Endoscopy 101: Why and How to Add Endoscopy to Your Exotic Practice

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Abstract: Probably one of the most expedient ways to make a definitive diagnosis is to collect a biopsy for histopathology and microbiology. Endoscopy provides a minimally invasive approach to achieve just that, and with greater accuracy than imaging-guided aspirates, faster than paired serologic titers, and less invasive than coeliotomy. Over the past few decades endoscopy has become such an established part of exotic pet medicine, including reptiles/amphibians, birds, small mammals and fish, that an exotic service/practice without endoscopy capabilities runs the risk of losing credibility in today's market. There are many publications in journals and books that advocate for the safety and improved diagnostics of endoscopy, so why are the numbers of exotic veterinarians using endoscopy still low? My answer to this dilemma is this masterclass! The plan is to cement the reasons why endoscopy is invaluable in practice and why you absolutely have to have it. Then, to come up with a plan of how to prioritize equipment purchases, formulate a fee structure, and market the service to your clients. My ultimate goal is to get you sufficiently interested at the end of this 1-hr session, that you will want to discuss equipment options with endoscopy companies and your colleagues, and that you will take the leap and take a dedicated endoscopy training course.

Introduction

Zoological medicine has been plagued with numerous problems, many of which our domestic animal counterparts do not have to face. As exotic animal veterinarians, we have to deal with a variety of diverse species, general lack of pathognomonic clinical signs, limited serologic tests, and relatively few tried and tested therapeutic modalities. I myself, used to be frequently frustrated with many of my reptile, avian, and small mammal cases. My inability to reach a definitive diagnosis often adversely affected the accuracy of my prognoses, and the effectiveness of my treatments. In 1994, I took the Harris and Taylor avian endoscopy lab at the North American Veterinary Conference, and that changed the way I practiced zoological medicine forever. During the last two decades, my research and clinical experiences have only strengthened my belief that endoscopy is a diagnostic cornerstone of zoological medicine, and offers major benefits to exotic pet practitioners. From the outset it is important to state that my interests in endoscopy are solely clinical. I am not a paid consultant for any endoscopy company, and all equipment used in my practice (Veterinary Teaching Hospital, University of Georgia) has been purchased (not donated). This short article is my attempt to convince those that do not endoscope regularly to start – you will never look back!

The Reasons Why Endoscopy is So Valuable

Much of what we do as veterinarians is governed by accurate diagnosis. It informs the client of the likely prognosis, which after all, is often their primary concern. An accurate diagnosis also tends to dictate appropriate

therapeutic approaches, and removes the flawed guesswork associated with antibiotic choice, or whether surgery or medical treatment may be more appropriate.

It is still concerning that many exotic animal diagnoses are made merely to the organ level with a presumed, generic cause, (eg, parrots with respiratory disease, iguanas with renal disease, rabbits with cystitis). When what is required is a definitive diagnosis to a histologic and etiologic level. A definitive diagnosis relies upon the demonstration of a patient's pathological response, and identification of the causative agent. Essentially, the pathological response can be demonstrated through histopathology, cytology, or paired rising serologic titers. There are relatively few serologic tests available for most exotic pets, and those that are available typically require several weeks between sample collection (the patient may well be better or dead by the time results are obtained). Consequently, they are typically used for retrospective confirmation. Cytology is most rapid, but suffers from a lack of tissue architecture, and therefore histopathology is often considered the gold standard. Demonstration of the causative agent relies on microbiologic culture or PCR for bacteria, fungi, viruses (and some parasites), sensitive assays to identify toxins, and a variety of other techniques for parasite identification.

It is well appreciated that the collection of samples from lesions/tissues for histopathology, microbiology, parasitology, and/or toxicology remains the best hope of reaching a specific diagnosis. Samples can be easily collected postmortem; however, diagnosis in the live animal requires an ante-mortem biopsy.

