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Introduction

The lacrimal drainage system sits in the lateral wall of the nasal cavity. Most of it is lodged in a canal excavated in the maxilla that runs craneo-caudally for 30 mm leading to the inferior meatus. Many structures in the lateral wall have a close relationship with this canal, serving as surgical landmarks. In addition to that, anatomical variations of nasal structures may distort this canal disrupting lacrimal drainage.

This complex relationship between nasal anatomy and the lacrimal system requires a good understanding by the surgeon (ophthalmologist or otolaryngologist) to avoid complications during the different approaches.

Osteology of the Medial Wall of the Orbit

The Orbit (*Cavitas Orbitalis*)

The orbit is a bony structure in the shape of a quadrangular pyramid limited by seven different bones: frontal, ethmoid, lacrimal, sphenoid,

zygomatic, palatine, and maxilla (Fig. 2.1). It has an anterior base, a posterior apex, and four walls (superior, inferior, lateral, and medial) [1].

Both lateral walls form a 90° angle, while each of them is situated at 45° from the medial wall. Orbital walls are curved in order to maintain the projection of the ocular globe while cushioning trauma to the eye.

In an adult, the height of the orbit is approximately 35 mm and the width 40 mm. The volume of the orbit is 30 mL, including 7 mL corresponding to the ocular globe [2, 3].

Medial Wall (*Paries Medialis*)

It separates the orbit from the ethmoid sinus and the nasal cavity. From anterior to posterior, the medial wall is constituted by the frontal process of the maxilla (*processus frontalis*), the lacrimal bone (*os lacrimale*), the lamina papyracea of the ethmoid bone (*lamina orbitalis*), and the sphenoid bone (*os sphenoidale*) (Fig. 2.1).

The lamina papyracea comprises the largest portion of the medial wall. It is an extremely thin layer of bone (0.2–0.4 mm) [4] that becomes thicker in its posterior part, where it inserts in the sphenoid body. In this area it conforms the medial wall of the optic canal (*canalis opticus*) [1]. Superiorly, the lamina papyracea articulates with the roof of the orbit at the frontoethmoid suture. The foramina of the anterior and posterior ethmoidal canals can be found at this level (Fig. 2.1).

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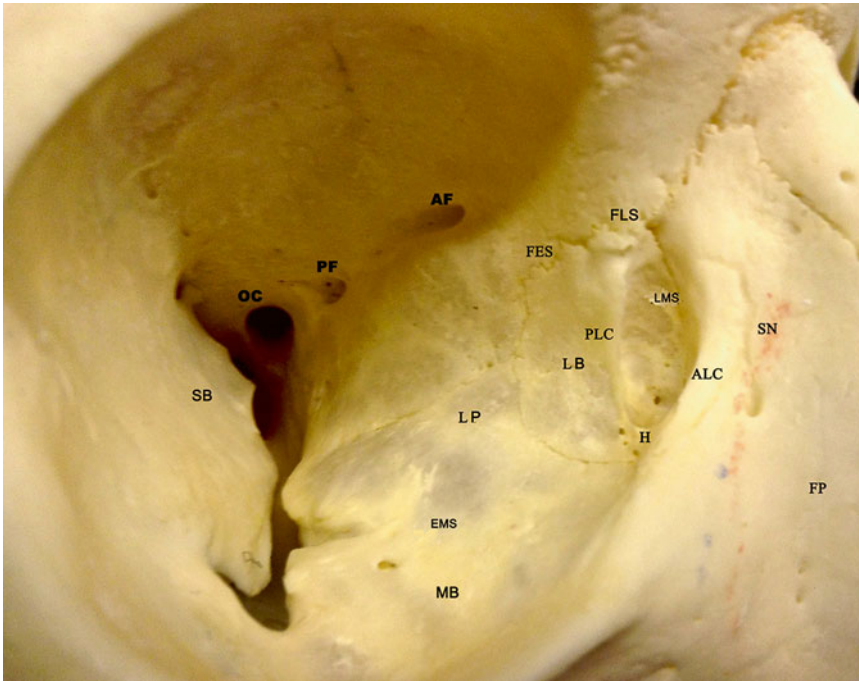


Fig. 2.1 Middle wall of right orbit. *PLC* posterior lacrimal crest, *ALC* anterior lacrimal crest, *H* hamulus, *LMS* lacrimo maxillary suture, *FES* fronto ethmoid suture, *FP* frontal process, *LP* lamina papyracea, *LB* lacrimal bone,

SN sutura nota, *AF* anterior foramen (anterior ethmoid artery), *PF* posterior foramen (posterior ethmoid artery), *OC* optic canal (optic nerve), *SB* sphenoid bone, *MB* maxilla *EMS* ethmoidomaxillary suture

Through these canals, branches of the ophthalmic artery and the nasociliary nerve exit the orbit towards the nasal cavity.

The rule 24–12–6 has been suggested to remember the distance in millimeters from the anterior lacrimal crest to the anterior ethmoidal foramen (24 mm), from anterior to posterior foramina (12 mm), and from the posterior foramen to the optic canal (6 mm) [5]. The medial wall articulates with the orbital floor at the ethmoidomaxillary suture.

Lacrimal Fossa (*Fossa Sacci Lacrimalis*)

The lacrimal sac is contained in a groove excavated in the inferomedial region of the medial orbital wall called the lacrimal fossa. It is limited by the anterior lacrimal crest (*crista lacrimalis anterior*) of the frontal process of the maxilla and the posterior lacrimal crest (*crista lacrimalis posterior*) of the lacrimal bone. The distance

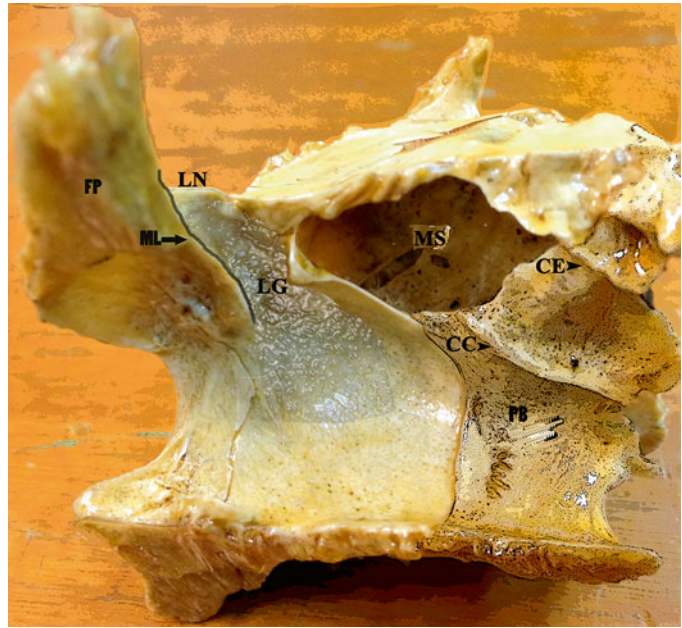
between both lacrimal crests is approximately 8–9 mm [6, 7] (Fig. 2.1).

