

Rhinoscopy

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Rhinoscopy involves visual assessment of the nasal cavity using an otoscope cone or a rigid or flexible fiberoptic endoscope.¹ In a clinical setting, rhinoscopy has distinct advantages over other examination techniques. Rhinoscopy is noninvasive, allows direct visualization of the nasal mucosa, allows adequate sample collection, and is much less traumatic than surgery.²

Diagnosis of Nasal Disease

A comprehensive diagnostic approach to nasal disease is indicated when a patient presents with chronic nasal discharge, intranasal obstruction, either acute and severe or chronic sneezing, epistaxis, or a facial deformity.³ Reasons for a comprehensive diagnostic approach include the following:

- Nasal disease can progress from unilateral to bilateral involvement⁴
- Nasal discharge can change from mucoid to mucopurulent⁵
- The efficacy of empirical therapy varies⁵

Clinical signs associated with nasal disease include sneezing, reverse sneezing, nasal discharge (mucoid, mucopurulent, hemorrhagic, or mixed), epistaxis, stertor, dyspnea, coughing, rubbing or scratching at the nose or face, ulceration of the nasal planum, facial swelling or distortion, and nasal or oral malodor.²

The differential diagnosis for nasal disease includes neoplasia (e.g., carcinoma, sarcoma, lymphoma), infection (i.e., bacterial, viral,



Figure 1. The airflow slide test.

fungal, or parasitic), inflammation (e.g., due to rhinitis, allergies, irritants, or sinusitis), structural disease (e.g., oronasal fistula, cleft palate), dental disease, foreign bodies, sinusitis, and trauma.² The similarity in the clinical signs of these differentials can complicate diagnosis.² A thorough patient history and complete physical examination can help to differentiate the various diseases/conditions.

Glossary

Deflection—bending or turning aside

Dyspnea—difficult breathing or shortness of breath

Edema—abnormal accumulation of fluid

Epistaxis—bleeding from the nose

Friability—the quality of being fragile or easily damaged

Iatrogenic—induced by a clinician's activity or by therapy

Lysis—destruction or decomposition

Meatus—body opening or passage

Morbidity—the incidence or prevalence of disease

Mortality—the death rate

Nasopharynx—the part of the pharynx above the soft palate

Opacity—the quality of being impenetrable by light

Radiodense—obstructing the passage of x-rays

Retroflexion—bending or bending backward

Rhinology—examination of the nasal passages

Rostral—toward the nose

Stertor—heavy inspiratory sounds

Vascularity—pertaining to the blood supply of tissue

Vasoconstriction—constriction of the blood supply



Figure 2. Proper patient positioning with a dental speculum in place. A flexible bronchoscope is being used to perform retroflexion.

An airflow slide test can be used to evaluate degree of airflow from each nostril (**FIGURE 1**), but interpretation of test results is very subjective. It is important to determine if nasal disease is primary or is secondary to an underlying disease/condition (e.g., canine distemper, feline viral rhinotracheitis, aspiration pneumonia, coagulopathy).⁶

Diagnosing nasal disease typically involves obtaining a complete blood count, obtaining a serum chemistry profile, performing a urinalysis, measuring blood pressure, and performing thoracic imaging. Specific infectious disease testing may be performed. A complete blood count may reveal thrombocytopenia, which can cause epistaxis.⁴ Serum biochemistry and urinalysis can help to diagnose concurrent systemic illness. Thoracic radiography is indicated to detect lower airway involvement. Indirect blood pressure measurement may identify hypertension, which can cause epistaxis.⁷ Serologic testing for *Aspergillus* and *Cryptococcus* spp may be performed.² A coagulation profile is indicated before rhinoscopy if epistaxis is present or excessive hemorrhage after rhinoscopy is a concern.⁴

After noninvasive diagnostics are performed, further advanced imaging is usually warranted and requires general anesthesia. First, computed tomography (CT) or nasal radiography is performed⁴ before rhinoscopy to help direct the clinician to the most affected area(s).⁷ Performing CT or radiography first avoids iatrogenic changes that may occur secondary to rhinoscopy and biopsy. CT is more sensitive than nasal radiography for detecting disease.⁷ On radiographs, the nasal cavity is evaluated for turbinate loss, facial bone lysis, increased fluid density, and radiodense foreign material.¹ The nasal septum, hard palate, and cribriform plate are easily visualized on a CT scan.¹ Inflammation can often be differentiated from neoplasia on a nasal CT scan.⁷ Contrast may be used to enhance CT scans to distinguish between structures that have the same opacity, such as soft tissue and mucus.⁸ CT may be used to guide rhinoscopy by helping to determine the extent of disease and the locations to biopsy.⁷

