2.3 Examination of the Nasal Cavity and Paranasal Sinuses

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2.3.1 Examination of the Nasal Cavity

Prior to instrumental examination, the nasal pyramid and maxillae should be inspected and palpated. Nasal deformities of the dorsum, tip or columellae may indicate internal alterations. Crepitation or pain on palpation will disclose fractures of nasal bones. Skin colour and texture and scars or wounds should be assessed. Nasal flapping and alar collapse should also be examined.

Inspection of the face in children can provide useful information about the course and degree of nasal obstruction (adenoid facies, allergic salute). Unilateral rhinorrhea would indicate a choanal atresia or a foreign body in the nostril.

2.3.1.1 Anterior Rhinoscopy

Anterior rhinoscopy is a simple, inexpensive technique that allows visualisation of the anterior third of the nasal cavity. Requirements are a light source (Clar mirror) and a nasal speculum (Killian, Vienna.) The use of an otoscope is recommended for small children.

The examiner stands in front of the seated patient, focusing the light beam on the tip of the nose. One hand holds the patient’s head while the other gently opens the nostril with the speculum. Care should be taken not to damage the septum or the nostril by excessive opening of the instrument. The anatomy of the vestibulum can be distorted by the insertion of the speculum. This region is best examined by lifting the nasal tip with the finger. This gives a clear view of the alterations in this area and distortion is minimal.

Rhinoscopy allows examination of the nasal vestibulum, septum, inferior turbinate and meatus and the floor of the nasal cavity. In some cases the nasopharynx can be directly visualised. Tilting the patient’s head backwards gives a consecutive view of the middle turbinate and middle meatus, superior turbinate and roof of the nasal cavity. Vasoconstrictor sprays or topical anaesthetics with epinephrine can be used in selected patients. Structures and deformities such as polyps or septal deviations can be palpated with a cotton swab.

Small children are better examined in the supine position, with the examiner holding the head with one hand while an assistant immobilises the child.

Summarising, the following aspects should be taken into consideration when performing anterior rhinoscopy:

1. The appearance of the mucosa (e. g. colour, humidity)
2. The situation and deformities of the nasal septum
3. Characteristics of nasal secretions (e. g. type, appearance, localisation)
4. Turbinate congestion and meatal patency
5. Presence of tumours, foreign bodies or nasal polyps
6. Bleeding points

2.3.1.2 Posterior Rhinoscopy

This technique is used to examine the posterior part of the nasal cavity, namely the choanae, tail of the turbinates, posterior end of the septum, rhinopharynx and torus tubarius.

It requires the patient’s collaboration and the physician’s expertise. It may be difficult or even impossible to perform in children. These problems have been largely resolved by nasal endoscopy, and posterior rhinoscopy has become less frequent in everyday practice.

Required instruments include a headlight, a small laryngeal mirror and a tongue depressor. The patient’s tongue is depressed while the laryngeal mirror is introduced, facing upwards, in the oropharynx behind the uvula. Contact of the mirror with the lateral or posterior walls of the oropharynx will likely provoke a nausea reflex and topical anaesthetics may be required.

The soft palate is sometimes large or inserts posteriorly, considerably reducing the field of vision. A palate retractor or two feeding tubes should be used to draw the palate forward and allow better exposure of the nasopharynx.

When correctly performed, this technique allows visualisation of:

- The size and shape of the choanae
- Blockage of the nasopharynx, e. g. tumours, adenoid hypertrophy, polyps, cysts, angiofibromas, etc.
- Nasal secretions: type, appearance
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Endoscopic examination should be performed systematically to achieve a complete exploration of the complex anatomy of the nasal cavity. The procedure should be carefully explained to the patient, especially to children, to obtain cooperation. An anterior rhinoscopy is performed, placing cotton pads soaked in anaesthetic solution with or without vasoconstrictor for 10 min (2% tetracaine in water solution with or without epinephrine 0.1 mg ml\(^{-1}\)). Topical anaesthesia may not be needed in all patients but is mandatory in children. Children younger than 3 years of age may need sedation.

The endoscope should be held with one hand while the other holds the patient’s head, as for anterior rhinoscopy. The tip of the instrument is soaked in antifog solution. The nasal cavity is entered, and the vestibulum (Fig. 2.3.1), anterior septum (Fig. 2.3.2), valvular region (Fig. 2.3.3) and head of the inferior turbinate (Fig. 2.3.4) can be visualised. The entrance of the inferior meatus is examined, progressing over the floor of the nasal cavity (Fig. 2.3.5). Heading up and backwards, the agger nasi and middle turbinate are reached (Figs. 2.3.6, 2.3.7). Examination of the middle meatus is the main step in the endoscopy procedure, as this area drains all the anterior cavities. The uncinate process and bulla ethmoidalis can often be seen lateral to the middle turbinate (Fig. 2.3.8). The presence of swelling or secretions should be assessed at this point (Fig. 2.3.9). The endoscope is carefully advanced up to the tails of the turbinates and nasopharynx (Fig. 2.3.10). Mobility of the palate and torus tubarius is now assessed as well as the presence of adenoid hypertrophy, cysts or masses in the area (Figs. 2.3.11, 2.3.12). The superior turbinate and sphenoid recess should also be assessed. The 70°-angled optic can be very useful at this point, even though it is more difficult to handle.

**2.3.1.3 Nasal Endoscopy**

Nasal endoscopy has become the gold standard in nasal examination, for it provides precise and reliable information on the entire nasal cavity. Even traditionally inaccessible spots such as the sphenoid recess or the ostiomeatal complex can be thoroughly assessed.

The required equipment consists of a light source, a fibre optic cable and the endoscope itself. The latter can be one of three different types:

1. **Rigid telescopes**
   - They may have different lengths and calibres. For adults, telescopes of 25-cm length and 4-mm diameter are most commonly used. Smaller endoscopes such as the 2.7-mm diameter model are often needed in children. Angulations used for examination are 0 or 30°. More recently, 45 and 70° optics have been developed, being most useful in surgery of the frontal recess.

2. **Fiberoptic endoscopes**
   - These are made of a flexible fibre optic, ranging from 2.2 to 4 mm in diameter. The tip can be bent 130–180° upwards and 80–100° downwards.

3. **Laryngo-epipharyngoscopes**
   - They can be used for posterior rhinoscopy, but they pose the same problems as the classic technique. They are 90° angled, providing a wide field of vision. Posterior rhinoscopy can also be performed with a 70° endoscope introduced through the mouth.

- Size and shape of the tails of inferior and middle turbinates
- Morphology of the torus tubarius and Rossenmüller’s fossae

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**Fig. 2.3.1** Nasal vestibulum C columellae, A nasal alae, S septum, Ve vestibulum

**Fig. 2.3.2** The endoscope is slightly introduced in the vestibulum. S septum, V nasal valve, Ci inferior turbinate, Ve vestibulum