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Endoscopy- A practical Approach Mini Series

Session 1: The other end of the scope. How to set-up your scopes and equipment

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Endoscopy - a practical approach

Endoscopy uses an optical endoscope to view the interior of a body cavity or hollow organ, such as the gastrointestinal tract, respiratory tract or abdominal cavity.

This can be performed using rigid or flexible scopes, which may be as simple as a hollow tube and light source through which one looks with the naked eye (e.g. a manual otoscope or rigid proctoscope), or as complex as a digital videoendoscope.

The general advantage of endoscopy is that it allows the clinician to examine areas of the body that could not be accessed otherwise, or at least not without invasive procedures such as a surgical approach. Endoscopy may therefore allow a reduced risk or morbidity of obtaining diagnostic samples or may reduce the recovery time from a procedure.

Gastrointestinal endoscopy includes:

- Oesophagoscopy – examination of the oesophagus
- Gastroduodenoscopy – examination of the oesophagus, stomach and duodenum
- Proctoscopy – examination of the rectum
- Colonoscopy – examination of the rectum and colon
- Ileocolonoscopy – examination of the rectum, colon and ileum
- Endoscopic retrograde cholangiopancreatography – endoscopic examination of the duodenum to facilitate a radiographic contrast study of the biliary tract and pancreatic duct.

Respiratory endoscopy includes:

- Rhinoscopy – examination of the nasal passages (anterograde)
- Nasopharyngoscopy – examination of the nasopharynx (retrograde)
- Laryngoscopy – examination of the larynx
- Tracheoscopy – examination of the trachea
- Bronchoscopy - examination of the trachea and bronchi

Urogenital includes:

- Vaginoscopy - examination of the vagina
- Urethroscopy - examination of the urethra
- Cystoscopy - examination of the bladder
- Ureteroscopy – examination of the ureters
- Pyeloscopy – examination of the renal pelvis

Otic examinations can be performed for diagnostic purposes, forforeign body retrieval or to perform myringotomy to sample the middle ear.

Thoracoscopy may be performed to obtain a lung biopsy, perform a pericardectomy, to seal a ruptured bulla or to remove a foreign body.

Laparoscopy is performed to obtain biopsies from the liver or other organs, or as an exploratory procedure.

Endoscopy equipment

The more traditional rigid endoscopes are still of great use and, in contrast to flexible endoscopes, may be used for various procedures.

Rigid hollow tube endoscopes

The most basic type is the rigid hollow tube endoscope with a light source that shines from the tip of the tube, and sometimes a lens affixed to the proximal end (operator end) of the endoscope. These scopes vary from several millimetres to around 2cm diameter.

Though sometimes dismissed as ‘old-fashioned’ they have several advantages: They have no moving parts and are difficult to break. The size and hollow nature of the scope allows for easy introduction of instruments and retrieval of objects.

Rigid tube endoscopes are excellent for visualisation and retrieval of oesophageal foreign bodies, tracheal foreign bodies and for proctoscopy, including snaring or biopsy of polypoid lesions.

Rigid telescopes

These are the more advanced type of rigid scope, in which light transmitted along a stainless steel metal tube using optical lenses. The scope is connected to a flexible fibre-optic cable which transmits light to the scope itself. This cable is in turn connected to a Xenon light source.

Though the rigid scope has an eye-piece, allowing direct viewing, a video camera is usually connected to the eye-piece so that the images are displayed on a monitor.

Rigid scopes are used for vaginoscopy, cystoscopy and rhinoscopy, as well as arthroscopy.

These telescopes have various angles of view of between usually 0 to 45 degrees. This allows visualisation of structures that might be out of view otherwise. A 30 degree scope is most versatile, but a 0 degree scope is easiest to use as the view is what you would expect straight ahead.

These rigid telescopes are at risk of damage from flexion and should be protected in storage by a rigid case and plastic sheath. In use, they are similarly at risk and should be used with a metal sheath. This usually has a small channel for instilling fluids, or may have multiple channels to allow biopsies, as well as ingress and egress of fluids.

Flexible endoscopes are available in various lengths and diameters. The two main types of flexible endoscopes are fibreoptic or videoendoscopes.

Both types actually transmit light to the area of interest via glass fibreoptic fibres, but the difference is in the detection and transmission of the image. Videoendoscopes have a sensor microchip at the distal end of the scope and transmit the image electronically; traditional fibrescopes transmit the image to the eyepiece via the glass fibreoptic fibres.

