

Anatomy of the pterygopalatine foramen and the fontanella in the lateral nasal wall

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SUMMARY

A dissection study of 20 cadaver specimens gives a firm knowledge of the anatomy of the pterygopalatine foramen in the middle and upper meatus of the nose. Measurements of the proportions between the end of the middle concha, the hiatus semilunaris and the foramen are described. A new, curved needle for puncturing of the maxillary sinus through the fontanella is shown.

Microsurgery of the nose requires a thorough knowledge of the anatomy of the nasal vault. Microscopic orientation is often difficult. In the last ten years many ENT surgeons have introduced microsurgery in nasal work, particularly in the middle meatus, which contains many important structures. To understand the anatomy of these structures we evaluated 20 human skulls in the Anatomy Institute in Zürich.

In this paper the exact location of the pterygopalatine foramen is described, which is of great significance during transnasal vidian neurectomies (Prades, 1979) (Figure 1). Furthermore a new puncturing-technique of the maxillary sinus is described.

RESULTS

a. The foramen pterygopalatinum

Six variations of the location of the foramen pterygopalatinum are registered. Usually one finds the lower part of the foramen immediately underneath the attachment of the middle concha. However, in two cases, no foramen was found in the middle meatus. After removing the middle concha partially, the foramen was located above the attachment of the middle concha (Figure 2).

In ten skulls dissection of the foramen was performed and the proportions between the end of the middle concha and the hiatus semilunaris were noted. The foramen pterygopalatinum was usually located slightly dorsal to the midline between the posterior part of the hiatus semilunaris and the posterior tip of the middle concha (Figure 3).

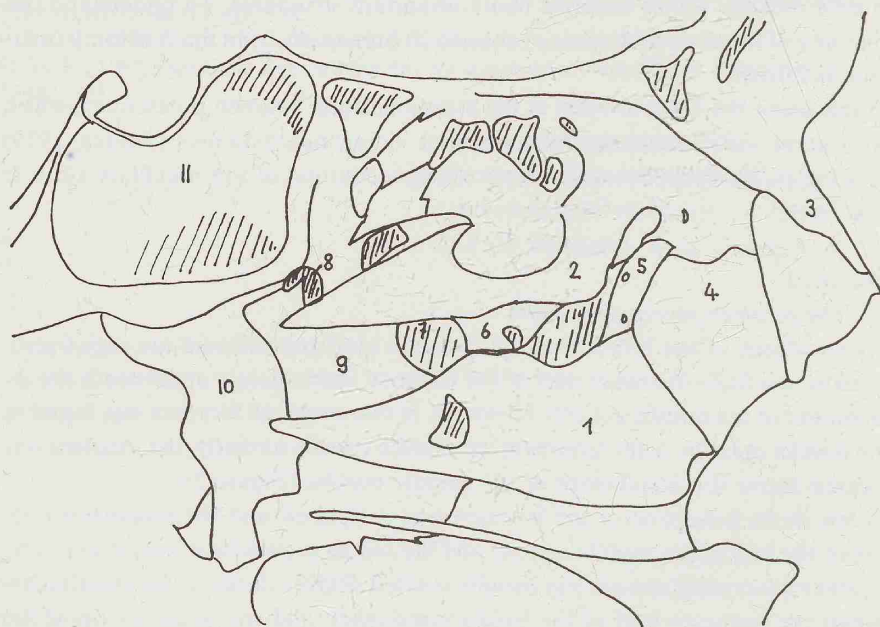
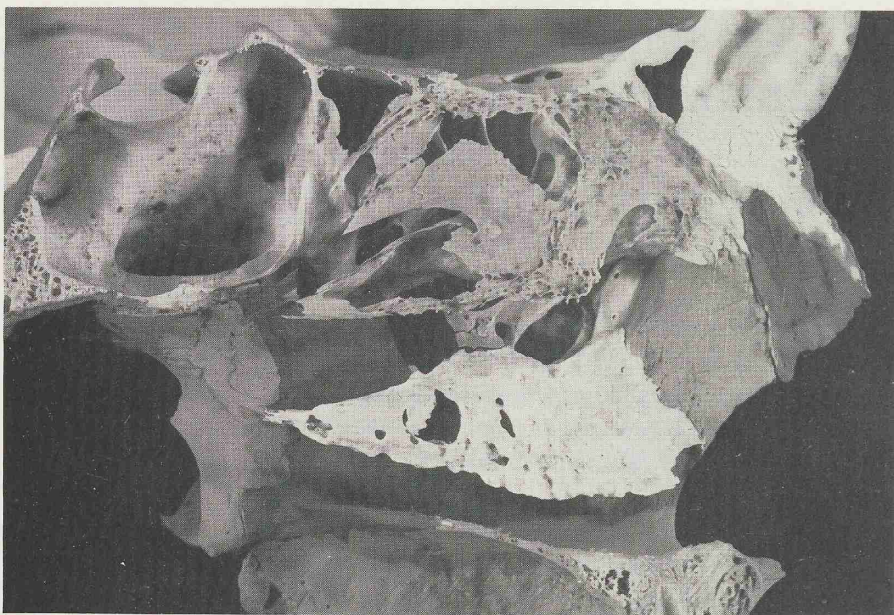