As an example to illustrate these points, let's take one of the earlier examples of an iguana with renal disease. An iguana with chronic weight loss, reversed calcium to phosphorus plasma biochemistry ratio most likely has renal disease, but this is not a definitive diagnosis, and does not indicate specific therapy. Radiology and ultrasonography may confirm renomegaly and again the likelihood of renal disease, but still does not provide a definitive diagnosis. An iohexol excretion study can demonstrate decreases in glomerular filtration rate and renal function, and although accurate is still is not a definitive diagnosis. Biopsy of the kidney with the histologic demonstration of interstitial nephritis with calcification, and culture of *Klebsiella* bacteria with antimicrobial sensitivity testing IS a definitive diagnosis, from which more targeted and specific therapy can be prescribed.

The Endoscopic Solution

There are a variety of ways that ante-mortem biopsies can be collected, including surgical excision, image-guided (eg, computed tomography, ultrasonography), or endoscopic. Surgical access to a lesion or diseased tissue, unless part of the integument, typically requires an invasive approach that may involve extensive laparotomy/coeliotomy. CT and ultrasound-guided biopsies are certainly possible, and techniques have been reported in the exotic animal literature. However, iatrogenic trauma is certainly more likely than when compared to direct endoscopic visualization.[1] There also multiple examples in the domestic and human literature to indicate the superior diagnostic capability of biopsy over ultrasound-guided aspirate cytology.[2-4] There also many examples of how endoscopy, being less invasive, is less traumatic and less painful than traditional surgical approaches. In human medicine, faster recoveries, reduced hospital stays, and decreased pain scores have been attributed to endoscopic procedures.[5-7]

The endoscopic approach is typically non- to minimally-invasive. Endoscopic evaluation of the gastrointestinal (via the mouth, anus or cloaca) and respiratory tracts (via the glottis), require no surgical incision, and yet the endoscopist can access deep, internal structures (Fig 1). Coelioscopy and laparoscopy enable internal visceral evaluation and biopsy through a much smaller incision than would be required for traditional laparotomy and biopsy (Fig 2). The benefits of endoscopy and endoscopic biopsy have been well demonstrated in human and domestic animal medicine. However, an increasing number of studies and reports in the exotic pet literature

have also demonstrated the safety and effectiveness of these techniques in birds, reptiles, mammals and fish.[8-16] Once competency has been achieved, endoscopic techniques tend to percolate into other areas of veterinary practice, for example, at the University of Georgia we are now recommending laparoscopic ovariectomies for exotic mammals and offering gender identification of juvenile turtles.[11,12,17]

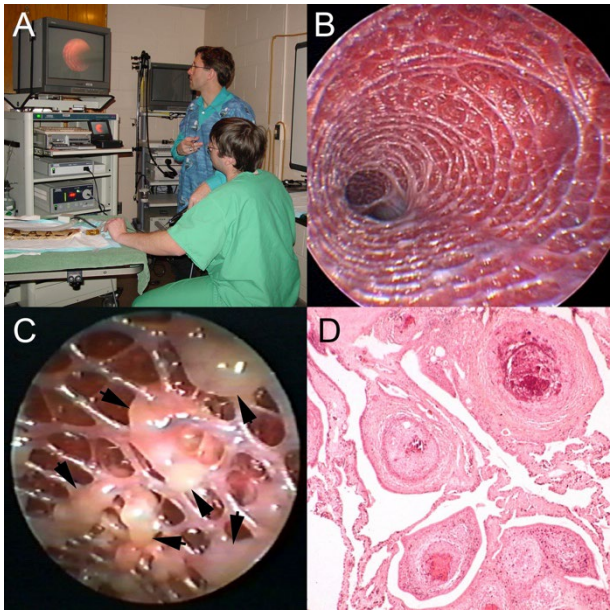

Figure 1. Respiratory endoscopy in snakes. (A) Endoscopic evaluation of a boa constrictor (*Boa constrictor*) using a fine flexible bronchoscope; (B) Endoscopic view of the lung of a healthy ball python (*Python regius*); (C) Endoscopic view of the lung of a ball python with chronic respiratory disease. Note the granulomata (arrows); (D) Histopathologic view of a biopsy taken from the same ball python in image C. The granulomas were caused by *Mycobacterium haemophilum* which were only identified by endoscopic biopsy, and 9 months later by culture. Multiple lung lavage procedures, cytology and aerobic cultures failed to diagnose this disease.