The articulation between the frontal process of the maxillary bone (*margo lacrimalis*) and the lacrimal bone is a vertical crest called lacrimomaxillary suture. Endonasally, this suture corresponds to the maxillary line [8] which is a very important landmark, easy to identify by endoscopic approach. For external DCR, however, the most important landmark is the anterior lacrimal crest. Anterior to this crest lies a fine vascular groove termed *sutura nota* that conveys a small branch of the infraorbital artery that may cause significant bleeding during dissection of this area [9].

The distance between the anterior lacrimal crest and the lacrimomaxillary suture is 4 mm, representing roughly the midpoint of the lacrimal fossa. Vertically, the lacrimal fossa measures 10–17 mm [7, 10, 11].

The palpebral portion of the orbicularis muscle (*pars palpebralis*) inserts in the anterior lacrimal crest by the medial palpebral ligament.

Fig. 2.2 Maxilla and palatine bone. *FP* frontal process, *ML* margo lacrimalis, *LG* lacrimal groove, *MS* maxillary sinus, *PB* palatine bone, *CE* crista ethmoidalis, *CC* crista conchalis, *LN* lacrimal notch



This portion has a deeper part that originates in the posterior lacrimal crest (*pars lacrimalis*) that runs behind the lacrimal sac and helps to its dilatation [1]. This portion was first described by Professor W.E. Horner in 1824 and has been named Horner's muscle [12].

The Lacrimal Bone

The lacrimal bone is a quadrilateral sheet of bone divided in two regions by the posterior lacrimal crest. The posterior part articulates with the lamina papyracea of the ethmoid bone, which lies at the same level. The anterior part forms the posterior boundary of the lacrimal fossa. The lacrimal bone has a thickness of 106 μm [13]. This minimal thickness allows the osteotomies to be done with laser during endocanalicular DCR.

Superiorly, the lacrimal bone articulates with the internal orbital process of the frontal bone, forming the frontolacrimal suture (Fig. 2.1).

Nasolacrimal Canal (*Canalis Nasolacrimalis*)

The nasolacrimal canal opens at the base of the lacrimal fossa. It is limited laterally by the maxillary bone and medially by the lacrimal bone and the inferior turbinate.

The superior orifice is formed by the articulation of a small hook-like projection of the lacrimal bone (*hamulus lacrimalis*) with the upper portion of the lacrimal notch (*incisura lacrimalis*) of the maxilla (Fig. 2.2). The lacrimal process of the inferior turbinate (*processus lacrimalis*) and the inferior margin of the lacrimal bone close the canal inferiorly. The mean length of the bony canal is about 11 mm. The mean transverse diameter is approximately 3.5–4.6 mm, and the anteroposterior diameter is 5.6–6.8 mm. A narrowing is usually found at entrance of the canal that has an oblique inferior and posterior course, forming a 15–25° angle posterior to the frontal plane [14–17] (Figs. 2.3 and 2.4).

Inferior Orifice of the Nasolacrimal Canal (*Ostium Canalis Nasolacrimalis*)

The orifice of the nasolacrimal canal is located at the roof of the inferior nasal meatus. It can be located approximately 1.5 cm superior to the nasal floor, 1.5 cm posterior to the anterior attachment of the inferior nasal turbinate to the lateral nasal wall, and 2.4 cm from the anterior nasal spine [10, 18]. This orifice is usually covered

by a mucosal fold called Hasner's valve [19] (Figs. 2.5 and 2.6).

Lateral Wall of the Nasal Cavity

The Maxilla (*Maxila*)

The maxilla is a paired bone that takes part in both the facial massif and the lateral wall of the nasal cavity. It is composed of a central body and four processes: zygomatic, frontal, alveolar, and palatine. The body of the maxilla contains the maxillary sinus that opens into the nasal cavity through the *hiatus maxillaris*. The palatine process articulates with its contralateral counterpart to form the anterior segment of the hard palate (Fig. 2.2). The frontal process grows superiorly from the anterior part of the body, to articulate cranially with the frontal bone, in the posterior margin with the lacrimal bone, in the medial aspect with the middle turbinate, and in the inferior margin with the inferior turbinate (Fig. 2.7).

The lacrimal groove (*sulcus lacrimalis*) is excavated in the body of the maxilla posterior to the frontal process. In most cases it is an open or partially covered groove, but eventually a complete conduct can be found. The lacrimal groove lodges part of the lacrimal sac and the membranous duct to its outlet in the inferior meatus.

The nasolacrimal canal is completed medially by the lacrimal bone in the uppermost part and

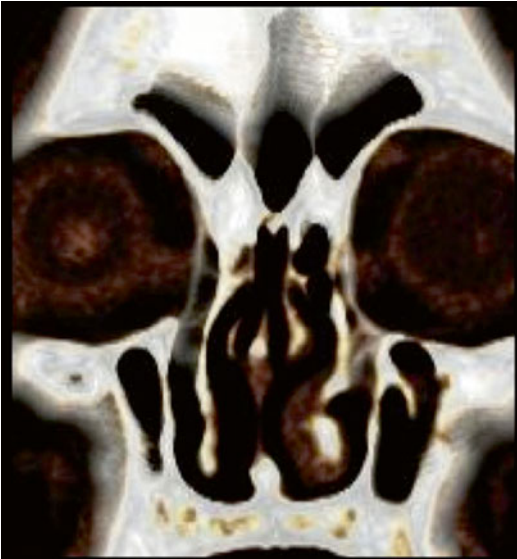


Fig. 2.3 Cranial CT scan of cadaver specimen showing the bony portion of the lacrimal system (nasolacrimal canal)