Figure 1.

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|--------------------|------------------------------|---------------------------|
| 1 lower turbinate | 4 frontal process of maxilla | 8 sphenopalatine foramen |
| 2 middle turbinate | 5 nasolacrimal duct | 9 os palatinum |
| 3 nasal bone | 6 processus uncinatus | 10 processus pterygoideus |
| | 7 fontanella | 11 sinus sphenoidalis |

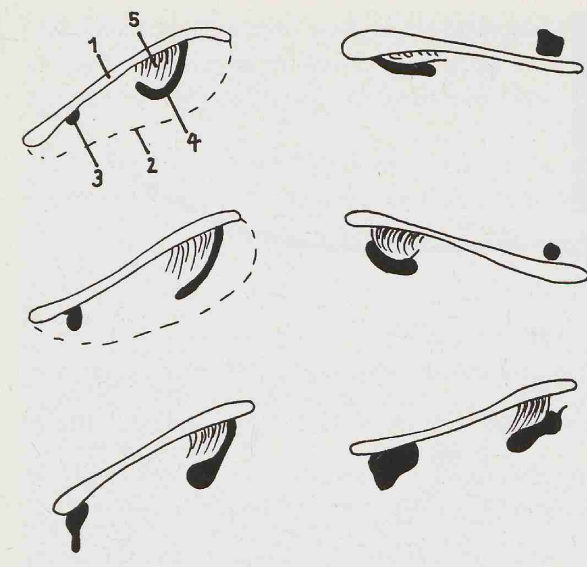


Figure 2. Six variations of the pterygopalatine foramen.

- 1 attachment of the middle turbinate
- 2 middle turbinate
- 3 pterygopalatine foramen
- 4 hiatus semilunaris
- 5 bulla ethmoidalis

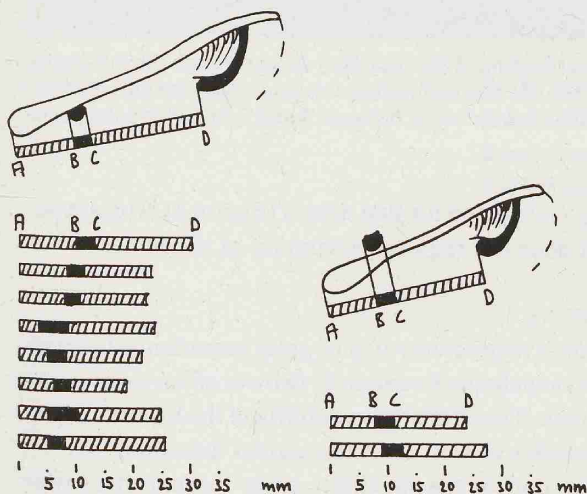


Figure 3. Results of the measurements of the pterygopalatine foramen: The proportions between the hiatus semilunaris and the foramen C D and between the posterior tip of the middle turbinate and the foramen A B are indicated. The foramen is usually located slightly behind the midline between the posterior tip of the middle concha and the posterior part of the hiatus semilunaris.

