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Medical History, Charting, and Physical Examination

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“The best doctor in the world is a veterinarian. He can’t ask his patients what is the matter -- he’s got to just know.”

—Will Rogers

A thorough history and careful, documented, and detailed physical examination are easily the most important diagnostic tools utilized by a veterinary healthcare professional when assessing an internal medicine patient. Establishing a rapport with both the client and patient is important to gain trust and glean the necessary information from both the history and physical examination. Obtaining a history and performing a physical examination should be performed in a stepwise, standardized manner that will, with practice, become second nature. Clear and concise yet complete medical recordkeeping, including a full account of events that transpired during the internal medicine visit, is also an important part of obtaining a thorough history and physical examination and will improve communication between all parties in the referral relationship: the internal medicine referral practice, the owner, and the referring primary care veterinarian.

Obtaining a Medical History

“A careful history will lead to the diagnosis 80% of the time.”¹

The Role of the Veterinary Technician

The veterinary technician has a primary role in history-taking in most internal medicine specialty practices. The information obtained and relayed to the veterinarian is vital to understanding the case presented and developing trust

with the patient and the owner. The veterinary technician, while unable to diagnose diseases, is still an integral part of performing and aiding the veterinarian in performing a physical examination. In this author’s opinion, a skilled veterinary technician should be comfortable performing a thorough physical examination.

Additionally, creation and maintenance of complete, clear, and accurate medical records is a skill required of all members of the veterinary care team, including veterinary technicians. Both history-taking and performing a physical examination will be outlined within this chapter, along with guidance on medical recordkeeping.

Pre-Visit Information

Whenever possible, utilizing pre-appointment registration and history questionnaires can help save time and focus the owner’s history into a cohesive timeline of events. These can be sent electronically prior to the visit date or accessed via the hospital’s website or portal. Important information for owners can be provided prior to arrival, such as fasting instructions, what to expect during the appointment, and information about the specialty care team members they will meet. Examples of a patient history form and a referring veterinarian form are provided in the online resources.

Patient pre-visit history forms can also be a great opportunity to practice Fear Free[®] care by identifying pets that may be anxious or fearful prior to their arrival. These pets may benefit from pre-visit anxiolytics prescribed in conjunction with their primary care veterinarian or certain accommodations, such as being put directly into an exam room upon arrival rather than waiting in the lobby.² In a 2009 study evaluating fearful behavior of dogs presented to a veterinary clinic in Germany, those with only positive previous experiences in veterinary hospitals were significantly less “fearful” than dogs that had a previous negative experience.³ Using fear-reducing behavioral management

strategies in a referral setting, or identifying patients that have had previous fearful experiences and addressing those concerns, can establish trust with both clients and patients. Utilizing fear-reducing strategies in these patients will also allow for a more thorough physical examination or other more invasive procedures (e.g., venipuncture) to be performed that may not have been otherwise allowed, given the patient's temperament and stress level. Importantly, utilizing fear-reducing strategies also keeps veterinary professionals safe as they are less likely to be bitten or scratched and are more prepared to intervene with appropriate physical or chemical restraint for fractious patients when these patients are identified early. See Chapter 2 Compassionate Patient Care and Effective Pain Management for more information.

Referring veterinarian pre-visit forms are also helpful to obtain the primary care veterinarian's reason for referral of the client and pet, the best method of contact with the primary care veterinarian for patient updates, what diagnostic testing and/or therapeutic trials have already been performed, and the overall clinical impression of the case. Keeping these forms concise and easily accessible can help provide clear communication between the specialty care team and the primary care veterinarian. The specialist and the primary care veterinarian are reliant upon each other to achieve the best care for the pet and the pet owner when a referral has been made to a specialty care team.

History-Taking Pointers

It is important for every member of the specialty care team to recognize that any time a referral is made by a general practitioner to a specialist, it is a mark of trust. The veterinary technician is often the second member of the specialty care team (after the reception/customer service team) with whom a client and pet interact. The owner has dedicated a considerable amount of time, energy, and financial resources to the care of their pet, so it is important to establish trust early in the visit. You are representing the specialty care team, hospital or practice, and the veterinary and veterinary technology professions.

