

## Olfactometry in Japan (II)

- Roentgenologic and endoscopic observations of the olfactory cleft -

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In a previous paper I reported on the standard olfactory acuity test and intravenous olfaction test (Zusho, 1983). This paper deals with the röntgenologic and endoscopic observations of the olfactory cleft.

Nearly 80 percent of the olfactory disturbances observed in Japan is caused by nasal diseases and in particular, by chronic sinusitis (60%). Therefore, the observation of the olfactory cleft is very important.

The human olfactory cleft is located between the medial part of the superior turbinate and the septum. It is difficult to inspect the olfactory cleft directly. It is also

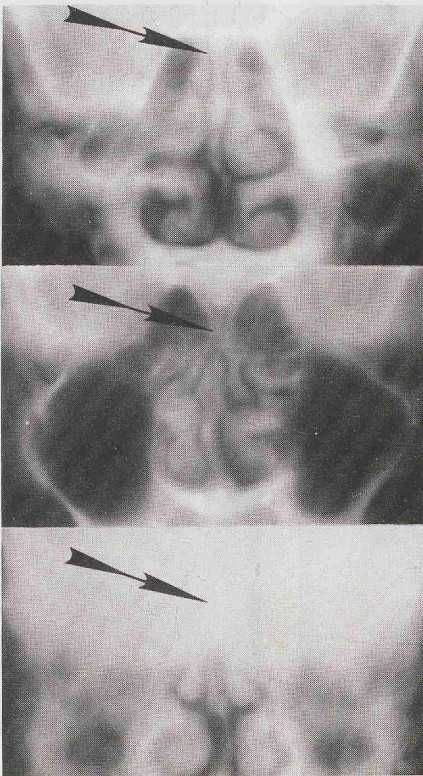


Figure 1.

Tomography of the olfactory cleft.

(↑ : olfactory cleft).