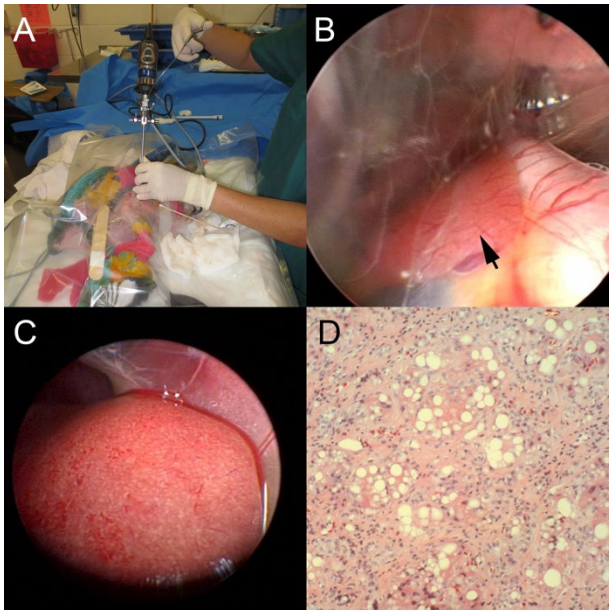

Figure 2. Coelioscopy and liver biopsy in parrots. (A) Coelioscopic liver evaluation and biopsy in a macaw via the left caudal thoracic air sac; (B) Endoscopic view of a normal liver in an Amazon parrot (*Amazona* sp); (C) Endoscopic view of the liver in an Amazon parrot without elevation of liver enzymes or bile acids. Note the pinpoint paler across the surface; (D) Hepatic histopathology from the same Amazon parrot as shown in C. Note the fibrotic changes characteristic of hepatic cirrhosis.

How to Add Endoscopy to My Exotic Practice/Service

While the clinical virtues of diagnostic and surgical endoscopy in exotic animal practice are obvious, appropriate management including a fiscally responsible fee structure appears to be more challenging. The costs of a basic rigid endoscopy system for exotic animal practice can range between $10,000 and $20,000, and is not an insignificant capital investment, and therefore a suitable fee structure is required to help recoup costs associated with purchase (or lease), use, repair, replacement, technician time, and practice facilities. From discussions with various colleagues, it became obvious that there was widespread variation in endoscopy practice management. In addition, concerns regarding fee structures were frequently raised by attendees at endoscopy courses. Consequently, I designed and circulated a short survey in the summer of 2014 in an attempt to obtain basic information on endoscopy practice management in Europe and the United States. This 2014 internet-based survey was completed by 35 veterinarians experienced with exotic animal endoscopy, of which 21 were from the United States or Canada, 10 from Europe, three from Australia or New Zealand, and one from Africa. The general demographics of their respective practices varied considerably; however, overall the mean exotic pet caseloads were avian 31%, reptile/amphibian 21%, small mammals 23%, fish 2%, with the remainder being domesticated animals. In the following sections, I have tried to indicate the general themes and commonalities, and have provided numerical mean values where appropriate.

Step 1. Case audit

It can be particularly rewarding and surprising to go through your exotic caseload sand identify the types of cases that you are seeing and how endoscopy could be utilized for such cases (Table 1). This is important for several reasons;

a. It highlights what you are actually seeing rather than what you think you are seeing

b. It will indicate equipment priorities

c. It will indicate which specific practice cultures and verbal deliveries must change to integrate endoscopy, including specific marketing ploys.