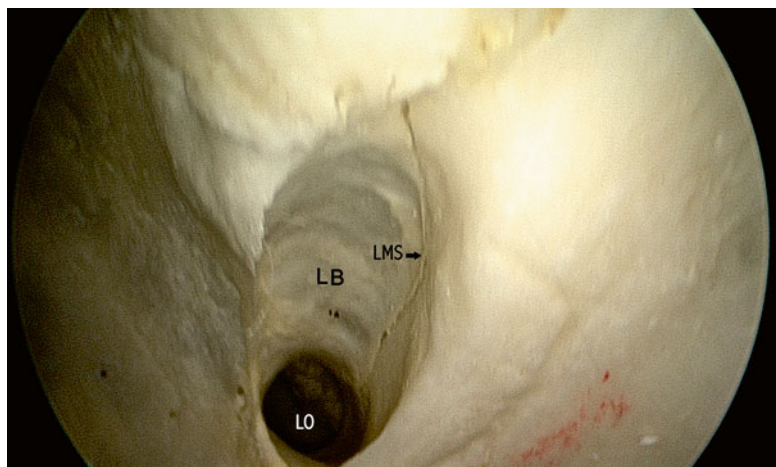


Fig. 2.4 Right nasolacrimal canal. View from the lacrimal fossa. *LMS* lacrimo maxillary suture, *LB* lacrimal bone, *LO* lacrimal orifice

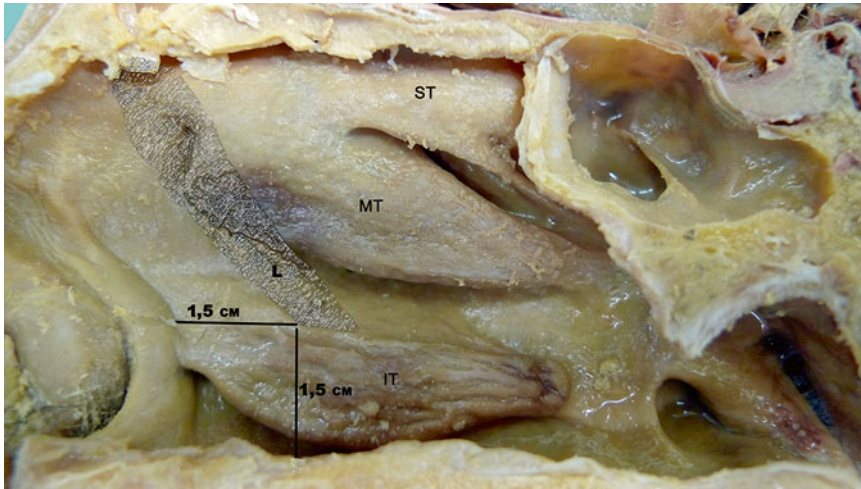


Fig. 2.5 Projection of the lacrimal system canal in the lateral wall of the right nasal cavity. *L* projection of the lacrimal system, *MT* middle turbinate, *IT* inferior turbinate, *ST* superior turbinate

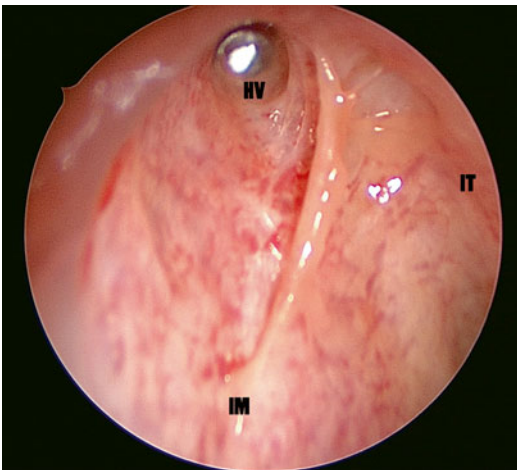


Fig. 2.6 Endoscopic view of the inferior meatus. 45° angled endoscope. *IM* inferior meatus, *HV* Hasner's valve, *IT* inferior turbinate

the lacrimal process of the inferior turbinate inferiorly (Fig. 2.8).

The maxilla articulates dorsally with the palatine bone, which in turn articulates with the pterygoid process of the sphenoid bone, serving as boundary for the pterygopalatine fossa. At the same time, they compose the lateral wall of the nasal cavity and give support to the ethmoidal air cells, and the middle, superior, and supreme turbinates.

The Palatine Bone (*Os Palatinum*)

The palatine bone is located between the maxilla and the pterygoid process of the sphenoid. It has horizontal and perpendicular plates. The horizontal plate articulates with the horizontal plate of the maxilla forming the hard palate. The perpendicular plate has two processes, orbital and sphenoidal, and a notch that is converted into a foramen by the apposition of the pterygoid plate of the sphenoid. This foramen serves as passage for the sphenopalatine vessels and nerves to the nasal cavity. The nasal surface of the perpendicular plate has two crests. The superior crest (*crista ethmoidalis*) gives insertion to the middle turbinate and the inferior (*crista conchalis*) to the inferior turbinate (Figs. 2.2, 2.7, and 2.9).

The Ethmoid Bone (*Os Ethmoidale*)

The ethmoid bone sits in the middle of the sino-nasal structures and is part of both the lateral and the middle walls of the nasal cavity. On its superior face, the lamina cribosa separates the anterior cranial fossa from the nasal cavity. The perpendicular plate (*lamina perpendicularis*) hangs on a sagittal plane that forms the upper part

Fig. 2.7 Lateral wall of right nasal cavity: maxilla. *IT* inferior turbinate, *LB* lacrimal bone, *MS* maxillary sinus, *PB* palatine bone, *M* maxilla