b. The fontanella

The fontanella is located between the lower and middle concha, behind the unicate process and anteriorly to the palatine bone (Lenhossèk, 1924; Myerson, 1932; Zuckerkandl, 1882, 1892). That is always a large area where the maxillary sinus and the nasal cavity are separated by only mucosa. In most cases the distance between the posterior end of the nostril and the fontanella is 4 to 5 cm. In Zürich, puncturing of the maxillary sinus is performed through the fontanella

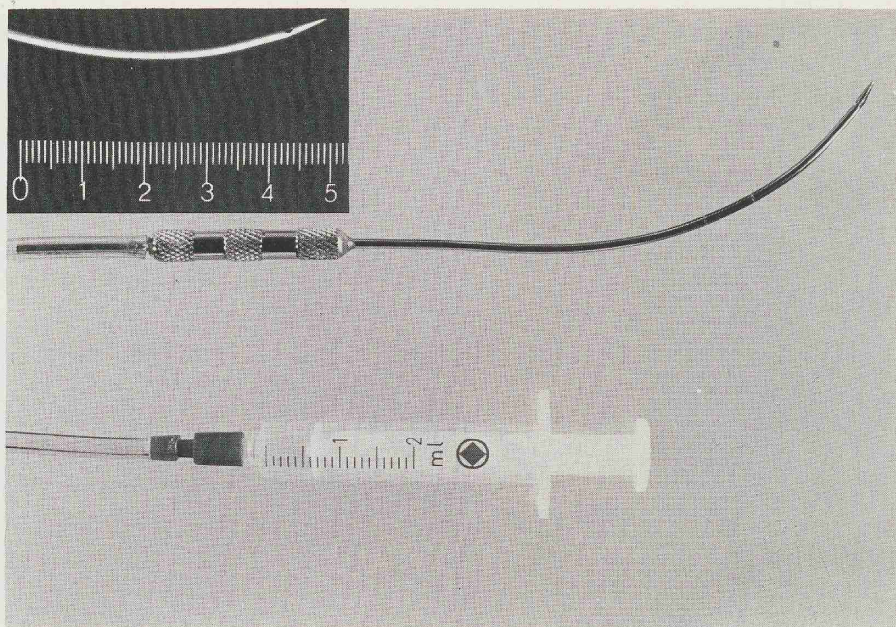


Figure 4. A curved needle for perforating of the maxillary sinus through the fontanella. The tip is pointed, but not sharp. The optimal perforation area is located with the aid of two landmarks. The fontanella is located in most cases between 4 and 5 cm behind the posterior end of the nostril.

with a curved needle specially constructed for that access (Figure 4). The advantage of this method is, that it does not require perforation of the bone.

DISCUSSION AND CONCLUSIONS

In performing a transnasal vidian neurectomy it is of great importance to know exactly the location of the pterygopalatine foramen. In two out of ten cases it was found above the middle turbinate. Therefore the variability of the location of the foramen is in the anterior-posterior as well as in the cranial direction.

In a certain percentage perforation of the maxillary sinus through the lower meatus is not possible. That was the reason, that a new needle was developed, which allows to enter the sinus through the fontanella. Due to the fact, that perforation of the bone is no longer required, the procedure is more comfortable for the patient. The landmarks aid the beginners to find the optimal area for the perforation.

ZUSAMMENFASSUNG

Die Mikrochirurgie der Nase setzt eine profunde Kenntnis der anatomischen Strukturen voraus. Die Orientierung endonasal ist häufig schwierig. In den letz-

ten Jahren wird immer häufiger das Mikroskop für endonasale Operationen gebraucht, speziell im mittleren Nasengang. Um die Strukturen im mittleren Nasengang zu verstehen, wurden am anatomischen Institut in Zürich 20 Schädel seziiert.

In dieser Arbeit wird die exakte Lokalisation des Foramen pterygopalatinum beschrieben die vor allem für die transnasale Vidianusneurektomie wichtig ist (Prades, 1979). (Fig. 1) Im weiteren wird eine neue Kieferhöhlenpunktionstechnik beschrieben.

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