Rhinoscopic Examination

The size of the nasal cavity of canine and feline patients places strict limitations on the type of equipment that can be effectively used to perform rhinoscopy.⁹ Three types of instruments may be used. An otoscope cone is relatively inexpensive but limits visualization to the rostral area of the nasal cavity.⁹ An arthroscope allows good visualization but does not allow through-the-scope biopsy or foreign body retrieval.⁹ A flexible fiberoptic endoscope (i.e., a bronchoscope) may also be used but is the most expensive option.⁹ A bronchoscope allows retroflexion over the soft palate for visualization of the nasopharynx.⁶ The scope has two-way deflection and allows through-the-scope lavage, biopsy, or foreign body retrieval.⁹ The main disadvantage of a bronchoscope is the inability to use it in cats and small dogs.⁹

General anesthesia is required for rhinoscopy.⁶ Sedation or a light plane of anesthesia is inadequate because the nasal cavity is very sensitive and it is difficult to maintain sufficient sedation in most patients.² General anesthesia allows appropriate patient positioning. An inflated endotracheal tube cuff is used to prevent airway compromise during the procedure.⁹ The patient is placed in sternal recumbency⁶ (**FIGURE 2**). The patient's head is slightly elevated with the nose tilted down so fluids can flow out of the nasal passages.² The rostral end of the nose extends over the end of the table, and a waste container is placed below the nose to collect runoff.² To prevent damage to the bronchoscope, a dental speculum is placed in the patient's mouth when the scope is inserted transorally⁵ (**FIGURE 2**).

Once the patient is properly positioned, a nasal culture sample is obtained using a minimally invasive modified nasal flush technique.⁵ A sterile soft catheter attached to a sterile saline-filled syringe is inserted into the nasal cavity, and the saline is forcibly injected in pulses and then reaspirated into the syringe.⁵ A thorough oral examination should be performed.² The teeth, gums, and hard and soft palates are examined for deformities or erosions.² The caudal pharyngeal area and caudal nasopharynx are evaluated by gentle retraction of the soft palate to look for polyps, neoplasia, or foreign bodies.²

To perform rhinoscopy, the nasopharynx should be examined first because induced hemorrhage from the nasal cavity tends to pool in the nasopharynx, diminishing visibility⁷ (**FIGURE 3**). Instilling the nasopharynx with a 0.25- to 0.5-mL mixture of phenylephrine and lidocaine (diluted to one part phenylephrine to 10 parts lidocaine) before the procedure can help to reduce hemorrhage and the gag reflex.⁵ If a foreign body is seen in the

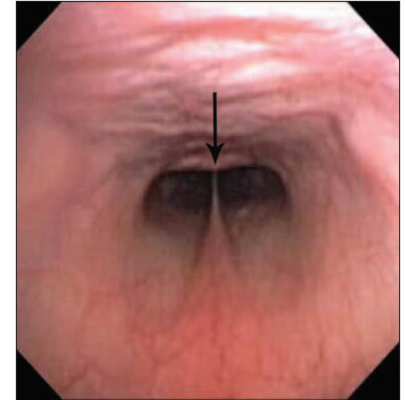


Figure 3. A normal canine nasopharynx. The nasal septum (arrow) divides the left and right nasal passages.



Figure 4. A gauze pack for protecting the airway.

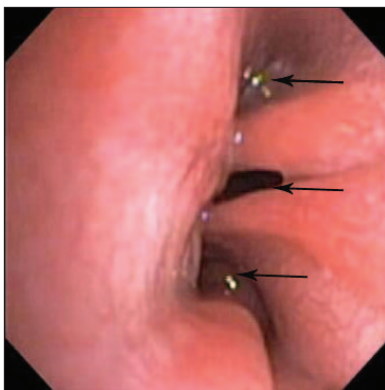


Figure 5. The canine nasal cavity. The *top arrow* points to the dorsal meatus, the *middle arrow* points to the middle meatus, and the *bottom arrow* points to the ventral meatus.

nasopharynx, it should be removed.⁹ All abnormal tissue should be biopsied.⁹ To perform a biopsy, a forceps must be placed in the instrument channel of the endoscope before retroflexion over the soft palate because the channel may be damaged if a forceps is passed through a fully deflected scope.⁹