Table 1. An example of a case audit used to determine approximate monthly revenue (using the mean fees from the survey of 35 exotic animal endoscopists).

Case	Procedure	Anesthesia	Procedural charge	Lab fees	Estimated # per month	Monthly revenue
Rabbit/rodent dental	Stomatoscopy	$184	$102	na	2	$572
Small mammal otitis	Otoscopy	$184	$237	$154	1	$575
Parrot with respiratory disease	Coelioscopy plus tracheoscopy	$184	$304 $280	$364	1	$1132
Anorectic lizard or turtle	Coelioscopy	$184	$319	$210	1	$713
Total monthly revenue						$2992

Note: This calculation is based upon only 5 exotic animal cases in a month, and does not take into account any dog/cat cases – most practices probably do a lot more. Just one of these streams would cover the $300 monthly equipment lease.

Step 2. Select equipment

It can be disheartening when looking at equipment displays or lists knowing that you cannot have everything. But remember that endoscopy systems are modular, and you can buy a basic system today and expand that system as your caseload increases and evolves. You will need a camera, monitor, light source, light guide cable, and CO2 insufflator if you plan on doing any laparoscopy/coelioscopy in non-aves. Also don't forget that endoscopy is not species based, and should be integrated for ALL species in a practice, birds, herps, small mammals, dogs and cats. In general the 2.7 mm system has greatest versatility in exotic companion animal practice (there are even multiple uses in dogs and cats). However, if the majority of your patients are small birds and rodents then the 1.9 mm system might be a better choice to start. Table 2 summarizes all the major equipment available for exotic animal endoscopy. However, more interesting is Table 3, which summarizes the preferred equipment and frequency of ownership of equipment by experienced exotic animal endoscopists. From our survey, the total purchase costs of endoscopy equipment was, on average, $25,000; however, none of the respondents provided figures representing the recurring monthly costs associated with maintenance, repairs and replacement. The basic 2.7 mm rigid endoscopy system can be purchased for around $15000 (considerably less on the second hand market), or leased for approximately $300 per month. Most survey respondents were experienced exotic animal endoscopists, and had obviously expanded their endoscopy facilitates from this basic starting point. Nevertheless, their continued preference for a 2.7 mm system was obvious with the majority (86%) owning this system. In addition, standard definition cameras and monitors were twice is common (66%) compared to high definition systems (34%), and xenon light sources were favored (60%) over cheaper halogen sources (34%). These differences probably represent a delay between new technological developments and the need to replace older items - I expect high definition and xenon to continue to gain in popularity in the future. The majority of veterinarians prefer to keep their equipment on a mobile endoscopy cart (or endoscopy tower).

Table 2. The following summarizes the major endoscopy equipment currently available for exotic animal procedures.