A: olfactory cleft fully open

B: olfactory cleft partially adherent

C: olfactory cleft obstructed

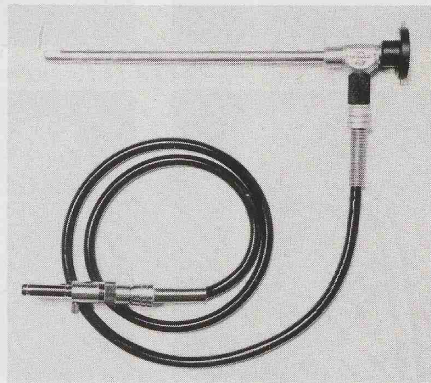
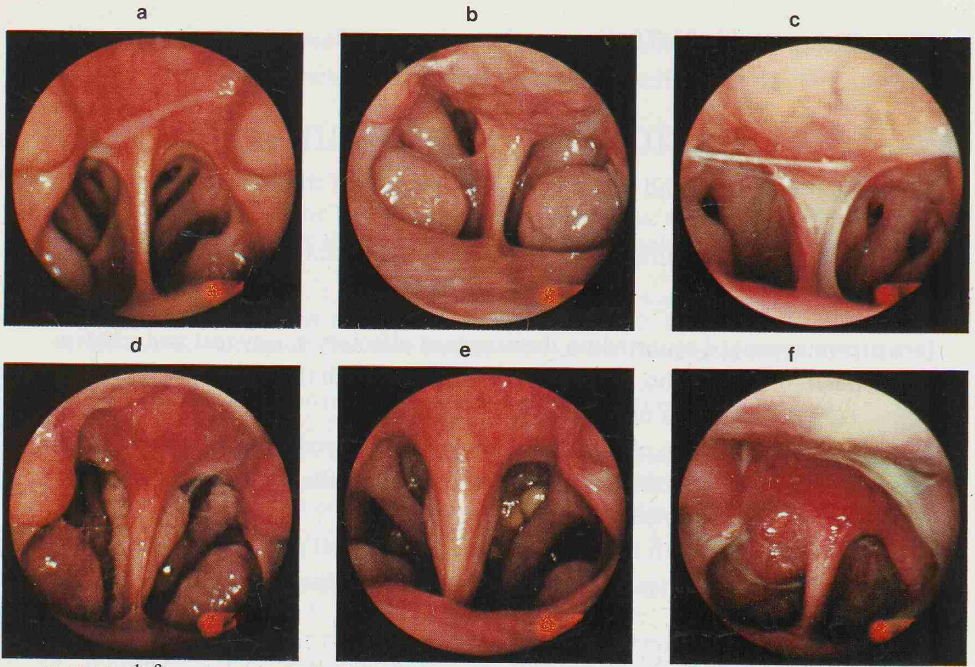
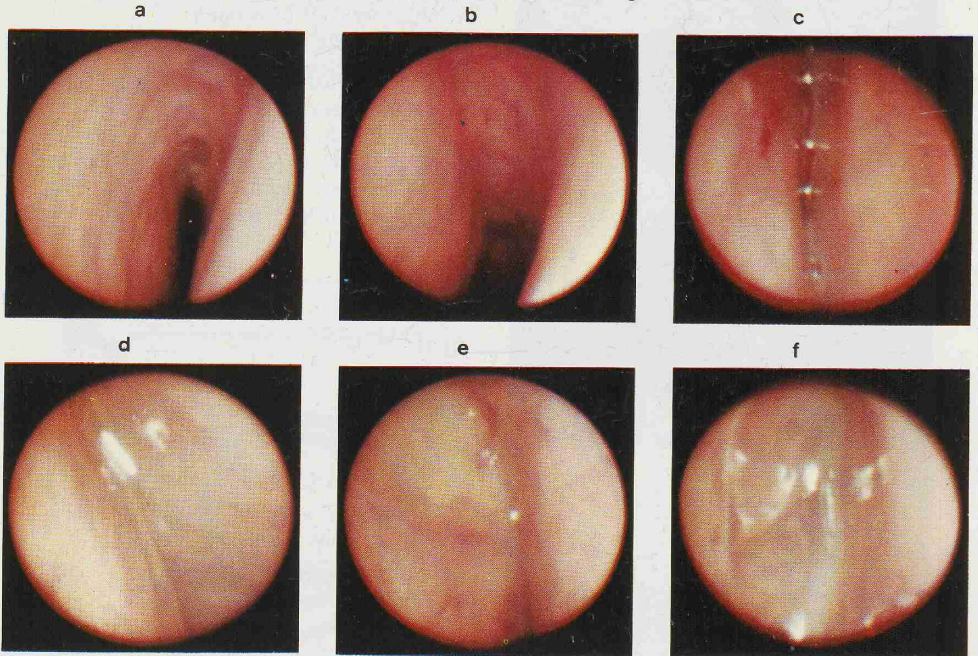


Figure 2. Nasopharyngoscope (SFN).



a: open cleft      b, c, d: obstruction by swelling      e, f: obstruction by polyps  
 Figure 3. Nasopharyngoscopic findings.



a, b: normal      c, d: edematous      e, f: polypous  
 Figure 7. Selfox endoscopic findings.

difficult to determine the morphological changes of the olfactory cleft using the ordinary X-ray examinations of the nose and paranasal sinuses.

The following methods are used by us.

### 1. Tomography of the olfactory cleft

Tomography of the olfactory cleft enables us to find the location of the olfactory epithelium easily. The olfactory cleft can be clearly delineated at the planes of 0.5, 1.5 and 2.5 cm posterior to the plane of the orbital rim in the occipito-frontal projection. Of these three tomographic planes, the 1.5 cm depth is most suitable for observation of the center of the olfactory cleft. Some examples of tomography of the olfactory cleft are shown in Figure 1. In case A the sense of smell was normal and the olfactory cleft is fully open; case B suffered from hyposmia and the olfactory cleft was partially adherent whereas in case C the ethmoidal region is shadowed and the olfactory cleft has disappeared at all.