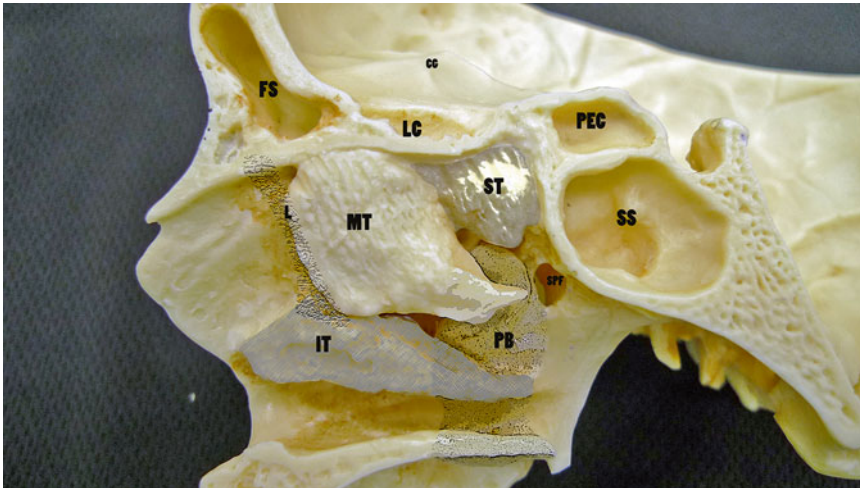
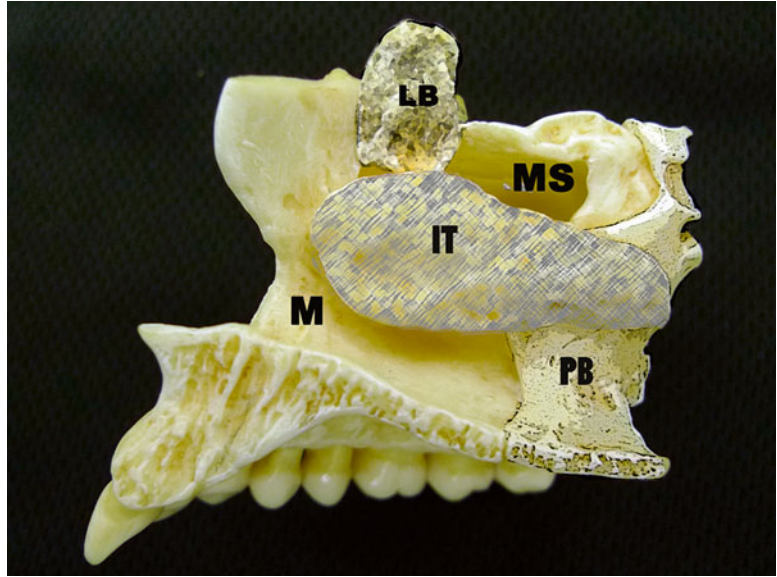


Fig. 2.8 Lateral wall of right nasal cavity. *FS* frontal sinus, *LC* lamina cribosa, *PEC* posterior ethmoidal cell, *MT* middle turbinate, *ST* superior turbinate, *IT* inferior

turbinate, *PB* palatine bone, *SS* sphenoid sinus, *l* projection of the lacrimal system

of the nasal septum. The ethmoid bone has two lateral masses that contain the ethmoidal cells (*labyrinthus ethmoidalis*). The external wall of the lateral mass is called lamina papyracea and contributes to the medial wall of the orbit, together with the lacrimal bone and the lateral wall of the sphenoid bone. In its superior border there are two small grooves that house the anterior and posterior ethmoidal arteries. The medial

surface of the lateral mass is part of the lateral wall of the nasal cavity. The middle, superior, and sometimes, the supreme turbinates are the main structures in this medial surface (Fig. 2.9). Each turbinate limits its corresponding meatus (middle, superior, or supreme). The lacrimal canal is partially located in the anterior part of the middle meatus in close relationship with the middle turbinate (Figs. 2.9 and 2.10a, b).

The middle meatus is the space between the middle turbinate and the lateral wall of the nasal cavity. It receives the drainage of the frontal and maxillary sinuses as well as the anterior ethmoidal air cells. The most evident landmarks are the uncinete process (*processus unciforme*) and the ethmoidal bulla (Figs. 2.11, 2.12 and 2.13).

The uncinete process is a half-moon-shaped ridge that descends from its insertion above the

axilla of the middle turbinate, at the level of the projection of the cranial end of the sac. It is approximately 3.4 mm wide and 1.5–2 cm in length reaching the ethmoidal process of the middle turbinate where it inserts. It is directly related with the frontal recess and with the hiatus maxillaris. The latter is divided by the uncinete process in two spaces, the anterior and posterior fontanellae that constitute the surgical access to the maxillary sinus called middle anastromy.

The ethmoidal bulla is immediately behind the unciform process. It is a rounded structure with thin walls containing the main anterior ethmoidal cell. The three dimensional space delimited by the uncinete process, the ethmoidal bulla, and the lamina papyracea is called ethmoidal infundibulum (*infundibulum ethmoidalis inferior*). Drainage of the frontal and maxillary sinus, as well as the anterior ethmoidal cells ends in this infundibulum. The *hiatus semilunaris* is the two-dimensional area between the posterior margin of the uncinete process and the corresponding line in the ethmoidal bulla that serves as entrance to the ethmoidal infundibulum.

The middle meatus is closed posteriorly by the basal lamella of the middle turbinate that inserts in the lamina papyracea, separating anterior and posterior ethmoidal cells.

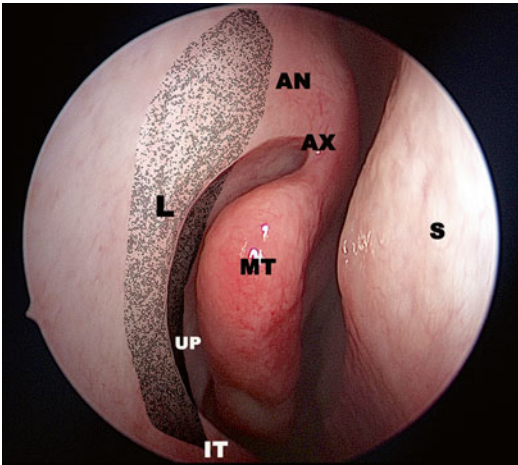


Fig. 2.9 Endoscopic view of the right nasal cavity. *L* projection of the lacrimal system, *UP* uncinete process, *MT* middle turbinate, *IT* inferior turbinate, *S* septum, *AN* agger nasi, *Ax* axilla

