

## CASE REPORT

# The maxillary recess of the sphenoid sinus

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### Abstract

The most studied recess of the sphenoid sinus seems to be the lateral one, which is highly variable. Less attention seems to be paid to the maxillary recess, extending anterior, inferior and lateral towards the maxillary sinus. Twenty patients were referred for CT of the paranasal sinuses (axial CT), during a 3-month period. After examining the morphology of the sphenoid sinuses, the authors found bilateral maxillary recesses in one patient. On either side, the maxillary recess of the sphenoid sinus was directed anterior and lateral, being separated from the maxillary sinus by a distinctive bony wall; the longitudinal size of these recesses was 1.36 cm, on the left, and 1.22 cm, on the right. As it becomes part of the antero-medial wall of the pterygopalatine fossa, the maxillary recess of the sphenoid sinus should be evaluated prior to the endoscopic endonasal approach of the fossa; the detail becomes more relevant when one takes into account the fact that in our case, on the right side, the CT-scan suggested that the sphenopalatine artery could traverse directly through the maxillary recess. Therefore, such a maxillary recess of the sphenoid sinus seems to be anatomically located in the situs of the orbital process of the palatine bone and thus, it assumes the respective topography. The differential diagnosis with a Haller cell is relevant – the surgical procedures that approach a Haller cell could lead to a misdiagnosed maxillary recess of the sphenoid sinus into the middle nasal meatus. This aspect determined us to consider the maxillary recess of the sphenoid sinus as a false Haller cell and to claim the imperative of a CT-evaluation performed prior to interventions.

**Keywords:** sphenoid sinus, CT, false Haller cell, skull.

### □ Introduction

Cross-sectional imaging has dramatically changed our approach and understanding of the anatomy and pathology of paranasal sinuses [1]. Preoperative recognition of the anatomic variations by the radiologist is beneficial for identification of the limits of dissection. This is particularly important in the sphenoid sinus area where extensive pneumatization of the skull base bones may distort the anatomic configuration [2]. The endoscopic transnasal approach to sphenoid sinus is a technique, which has established itself in the recent years and demands a thorough knowledge of surgical anatomy and a huge amount of anatomical variations involving the sphenoid sinus [3].

Examples of migrating extramural cells by the ethmoid into adjacent structures are consistently variable. Such extramural ethmoid cell migration occurs when these cells migrate to the floor of the orbit or infraorbital cells; these cells are called Haller cells in honor of August von Haller who originally described them in the early 19<sup>th</sup> century [4].

As for the recesses of the sphenoid sinus, the most studied was the lateral one, which extends into the greater wing of the sphenoid bone and is highly variable [5]. Less attention seems to be paid in publications on the anterior, inferior and lateral recess of the sphenoid sinus that extends into the orbit floor, neighboring the

maxillary sinus and to the eventuality of its confusion with a Haller cell.

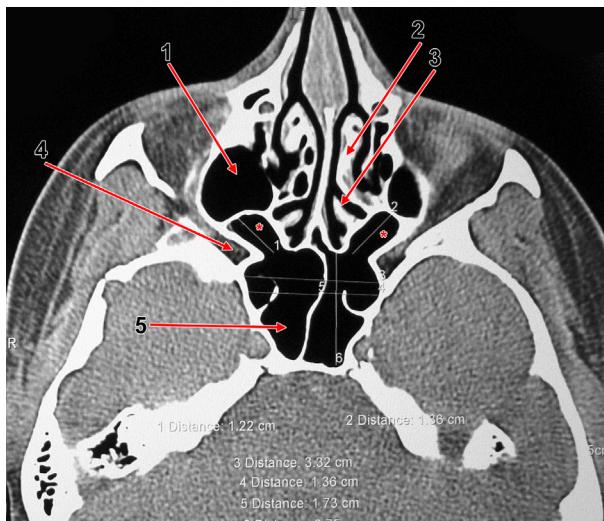
### □ Patients and Methods

The study group consisted of 20 patients referred for CT of the paranasal sinuses during a 3-month period. All subjects underwent axial CT with 3 mm contiguous slices and high-resolution bone-algorithm reconstruction. The configuration and recesses of the sphenoid sinus were assessed. Measurements were obtained by electronic calipers on the console.

