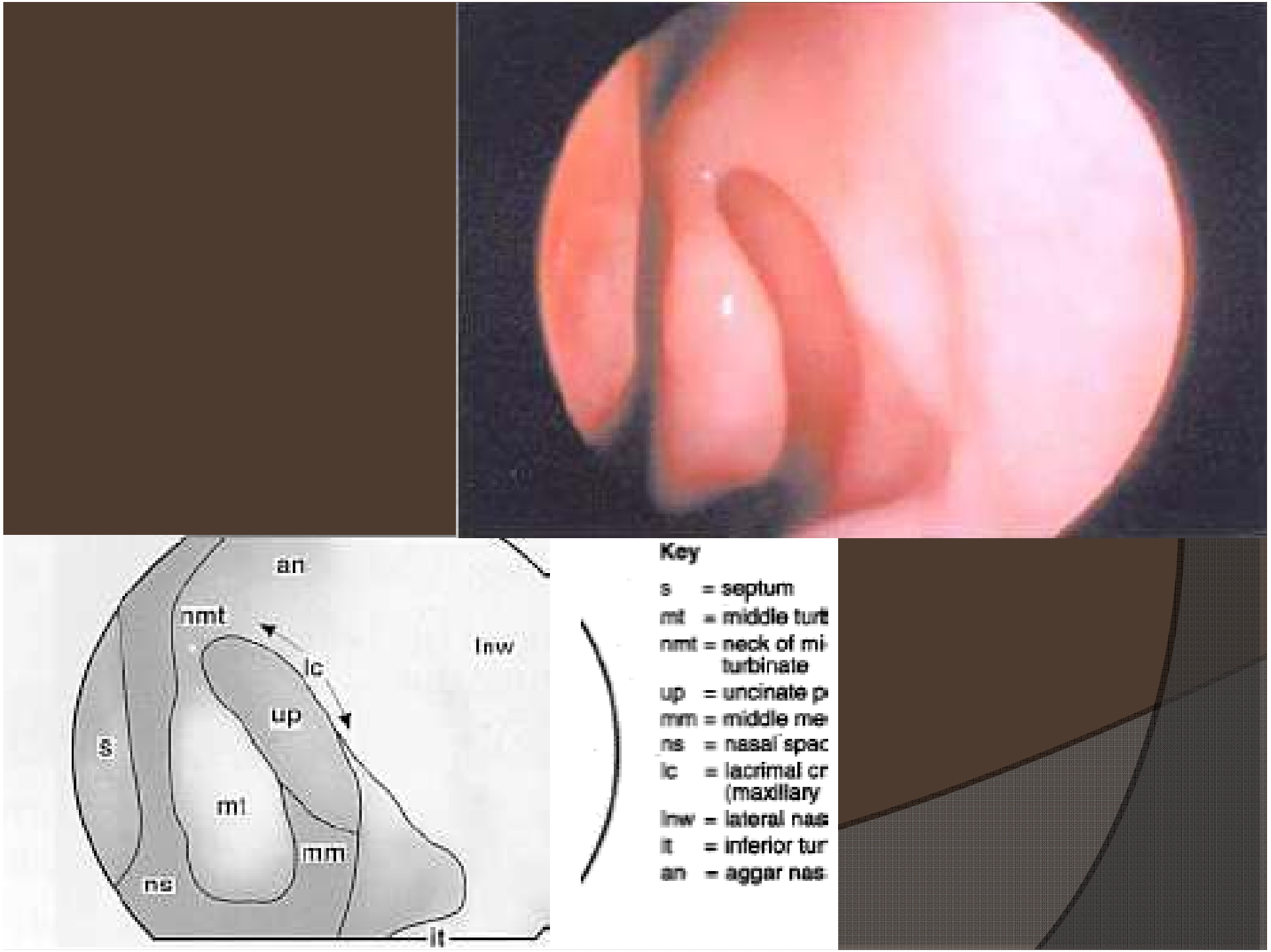


Diagram showing cross-section at level of lower lacrimal sac/upper nasolacrimal duct. Note the thick maxilla bone antero-medially.

Getting started with endonasal DCR

- Endonasal surgery is most commonly performed by an otolaryngologist and an ophthalmologist together.
- The ophthalmologist initially looks after the upper part of the lacrimal drainage system, but can be trained to do the endonasal part.


an
nmt
lnw
lc
up
s
mt
mm
ns
lt
Key
s = septum
mt = middle turt
nmt = neck of mi
turbinate
up = uncinate p
mm = middle me
ns = nasal spac
lc = lacrimal cr
(maxillary
lnw = lateral nas
it = inferior tur
an = aggar nas

endonasal surgeon-patient positioning

- Operate from the right side, whether doing a right or left endonasal DCR.
- Hold the endoscope or light speculum in the left hand and instruments in the right hand (reverse only if strongly left handed)
- Tilt the patient's head towards the surgeon, so that the endoscope easily lies dose to the middle meatus.

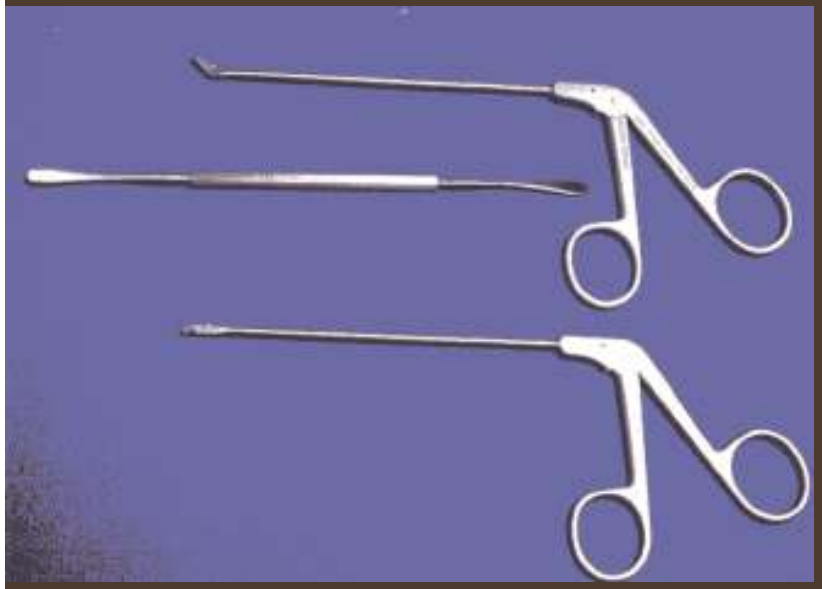
Mucosal Decongestion

- Even under general anesthesia, the nasal mucosa must be decongest
- Neurosurgical patties or sponge soaked with nasal phenylephrine drops (0.5% – 0.25%)
- During surgery, adrenaline 1:1000 is applied to the nasal mucosa at the start of the procedure and as necessary.

Caution for the endonasal surgeon

- Respect the nasal mucosa and avoid inadvertent mucosal damage, which could lead to swelling and later synaechiae.
- Be careful not to damage the vestibule when inserting and removing instruments.

Endonasal instruments.