### 2. Nasopharyngoscopy

The olfactory cleft is observed via the nasopharynx, using a nasopharyngoscope (Nagashima Co., Ltd., Japan), without anesthesia or with light surface anesthesia applied to the pharynx. With the endoscope now available (Figure 2), the olfactory cleft is seen rather from a distance and it is therefore impossible to observe the olfactory epithelium directly. However, it is possible to establish whether the posterior part of the olfactory cleft is open and whether pathological changes around the superior turbinate are present. The olfactory cleft can be well observed in cases with normal sense of smell (Figure 3a), in cases with hyposmia in which the olfactory cleft is swollen (Figure 3b-d), and in cases with anosmia in which the olfactory cleft is obstructed with polyps (Figure 3e and f).

### 3. Endoscopic observation of the olfactory mucosa

It is most important for treatment to observe the changes in the olfactory epithelium directly, because the majority of olfactory disturbances in Japan are due to

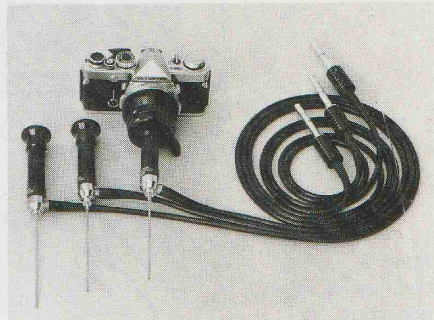


Figure 4. Selfox endoscope (selfoscope SES, 1711D) and camera.

lesions in the olfactory region. The Selfox endoscope (Olympus Co., Ltd., Japan) (Figure 4) is inserted without topical anesthesia, and examination is carried out as the endoscope approaches the olfactory epithelium within a few mm. The endoscope finds its way towards the olfactory region, passing the middle turbinate without touching the mucosa (Figure 5). The outer diameter of the endoscope is 1.7 mm, and the diameter of the inserted Selfox rod lens is 1 mm. (Figure 6). With this endoscope, changes in the olfactory epithelium can be readily observed and recorded.

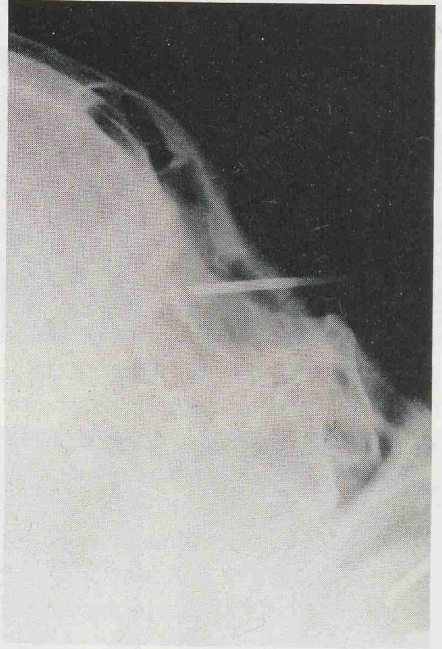


Figure 5. Endoscopic observation of olfactory mucosa (lateral view on X-ray).

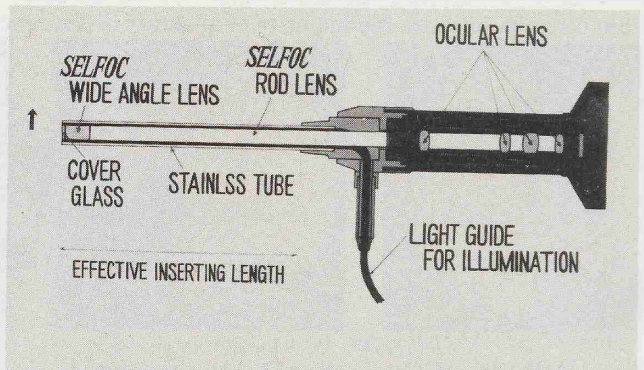


Figure 6. Structure of selfox endoscope.

The olfactory mucosa is edematous, polypous, hypertrophied or atrophied in diseased noses. Figure 7 shows normal (a,b), edematous (c,d) and polypous (e,f) olfactory mucosa. Caution is needed, as repeated use of this device will cause changes in the olfactory epithelium.

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