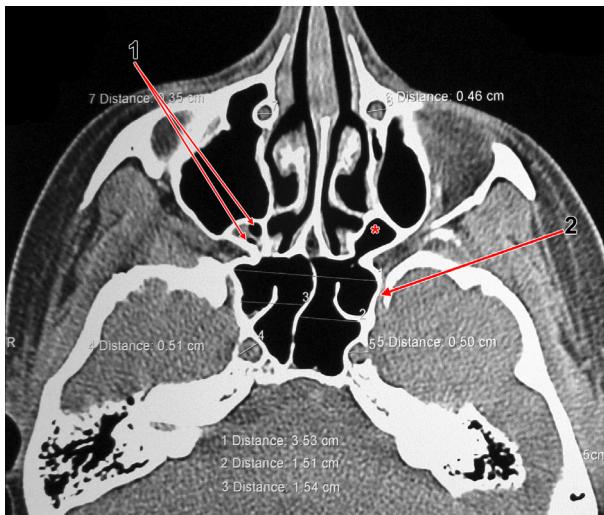
### □ Results

A single patient (5%) presented, on the axial CT, bilaterally, recesses expanded from the anterior, inferior and lateral angle of each sphenoid sinus (Figures 1 and 2) towards the maxillary sinus on that side – we termed these recesses as “maxillary recesses”. Even though the septum of the sphenoid sinuses was slightly deviated posterior towards the right side we evaluated that generally there was a bilateral symmetry of the sphenoid sinuses and their recesses.

On each side, that maxillary recess of the sphenoid sinus was directed anterior and lateral, being separated from the maxillary sinus by a distinctive bony wall; the longitudinal size of these recesses was, on the left side of 1.36 cm and on the right side of 1.22 cm.



**Figure 1 – Axial CT-scan:** 1. right maxillary sinus; 2. left middle nasal concha; 3. left superior nasal concha; 4. right pterygopalatine fossa; 5. sphenoid sinus. Each sphenoid sinus presents a maxillary recess (asterisks).



**Figure 2 – Axial CT-scan:** 1. foramina in the floor of the maxillary recess of the right sphenoid sinus, presumably for the sphenopalatine artery; 2. left vidian canal. The asterisk marks the left maxillary recess of the sphenoid sinus.

For each maxillary recess of the sphenoid sinus, we evaluated the following walls:

- the antero-lateral wall, that was the wall separating the recess and the maxillary sinus;
- the antero-medial wall, that attached the superior nasal concha; posterior to the respective attachment a narrow crest was present bilaterally (presumably a supreme nasal concha) (Figure 1); also, it appeared that the left side the respective wall of the maxillary recess is also attached to the middle nasal concha (Figure 2);
- the postero-lateral wall, facing and thus included in the limit of the pterygopalatine fossa;
- the ostium was present postero-medial, draining the respective recess into the sphenoid sinus.

The study indicates that such a maxillary recess of the sphenoid sinus is anatomically located in the situs of the orbital process of the palatine bone and thus, it assumes the respective topography.

Moreover, due to the slight head inclination of the patient while CT was performed, we identified on the right side, at the height of the vidian canal, presumably, the entrance and exit foramina (Figure 2) of a passage traversing the maxillary recess – due to this passage anatomical correspondence with the sphenopalatine foramen we could evaluate that the recess could've been traversed in that patient by the sphenopalatine artery.

## Discussion

A very recent study evaluated the presence of the Haller cells as being 16.0%, by using multi-slice CT-data sets analysis; the respective authors emphasized that even though the coronal CT-views offer an exact representation of the microanatomy in the region of the lateral nasal wall, axial and sagittal views can provide important additional information [6]. Earlier, Arslan H *et al.*, also by the use of CT, evaluated that infraorbital ethmoid cells (Haller' cells) are present in 6% only [7]. Due to this important difference between the frequency of the Haller cells reported in that two studies, one can rise the suspicion on the presence of false Haller cells or just invoke the haphazard of the specimens. If false Haller cells are taken into account, a possible explanation for these can be offered by the maxillary recess of the sphenoid sinus we present here – such a recess can be misdiagnosed as Haller cell, especially on coronal CT-scans.

Currently, the medial (antero-medial) wall of the pterygopalatine fossa (PPF) is considered only represented by the perpendicular plate of the palatine bone. Being that wall traversed for the endoscopic endonasal approach of the PPF [8], an anatomic variation at this level can alter the procedure. The presence at the upper part of the PPF in that wall of it of a maxillary recess of the sphenoid sinus, undocumented prior to the intervention, will make probable the sphenoid sinus opening, with consecutive unwanted effects; a sphenopalatine artery traversing the maxillary recess of the sphenoid sinus used as a landmark during the endoscopic procedure can be determinant for an accidental opening of that recess.

Surgical intervention is indicated when a Haller's cell contributes to ostiomeatal complex obstruction and inflammation of the sinuses. The cell is approached through the middle meatus by using a microdebrider to remove the uncinate process. The cell is visualized and carefully uncapped with a curved microdebrider blade and then its inferior and medial portions are carefully removed, the infundibulum being widened [9]. Such approach of an undiagnosed maxillary recess of the sphenoid sinus will open it accidentally into the middle meatus and lead to the pathologic involvement of the sphenoid sinus.

## Conclusions

The possible existence of a maxillary recess of the sphenoid sinus must be held in mind prior to interventions at the level of the lateral nasal wall and sphenoid sinus; an axial and not only coronal

CT-evaluation may help the differential diagnostic between a true Haller cell and a maxillary recess of the sphenoid sinus.

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