On the Cottle areas and the proposal for a new classification of septal areas*

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Dear Editor:

The division of the nasal septum (NS) into areas helps describe its anatomy. In recent decades, the Cottle classification has been the most widely used clinical classification. Nevertheless, several authors have criticized Cottle's classification due to its limited applicability in clinical practice and lack of agreement in the field. For instance, in a compelling discussion of the incorrect terminology in rhinology conducted by Huizing, the author concluded that Cottle's classification should be discontinued to avoid confusion and misunderstanding [(1)]. Furthermore, the author proposed the division of the nasal organ into three areas; anterior segment (upstream area), middle segment (functional area), and posterior segment (downstream area) [(2)] (Figure 1). Agreeing with the author, we consider that it is possible to divide the NS into three segments. However, instead of making a division based on functional areas, which are usually challenging to objectify in daily clinical practice, we propose using a classification based on two anatomical points that can be objectified through physical and radiological examination. The incisive canal (IC) and the posterior edge of the hard palate (PEHP) (Figure 2). The three areas described match and better define the nasal functional areas described by Mlynski [(3)] and Huizing [(2)].

The first area is anterior to the IC. Caudally includes the anterior nasal spine and the premaxilla (Derived embryologically from the primary palate) [(4)]. In this area, the septum is mostly cartilaginous (quadrangular cartilage) except for its caudal insertion and the frontoethmoidal suture of the perpendicular plate of the ethmoid (PPE) cranially. The vasculature depends on the anterior ethmoidal artery superiorly and the superior labial and greater palatine arteries inferiorly. Moreover, the first area can be divided into a valvular area (1a) and a superior septal area (1b), taking as reference the line that connects the IC and the Rhinion. The second area is between the IC and the PEHP, which corresponds embryologically to the secondary palate. Made up mostly of bone, caudally includes the palatine process of the maxilla and the horizontal plates of the palatine bones, cranially the PPE, and in the middle, the anterior two-thirds of the vomer and a variable cartilaginous area formed by the sphenoid process of the quadrangular cartilage. The third area is located posterior to the PEHP. In this segment, the septum is entirely bony (posterior third of the vomer). The vasculature of the second and third areas depends on the anterior and posterior ethmoidal arteries superiorly and the sphenopalatine artery inferiorly. The surface area of each region is approximately 7.59 ± cm^2, 16.61 cm^2, and ± 1.41 cm^2, respectively [(5–7)].

Since in each area the septal structure is different, this classification makes it possible to describe better and typify septal deviations. Regarding nasal septal perforations, those located in the anterior area are usually more symptomatic, and the support is almost entirely cartilaginous. Posterior perforations, those located in the second and third areas, are usually less symptomatic, and the support has a greater bone component. This classification also allows for better surgical planning. For example, a greater palatine artery flap is only indicated in perforations located in the first area, or lateral wall and nasal floor flaps are more indicated for posterior perforations [(8)]. Clinically the third area is less critical; however, its delimitation can be useful during surgery. Posterior nasal septectomy (PNS) during skull base procedures are routinely performed to optimize visualization of the nasopharynx and clivus, and allows for a four hands technique. Although the size of PNS varies depending on the procedure and the resection, it should include at least the septal Area 3. Since the posterior part of the vomer is included in the Area 3, its delimitation can be also useful to perform an adequate vomer resection in choanal atresia surgery. Although septal dysmorphias are rare in this area, we believe that considering this area while performing septum surgery is important because its relationship with the sphenoid rostrum. The fracture of the lateral walls of the sphenoid sinus during septoplasty can have devastating complications [(9)]. Finally, this ventro-dorsal division of the nasal cavity could be useful when assessing the degree