Fibreoptic endoscopes form an image that is not as good as videoscopes– the image is more pixelated and fractured fibres appear as black dots on the image. Video endoscopes do not have this problem.

Just as video cameras can be connected to rigid endoscopes, these can be used with fibreoptic scopes.

The **outer diameters** of flexible scopes range from 6mm to 14mmand endoscope **insertion lengths** range from 40cm up to around 2.4m. Some scopes have tips that can be deflected in one plane (two directions – up and down); others in two planes (four directions – up, down, left and right). The angles of deflection vary between scopes. For a gastroscope four-way flexion is necessary with 90 to 100 degree flexion to the left and right, and 180 to 210 in an up and down plane. All functions, including deflection controls, require space within the insertion tip of the scope, so smaller endoscopes will usually have less versatile deflection abilities than larger scopes.

As well as visualising the area of interest, it may be necessary to be able to biopsy (via a biopsy channel), flush with water, insufflate with air or suction. All of these additional functions are necessary for gastrointestinal examination. Bronchoscopy requires only the ability to perform a bronchoalveolar lavage via a biopsy channel.

The **working channel** of a flexible endoscope should be ideally a minimum of 2mm in diameter to accommodate suitable biopsy forceps or sampling catheter. The same channel doubles up for suction and cannot be used for two functions at once.

An **endoscopy tower** houses the processors, pumps, light sources and power sources, as well as providing a hanging hook for temporary storage of the endoscope and space for a video monitor and computer for recording the examinations.

The tower should hold:

- Light source & control
- Air pump & control
- Image processor
- Water bottle for flushing
- Computer & monitor
- Mains electricity source

A **suction unit** is usually separate from the endoscopy tower and must be available if using insufflation, to balance the inflation. Additionally, suction is necessary to retrieve samples (bronchoalveolar lavage) and for removal of fluid or fine debris.

Having a well-functioning suction unit will make endoscopy easier and more productive.

Suction may be provided by a centralised suction system in larger hospitals, but this still requires a unit to plug into the suction source. It is generally more effective, but certainly more expensive than a standalone suction unit.

Stand-alone suction units are portable and inexpensive, but may be less effective than centralised suction.

Suction should be applied carefully and intermittently – it is easy to suction the tip against mucosa, causing iatrogenic lesions that may be mistaken by less experienced operators as significant lesions.

While suction may be very effective for removing fluid content from the gastrointestinal tract, the scope channel diameter limits the suction of solid debris and anything more than 2mm may block the channel. Large debris should be suctioned with a separate larger suction tube passed alongside the scope or in advance of the scope.

Deflection control

The flexible tip can be deflected by using the operating knobs on the endoscope handpiece. Helpfully, the controls are usually labelled 'U' for up, 'D' for down, 'R' for right and 'L' for left. With experience the use of these controls will become second nature.

The handpiece is held in the left hand. The up and down controls may be used with the same hand as holds the handpiece, leaving the right hand free for working biopsy forceps – the left right controls are 'replaced' by applying rotational forces to the length of the scope ('torque'). If an assistant is available for dealing with biopsy instruments, however, then while the left hand holds the handpiece, the right hand can work both of the deflection controls.

There are two levers which lock the deflection controls – one is an actual level and the other is usually a dial or knob. Moving the lever in the direction labelled as 'F> RL' *frees* the movement of the scope in the right-left plane. Moving the lever in the direction labelled as 'F> UD' *frees* the movement of the scope in the up-down plane. As these levers lock the wires that control the deflection of the scope tip, trying to deflect the tip while the lock is applied will stress and potentially snap the wires. There is very seldom any need to apply these deflection locks, but an example of when they might be used is when you are trying to biopsy a lesion that can only be visualised by keeping the scope in full flexion while applying torque, which prevents you from operating the biopsy forceps at the same time.

Air and water

The air pump on the endoscopy tower provides a constant flow of air, the rate of flow of which can be adjusted on the control unit. This air constantly exits the hole in the centre of the blue button on the endoscope handpiece *unless* the button is covered. By covering the button, the airflow is diverted down the working channel to the tip of the endoscope and hence insufflates the viscus (e.g. stomach) being examined.

Pressing the blue button adds water to the air jet and hence water sprays from the tip of the scope. There is usually a small metal coverlet angled across the opening of the channel at the tip of the scope, which directs the water jet across the lens of the scope, keeping it clean.