Equipment description	Primary indications
Telescopes and endoscopes	
1 mm x 20 cm semi-rigid miniscope, 0^o	Stomatoscopy, otoscopy, rhinoscopy, tracheoscopy in animals up to 1 kg
1.9 mm x 18.5 cm telescope, 30^o oblique, with integrated 3.3 mm operating sheath	Stomatoscopy, otoscopy, rhinoscopy, tracheoscopy, gastroscopy, colonoscopy, cloacoscopy, and coelioscopy in animals up to 3 - 4 kg
2.7 mm x 18 cm telescope, 30^o oblique 4.8 mm operating sheath	Stomatoscopy, otoscopy, rhinoscopy, tracheoscopy, gastroscopy, colonoscopy, cloacoscopy, and coelioscopy in animals between 100 g and 10 kg
5 mm x 8.5 cm otoendoscope, , 0^o, with integrated operating sheath	Stomatoscopy and otoscopy in animals between 1 and 50 kg
Mechanical holding arm (VITOM)	Enables the telescope to be held in place by a table clamped mechanical arm
3 mm 100 cm fiberoptic bronchoscope with 1.2 mm channel	Two-way deflection and biopsy channel for flexible gastro-intestinal and respiratory endoscopy
2.8 mm 60 cm video bronchoscope with 1.2 mm channel	Two-way deflection and biopsy channel for flexible gastro-intestinal and respiratory endoscopy
5.9 mm 110 cm video gastroscope with 2 mm channel	Four-way deflection, irrigation, suction and biopsy channel for flexible gastro-intestinal
Visualization and documentation	
Endovideo camera and monitor Xenon light source and light guide cable Digital capture device (eg, AIDA-DVD)	Required for all endoscopy procedures
Flexible instruments for use with operating sheaths	
1 mm biopsy forceps 1 mm grasping forceps	For use with 1.9 mm telescope and integrated sheath
1.7 mm biopsy forceps 1.7 mm single-action scissors 1.7 mm remote injection needle 1.7 mm grasping/retrieval forceps 1.7 mm wire basket retrieval 1.7 mm needle end radiosurgery electrode 1.7 mm polypectomy snare	For use with 2.7 mm telescope and 4.8 mm operating sheath, and 5 mm otoendoscope
Insufflation	
CO_2 insufflator with silicone tubing	Used for insufflation during reptile coelioscopy
Sterile saline suspended above endoscopy table with intravenous drip line to a port on the operating sheath	Used for sterile saline infusion for otoscopy, rhinoscopy, cystoscopy, cloacoscopy, reptile (especially of small and/or aquatic species) or fish coelioscopy.
Rigid instruments, handles, and cannulae for multiple-entry coelioscopy	
2.5 mm graphite and plastic cannula 2 mm Reddick-Olsen dissecting forceps, plastic handle without racket 2 mm Metzenbaum scissors, plastic handle without racket 2 mm Babcock forceps, plastic handle with racket	Used with the 1.9 mm telescope for coelioscopy in animals under 1 kg
3.9 mm graphite and plastic cannula (accommodates 2.7 mm telescope and 3.5 mm protection sheath) 3.5 mm graphite and plastic cannula (accommodates 3 mm instruments) 3 mm fenestrated grasping forceps 3 mm Reddick-Olsen dissecting and grasping forceps 3 mm short curved Kelly dissecting and grasping forceps 3 mm atraumatic dissecting and grasping forceps 3 mm Babcock forceps	Used with the 2.7 mm telescope for coelioscopy in animals under 10 kg

Equipment description	Primary indications
3 mm Blakesley dissecting and biopsy forceps	
3 mm scissors with serrated curved double action jaws	
3 mm micro hook scissors, single action jaws	
3 mm Mahnes bipolar coagulation forceps	
3 mm irrigation and suction cannula	
3 mm palpation probe with cm markings	
3 mm distendable palpation probe	
3 mm ultramicro needle holder	
3 mm knot tier for extracorporeal suturing	
2 plastic handles without rackets	
1 plastic handle with Mahnes style racket	
1 plastic handle with haemostat style racket	
Radiosurgery equipment	
3.8 or 4.0 MHz dual radiofrequency unit with foot pedal	Enables endoscopic instruments to be used as monopolar devices and facilitates bipolar coagulation
Monopolar lead to connect to plastic instrument handles	
Bipolar lead to connect to 3 mm Mahnes bipolar coagulation forceps	
5 mm Ligasure laparoscopic seal and cut instrument connected to electrosurgical unit	This unit facilitates sealing and cutting with a single instrument but is only available in 5 mm, and not smaller sizes

Table 3. The following summarizes the endoscopy equipment actually owned by exotic animal veterinarians.