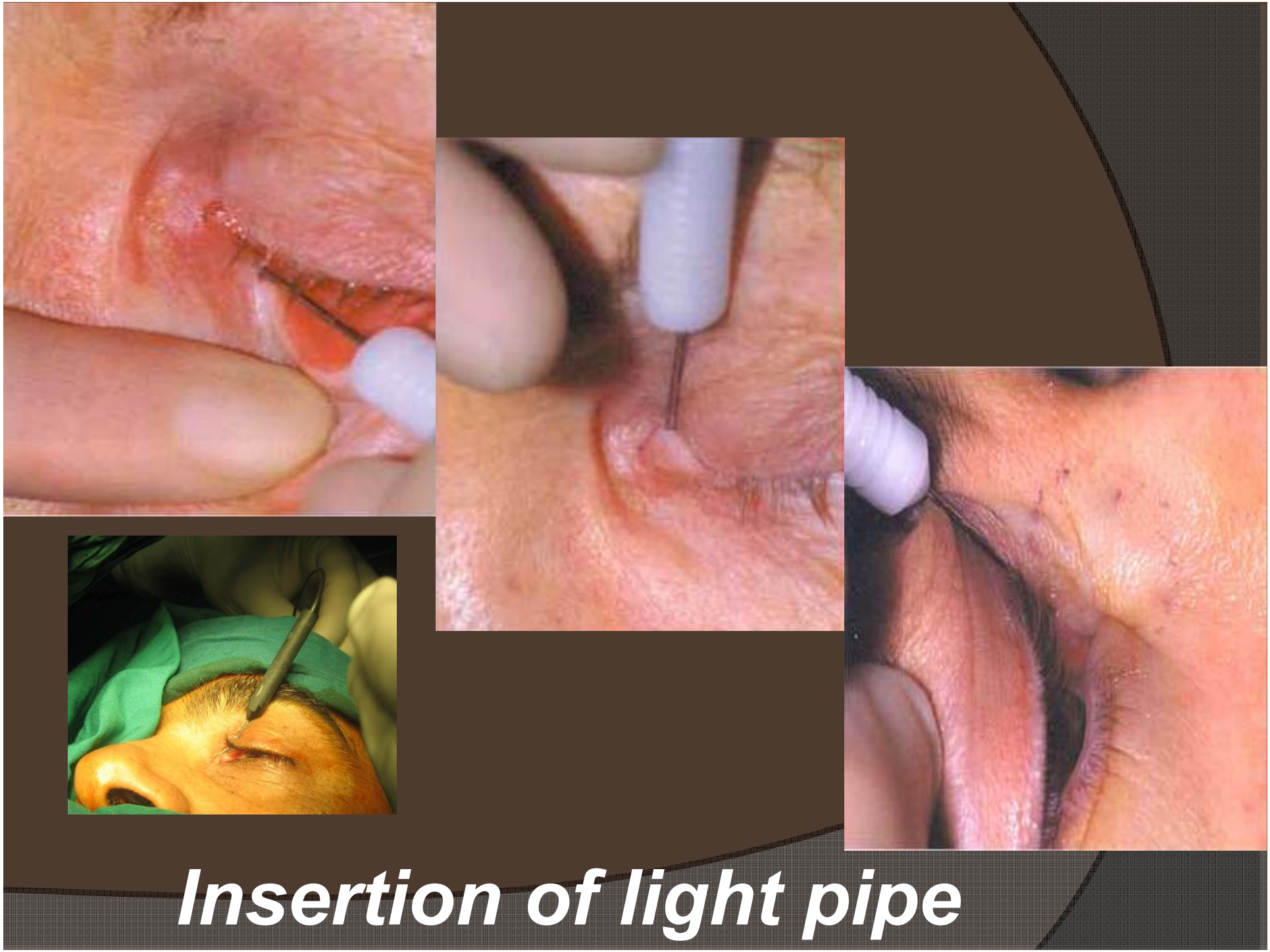
Freer's elevator (centre) with straight and up-biting Blakesley forceps.

2.8 mm keratome.

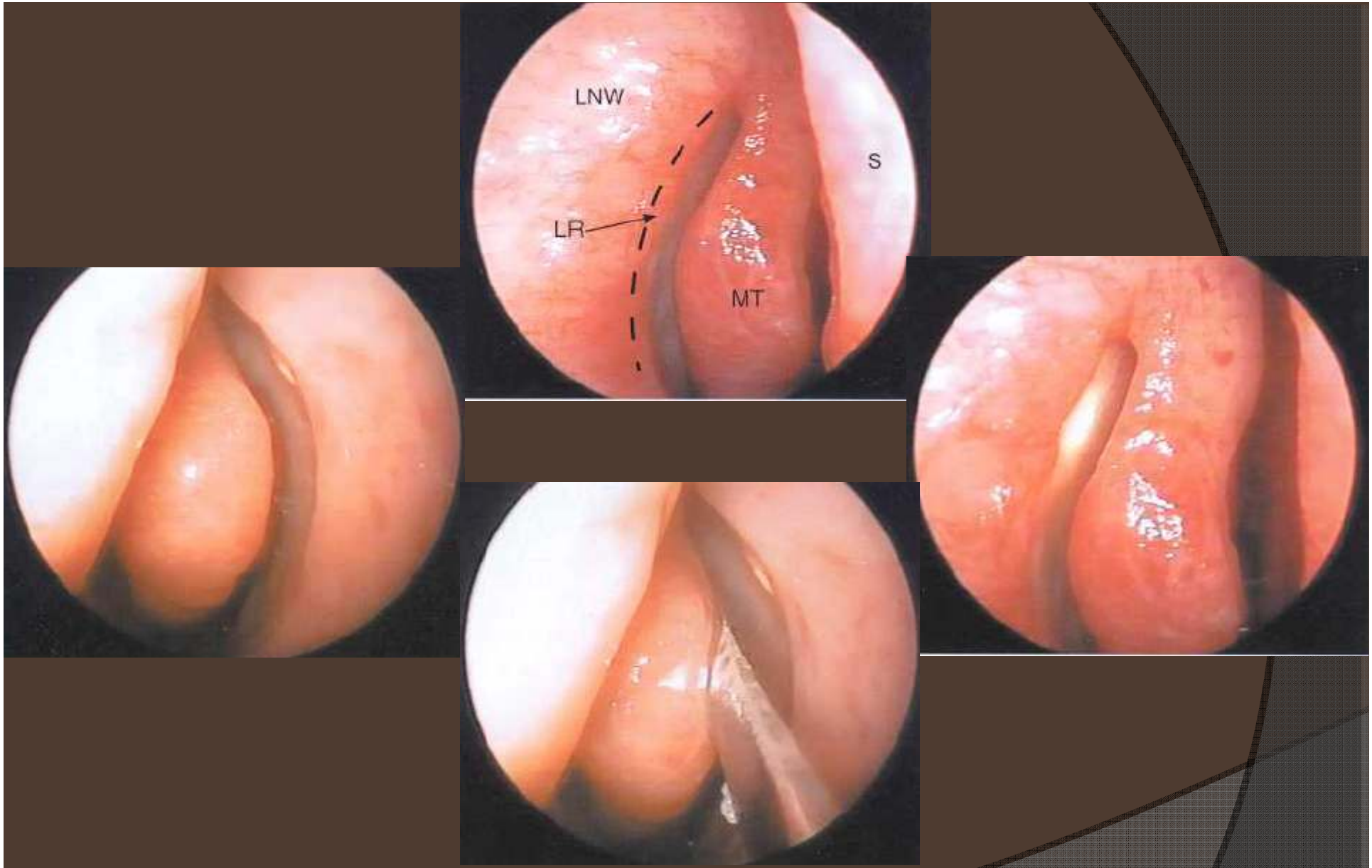
Kuhn spoons: left, half bent; right, fully bent.

Surgical steps

- 1. Insert light pipe and inject nasal mucosa with adrenalinated local anaesthesia
- 2. Incise/excise nasal mucosa
- 3. Remove bone
- 4. Incise lacrimal sac mucosa
- 5. Pass and secure silicone tubes.



