The Study of the Agger Nasi Cell

"The agger nasi (from agger meaning "mound or heap") is a small ridge on the lateral side of the nasal cavity. It is located midway at the anterior edge of the middle nasal concha, directly above the atrium of the middle meatus. It is formed by a mucous membrane that is covering the ethmoidal crest of the maxilla. It is also called the nasoturbinal concha and the nasal ridge." (Google Search) It can become pneumatized and conducts to an air cell.

The Agger nasi cell (ANC) and the frontal sinus ostium (FO) are important structures that can influence the anatomy and physiology of the frontal recess. "An enlarged agger nasi cell may encroach the frontal recess area, constricting it and causing mechanical obstruction to frontal sinus drainage. While tyhe Agger Nasi is present in all individuals, the Agger Nasi cell is present only in some”

“In recent years, endoscopic endonasal surgery (EES) has been widely used for the treatment of the most varied sinonasal disorders, especially of the frontal sinus (FS). However, the frontal endoscopic sinusotomoy remains a challenge for most otorhinolaryngologists, due to the complexity and anatomical variability of the three-dimensional spaces called ethmoidal infundibulum and frontal recess (FR) or frontal drainage pathway.

The FR is the anterosuperior border of this complex, being the embryological origin of the FS. Its medial border is the lateral surface of the anterior portion of the middle concha, all the way to its insertion in the skull base. Should the unciform process curve medially and inserts in the middle concha, it will also be part of the FR medial border. The lamina papyracea is the lateral recess border, and the unciform process may be part of such border when it is inserted superiorly or laterally to it. The posterior boundary is created from the anterior surface of the ethmoid bulla, which is typically inserted at the skull base, which may be an incomplete insertion. The anterior border includes the Agger nasi (AN), which can be pneumatized and of varied size. “ When the AN is pneumatized, we have the Agger nasi cell (ANC) formation, as it is seen in the last picture at left of the following CAT scan.”

![Fig. 10.4. Lateral wall of nasal cavity (with intact mucous membrane).](image-url)
Daniels, D. L.; Overview of the drainage pathways of the paranasal sinuses; The Frontal Sinus Drainage Pathway and Related Structures
Dr. T. Balasubramanian M.S. D.L.O.; Advanced anatomy of lateral nasal wall

Figure 1. Anteroposterior measure of the frontal sinus ostium (OFAP).
Figure 2. Side-to-side measure of the frontal sinus ostium (OFLL).

Figure 3. Anteroposterior measure of the Agger nasi cell (AGAP).

Figure 4. Side-to-side measure of the Agger nasi cell (AGLL).
Figure 5. Craniocaudal measure of the Agger nasi cell (AGCC).

Fig.: Agger nasi cells (coronal and sagittal plane).
At right at the entrance of the frontal sinus, we can see only one cell while at left, we see two cells with the *Agger Nasi cell* outward and another inner cell leading to the *Frontal Sinus Ostium*. An increase in the pneumatization of the *Agger Nasi cell* creates an anatomical obstruction that prevents the aeration of the *Frontal Sinus* and giving the symptoms of nasal obstruction. This happens often for this patient but much more when the wind is blowing. When it is cold, the cold air in the Agger Nasi is heavier than the air in the frontal sinus and does not circulate much increasing also the pneumatization that occludes the *Frontal sinus ostium Sinus* and gives the symptoms of nasal obstruction.
Some Definitions and Explanations of the Words Used:

“Sinus nomenclature may be both redundant and confusing (10, 11). Originally, the terms *sinus, antrum, and recess* all referred to a cavity, then a cavity within a bone. Now an *osseous recess* is an air space with more than one drainage ostium (as distinct from an *osseous air cell*, which has only one drainage ostium), whereas the terms *maxillary sinus* and *maxillary antrum* may be used interchangeably. Both *cribriform* and *ethmoid* mean “sievellike,” (sieve: utensil of wire mesh or closely perforated metal,) and both *bulla* and *agger* signify a “projecting anatomic structure,” but convention has limited usage of each term to specific structures. For these reasons, and because anatomic variations are frequent, the exact terminology employed to designate paranasal air spaces may be subjective. Herein one coherent set of names for the structures of the FSDP (Frontal Sinus Drainage Pathway and Related Structures) is used that specifically excludes the term “frontal recess” because that term is difficult to define anatomically (6).”