Suction control

Similar to the air supply, suction is continuously supplied to the scope (as long as you remember to turn on the suction unit). To apply this suction to the tip of the scope, the red button should be held down. Suction should be released periodically to prevent suctioning of mucosa into the scope tip – apart from preventing suction of the intended material it causes red lesions on the mucosa that may be mistaken for actual pathologic lesions.

Endoscopic instruments

There are many types of instruments suitable for use with endoscopes, but it is important to note that these are supplied in various lengths and diameters – check that you order ones that fit the endoscope(s) you have. As a minimum, I would advise the following:

- Grasping forceps (e.g. 'Ratigator') – for removing foreign bodies.
- Wire basket – for removing foreign bodies.
- 1.8mm biopsy forceps – I prefer non-spiked, non-serrated, but spiked forceps may make gastric biopsies easier to take (though can disrupt the architecture).
- Mucus suction trap and 1.8mm diameter suction tubing.

Endoscopy room set-up

The endoscopy room or area should be set-up the same every time - this also applies if endoscopy is performed in different areas. Whether you set up the tower on your left or right side is personal preference, but do it the same every time.

For gastrointestinal endoscopies, it is helpful to have a table with built-in drainage.

As all endoscopic procedures are carried out under anaesthesia, you will need an anaesthetic trolley or wall-mounted station, as well as the associated monitoring equipment. As well as fitting in the tower, suction unit and other devices, you'll need room for an anaesthetist, endoscopist, endoscopy assistant(s) and any observers (foreign body removals seem to be a bit of a spectator sport).

Endoscopy recording

I would advise keeping a permanent record of all endoscopies so that you can review them later, as well as using them for teaching. Some free software is available for viewing endoscopies, as well as saving stills and video loops. As with any patient records, you should save a back-up in a different location.

Reporting examinations

Some software includes standard (WSAVA) report formats to complete online or at another computer. Otherwise, you should fill in the report in hard copy during (via an assistant) or immediately following the examination. It is helpful to save still images within the report and to attach the report to the patient file for future reference.

Anaesthesia for endoscopy - GI

Necessarily, during GI endoscopy, the endoscopist insufflates a significant volume of air, to allow a thorough examination. This presents some challenges for the anaesthetist. Firstly, the distension of the GI tract may cause discomfort, reducing the plane of anaesthesia and requiring top-up with opioids or intravenous anaesthetic agents.

The distension of the GI tract causes vagal stimulation which in turn may cause bradycardia. As long as this is monitored, and the patient's blood pressure remains normal, this often does not need correction with atropine or glycopyrrolate. The increased intra-abdominal pressure, however, may reduce venous return from the splanchnic circulation, which drops the cardiac preload and therefore blood pressure.

Marked abdominal distension can also cause respiratory impairment by reducing diaphragmatic excursion.

It is good practice for the endoscopist to check the degree of distension regularly - this is easily forgotten if the patient is under a blanket. Periodically, you may have to deflate the stomach (by suction), to keep the anaesthetists and patient happy and stable.

Anaesthesia for upper GI endoscopy

A full u-agonist opioid is usually used in the premed for routine upper GI endoscopy, but may cause some nausea or vomiting. For this reason, if a foreign body is suspected, it may be wise to use a k-agonist such as butorphanol to reduce the risk of vomiting.

We routinely use intravenous alfaxalone as an anaesthetic induction agent.

In addition to the opioid, we usually use an alpha-2 agonist, such as medetomidine. It is important to know that this may wear off during longer examinations, leading to a sudden reduction in the plane of anaesthesia and necessitating top-up with an intravenous anaesthetic agent (e.g. alfaxalone).

Anaesthesia for endoscopy - rhinoscopy

Rhinoscopy causes stimulation of the very sensitive nasal passages, which can cause sneezing even in anaesthetised patients - this can be dangerous with a rhinoscope in the nose. Additionally, even if this does not occur, we prefer to pre-empt the possible pain from nasal biopsies. As local anaesthesia takes 15 - 20 minutes to take full effect, we use local anaesthetic immediately after induction and intubation. This takes one of two forms: Either topical lidocaine diluted in saline and squirted up both nostrils, or (by preference) an infraorbital nerve block (bilaterally).

As for GI endoscopy, we use an opioid with alpha-2 agonist as pre-med, followed by alfaxalone induction.

Anaesthesia for bronchoscopy

The route of anaesthesia required for bronchoscopy will depend upon the size of the patient or, more precisely, the diameter of their trachea. We routinely induce with alfaxalone after an opioid and alpha-2 agonist premed. We then perform endotracheal intubation *unless* the patient is suspected of having a *tracheal* foreign body, a tracheal mass lesion or a tracheal tear.