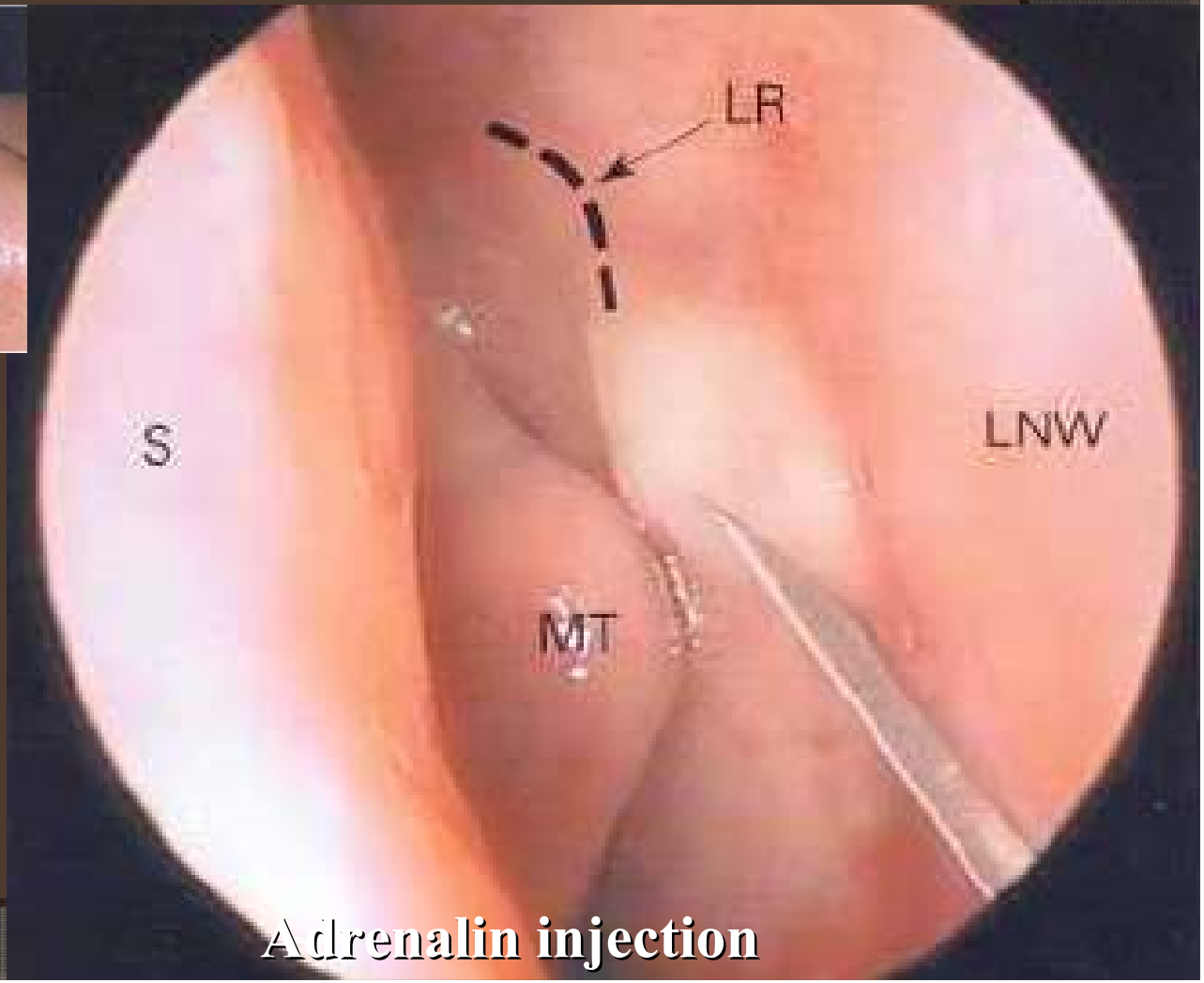
Insertion of light pipe



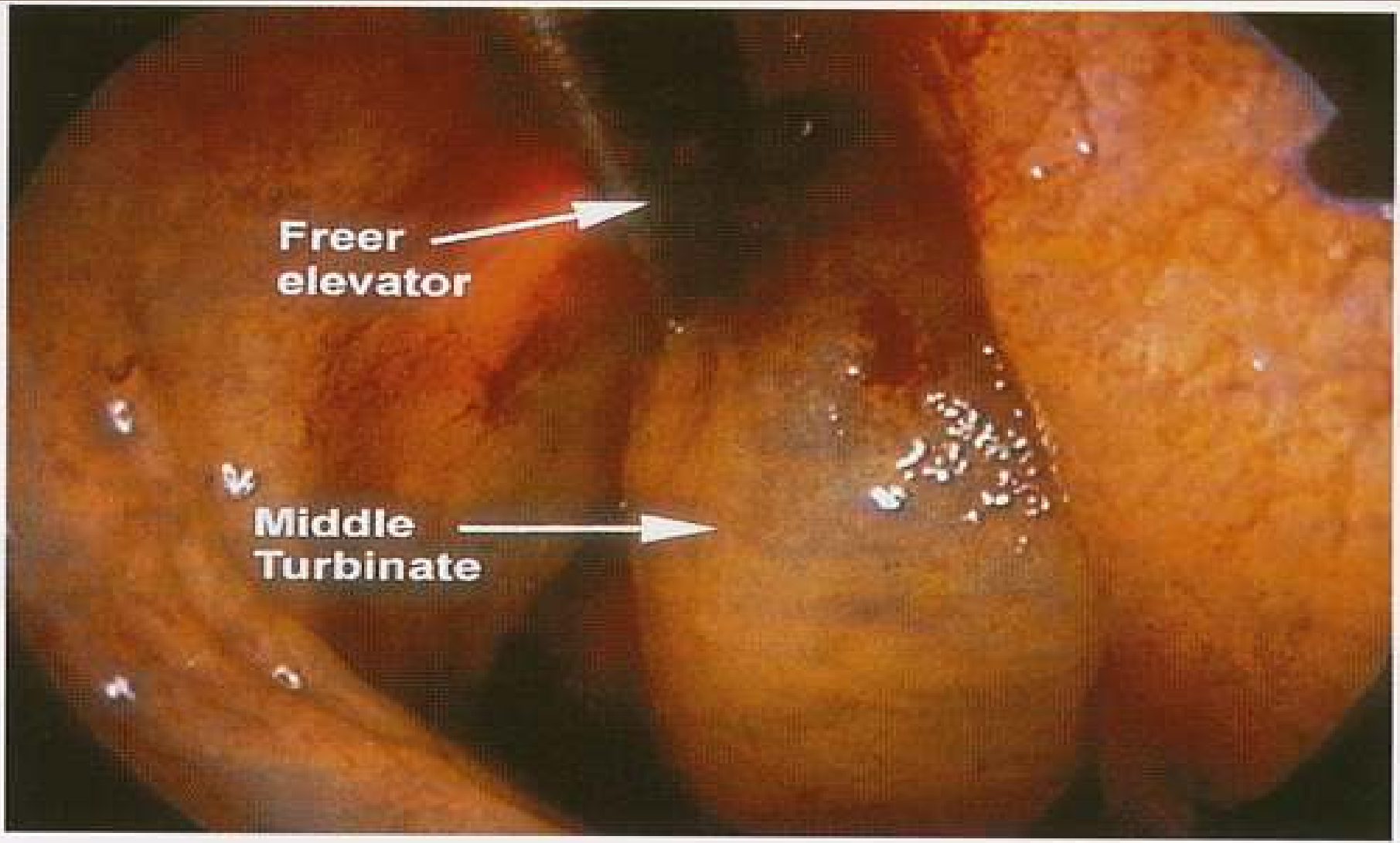
The light beacon is seen just posterior to the lacrimal ridge below the neck of the middle turbinate.

- Endoscopic view of left nasal space. S = septum, MT = middle turbinate, LR = lacrimal ridge, LNW = lateral nasal wall. Blanched injection bleb visible.