David L. Daniels & al.; Frontal Sinus Drainage Pathway and Related Structures;

“Kilian was the first to use the term “frontal recess” in 1898 [9]. Traditional training taught that the frontal sinus was connected to the anterior ethmoids by a tubular, duct-like structure termed the “nasofrontal duct” despite Mosier’s work in 1912 and Van Alyea's from 1934–1943. In order to conceptualize the endoscopic frontal recess approach, one must change his or her perception of this connection. A naso-frontal duct does not exist! This fact was recognized by Mosher as he described the connection between the frontal sinus and anterior ethmoid as a recess: a potential, inverted, funnel-shaped space with the narrow end at the internal frontal ostium and the lower bell-shaped end blending into the anterior ethmoid sinus walls

Van Alyea’s extensive cadaver dissections further clarified that the connection be referred to as the frontal recess, and this space is subject to narrowing by numerous anterior ethmoid cells [24]. Unfortunately most of Van Alyea’s work was either forgotten or overlooked by the time most modern otolaryngology training programs were established. Van Alyea performed 247 lateral nasal wall dissections and described several cells that could potentially obstruct the frontal recess, leading to chronic frontal sinusitis [23]. He warned that inadequate removal of these cells could lead to iatrogenic chronic frontal sinusitis These cells include:

1. the agger nasi cell,
2. supraorbital ethmoid cells
3. frontal cells (Types I–IV)
4. frontal bulla cells
5. suprabullar cells
6. and the interfrontal sinus septal cell

Details regarding these cells have been described by Kuhn and are summarized in”

The agger nasi cell is the most anterior and constant of the frontal recess cells. This cell plays a significant role in frontal, naso-sinusal obstruction. Often, the agger nasi cell will fill the frontal recess, and any degree of edema will cause frontal sinus obstruction.

Uncinate process of ethmoid bone: In the ethmoid bone, a curved lamina, the uncinate process, projects downward and backward from this part of the labyrinth; it forms a small part of the medial wall of the maxillary sinus, and articulates with the ethmoidal process of the inferior nasal concha.

Uncinate process probably acts as a protective wall by directing the allergen bearing and contaminated inspired air away from the sinuses and facilitating ventilation of the sinuses in the mucociliary pretreated expiratory phase. Injudicious removal of the uncinate process especially in cases with allergic rhinosinusitis should thus expose the sinus mucosa to contaminated air.

CORONAL plane: plane dividing the body into front and back
TRANSVERSAL: plane dividing the body into upper and lower
SAGITTAL: plane dividing the body into anterior and posterior

CAVITÉS SINUSIENNES DE LA FACE: GRANDE VARIETE DE VARIANTES ANATOMIQUES ET LES PROBLEMES QU’ILS POSENT:
DIFFICULTE DE DIAGNOSTIC, RISQUE INFECTIEUX ET RISQUE CHIRURGICAL

- Déviation de la cloison nasale
- Cornet moyen à convexité paradoxale
- Pneumatisation du processus unciné
- Anomalie d’attache du processus unciné
- Déviation du processus unciné
- Anomalie de déflexion du processus unciné
- Procidence carotidienne
- Pneumatisation de l’apophyse clinoïde
- Pneumatisation d’une cellule d’Onoddi
- Cloisonnement du sinus maxillaire
- Ostium accessoire
- Déhiscence de la lame orbitaire
- Asymétrie du toit de l’ethmoïde
- Amincissement du toit de l’ethmoïde
- Hypoplasie du sinus maxillaire
- Développement de cellule de Haller
- Hypertrophie d’une cellule de la bulle
- Concha bullosa
- Cornet moyen à courbure paradoxale
- Pneumatisation de cellule de l’Ager Nasi (Ce que je viens de considérer comme probable, me basant sur le CAT scan)
- Pneumatisation du vomer
- Procidence des canaux ptérygoïdiens
- Procidence des canaux sous orbitaires
- Pneumatisation de l’apophyse Crista Galli
- Pneumatisation des processus ptérygoïdes
- Déviation de la cloison nasale

So I was right not to have removed the inferior concha by my ENT doctor in Haiti, because the CAT scan was missing to let identify exactly what was the problem;

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