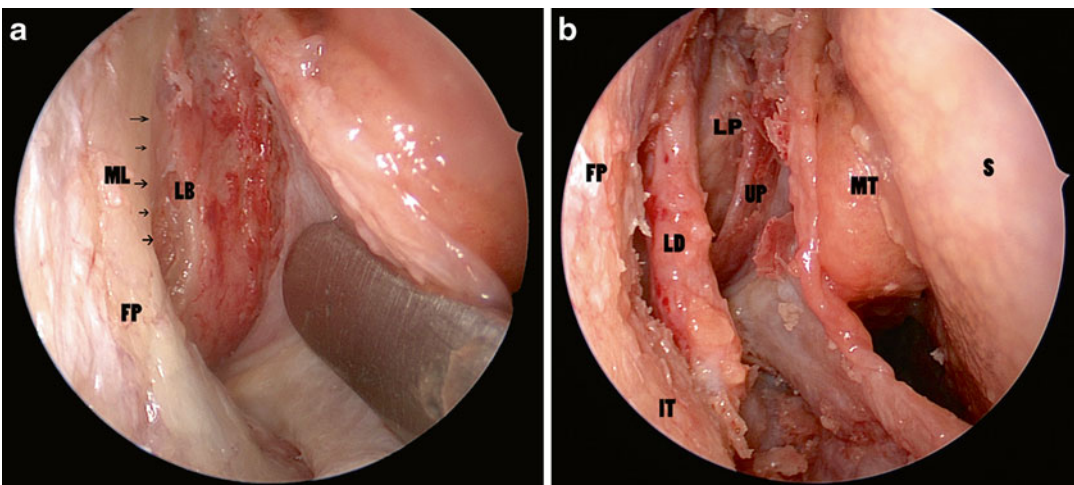


Fig. 2.10 (a) Lacrimal system. Endoscopic view. *FP* frontal process of maxilla, *ML* maxillary line, *LB* lacrimal bone. (b) Dissection of the lacrimal system. Endoscopic

view. *FP* frontal process of maxilla, *IT* inferior turbinate, *LD* lacrimal duct, *LP* lamina papyracea, *UP* uncinete process, *MT* middle turbinate, *S* septum

Fig. 2.11 Lateral wall of the nasal cavity. *LC* lamina cribrosa, *Ax* axilla, *FP* frontal process, *ST* superior turbinate, *MT* middle turbinate, *IT* inferior turbinate, *SS* sphenoid sinus

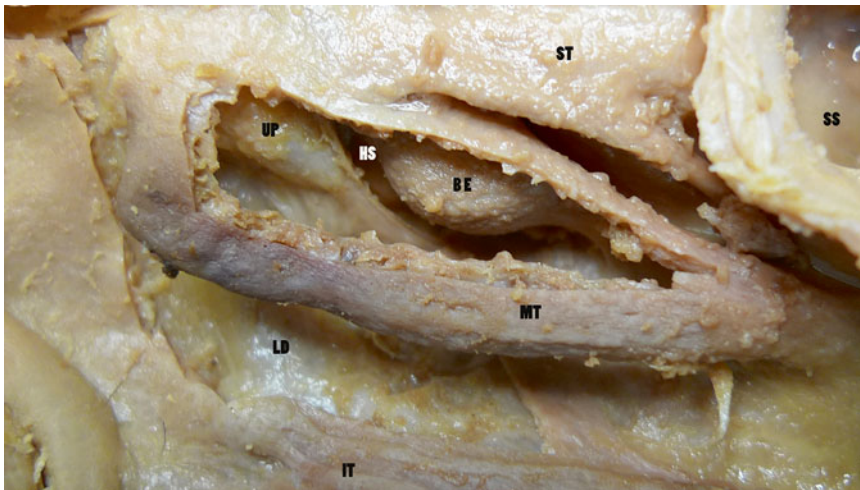
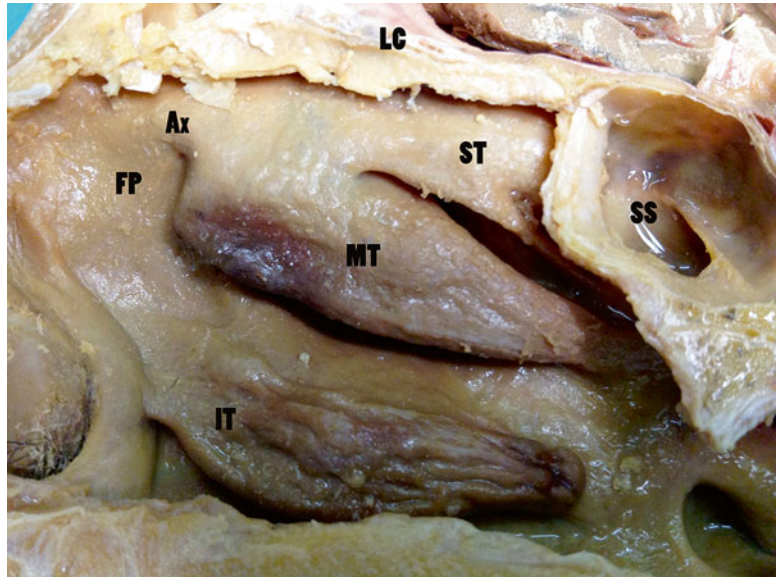


Fig. 2.12 Middle turbinate dissected to expose the middle meatus and the relationship with the lacrimal duct. *ST* superior turbinate, *SS* sphenoid sinus, *UP* uncinat

cess, *HS* hiatus semilunaris, *BE* bulla ethmoidalis, *MT* middle turbinate, *LD* lacrimal duct, *IT* inferior turbinate

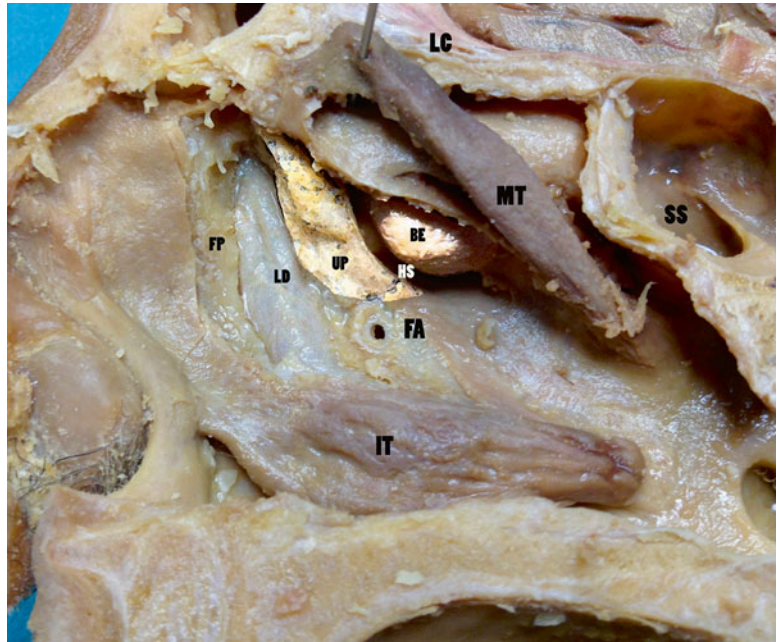
Nasal Septum (*Septo Nasalis*)

The nasal septum separates both nasal cavities. It is composed by the quadrangular septal cartilage, the vomer, and the perpendicular plate of the ethmoid bone. It is usually irregular and may have deviations that hamper the location of the lacrimal system, particularly when they affect the upper segment of the cartilaginous septum.