Test your bronchoscope for fit down various diameters of ET tube, so that you have an idea before anaesthetising a patient.

If the ET tube is too narrow (less than size 9 usually), then the patient will need to be extubated at the moment before starting the bronchoscopy. In this case, supplemental oxygen can be supplied by means of a nasal catheter or via a rigid dog urinary catheter passed down the trachea alongside the scope. In this case, anaesthesia should be continued as Total Intravenous Anaesthesia (TIVA) - preferably a CRI of propofol, rather than boluses.

If the bronchoscope will fit through the ET-tube without occluding too much of the lumen then an ‘elbow connector’ should be included in the anaesthetic circuit. This allows the bronchoscope to be passed through a rubber diaphragm (ensuring no leakage of anaesthetic gases), down the ET tube and into the distal trachea. Bear in mind, that this prevents visualisation of the proximal trachea. A very thin layer of sterile lubricating gel faciliates the smooth passage of the scope down the ET tube.

Pre-endoscopy preparation - upper GI endoscopy

Before upper GI endoscopy the patient should be fasted for at least 12 hours - preferably longer, particularly if the patient is known to have delayed gastric emptying (which can, itself be caused by the stress of hospital visits). We withhold water during the hour before endoscopy.

If the patient has a history of chronic vomiting, or of regurgitation, omeprazole should be started 24 hours prior to the procedure (e.g. two oral doses, 24 and 12 hours prior to the procedure, at home). I routinely give an intravenous dose of omeprazole at the time of anaesthetic induction.

Pre-endoscopy preparation - lower GI

Preparation for lower GI endoscopy usually takes place in the hospital, requiring hospitalisation at least overnight beforehand. The patient should be fasted for 24 hours before the procedure. For dogs, a bowel-cleansing solution (cathartic) such as 'KleanPrep' (off-label use) is given in 3 doses, each 6 hours apart. I find that Labradors often drink this if a very small amount of a/d or Chappie is mixed in. Most other dogs do not, in which case the decision may be made to administer this by gastric tube or syringe. It is important to note that aspiration of the solution causes a severe pneumonitis and owners should be made aware of the risk. I chose never to administer this if the patient doesn't take it willingly, but this does necessitate more preparation by means of enemas.

We do not administer enemas in the conscious patient, but rather do this following induction of anaesthesia. Textbooks will advise three warm saline enemas 20ml/kg) to be administered on the afternoon before the procedure, on the morning of the procedure and immediately after anaesthetic induction. We obtain excellent results simply by administering one larger volume enema after anaesthetic induction. We use approximately 2 litres for a Labrador-sized dog (in effect, approximately 60mL/kg). Importantly, we do not instil the entire volume at once, but ensure that there is a backflow as we continue to instil the saline.

While many use syringes or bulb syringes for administering an enema, we find it most effective to use a gravity-fed siphon technique. In cats, however, we will use a syringe technique.

Siphon technique: Warm a pour bottle of (0.9%) saline to just above body temperature (39 or 40°C) - this prevents excessive cooling of the patient. A lubricated, soft suction catheter is attached to one end of a long piece of wide-bore suction tubing. The other end is coiled into the bottom of the saline bottle - as much of it as possible. Wearing suitable PPE, with the patient anaesthetised and lying on a tub-table, an assistant holds the saline bottle above shoulder level and the operator kinks the end of the suction tubing and pulls the majority of it out of the bottle, keeping it below the level of the bottle. When the tube is unkinked, the

column of saline within it should flow by gravity. The suction tip is introduced into the patient's rectum and passed further up the descending colon as long as there is no resistance. The saline is allowed to flow passively, to the desired volume, ensuring that there is return flow out of the rectum to prevent over-distension.

To change to a second bottle of saline for larger patients, kink the tube before the saline runs out, while keeping the catheter in the patient's colon. Then hold a second bottle at height and introduce the tip of the suction tubing into the bottom of that bottle before unkinking the tube. Done correctly, flow will continue.

Rhinoscopy - indications

- Chronic nasal discharge
- Epistaxis without systemic cause
- Very acute sneezing and/or pawing at face (suspected nasal FB)
- Suspected mass
- Nasal pain

Rhinoscopy - contraindications

- Coagulopathy
- Thrombocytopenia
- Acute bilateral mucopurulent nasal discharge with ocular signs (suspected infectious cause)
- Other explicable systemic cause of nasal signs

Rhinoscopy - limitations

Rhinoscopy is not sensitive at finding nasal tumours and we have shown in a retrospective study of 117 dogs with nasal tumours that rhinoscopic biopsies are no more likely to be diagnostic for nasal tumours than blind grab biopsies (i.e. stick grab forceps up the side affected by clinical and radiographic signs and grab). The likely reason for this is that the rhinoscopic biopsies are deliberately aimed at the surface of a lesion or tissue, whereas the blind grab may push deeper into that tissue. Nasal tumours are often surrounded by inflammatory tissue, and it is often this that is represented on small, superficial biopsies.