Always introduce the second instrument below the endoscope

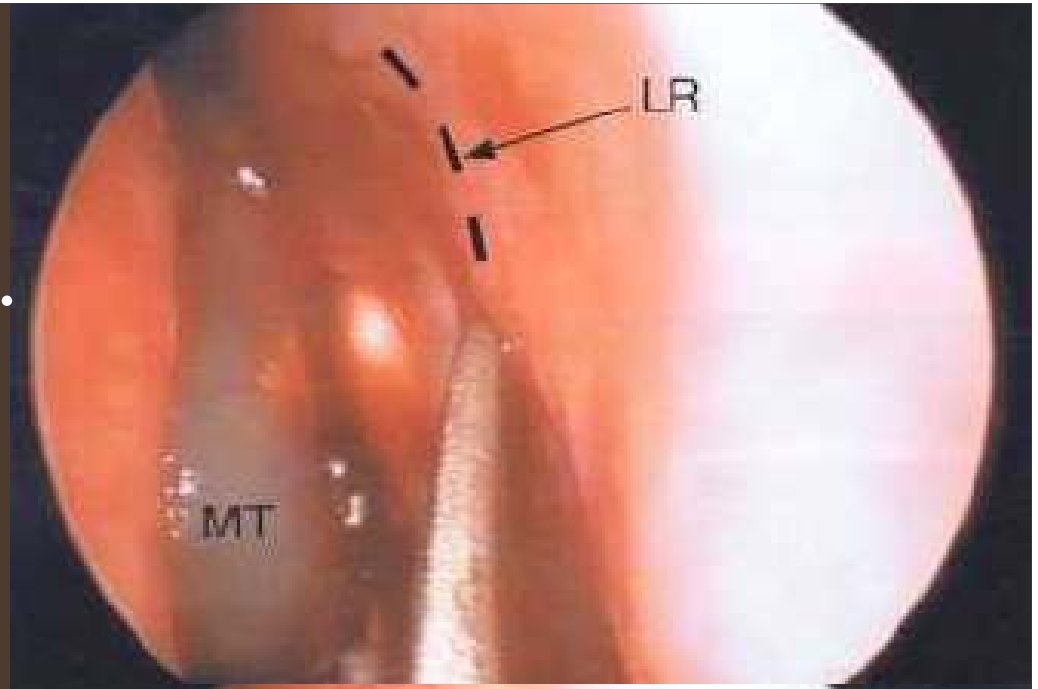


Adrenalin injection

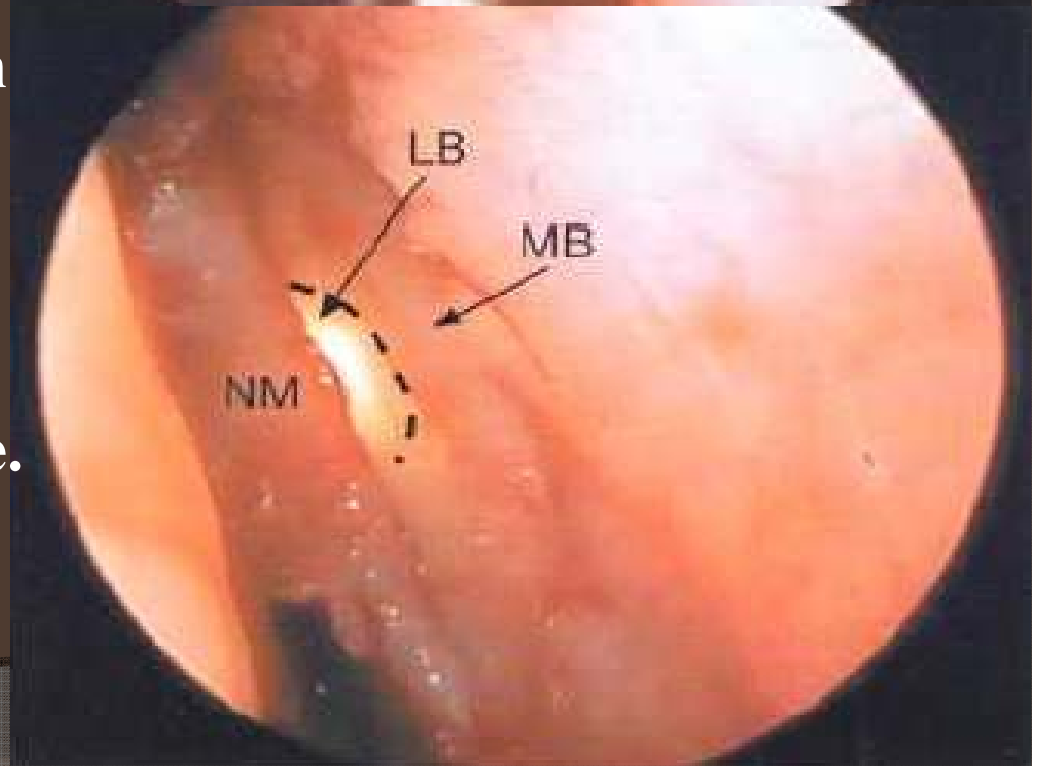


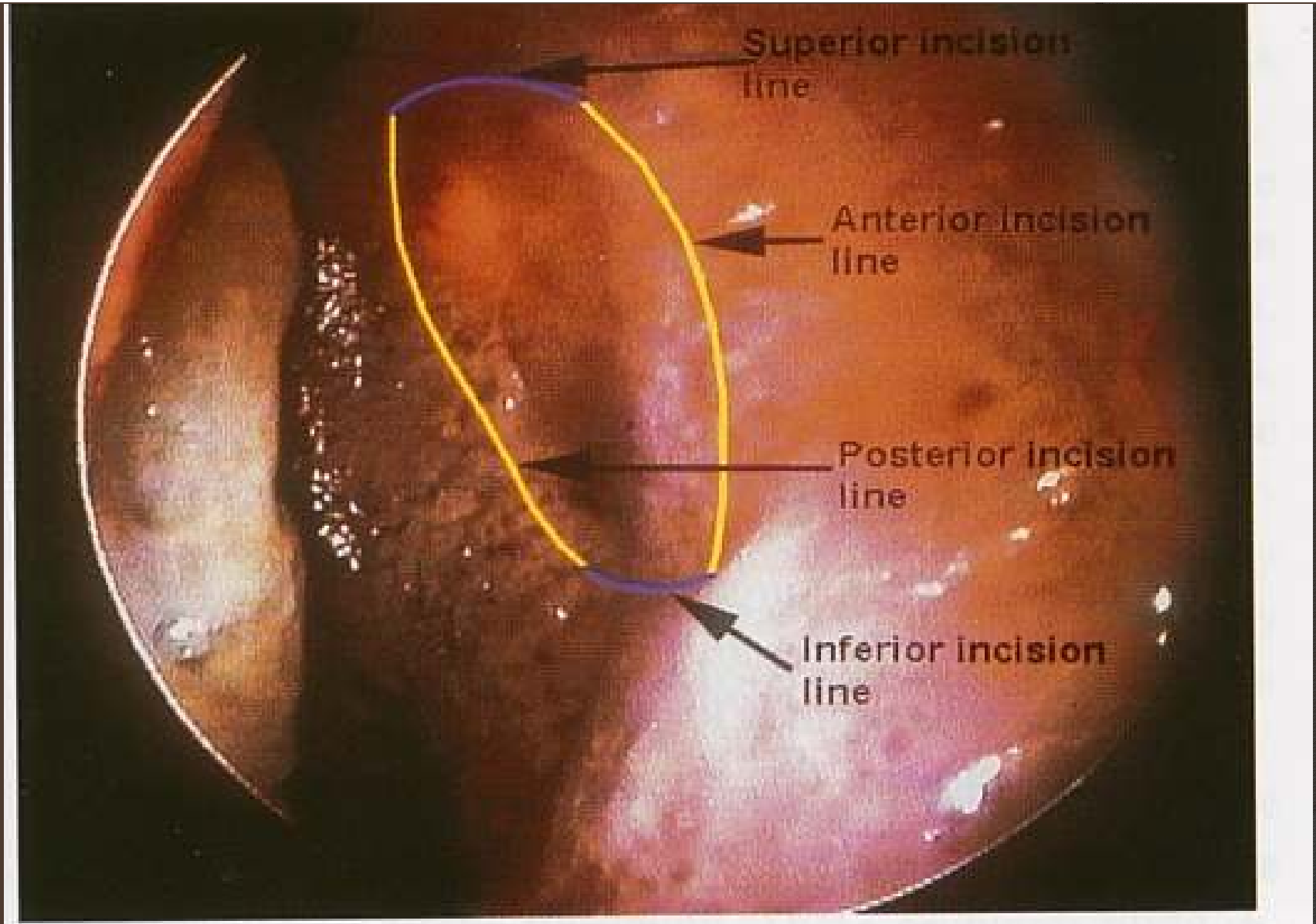
[redacted]The left middle turbinate is displaced medially with a Freer elevator to give adequate exposure to the surgical site.