Endoscopy equipment items	Ownership %
Separate xenon light source	60%
Separate halogen light source	34%
Separate standard definition (SD) camera and monitor	66%
Separate high definition (HD) camera and monitor	34%
All-in-one integrated light source, camera and monitor system (eg, TelePak)	23%
CO2 insufflator	40%
Tilting endoscopy table	25%
Integrated operating theater with endoscopy equipment on drop-down ceiling booms	3%
Mobile endoscopy tower with endoscopy equipment on a mobile cart	60%
< 1.9 mm rigid or semi-rigid endoscope	40%
1.9 mm telescope, sheath and instruments (eg, biopsy, retrieval forceps, scissors)	40%
2.7 mm telescope, sheath and instruments (eg, biopsy, retrieval forceps, scissors)	86%
3 mm endosurgery instruments (eg, handles, instruments, trocars/cannulae)	17%
4 mm telescope, sheath and instruments (eg, biopsy, retrieval forceps, scissors)	20%
5 mm telescope	26%
5 mm endosurgery instruments (eg, handles, instruments, trocars/cannulae)	20%
10 mm telescope	14%
10 mm endosurgery instruments (eg, handles, instruments, trocars/cannulae)	17%
>10 mm telescopes and instrumentation	6%
Endoscopic radiosurgery or electrocautery	34%
Endoscopic laser (eg, diode)	14%
Flexible endoscopes < 3 mm in diameter (with biopsy/retrieval instruments)	14%
Flexible endoscopes 3 - 4.9 mm in diameter (with biopsy/retrieval instruments)	29%
Flexible endoscopes 5 - 9 mm in diameter (with biopsy/retrieval instruments)	29%
Flexible endoscopes > 9 mm in diameter (with biopsy/retrieval instruments)	17%
Separate, dedicated flexible endoscopy tower	11%

Step 3. Training

Training is essential because it prevents damage to patient and equipment, improves ability and efficiency, and most important of all, it breeds confidence that is infectious and obvious to clients. So training is essential and fortunately, there are a variety of training opportunities within United States and Europe, and short 4 hour workshops are frequently available at veterinary conferences (eg, ARAV, AAV, AEMV, AAZV, ICARE). These are especially useful as a first step to try and see if this is something that you are comfortable with – some of us are more like physicians, and others are more like surgeons. If your initial experience was positive then a 2 day intensive course would be the next step. Such weekend courses are held on reptile/avian and small mammal endoscopy at the University of Georgia (www.vet.uga.edu/ce). After 8 hours of hands-on endoscopy time, the goal is to provide sufficient confidence to scope a client-owned animal the next day!

Step 4. Charges and fees

Equipment charges and ancillary fees: Back to the survey, there was considerable variation in the charging mechanism for the set up and use of endoscopy equipment. Only half the veterinarians surveyed specifically charged for use of an endoscopy or operating room ($150), sterilization, use, and cleaning of endoscopy equipment ($122), or standard surgical pack including traditional instruments, drape, cap, mask, and gloves ($71). Only 25% charged a specific fee for technician or nurse time ($31). No doubt, many veterinarians that do not charge the above fees separately, but probably incorporate them into their endoscopy procedural fees. However, there was almost universal consistency in applying separate charges for anesthesia ($184), histopathology ($210), and microbiology ($154).

Endoscopy procedural fees: There also was variation in how veterinarians actually charged for their endoscopy procedures. Approximately one third of veterinarians used a tiered fee structure (eg, level 1-6, Table 4), while another third used an individual fee for every specific procedure (eg, reptile coelioscopy, avian tracheoscopy, small mammal otoscopy, etc). The advantage of a tiered fee structure is that it provides flexibility to increase or decrease fees depending upon difficulty, is simple and easily utilized by staff and doctors, and avoids numerous fee codes and individual descriptors. A major advantage of using detailed descriptors is that electronic medical record searches can be more targeted; however, this is at the expense of inputting considerably more data into a computerized accounting system.

Surprisingly, the final third of the survey population admitted to using no pre-determined fee structure, and calculated the fee to be charged on a case-by-case basis. While this provides the greatest flexibility, general business management dogma suggests that it may result in under charging, especially by those not directly invested in the fiscal wellbeing of the practice.