The Inferior Turbinate (*Concha Nasalis Inferior*)

The inferior turbinate is an independent bone, articulated to the ethmoidal complex. It forms the inferior margin of the *hiatus maxillaris* and closes the inferior lacrimal canal with its anterior-superior lacrimal process. The lateral surface of the inferior turbinate forms the inferior meatus,

Fig. 2.13 Middle meatus and lacrimal duct. *FP* frontal process, *LD* lacrimal duct, *UP* uncinat process, *HS* hiatus semilunaris, *BE* bulla ethmoidalis, *MT* middle turbinate, *LC* lamina cribosa, *SS* sphenoid sinus, *FA* fontanelle area, *IT* inferior turbinate



where the Hasner's valve opens to the nasal cavity. The ethmoidal process articulates with the uncinat process posteriorly (Figs. 2.7 and 2.8).

Relationships and Landmarks

The lacrimal system has close relations to several structures that can serve as landmarks for exploration and surgery. The synostosis between the lacrimal bone and the frontal process of the maxilla (lacrimomaxillary suture) produces a half-moon-shaped ridge in the nasal mucosa called the maxillary line. This is the main landmark for the endonasal DCR because most of the lacrimal system rests posterior and lateral to this line (Figs. 2.9 and 2.10a, b).

The head of the middle turbinate inserts in the medial aspect of the frontal process of the maxilla, medially to the maxillary line. The anterior point of insertion of the middle turbinate into the lateral nasal wall is called the axilla of the middle turbinate. The *agger nasi* is a protuberance that can usually be observed anterior to the axilla. It can be more or less evident depending on the degree of pneumatization. The mean distance between the cranial end of the lacrimal sac and

the *axilla* is 8.8 mm [20] (Figs. 2.9 and 2.14a, b). The rhinostomy must be performed at this level to ensure a wide opening of the lacrimal sac that warrants long-term patency. It must be kept in mind that the distance to the *lamina cribosa* at this level is only around 10 mm [10], so the risk of an injury leading to a CSF leak is not negligible. This is especially true for external approaches performed without endoscopic control.

The middle turbinate can show anatomical variations that can add significant difficulty to the surgical approach to the lacrimal system because 50 % of these variants produce narrowing of the *hiatus maxillaris* [21].

The concha bullosa is the most prevalent anatomical variation, found in 28–47 % of the cases [21–23]. It is produced by an intra-turbinal pneumatization that dilates the turbinate both antero-posteriorly and mediolaterally. The consequence is the narrowing of the opening between the middle turbinate and the lateral wall that leads to the middle meatus (meatal hiatus). Additionally it may alter the relationship between the maxillary line and the head of the middle turbinate. The maxillary line is usually found slightly anterior to the head of the middle turbinate. In the case of a concha bullosa, the maxillary line appears into

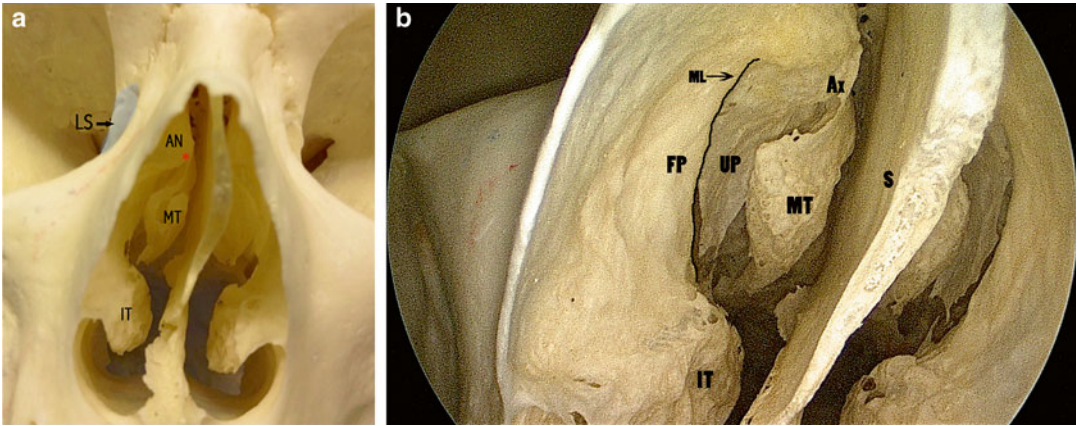


Fig. 2.14 (a) Osteology of the nasal cavity. (b) Endoscopic view of the right nasal cavity. *LS* lacrimal sac, *AN* agger nasi, *FP* frontal process, *ML* maxillary line, *UP*

uncinate process, *Ax* axilla, *MT* middle turbinate, *S* septum, *IT* inferior turbinate

the middle meatus, hidden by the enlarged turbinate. Removal of the lateral wall of the concha bullosa must be the first surgical step to grant access to the lacrimal system.

Paradoxical curvature of the middle turbinate is less frequent, appearing in 12–23 % of the cases [21–23]. It consists in an aberrant outwards folding of the middle turbinate. The image of the coronal CT scan shows a characteristic hook-shaped image with lateral convexity. This anomaly leads to a narrowing of the middle meatus that hampers endoscopic control especially in intracanalicular laser surgery.

The relationship of the uncinate process with the lacrimal system is variable, but it is usually considered the posterior limit of the rhynostomy in the endoscopic DCR approach.

The upper end superposes on the maxillary line and contacts the lacrimal bone.

As it curves down and posteriorly it separates completely from the lacrimal system. In most cases it represents no obstacle for surgery but some authors advocate its systematic removal [24] (Fig. 2.15). Pneumatized uncinate processes were found in 2–3 %. These cases usually require removal to access the lacrimal system [22, 25].

Occasionally, the laser diode fiber can twist backwards, appearing lateral to the uncinate process in the space between the ethmoidal bulla and the lamina papyracea (*infundibulum*

ethmoidalis inferior). This situation requires complete removal of the uncinate process to achieve a wide rhynostomy.

Blood and Nerve Supply

The nasal cavity receives arterial supply from both the internal and the external carotid arteries via the ethmoidal arteries and the sphenopalatine artery respectively.