Freer's elevator incising the nasal mucoperiosteum at the lacrimal ridge. MT = middle turbinate, LR = lacrimal ridge.

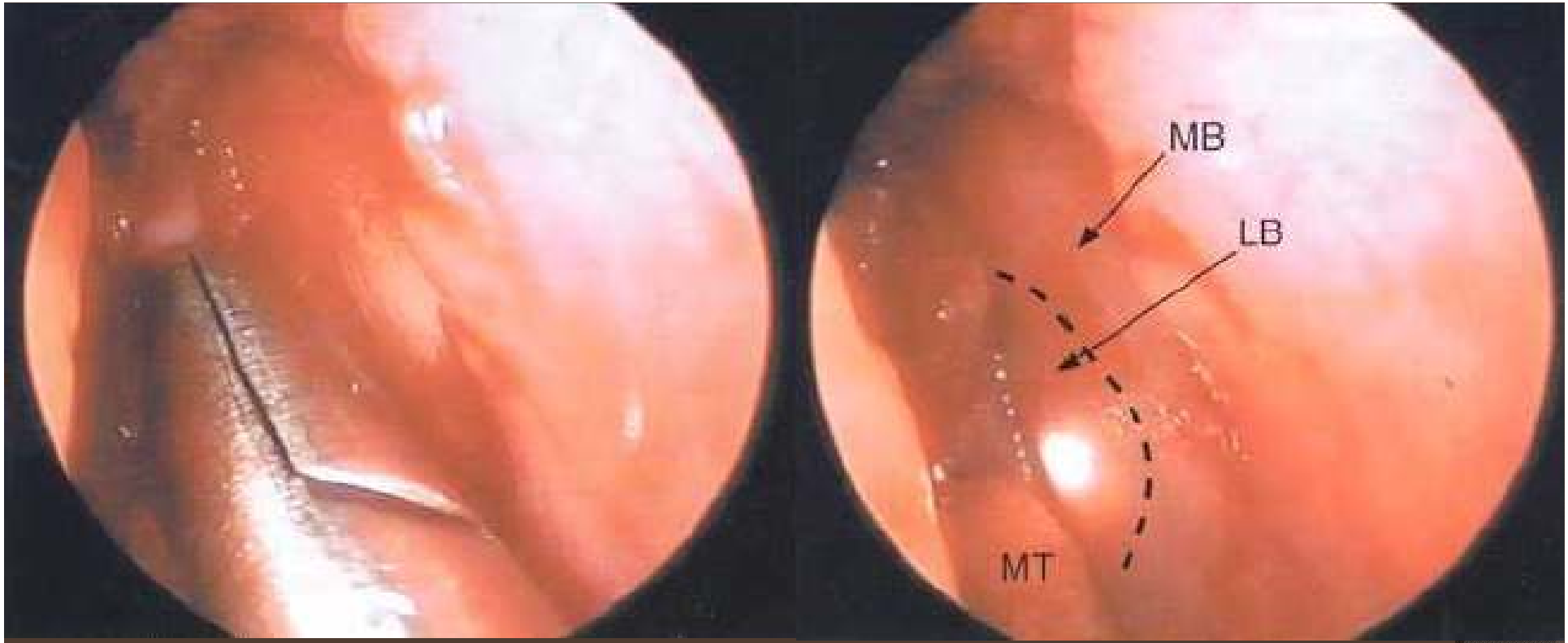


Flap of nasal mucoperiosteum is raised, exposing the maxilla and lacrimal bone. Note that the light pipe beacon is clearly visible through the thin lacrimal bone. LB = lacrimal bone, MB = maxilla bone, NM = nasal mucoperiosteum.



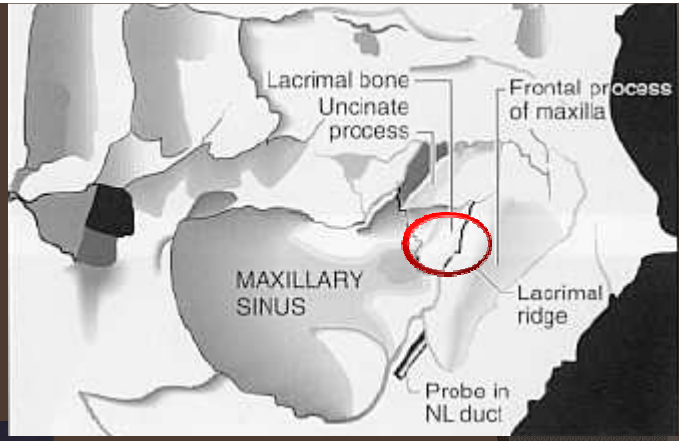


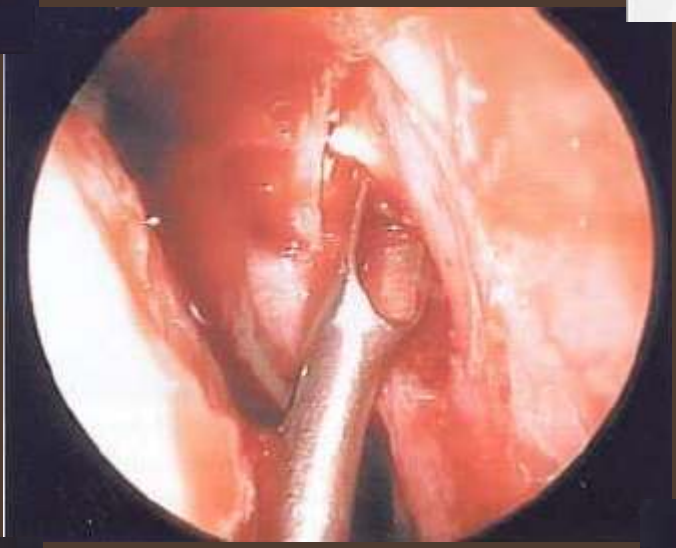
Outline of the area of nasal mucosa to be incised

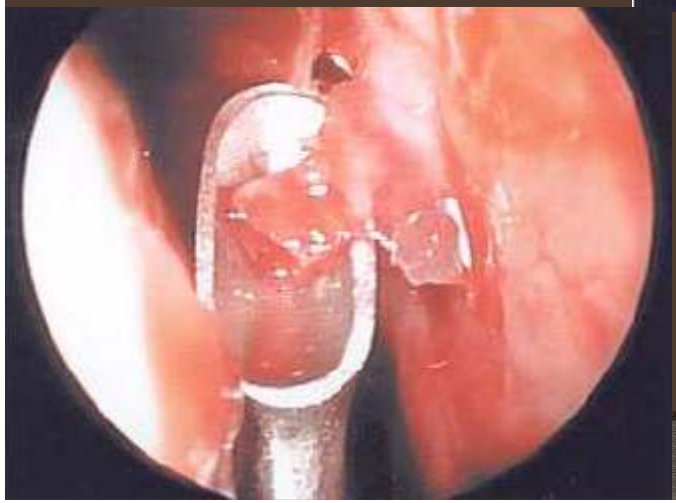


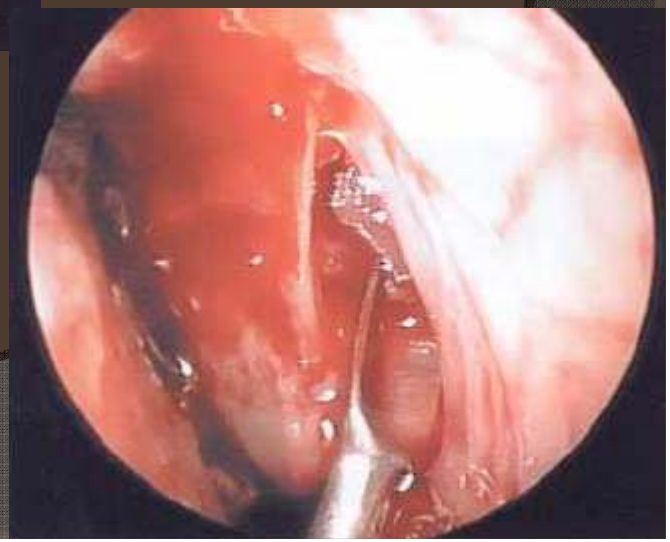
- Straight Blakesley forceps grasping flap.
- Bone exposed. LB = lacrimal bone, MB = maxilla bone, MT = middle turbinate. light beacon clearly visible through thin lacrimal wall.