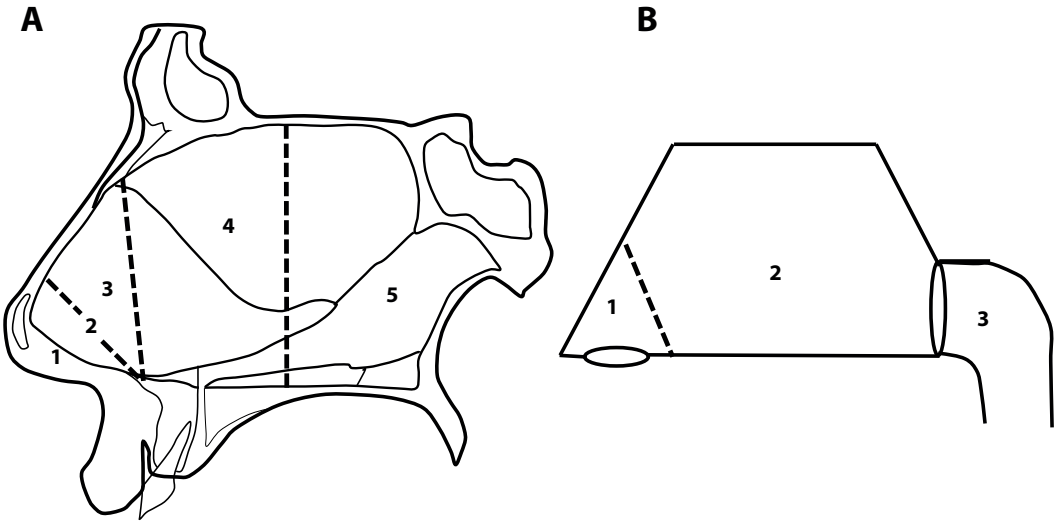

Figure 1. A: Cottle's classification*: Area 1: nostril. Area 2: nasal valve. Area 3: area underneath the bony and cartilaginous vault, also called the attic. Area 4: anterior part of the nasal cavity including the heads of the turbinates and the infundibulum. Area 5: the posterior part of the nasal cavity, including the tails of the turbinates. B: Huizing classification: Area 1: Anterior segment or adapter (upstream area: nostril, vestibule, and valve area). Area 2: middle segment or functional area (mucosa-lined nasal cavity with the turbinates, septum, and sinus ostia). Area 3: Posterior segment (downstream area: tails of the turbinates, anterior wall of the sphenoid, and choanae)
* From Huizing [1,2]. Cottle system division adopted by most authors. In some textbooks the "area 3" is given to a different region. According to the author Maurice Cottle mentioned his classification in lectures but never published his 1-5 Areas.

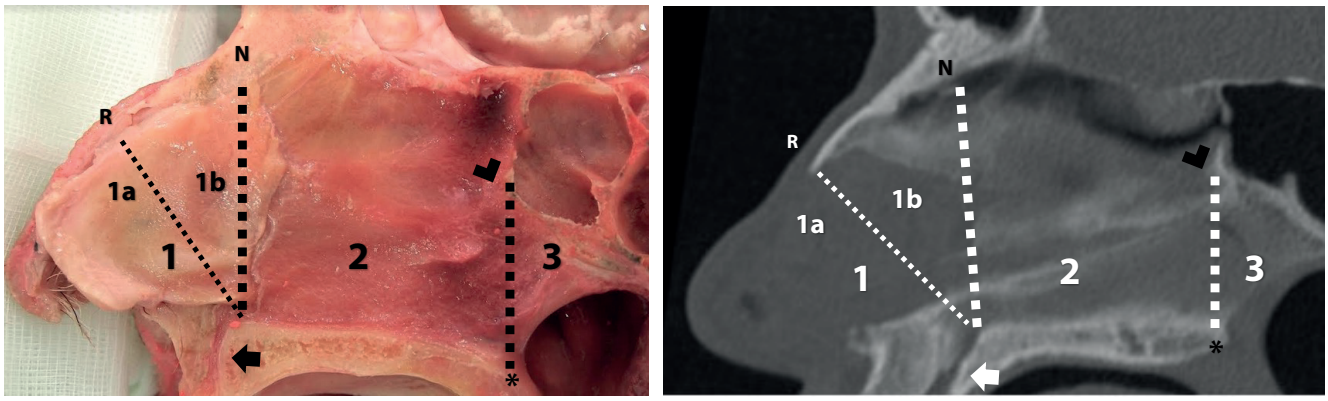

Figure 2. Nasal septal areas. Area 1 is anterior the incisive canal (Black arrow). The superior point of this line corresponds to the Nasion* (N). The first area can be divided in Valvular Area (1a) and the Superior part of the septum (2b) taking as reference the Rhinion** (R). Area 2 is between the incisive canal and the posterior edge of the hard palate (Black Asterix). The superior point of this line corresponds to the junction between the vomer, the perpendicular plate of the ethmoid and the rostrum sphenoidale (Black arrowhead). Area 3 is posterior the posterior edge of the hard palate. * The most anterior point of the frontonasal suture. ** The most caudal point of the paired nasal bones. Also defined as the midline junction of the bony and cartilaginous vaults.

of occupation of nasal polyps in patients with chronic rhinosinusitis with nasal polyps since current grading systems only consider the cranio-caudal occupation (A grade III polyposis that occupies only the area two of the nasal cavity is not the same compared to one that occupies the area two and three)[10].
The classification we propose divides the nasal septum into three areas, takes as reference two anatomical landmarks that can be assessed clinically and radiologically, and is based on the embryology, vascular supply, and surgical anatomy of the nasal septum.

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Conflict of interest

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