The sphenopalatine artery is the terminal branch of the maxillary artery. It emerges from the superomedial part of the pterigopalatine fossa and enters the nasal cavity through the sphenopalatine foramen. It gives off two main branches: the posterior lateral nasal branch (PLNB), which supplies the region of the lateral nasal wall and then anastomoses with branches of the anterior and posterior ethmoidal arteries, and the posterior septal branch (PSB), which courses the anterior inferior wall of the sphenoid sinus and distributes on the nasal septum. The distal extreme of this septal branch, the nasopalatine artery, ends in the incisive canal where it anastomoses with the greater palatine artery (Fig. 2.16).

The anterior and posterior ethmoidal arteries irrigate the roof of the nasal cavity.

Innervation of the nasal cavity depends on the first and second divisions of the trigeminal nerve.

Fig. 2.15 Middle meatus. View through opening in the middle turbinate. *FS* frontal sinus, *LC* lamina cribrosa, *FP* frontal process, *UP* uncinate process, *HS* hiatus semilunaris, *BE* bulla ethmoidalis, *MT* middle turbinate, *LD* lacrimal duct, *IT* inferior turbinate, *SS* sphenoid sinus

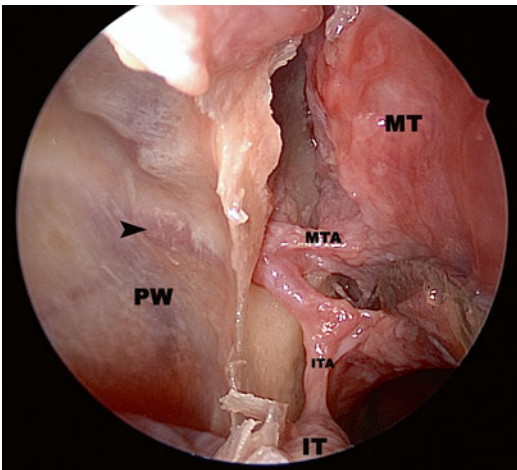
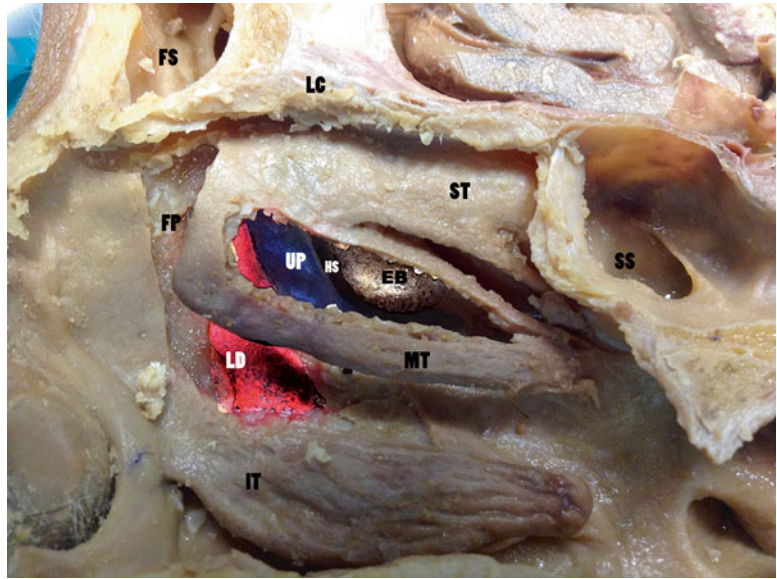


Fig. 2.16 Branches of the right sphenopalatine artery. *IT* inferior turbinate, *MT* middle turbinate, *ITA* inferior turbinate artery, *MTA* middle turbinate artery, *PW* posterior wall of maxillary sinus; arrow: bulging of the sphenopalatine artery in *PW*

The ophthalmic nerve gives off anterior and posterior ethmoidal branches and the nasociliary nerve. The maxillary nerve has posterior superior lateral and medial nasal branches.

Autonomous sympathetic and parasympathetic innervation of the nasal cavity relies on branches from the greater and lesser petrosal nerves distributed from the pterygopalatine ganglion.

The lacrimal system receives superior and inferior palpebral arteries from the ophthalmic artery. There are significant contributions from the angular artery, branch of the facial artery in the superior portion, and the sphenopalatine artery inferiorly.

The infratrochlear nerve, branch of the ophthalmic nerve (V1), crosses under the trochlea of the superior oblique muscle to the medial commissure of the eye. It provides sensory innervation to the lacrimal sac, the caruncle, and the surrounding skin.

Evaluation

Surgical planning requires careful evaluation of the nasal cavity to rule out anatomical variations that may hamper surgical access (Figs. 2.17, 2.18, and 2.19).

Flexible or 0° rigid nasal endoscopy is considered the gold standard nowadays. A first exam avoiding topical anesthesia and decongestants is recommended. Secondly, pledgets soaked in 2 % lidocaine and 0.05 % oxymetazoline are placed to allow introduction of the endoscope in the middle meatus.

The recommended procedure consists in the insertion of the endoscope along the floor of the

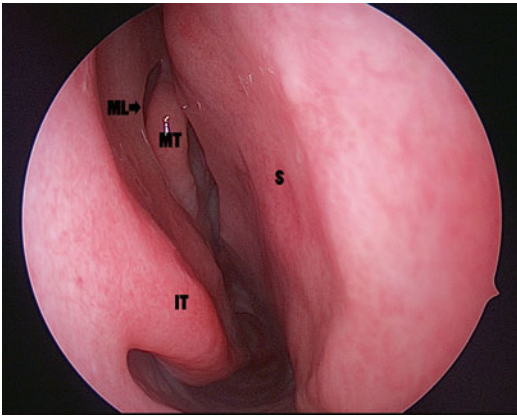


Fig. 2.17 Endoscopic view of right nasal cavity. *IT* inferior turbinate, *S* septum, *MT* middle turbinate, *ML* maxillary line

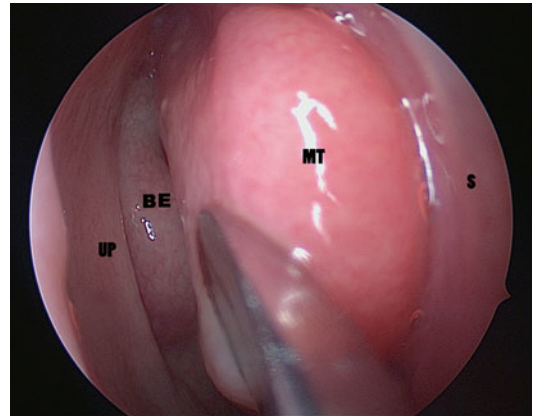


Fig. 2.19 Endoscopic view of the right middle meatus. A Freer elevator separates the middle turbinate. *MT* middle turbinate, *S* septum, *UP* uncinat process, *BE* bulla ethmoidal