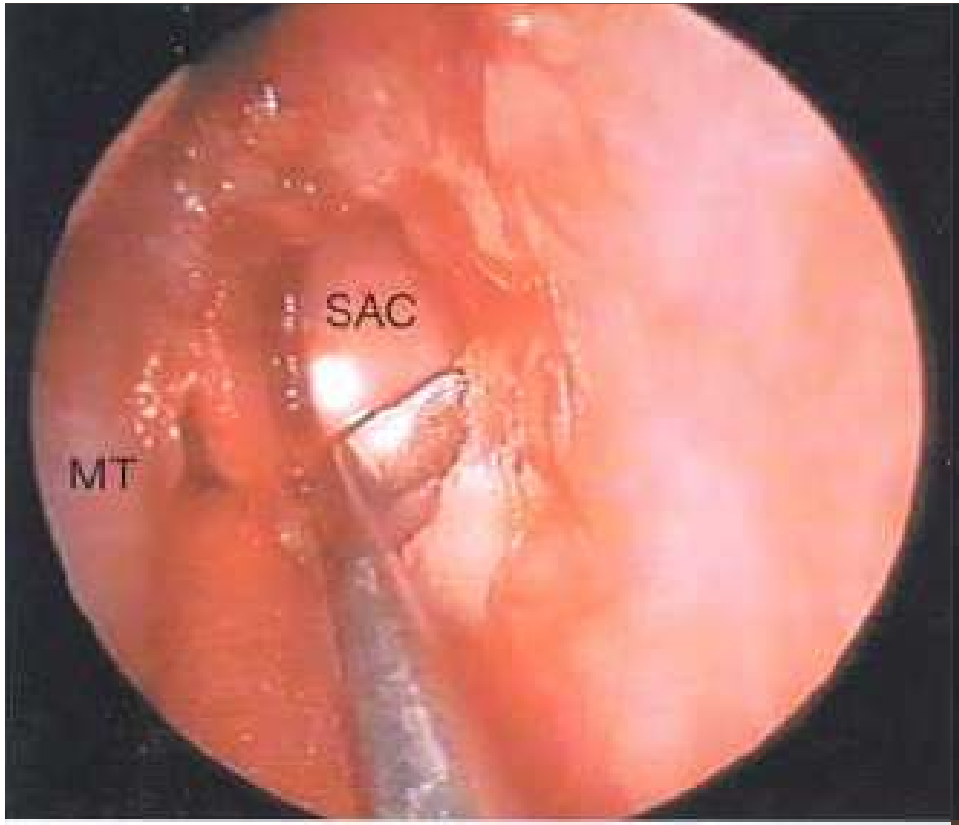
Bone Removal

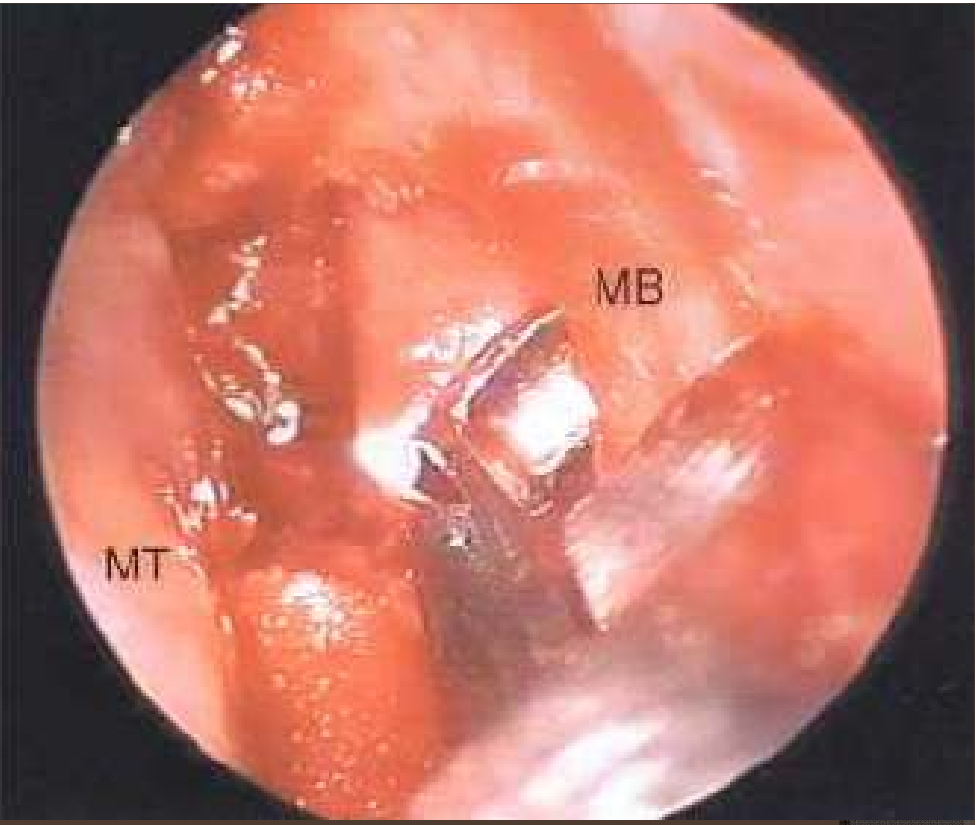






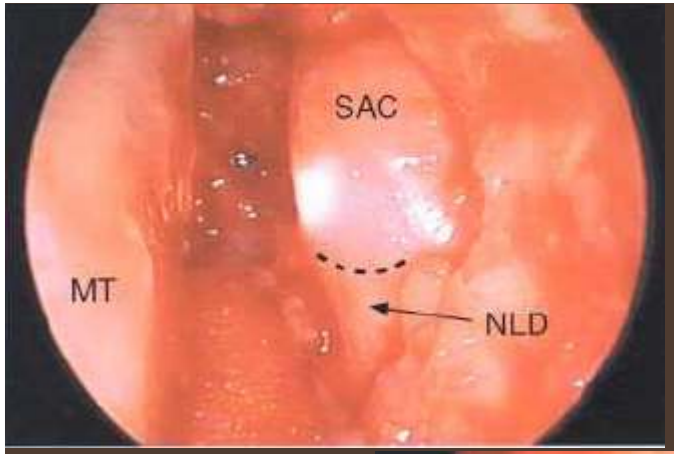


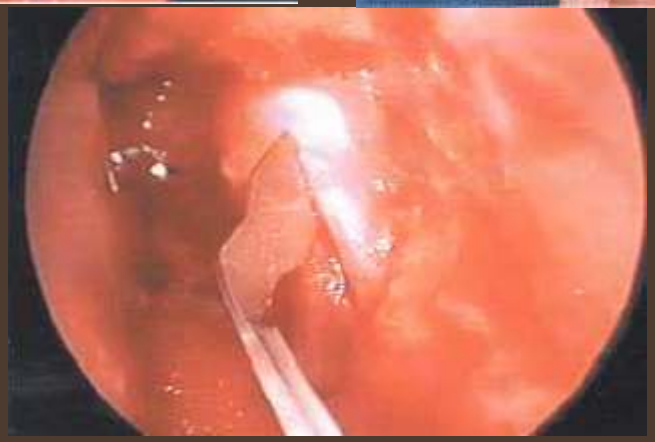


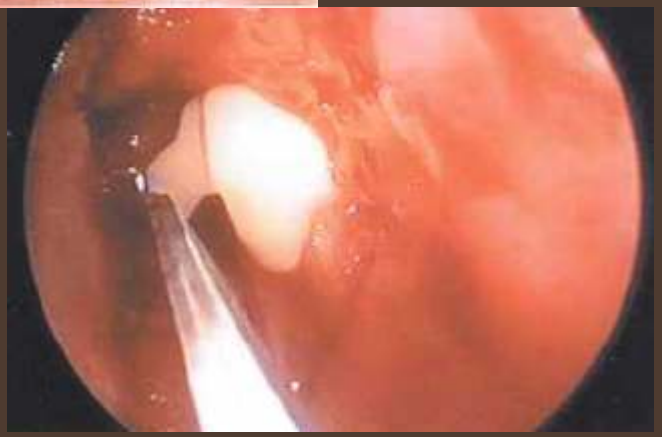


- ***OSTEOTOMY***
- The Kerrison rongeur is used to take large bites of thick maxilla bone to enlarge the rhinostomy anterior to the sac.