It is also important that the veterinary technician review any previous records or intake information provided by the owner or referring hospital. This demonstrates to the owner that care has been taken in establishing the referral relationship and that the technician is knowledgeable about the pet's condition. Remember, in many cases, the internal medicine specialty care team is the second, third, or even fourth clinic to have assessed this pet for a particular problem. Building confidence in the care of the patient is paramount.

Many times, owners will lead the conversation away from a productive discussion. This is where the "art" of taking a

history becomes important. This is often best learned through experience, but keeping a short list or bullet point template of questions to ask and necessary information to obtain (such as on a laminated sheet of paper or a pre-populated form in an electronic medical record) (see online resources) can be helpful to ensure pertinent information is obtained from even the most wayward client.

Medical Recordkeeping—SOAP Approach

The SOAP (subjective, objective, assessment, and plan) approach is the standard method utilized by medical professionals to create a concise and accurate medical record. It is a technique of organizing thoughts so that any knowledgeable person reading a patient's medical record will understand what is happening with the case. The medical record can be subpoenaed by a court of law if any complaints or other actions are taken against the practice. It is important to remember the adage, "If it's not written in the record, it didn't happen." Understanding the importance of the medical record is paramount to good medical practice.

Subjective (S)

A thorough history should include both "subjective" and "objective" information. "Subjective" information is that which *cannot* be quantified, such as

- The owner's impressions of the patient's attitude, emotions, or physical status (i.e., restlessness, increased hunger, lethargy, etc.).
- The duration of the primary complaint (if dates are unclear), such as "he's been coughing since summer."
- Any assessments of therapies tried (e.g., "she's been vomiting less since we started the anti-nausea medication").

When obtaining a history, it is important to ascertain what the *client's* primary complaint(s) is/are and at least a general idea of when the pet was "last normal."

Objective (O)

Objective information is that which *can* be measured or quantified, such as

- The patient **signalment** (age, breed, neuter status).
- Vital signs such as heart rate (HR), body weight (BW), temperature, and respiration.
- Information about the patient such as diet history (e.g., "3 cups of dry dog food per day," "vaccinations up to date," or "indoor only").

- The duration of the primary complaint (if dates are known) such as “He started coughing on October 1.”
- Changes in laboratory values (e.g., “The creatinine increased from 2.5mg/dL last month to 3.0 mg/dL today”)

Note that oftentimes it is convenient to group the subjective and objective sections together. This will be commonly written as “S/O” in the medical record, which is acceptable.

Assessment (A)

The “assessment” is a summary and interpretation of the clinical signs and includes the diagnosis (if available), a complete problem list, and possible—or “*differential*”—diagnoses for each problem if a clear diagnosis has not been obtained.

For example, a patient who is presented with the primary complaint or problem of “coughing” could have a “differential diagnosis” list including tracheal collapse, congestive heart failure, kennel cough, chronic bronchitis, or another disease. When further diagnostic testing (such as radiographs or an echocardiogram confirming a heart condition as the cause of the cough) yields a definitive diagnosis, the problem list is revised, and the differential diagnoses that have been ruled out are removed from the assessment. *The “assessment” is therefore continually being updated as the patient is evaluated further, and more information is made known.*

Typically, the veterinarian would document this “assessment” in the medical record as part of making a diagnosis since diagnosing diseases is outside of the scope of a veterinary technician’s practice. The veterinary technician should create a detailed problem list in the medical record, discuss possible differential diagnoses with the veterinarian and owner based on the problem list, and help develop the plan with the veterinarian based on the history and physical examination findings.

Plan (P)

Once the list of differential diagnoses or assessment of the problems has been established, the clinician forms the “Plan.” The plan is divided into three components: the treatment plan (Tx), the diagnostic plan (Dx), and the client education plan (CE).

In our coughing dog example, a **treatment plan** may include hospitalization with oxygen therapy while additional diagnostic testing is performed, while a **diagnostic plan** would involve obtaining radiographs and an echocardiogram to rule in or out heart or pulmonary disease. **The client education plan** would be a phone call from the veterinary technician to update the client on the patient status once diagnostic testing has been performed.

Complete Physical Examination

The Importance of the Physical Examination

The physical examination is the most important and useful diagnostic tool a veterinarian uses to evaluate a patient. It requires the use of at least three senses—sight, touch, hearing, and sometimes (unfortunately) smell. By performing a thorough physical examination, we begin to collect important subjective and objective data about the patient themselves.