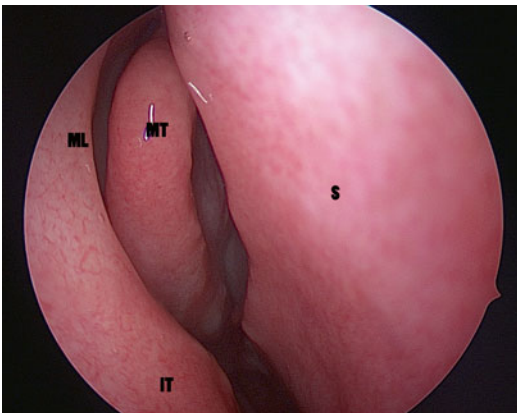


Fig. 2.18 Endoscopic view of the right middle meatus. *IT* inferior turbinate, *MT* middle turbinate, *ML* maxillary line, *S* septum

nasal cavity, identifying the head and the body of the inferior turbinate. Full evaluation of the nasal septum is mandatory, reporting any deviation or spur. When the choana is reached, slow withdrawal of the endoscope allows visualization of the opening of the middle meatus up to the axilla of the middle turbinate where the maxillary line can be identified.

The following list of items must be evaluated at this level:

- The space between the head of the middle turbinate and the lateral wall (meatal hiatus).

- The axilla of the middle turbinate.
- The projection of the maxillary line.
- The distance between the maxillary line, the head of the middle turbinate, and the uncinat process.
- The morphology of the uncinat process and its relationships with the lacrimal system.
- The existence of a paradoxical turbinate or concha bullosa.
- The presence of deviations in the superior nasal septum that obstruct total or partially the exposure of the middle turbinate and the maxillary line (Fig. 2.20a, b).
- The distance between the root of the middle turbinate and the lamina cribosa (Figs. 2.8 and 2.11).
- The existence of inflammatory mucosa, polyps, or infection with purulent discharge (Figs. 2.21 and 2.22).
- Synechiae or scarring secondary to previous surgery (i.e., absence of the middle turbinate).

Gently, the endoscope can be insinuated in the middle meatus to observe the uncinat process as it courses downwards, the ethmoidal bulla and the fontanellae area. The presence of pathologic conditions that could affect surgery or its outcome must be considered.

Endoscopic evaluation of the inferior meatus and Hasner's valve can be more challenging. It

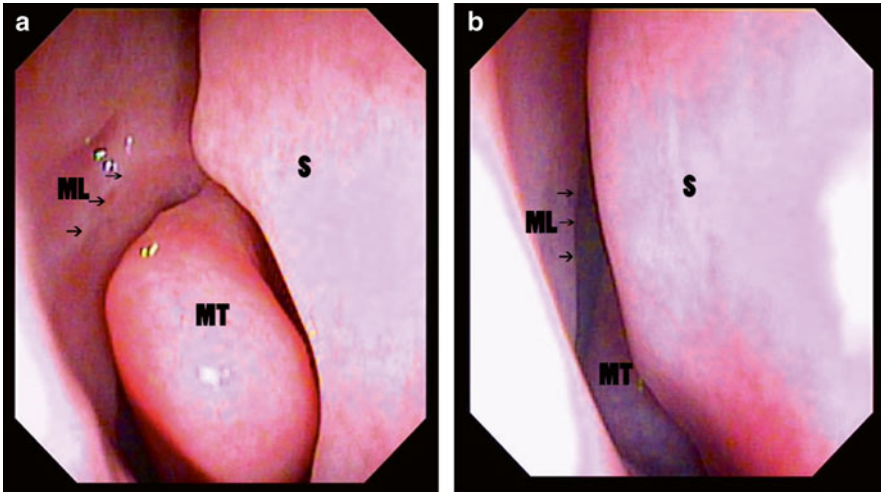


Fig. 2.20 (a, b) Anatomical variations of the nasal septum that affect surgical approach to the lacrimal system. (a) Normal. (b) High septal deviation precluding

endoscopic DCR, that requires previous septoplasty. *ML* maxillary line, *MT* middle turbinate, *S* septum, *FP* frontal process, *IT* inferior turbinate, *SD* septal deviation

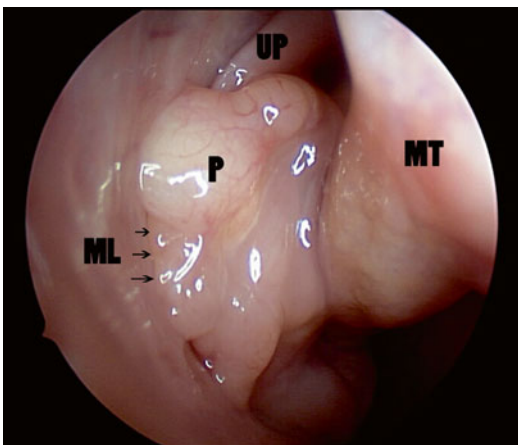


Fig. 2.21 Polypoid mass (papilloma) that overlaps the lacrimal duct. *ML* maxillary line, *P* papilloma, *UP* uncinat process, *MT* middle turbinate

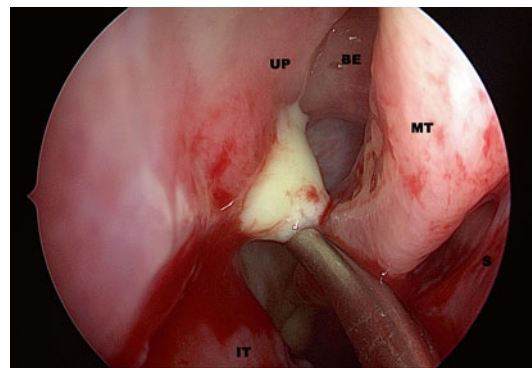


Fig. 2.22 Purulent sinusitis. *UP* uncinat process, *BE* bullae ethmoidalis, *MT* middle turbinate, *IT* inferior turbinate, *S* septum

usually requires an instrument such as a Freer elevator to luxate the turbinate medially while introducing a 30° angled endoscope.

Once the nasal evaluation is complete, the surgeon must choose the best surgical approach for every particular patient, considering the obstacles that are likely to affect the surgical procedure and its results [26, 27].

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