By preference, rhinoscopic biopsies should be directed based upon 'triangulation' from advanced imaging. In fact, it is important that imaging is performed before any attempt at rhinoscopy or biopsy, to prevent artefactual changes from bleeding or instillation of saline.

Rhinoscopy is the superior technique, however for diagnosis of nasal or sinonasal aspergillosis, as well as for identification and retrieval of nasal foreign bodies. Still, before rhinoscopy is performed, an adequate suspicion is gained for these conditions by means of advanced imaging. Aspergillosis usually shows a moderate to marked destructive rhinitis, which may be unilateral or bilateral.

Rhinoscopy - preparation

Rhinoscopy should *never* be performed without first checking the patient's coagulation status. This includes a platelet count (or estimation from a blood smear), and a test for secondary coagulation (e.g. PT & APTT, or whole blood clotting time). It is good practice to measure PCV and TP before rhinoscopy as a baseline in case of significant haemorrhage.

Rhinoscopy - materials

- Rhinoscope
- Operating sheath with at least two ports.
- Light source and base unit.
- Warm saline (0.9%) bag in pressure sleeve
- Rhinoscopic grab forceps (GI biopsy forceps will suffice)
- Cup biopsy forceps

Patient preparation for rhinoscopy

- Patients must be anaesthetised
- Patient in sternal recumbency
- Nose angled downwards
- Throat pack (I prefer to use a rolled bundle of gauze swabs tied together or clipped together with a large pair of forceps attached).

- Tray on floor with absorbent material (e.g incontinence pads)

Maxillary nerve block - modified infraorbital approach

1. Palpate the infraorbital foramen - this is an indentation dorsal to the 3rd premolar tooth
2. Insert a 20ga, 5cm catheter through this foramen, into the infraorbital canal parallel to the maxilla
3. At a depth of 5 mm draw back the stylet so the point is just within the tip of the catheter (the stylet now acts to stiffen the cannula, rather than presenting a cutting tip)
4. Advance the stylet and cannula until resistance is encountered or until it can go no further
5. Remove the stylet
6. Infuse bupivicaine 0.5 mg/kg (divide dose to use bilaterally)

Rhinoscopy - the procedure

Having set-up the scope, connect the saline giving set line to the side port, but keep it closed initially. Inflate the pressure sleeve around the saline bag. Measure the rhinoscope from the nasal planum to medial canthus - mark this length on the scope with some mildly adhesive tape (you need to be able to remove it afterwards!). You should not introduce the scope further than this.

Start recording the examination (if possible). Introduce the scope into the most 'normal' nostril first. This is often made a little easier by pushing the nasal planum upwards with your thumb. Move the scope gently around, methodically exploring each of the three meati - dorsal, middle and ventral. Gently advance the scope - and only if you can see ahead - minor bleeding can occur due to scope abrasion, which is of no real concern. If the view is obscured by mucus or blood, start a steady flow of saline through the scope. As well as improving the view, this may also make passage of scope easier. Keep the nose pointing downwards and ensure that the ET tube cuff is inflated and the pharynx packed with swabs before flushing. Repeat rhinoscopy on the other side, comparing and contrasting what you see to help determine what is pathologic and what is normal.

Nasal biopsies.

If focal lesions are seen then grab forceps may be passed down the rhinoscope, keeping the lesion in view. Endoscopic biopsy forceps (such as used for GI biopsies) are often suitable. If no focal lesions are seen then a grab biopsy should be taken without using rhinoscopic guidance. CT, radiographic or MRI images may guide such biopsies. When taking such grab biopsies, a grab, twist and pull action is used. This may result in a bit of a crunch of a turbinate, but that's expected and hopefully means you have a decent-sized representative biopsy. We found that one third of nasal biopsies are not representative of the underlying lesion - many required a second or even third biopsy to confirm the presence of a tumour that was visualised on CT or MRI. It is crucial that clients are informed of this risk beforehand. In fact, I routinely advise all clients that a 'risk' of any biopsy, including FNA, is that they may not be diagnostic or representative.