The nasal cavity is then examined. Before the scope enters the nasal cavity, a gauze pack (**FIGURE 4**) is placed in the caudal nasopharyngeal area to help prevent mucus, hemorrhage, or irrigation solution from entering the airway.⁵ In unilateral nasal disease, the normal side is evaluated first to avoid the effects (e.g., entry of fluid, exudate, or blood) of examining the abnormal side first.² If bilateral disease is present, it does not matter which side is examined first. Force should never be used to insert the endoscope into the nasal

cavity.¹ Mucosal bleeding cannot be prevented during rhinoscopy; however, irrigation using cold, sterile saline solution from a pressure bag can improve visualization and control hemorrhage.²

A systematic approach to examining all accessible areas is recommended.² To examine the mucosa and turbinates, it is best to start with the ventral meatus, proceed to the middle meatus, and then examine the dorsal meatus (**FIGURE 5**). This approach ensures that bleeding due to the endoscope stays ventral to the meatus being visualized. The nasal mucosa is examined for friability, vascularity, edema, and changes in color.⁷ After all accessible areas have been explored, biopsies should be performed.⁶ Unfortunately, only a few biopsies can be performed before profuse bleeding hinders visualization. Irrigation with saline cannot be used to improve visualization during biopsy because irrigation and the biopsy forceps require the same port. Alternatively, a blind biopsy technique may be used³ (**FIGURE 6**). In this technique, an alligator forceps is premeasured to the medial canthus of the eye and is marked.³ Next, the forceps is directed dorsally and medially into the nasal cavity and advanced no farther than the premeasured mark.³ The instrument is opened and extended into the mucosa and then closed and retracted. If necessary, a more aggressive biopsy technique can be used to ream the area of interest with a



Figure 6. The blind biopsy technique.

stiff plastic tube while suction is applied.¹⁰ The biopsy specimens are placed in formalin for histopathologic evaluation.¹ Samples are also placed in appropriate media for bacterial and fungal cultures.¹ Impression smears may be made on glass slides for cytologic evaluation. Multiple biopsy samples from multiple areas should be obtained to increase the amount of tissue available for evaluation.²

After the procedure is completed, the gauze pack is removed and the pharyngeal area cleaned of debris, blood, and fluid.² The nares are monitored for excessive bleeding, which can be reduced by applying an ice pack to increase vasoconstriction. The use of epinephrine-soaked (1:100,000), cotton-tipped applicators may also increase vasoconstriction.⁵ Recovery from anesthesia is delayed until bleeding is controlled.² Patients usually recover with minimal epistaxis if they remain hospitalized overnight.² Overexcitement caused by release from the hospital can induce epistaxis.² Some epistaxis is expected after rhinoscopy and may be observed for a few days.³ If epistaxis becomes uncontrollable, the carotid artery on the hemorrhaging side can be ligated.²

Conclusion

Rhinoscopy is associated with less morbidity and mortality than surgical exploration of the nasal cavity.² Used with a complete and sequential approach, rhinoscopy affords a good chance of an accurate diagnosis.² The main disadvantages of rhinoscopy include the need for expensive equipment and the potential for difficult visualization as a result of nasal discharge and

Key Points

- Rhinoscopy has distinct advantages over other examination techniques.
- The sequence of rhinoscopic procedures is important for accurate diagnosis.
- A complete diagnostic approach to nasal disease is indicated when a patient presents with chronic nasal discharge, intranasal obstruction, either acute and severe or chronic sneezing, epistaxis, or a facial deformity.

hemorrhage.¹⁰ Veterinary technicians can play a vital role in ensuring that a sequential approach is used and that appropriate samples are collected and stored properly. Veterinary technicians can also help to educate owners about the diagnostic value and potential complications of rhinoscopy.