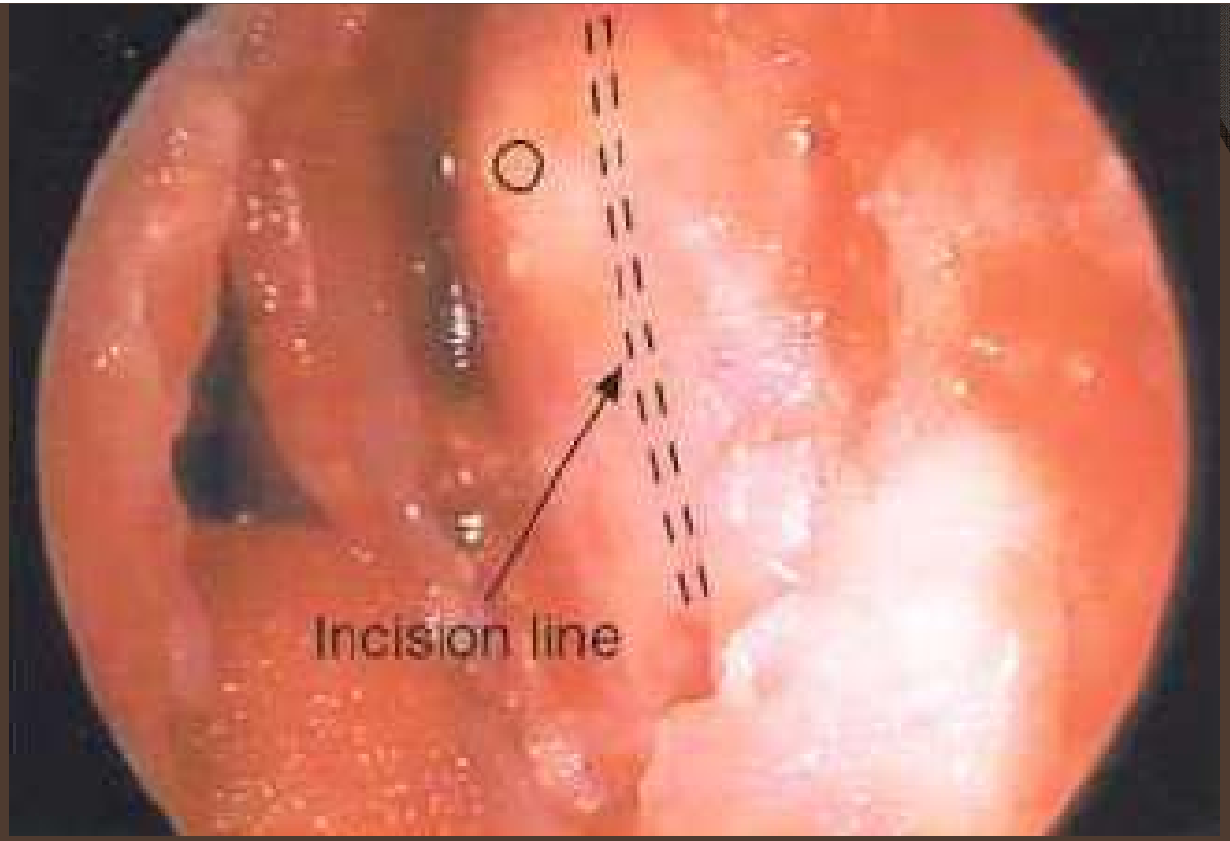
MT = middle turbinate, MB = maxilla bone.





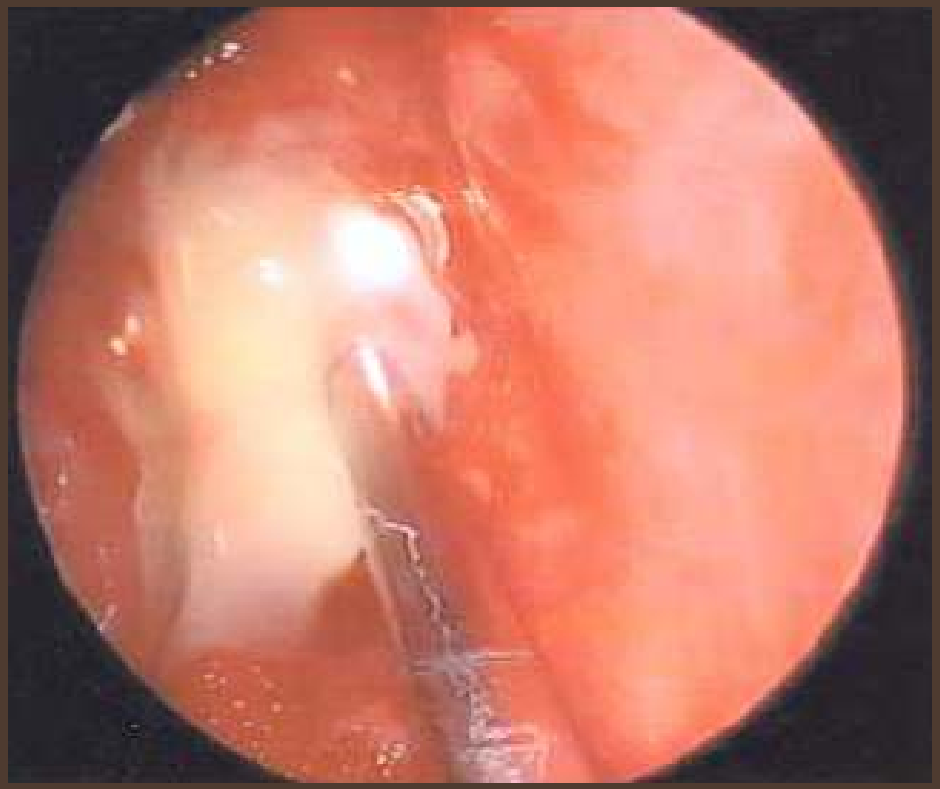


Lacrimal Sac Incision

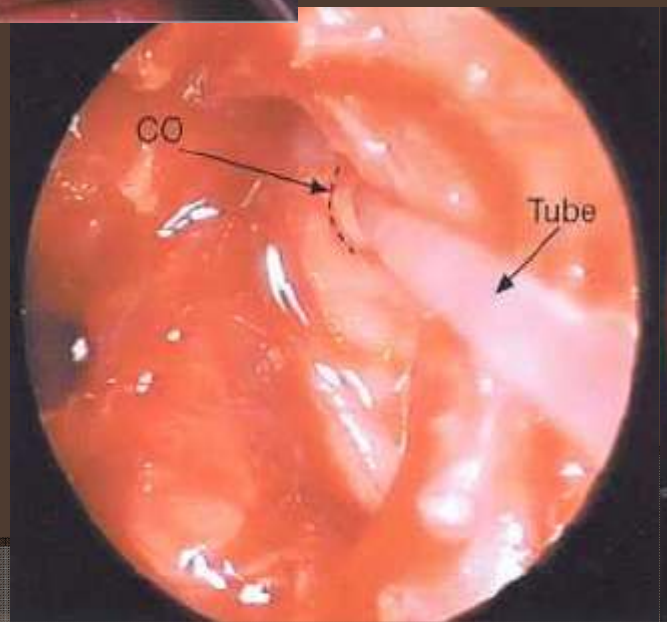


- Make sure the sac incision is on the antero-medial aspect. There is a risk that if you try and incise the sac on its medial aspect the incision will be too posterior and the orbit inadvertently penetrated causing fat prolapse. By incising on the antero-medial aspect, you also have the best chance of a good view into the sac lumen