Normal nasal passages appear pink and homogenous, with minimal mucus present. The right and left sides should have a very similar appearance. No spontaneous bleeding should be seen, but even mild scope trauma will cause modest iatrogenic bleeding.

No white plaques should be seen - these are rather pathognomonic for **aspergillosis**. The plaques of aspergillosis are white and have a matt, fluffy appearance - they are not shiny or glistening like mucus may be. So convincing is the appearance of aspergillus, that we usually proceed with the first treatment (instillation of clotrimazole solution, followed by clotrimazole cream) at the time of visualisation of plaques - even before we have received cytology, histology or fungal culture results.

Some dogs with aspergillosis only have fungal plaques visible in the frontal sinus: In one study 17% of dogs with aspergillosis only had frontal sinus plaques. If the clinical signs and diagnostic imaging findings are consistent then sinusoscopy should be performed to look for the plaques - this is done by trephination in the same way as for anti-fungal treatment, followed by introduction of the rigid scope tip. A second and occasionally third clotrimazole treatment may be required in a few patients - this is done at 4 week intervals, depending upon the presence of absence of the fungal plaques.

Identifying neoplasia by rhinoscopy

Many masses may be unconvincing or impossible to see - Auler et al. found that CT is more sensitive than rhinoscopy for detecting neoplasia: In dogs with CT evidence of nasal mass, only 75% had a mass visualised on rhinoscopy. All dogs with rhinoscopic evidence of a mass were positive for a mass lesion on CT. Our study had very similar findings.
As previously mentioned, nasal rhinoscopic biopsies may be very small and superficial. It is perfectly reasonable to attempt such a biopsy if you can see a suspected tumour via the scope. I would usually still go ahead with a larger 'blind' grab biopsy from the same site immediately afterwards, to maximise the diagnostic yield.

Nasal foreign bodies

Nasal FBs often result in more frequent sneezing than other nasal diseases. Clinical signs are usually acute in onset and there is often a history of running in long grass (etc.)
Detecting nasal foreign bodies is challenging by any means: CT is fairly limited but may show focal changes consistent with rhinitis. One study of CT reported that all grass seeds visualised directly in CT images were in the respiratory tract or were surrounded by air (providing contrast to highlight the FB).

Nasopharyngoscopy - indications

- Unexplained URT noise
- Reverse sneezing
- Unexplained cough
- Inability to breathe through nose (e.g. suspect nasopharyngeal stenosis)
- Nasal discharge
- Suspected nasopharyngeal polyp
- Mass evident on advanced imaging

Nasopharyngoscopy should be performed before anterograde rhinoscopy. No throat pack should be in place at the time of this procedure. A small flexible endoscope should be used that can be flexed to 180° in one plane. A biopsy channel should also be available.
The patient should be anaesthetised, in sternal recumbency and a mouth gag should be in place.

There are two main methods for examining the nasopharynx with an endoscope. The first is the easier of the two in smaller patients: Flex the scope to 180° *before* introducing the scope horizontally into the mouth. When the scope is in the caudal part of the pharynx, rotate the whole scope 90° so that the tip of the scope is dorsal. Then, keeping the 180° flexion, gently pull the scope forwards. With a little manoeuvring the tip of the scope should end up over the top of the soft palate, pointing forwards (cranially).
The second technique is possible usually only in larger dogs: Introduce the unflexed scope and when the tip is in the caudal part of the pharynx, flex it dorsally by 180° to view the nasopharynx. Again, the scope can then be pulled forwards a little to manoeuvre into the nasopharynx.
When in place, the caudal extent of the nasal septum is seen. In brachycephalic patients, the ethmoturbinates may be seen. Pathologies that may be identified in this way include nasopharyngeal stenosis (e.g. congenital, or from reflux of gastric acid - particularly from previous anaesthesia)
Nasopharyngeal tumours sometimes originate in the nasal passages and extend caudally into the nasopharynx. This is easily identified on CT and can then be biopsied at nasopharyngoscopy. It may be easier to get a sample from the nasopharynx as it is generally easier to distinguish mass lesions from normal tissue than in the nasal passages.
Nasopharyngeal polyps and identified by a similar approach to nasopharyngeal tumour but may be removed by traction - grasp as close to the stalk of the polyp as possible

To take a nasopharyngeal biopsy you must always introduce the forceps *before* flexing the scope; otherwise you will damage the scope channel. Keep the tip of the forceps just inside the scope channel to avoid trauma to tissues while manipulating the scope.