References

1. Hawkins EC. Diagnostic tests of the nasal cavity. In: Nelson RW, Couto CG, Bunch SE, et al, eds. *Small Animal Internal Medicine*. 3rd ed. St. Louis, MO: CV Mosby; 2003:217-229.
2. McCarthy TC. Rhinoscopy and frontal sinoscopy. www.vin.com/proceedings/Proceedings.plx?CID=WSAVA2002&Category=&PID=784&O=Generic. Accessed May 2012.
3. Cote E. Rhinoscopy. In: Buffington CA, Dewey CW, Cohn LA, et al, eds. *Clinical Veterinary Advisor*. St. Louis, MO: CV Mosby; 2007:1305.
4. Hawkins EC. Clinical manifestations of nasal disease. disorders of the nasal cavity. In: Nelson RW, Couto CG, Bunch SE, et al, eds. *Small Animal Internal Medicine*. 3rd ed. St. Louis, MO: CV Mosby; 2003:211-216.
5. Acierno MJ. Rhinoscopy, nasal flushing and biopsy. In: Ettinger SJ, Feldman EC, eds. *Textbook of Veterinary Internal Medicine*. 7th ed. Philadelphia, PA: WB Saunders; 2010:395-397.
6. Herrtage ME. Diseases of the ears, nose and throat. In: Ettinger SJ, Feldman EC, eds. *Textbook of Veterinary Internal Medicine*. 7th ed. Philadelphia, PA: WB Saunders; 2010:1030-1033.
7. Kuehn NF. Rhinitis in the dog. In: Bonagura JD, Twedt DC, eds. *Kirk's Current Veterinary Therapy*. XIV. St. Louis, MO: WB Saunders; 2009:609-615.
8. Thrall DE. Introduction to radiographic interpretation. In: Thrall DE, ed. *Textbook of Veterinary Diagnostic Radiology*. 3rd ed. Philadelphia, PA: WB Saunders; 1998:25.
9. Tams TR. Endoscopy of the upper respiratory tract of the dog and cat. In: Reinhardt RW, ed. *Small Animal Endoscopy*. 2nd ed. St. Louis, MO: CV Mosby; 1999:297-301.
10. Davidson AP, Mathews KG, Koblik PD, Theon A. Diseases of the dog and cat. In: Ettinger SJ, Feldman EC, eds. *Textbook of Veterinary Internal Medicine*. 5th ed. Philadelphia, PA: WB Saunders; 2010:1013-1017.



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1. During a blind biopsy of the nasal passage, an alligator forceps is premeasured to the _____ and marked.
 - a. frontal sinus
 - b. canine tooth
 - c. carnassial tooth
 - d. medial canthus of the eye
2. During rhinoscopy, _____ can be used to improve visualization and control hemorrhage.
 - a. epinephrine
 - b. sterile saline
 - c. an ice pack
 - d. patient positioning
3. Attempting to pass a forceps through a fully deflected scope
 - a. enhances the ability to biopsy a specific area.
 - b. helps place the forceps.
 - c. may damage the channel.
 - d. cannot damage the channel.
4. _____ has two-way deflection and allows through-the-scope lavage, biopsy, and foreign body removal.
 - a. A flexible fiberoptic endoscope
 - b. An arthroscope
 - c. An otoscope
 - d. A dental mirror
5. With the patient under general anesthesia, the proper approach to rhinoscopic examination is
 - a. perform CT or nasal radiography, obtain a sample for nasal culture, perform an oral examination, perform rhinoscopy, and perform a biopsy.
 - b. perform an oral examination, perform rhinoscopy, perform a biopsy, obtain a sample for culture, and perform CT or nasal radiography.
 - c. perform a biopsy, obtain a sample for culture, perform an oral examination, perform CT or nasal radiography, and perform rhinoscopy.
 - d. perform CT or nasal radiography, perform a biopsy, perform rhinoscopy, obtain a sample for culture, and perform an oral examination.
6. In unilateral nasal disease, which nostril is evaluated first during rhinoscopy?
 - a. the abnormal side
 - b. the normal side
 - c. either side
 - d. Rhinoscopy is not necessary for unilateral nasal disease.
7. Which statement regarding rhinoscopy is false?
 - a. The size of the patient's nasal cavity places limitations on the equipment that can be used.
 - b. Mucosal bleeding can be prevented.
 - c. A systematic approach is recommended.
 - d. Biopsies are performed after all accessible areas have been explored.
8. _____ can help to protect the airway during rhinoscopy.
 - a. A dental speculum
 - b. An inflated endotracheal tube
 - c. A gauze pack
 - d. b and c
9. Which of the following can cause epistaxis?
 - a. thrombocytopenia
 - b. hypertension
 - c. nasal trauma
 - d. all of the above
10. To prevent damage to a scope, a(n) _____ is placed in the patient's mouth when a scope is introduced transorally.
 - a. small amount of lubricant
 - b. absorbent towel
 - c. dental speculum
 - d. gauze pack