The physical examination should be performed in a stepwise, consistent manner. Each clinician has an order of examination that works for them, but it should be consistent and—in most cases—proceed from “nose to tail” in the small animal patient. This is not the time to rush, especially in a fearful, painful, or skittish patient. The examination should progress from least (observation) to most invasive (e.g., assessment of pain/proprioception and rectal examination). The record for nervous or fractious patients should include detailed information about what physical examination techniques have worked in the past and any specific techniques used in the examination.

It is important to know what is considered “normal” on a physical examination and to recognize breed, age, sex, and species variations. For example, a normal topline in a Borzoi would be considered kyphosis (arching of the spine) in a Labrador Retriever. It is also important to describe abnormalities as consistently as possible in the medical record. Use exact measurements if possible and provide accurate anatomic landmarks—for example, writing “there is a 3cm firm freely moveable mass over the left lateral humerus” rather than “there is a golf-ball sized mass on the leg.” Having a checklist or template is helpful (see online resources).

The Role of the Veterinary Technician and Veterinary Technician Specialist

The veterinary technician is integral in assisting the veterinarian in obtaining a thorough examination, and technicians must be able to perform a thorough physical examination themselves. In most hospitals, if the patient is amenable to an examination and at least some level of restraint, the veterinary technician should be the person who begins the physical examination and shares their findings with the veterinarian. In the inpatient setting, veterinary technicians should be performing a minimum of once-daily examination on patients in their care. A good recommendation is to perform an examination at the start and end of each shift so that trends, sometimes subtle, can be identified early in the course of the disease.

A veterinary technician specialist (VTS) can be an invaluable addition to a veterinary healthcare team, especially in terms of the advanced skills they have mastered and their advanced knowledge of anatomy, physiology, disease processes, diagnostics, and available interventions in their specialty. VTS qualified technicians can, depending on the state veterinary practice act, manage many aspects of patient care, with history and physical examinations forming the basis of that care.⁴

The veterinary technician should communicate abnormal findings from their physical examination to the veterinarian for further evaluation as needed.

Performing the Physical Examination

Vital Signs and Initial Assessment

The technician obtains the pet's vital signs, commonly known as a **TPR**, which includes temperature, heart/pulse rate (and quality), respiratory rate (RR), mucous membrane color, capillary refill time (CRT), weight, and a brief assessment of the overall stability of the patient (*triage*). We will discuss each area of the TPR in the order in which they usually occur during the visit to the veterinary facility.

Body Weight

Body weight (BW) should be obtained and noted in the medical record in kilograms. A baby scale should be used for animals under 10 kg and a floor scale for those over 10 kg. Keep in mind that most drugs are dosed in milligrams per kilogram (mg/kg).

Heart Rate

Heart rate (HR) can be assessed by auscultation. In cats and small dogs, it is possible to determine HR via direct palpation of the apex beat near the sternum. See cardiac auscultation for more information.

Pulse Rate

The pulse rate can be obtained by palpation of the femoral pulses. A **pulse deficit** occurs when the pulse rate is less than the HR or the pulses do not match with the heartbeat (skipped pulses). This indicates a significant cardiac abnormality and should be further investigated.

Pulse Quality

This is a rough assessment of the “feel” of the pulses: are they normal, bounding, or weak? This is known as the “poor man’s blood pressure” and is a great way to quickly assess overall cardiovascular status.

Respiratory Rate

Respiratory rate (RR) can be assessed by counting inspirations or expirations, watching the chest rise and fall, or

direct auscultation. See respiratory evaluation for more information. See Chapter 8 Respiratory Disease for more information.

Mucous Membrane Color and Capillary Refill Time

Mucous membrane color and CRT reflect the perfusion of peripheral tissues. A prolonged CRT (> 2 s) may indicate compromised circulation due to cold, shock, cardiovascular disease, anemia, or other causes. This may be difficult to assess in a patient with darkly pigmented gums if you cannot find a spot where the mucous membranes are pink. In patients with pigmentation of the oral mucous membranes, the conjunctiva and lining of the prepuce or vulva offer alternative sites for observation of mucous membrane color and CRT.