Table 5 lists a number of exotic animal endoscopy procedures and the mean fees charged from the survey responses. It must be appreciated that, just like any fee structure, there was considerable variation between low and high levels (approximately 50-150% of stated means) that was probably related to geographical location and associated costs of living.

Table 4. The tiered endoscopy fee structure used at the University of Georgia by all services including zoological medicine.

Endoscopy fee level	Cost[a] (Jan 2015)	Examples of exotic animal procedures
1	$81.44	Basic stomatoscopy, tracheoscopy, otoscopy
2	$181.53	Complicated stomatoscopy, tracheoscopy, otoscopy Basic rhinoscopy, gastroscopy, cloacoscopy
3	$264.75	Complicated rhinoscopy, gastroscopy, cloacoscopy Basic coelioscopy with biopsy
4	$348.38	More complicated coeliotomy, bilateral entries, basic endosurgery (eg, granuloma removal)
5	$431.80	More complicated endosurgery, multiple ports, surgical assistant
6	$51.06	Reptile/bird sex identification fee per animal belonging to the same owner (in addition to a $500 set-up fee)

[a]These fees only represent the procedure. Anesthesia, equipment, and laboratory tests are in addition.

Table 5. Mean fees charged in 2014 for specific exotic animal endoscopy procedures performed by 35 experienced clinicians.

Avian oculoscopy	$27
Avian tracheoscopy	$198
Avian tracheoscopy with biopsy or debridement	$280
Avian esophagus/proventriculus/ventriculus	$245
Avian esophagus/proventriculus/ventriculus with biopsy or debridement or foreign body removal	$400
Avian cloacoscopy	$173
Avian cloacoscopy with biopsy or debridement	$294
Avian coelioscopy for reproductive evaluation of healthy birds (fee per bird in a group)	$194
Avian single-sided coelioscopy for disease investigation	$304
Avian single-sided coelioscopy with biopsy or debridement	$338
Avian multiple entry endosurgery in a bird (eg, orchidectomy, salpingohysterectomy, mass removal)	$508
Reptile tracheoscopy	$151
Reptile tracheoscopy with biopsy or debridement	$273
Reptile esophagoscopy/gastroscopy	$195
Reptile esophagoscopy/gastroscopy with biopsy or debridement or foreign body removal	$310
Reptile coelioscopy	$250
Reptile coelioscopy with biopsy or debridement	$319
Reptile coelioscopy and gonadectomy	$434
Reptile juvenile gender identification by coelioscopy	$141
Reptile juvenile gender identification by cloacoscopy	$94
Reptile cloacoscopy for disease investigation	$172
Reptile cloacoscopy with biopsy or debridement	$228
Reptile pulmonoscopy (transcutaneous lung examination)	$253
Amphibian tracheoscopy	$135
Amphibian orograstroscopy	$55
Amphibian coelioscopy	$61
Amphibian cloacoscopy	$47
Small mammal otoscopy	$129
Small mammal otoscopy with biopsy or debridement	$237
Small mammal oculoscopy	$73
Small mammal stomatoscopy for dental evaluation	$102
Small mammal stomatoscopy with biopsy, debridement or guided dentistry	$183
Small mammal rhinoscopy	$199
Small mammal rhinoscopy with biopsy or debridement	$219
Small mammal tracheoscopy or intubation	$108
Small mammal tracheoscopy with biopsy or debridement	$213
Small mammal ovariectomy or ovariohysterectomy	$348
Small mammal laparoscopy	$308
Small mammal laparoscopy with biopsy or debridement	$361
Small mammal colonoscopy/vaginoscopy/cystoscopy	$232
Small mammal colonoscopy/vaginoscopy/cystoscopy with biopsy or debridement	$294
Fish gill endoscopy	$52
Fish orogastroscopy	$102
Fish coelioscopy	$155