Lacrimal Sac Mucosa Removal



Silicon Intubation



MOVIE

Post-operative management

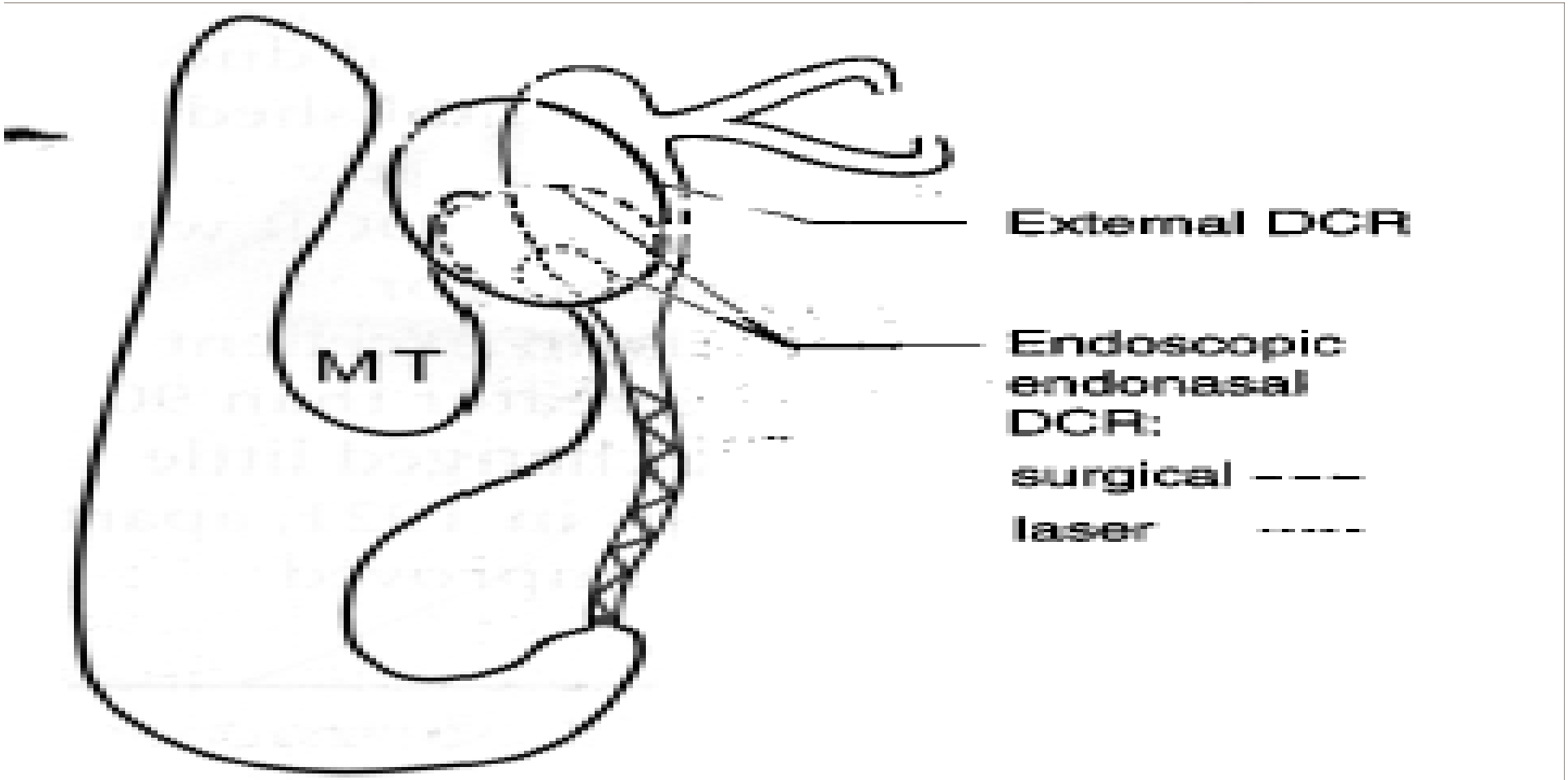
- There is usually no nasal pack
- Sit patient up at 45 deg as soon as possible to reduce bleeding
- Avoid nose-blowing for 4-7 days
- Give topical steroid and antibiotic eyedrops for 4 weeks and irrigation with warm normal saline for first two weeks QID
- There is usually no need for nasal steroid spray.

Fullow Up

- **1 or 2 weeks to check nose and position of tubes**
- **Between 2 and 3 months for removal of tubes**
- **6 months after surgery for the last check.**

- Endoscopic endonasal view of left functioning DCR ostium. Fluorescein tears are seen trickling down the lateral nasal wall. This is a positive functional endoscopic dye test (FEDT)

- There is an early soft synaechia present anterior to the rhinostomy, between the septum (left) and lateral nasal wall (right).
- Straight Blakesley forceps are used to grasp and remove the synaechiae.



- The difference in size and location of the per-operative rhinostomy in external DCR compared to endonasal DCR. Note that the endonasal rhinostomy is generally smaller and lower. When healed, there is very little visible difference in size between external and endosurgical DCR, but endolaser DCR may result in a smaller healed ostium.

- There is no apparent difference between the size and appearance of the healed rhinostomy after external DCR compared to endonasal surgical DCR, but the healed rhinostomy after endolaser DCR appears smaller

END RESULTS

- Appearance 6 months after left endonasal surgical DCR. There are fine synaechiae between the posterior edge of the rhinostomy and the septum, which do not interfere with function. Right: Positive FEDT.

Appearance 6 months after left external DCR. Round cavernous ostium, more anterior than above Right: Positive FEDT

Non endoscopic mechanical endonasal dacryocystorhinostomy.(MEDCR) A modified technique, indication and results.

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Design and patients

- prospective, non-randomized interventional case series a total of 99 procedures performed consecutively in khatam – al – anbia Eye hospital from 2004 till early 2006
- Adult patients enrolled in three subgroups including:
- Chronic nasolacrimal duct obstruction (NLDO)
- NLDO with acute or subacute dacryocystitis.
- Recurrent lacrimal pathway obstruction after failed previous external DCR

Exclusion criteria

Traumatic etiology of NLDO and any significant proximal and canalicular obstruction.Surgical procedure was done through nasal rout (with light speculum) without use of endoscope

Results

- 95 patients (24 men / 71 women) underwent 99 MEDCR procedures (bilateral in four cases)
- average age of the patients was 42 years (range 8- 82 with SD 15.5 years)
- 54% of cases had chronic NLDO, 32% had acute or subacute dacryocystitis secondary to NLDO and 14% had history of failed external DCR

Results

- The mean surgical timing was 30 minutes and the average amount of intraoperative bleeding was 12 ml
- Minimum follow time was 6 months (range from 6 to 18 months)

Results

- Surgery was successful in 95% of cases
- Success was defined as relief of symptoms and certification of anatomic patency of lacrimal drainage pathway which was assessed by patient history, dye disappearance and Jones I tests and lacrimal syringing
- In two of four failed cases partial obstruation was defined

Side Effects

- Side effects were periorbital vague pain and ecchymosis and nasal bloody discharge in early postoperative days. NO significant late complication was detected.

Conclusion

The success rate of MEDCR (95%) compares favorably with standard external DCR (90 – 95% in most studies). This type of procedure specially may be useful for the cases of NLDO with docryocystitis and failed previous external DCR.