Temperature

Oftentimes, taking the temperature is reserved until near the end of the physical examination, especially in an otherwise healthy pet. The temperature can be taken rectally or, less commonly, auricular, or axillary temperatures are obtained. If the pet is stressed, the temperature may be elevated, so re-taking a temperature after the patient is more relaxed may give a more accurate assessment.

Observation of General Appearance

The general appearance of an animal can be assessed when the pet is first taken into an exam room or removed from a carrier. Allow the patient to interact with its surroundings and simply observe them. An example would be watching a dog sniff around in an exam room or leaving a cat in their carrier on the exam table while you get a history from the owners.

Temperament/Personality

Is the patient nervous or aggressive? A simple green/orange/red FAS (fear, anxiety, and stress) score⁵ is an easy way to communicate a patient's temperament within the clinic. The author's hospital places a Velcro[®]-backed color placard corresponding to the patient's FAS score on each cage card to indicate to everyone which patients may need care or caution during handling or interaction.

Vision

Is the patient visual? If in doubt, throw a cotton ball in the animal's visual field and see if they follow it with their eyes.

Mentation/Level of Consciousness

Does the pet react to normal stimuli? Is it behaving appropriately with normal mentation?

- **Normal** mentation states:
 - BAR—bright, alert, and responsive

- QAR—quiet, alert, but responsive
- **Abnormal** mentation:
 - **Dull/depressed/lethargic:** patient prefers to sleep or not interact but has a normal response to stimuli
 - **Obtunded:** delayed response to stimuli
 - **Stuporous:** only responds to pain stimuli (i.e., pinching a toe and poking the cornea with a cotton tip applicator)
 - **Comatose:** will not respond to **any** stimuli

Posture

How does the pet hold its head and body?

- **Head:** Is there a head tilt or head turn? To which side?
- **Neck:** Is the neck held down (ventroflexion)? This is an especially important examination finding in cats, as it can be caused by hypokalemia or thiamine deficiency. Is there a neck turn? Is the patient guarding or appearing painful?
- **Spine:** Is the spine straight?
 - **Kyphosis:** Abnormal flexion of the thoracolumbar spine or a “hump-backed” appearance.
 - **Lordosis:** Ventral flexion of the spine or a “sway-backed” appearance.
 - **Scoliosis:** Lateral flexion of the spine to the left or right.
- **Tail position:** Is it down in a breed where the tail is normally upright? Straight in a breed where it is normally curled (such as a Pug)?
- **Circling:** Is the pet circling? In which direction? Is it consistent?
- **Gait:** Can the patient walk on its own? Is it having difficulty walking? How so?
- **Lameness:** Is the pet limping, does it appear painful, or is it unwilling to bear weight? On which leg(s)? Lameness implies an *orthopedic disease* (abnormalities of the bones, joints, tendons, or muscles).
- **Weakness (Paresis) or Ataxia:** Is the pet weak and unable to bear weight on one or more legs or is it uncoordinated? Is it knuckling or dragging a leg? Weakness (paresis) or ataxia (incoordination) implies a *neurologic*

disease (abnormality of the brain, spinal cord, nerves, or neuromuscular junction).

Respiratory System

- **Dyspnea:** Is the patient struggling to breathe? Is **cyano-sis** (bluish tinge to the gums or tongue) seen, which indicates decreased oxygen saturation? In cats, open-mouth breathing is abnormal and is a sign of respiratory distress or, rarely, a stress response.
- **Tachypnea:** Increased RR (see Table 1.1 for normal rates).
- Airway sounds:
 - **Stertor:** Low-pitched “snoring.” This airway sound localizes the abnormality to the *nasopharynx*. For example, imagine a brachycephalic dog’s breathing, such as a Pug or French Bulldog.
 - **Stridor:** Loud, high-pitched breathing. This airway sound indicates *large airway disease* (i.e., nasal passages, trachea, larynx/pharynx). A “classic” example of this sound is a Labrador Retriever with laryngeal paralysis (aka “LarPar”). You can often identify these dogs from across the waiting room!
 - Wheezes in the laryngeal region will present as loud stridor and suggest airway narrowing due to laryngeal paralysis, a laryngeal mass, or everted laryngeal sacculles (a sequelae of brachycephalic airway syndrome).
 - **Inspiratory noise or difficulty:** This airway sound indicates upper airway disease (especially the larynx). **USE CAUTION!** *These patients are often in respiratory distress and can quickly become unstable if stressed by handling.*
 - **Expiratory noise or difficulty:** Often described as a “grunt” or “wheeze,” this airway sound indicates intrathoracic tracheal disease or lower airway disease. This sound might be accompanied by an “expiratory push” in a cat with feline lower airway disease.