Step 5. Marketing

Whenever a practice develops a new service area, appropriate marketing is essential. The ability to capture endoscopy images and video for documentation, makes it relatively simple to show case the procedure to the client or referring veterinarian. It is important that the name and telephone number of the practice accompanies any image or video, as clients will frequently show their friends and family. Past materials can also be used in the examination room to demonstrate a proposed diagnostic plan to a new client (Fig 3). These images should also be incorporated into letters sent to other veterinarians regarding cases that they referred to you, or for referral brochures. Some practices have also discovered the benefits of holding an open day, where the public can take behind the scenes tours, and see demonstrations including use of endoscopy equipment (Fig 4).

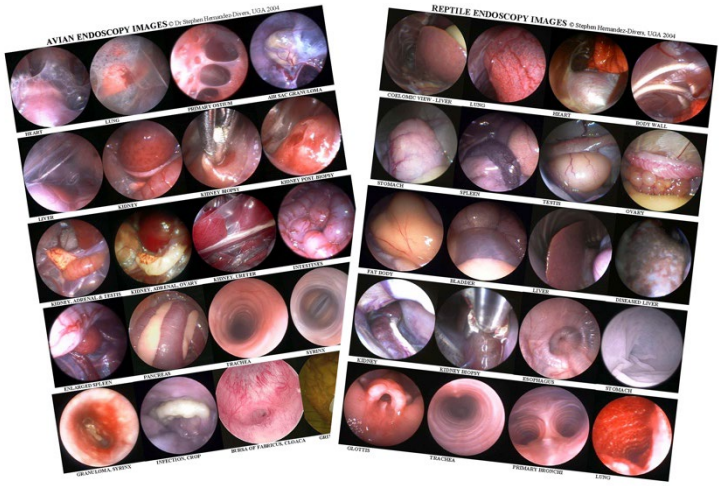

Figure 3. Examples of endoscopy images being collated and laminated for client education and marketing.

Figure 4. Endoscopy station at the annual open day at the University of Georgia's Veterinary Teaching Hospital. Under veterinary staff supervision, children get to play various endoscopy games using old (autoclaved) disposable instruments. Such events can showcase practice facilities and staff, and improve client awareness and appreciation.

When marketing endoscopy to clients, verbal delivery is critical. Take the following as an example;

> "*Mrs Smith your African grey appears to have respiratory disease, most likely fungal but could be bacterial? We could anesthetize for a radiograph, and even perform endoscopy, or we could start treatment today with both antibiotics and antifungals.*"

Compare the above delivery with the following and consider (a) which would be more convincing for client, and (b) more medically appropriate.

> "*Mrs Smith your African grey appears to have respiratory disease, but there are several possible causes and different treatments. We need to stabilize before briefly anesthetizing for radiographs, and then consider endoscopy and biopsy to determine the best approach to treatment. Precise diagnosis will maximize treatment success.*"

I hope you agree that the second delivery is more convincing, and avoids the inappropriate use of antimicrobials. However, it does depend on the veterinarian having confidence in his or her endoscopic abilities, and this not just training but practice comes into play. There are various ways to "practice endoscopy". One way that I found particularly effective in private practice was to offer a minimally invasive necropsy. If a beloved pet exotic died, clients were sometimes resistant to permit a necropsy for aesthetic reasons. Using the telescope to see inside a recently dead patient provides a no risk learning opportunity, a mini-necropsy examination that a) could yield biopsies for histopathology and cultures, and be another fee generating service. Also any wildlife that comes in and needs to be euthanatized could be yet another practice opportunity. The use of plastic Tupperware containers, green peppers, etc can all be used to help maintain eye-hand-telescope-instrument coordination when there is down time. The trick with all these practice options is to keep the equipment non-sterile. We as veterinarians often have an innate resistance to open sterile pack for a non-fee generating fun and games. So keep it unsterile and you will be much more likely to play with the equipment, and if its needed in a hurry it can be cold sterilized and ready to go in 20 min.

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