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THE INCIDENCE OF THE VOMERONASAL ORGAN IN 1000 HUMAN SUBJECTS AND ITS POSSIBLE CLINICAL SIGNIFICANCE

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Summary—The 1000 subjects randomly selected were evaluated for the presence of the vomeronasal organ (VNO). The results of the present investigation indicated the presence of the VNO in almost every subject studied. The implications of the presence of the VNO and its clinical significance during nasal operations are considered.

Plastic surgery is a firmly established surgical speciality. Among the several fields where it can be applied, nasal surgery is one of the most developed and is practiced in almost every country. Even though nose plastic surgery was performed in India and Egypt between 2500 and 600 B.C., cosmetic rhinoplasty is a recent surgical development. It is considered to be not only a technical challenge, but more importantly, a challenge to aesthetic sensibilities and the ability to appreciate the consequences of minute or subtle details. It has been said that a beautiful and naturally appearing nose is but one determinant of a satisfactory rhinoplastic result. A determinant of equal importance is a nose that functions normally and well [1–3].

The recent interest of some investigators in nasal neurophysiology relating to olfactory function has brought attention to the possible importance of the vomeronasal organ (VNO); a rather small anatomical structure located in the nasal mucosa. This organ is described in detail in old French anatomy textbooks as a blind pouch 2 to 7 mm long that extends backwards in the nasal mucosa of the septum and opens into the nasal cavity through a small pit located in the antero-inferior area about 2 cm from the nostril at the level of the union of the septal cartilage with the bony septum (vomer bone). They called it the Ruysch tube; it is also known as the Jacobson organ [4, 5]. Modern books on nasal surgery and also papers in specialized journals fail to mention the VNO; but recently Moran *et al.* [6] mention the existence of this organ in many human subjects possessing electronmicroscopic characteristics which suggest that functional aspects may be present. A series of experimental investigations by Monti [7] has demonstrated the importance of the VNO in human physiology. Because of these new data, we became very interested in looking for the presence of the VNO in humans and in bringing to the attention of surgeons involved in nose surgery the importance of preserving the VNO during surgical interventions.

METHODS

We have studied a random sample of patients seeking plastic surgery in an attempt to establish the presence or absence of the VNO and determine its incidence. As a first step, five samples were obtained from fresh cadavers. This preliminary work was undertaken to evaluate the precise anatomical location of the VNO and to isolate it from the rest of the septal structures [Fig. 1(A), (B) and (C)]. About 1000 randomly selected subjects underwent a detailed clinical evaluation of both nasal cavities, focusing attention on the nasal septum. A nasal speculum and a light from a head lamp or a fiber optic device were used. In some patients a vaso-constrictor agent was employed when the turbinates were congested. From this group of 1000 (579 females and 421 males), the VNO was clearly visualized in 808 subjects. Once our observations were completed, subjects were divided into groups based on sex in order to ascertain if gender was a significant factor in the presence or absence of the VNO. Subjects were further

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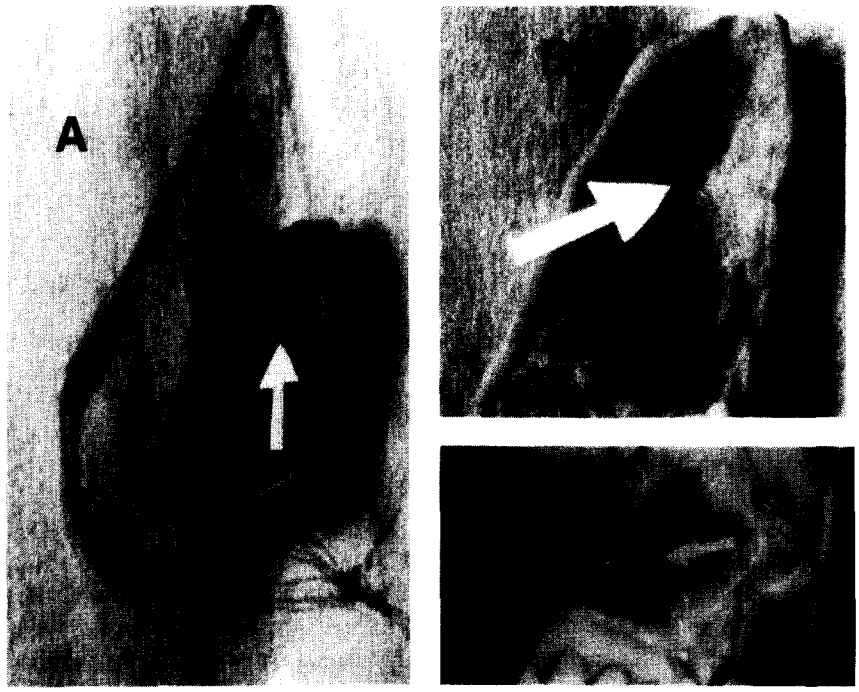

Fig. 1. (A) Human nasal septum specimen. Arrow shows the opening of the VNO Duct (nose outlined). (B) Same specimen in close-up. (C) Anatomic dissection of a fresh cadaver. The nose has been opened with a sagittal incision including the upper lip. The arrow indicates the VNO.

regrouped into two categories based on the presence or absence of septal pathology.

RESULTS AND DISCUSSION

The presence of the VNO was very similar in both males and females, and did not show any significant differences. Of 192 subjects where the VNO was not clearly visualized (23.7%), 125 subjects had definite septal pathology. The osteocartilaginous septum was twisted and distorted not only in the sagittal and frontal planes, but also along the floor of the nose in these cases. This made it physically impossible to find the VNO. This situation was evaluated at the time of surgery. In the 125 subjects where the VNO was not found, it became visible in 102 subjects after the deviation was corrected.

The first clear finding was that the VNO was a normal, distinct structure in the nose and was present in practically all the subjects studied. Of the 192 cases in which the VNO was not visible, 125 had septal deviation that made it physically impossible to visualize; however, after surgical correction the VNO was visualized in 102 of these subjects. This made us suppose that the VNO was present in all cases even though visual identification of the duct orifice was not possible before the correction.

These findings, together with data from other electronmicroscopic and neuro-physiological studies [6, 7], should be taken into consideration because of possible problems that might result by performing surgical alterations on the nose without preserving the VNO. It is difficult to estimate the number of nasal operations performed annually in the world: a conservative estimate would be 100,000 per year. In every one of them the combination of the aesthetic and functional aspects should be considered. Thus, we need to start thinking about preserving the VNO in any nasal operation, especially in the surgical correction of the twisted nose associated with severe septal deviation. Special care is required at the junction of the vomer bone and the cartilaginous septum where the VNO is located and severe septal deviations are more frequent. The ideal procedure to use should be the so-called extra mucosal technique [8] which provides a method of preserving intact the mucosal lining of the internal nose [9].

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