Head

Moving on to touching our patients! The head is usually the first body part assessed. Remember, examinations should proceed from least to most invasive. If at any point the patient becomes fearful or uncooperative, or there is

Table 1.1 Normal vitals in dogs and cats

	Temperature	Pulse	Respiratory rate	Capillary refill time
Dog	99.0–102.5F (37.2C–39.2C)	80–160 bpm	15–30 brpm or note “pant” if panting	<2 sec
Cat	100–103F (37.8C–39.4C)	110–200 bpm	20–40 brpm	<2 sec

Credit Author

concern that the patient is not stable enough for a full physical examination, it is best to stop where you are and reevaluate if proceeding with a full examination is necessary at that time. You may need to prioritize a certain body system or abort the examination altogether.

Cranial Nerves

The “cranial nerves” (abbreviated CN, followed by a Roman numeral) are a set of 12 paired nerves that arise directly from the brain. Each has a different function responsible for sense or movement. See Chapter 15 Neurology for a more detailed explanation. The following tests are performed to evaluate cranial nerve function:

- **Menace response (CN II, CN VII):** Wave your hand quickly in front of the patient’s face, and they should blink or react. This is a learned response, so young animals may not menace.
- **Pupillary light reflex (PLR) (CN II, CN III):** Evaluate the constriction of the pupil by shining a bright light into one eye (direct PLR); also visualize the response of the other eye, which should constrict slightly at the same time (indirect PLR).
- **Pupil size (CN II, CN III):**
 - **Anisocoria:** A mismatch in pupil size. It is important to note which pupil is abnormal.
 - **Mydriasis:** The pupil is larger than normal.
 - **Miosis:** The pupil is smaller than normal.
- **Palpebral reflex (CN V, CN VII):** Gently touch, tap, or stroke the hairs of the face (typically near the medial canthus of the eye) and see if the animal responds with facial movement, eye blink, lip retraction, or other reflexive movement.
- **Corneal reflex (CN V, VI, VII):** Gently probe the globe of the eye with a cotton-tipped applicator. This is typically not performed unless the patient has an abnormal palpebral response or level of consciousness.
- **Eye movement and position (CN III, IV, and VI):**
 - **Vestibular ocular reflex (“doll’s eye”):** Turn the patient’s head to the left and right briskly but gently. A normal response is for the eyes to move opposite to the head movement, such as looking left as you turn their head to the right.
 - **Strabismus:** Crossed eye or walleye appearance. It is often positional (induced when the head is rotated dorsally) but can also be spontaneous (always present).
 - **Nystagmus:** Fast, uncontrollable motion of the eyes. Be sure to note and record the “fast phase” vs “slow phase”; the fast phase is always “away from the lesion.” Nystagmus can be vertical, horizontal, or rotational.
- **Nystagmus and strabismus** may occur at rest or may only be positional. A good way to look for positional nystagmus is to put the animal into lateral recumbency and extend the head rapidly and then quickly turn the animal onto its dorsum, looking at the eyes continuously and noting the movements.
- **Facial sensation (CN V):** Gently touch the face and muzzle and see if the patient responds.
- **Nasal sensation (CN V):** Gently probe the inside of the nostril with a pen or cotton-tipped applicator.
- **Palpation of the temporal muscles (CN V):** Feel for the presence or absence of normal musculature around the temporomandibular joint. A unilateral lesion means there is muscle loss on one side. A bilateral lesion leads to the inability to close the mouth.
- **Gag reflex (CN IX, X, XI):** This test is not performed in all patients. Clinical signs of dysphagia (difficulty swallowing) such as hard swallowing, dropping food, drooling, etc., are seen when these nerves are abnormal. *Wear gloves and be cautious, especially in a neurologic patient, where rabies could be a concern!*
- **Tongue position (CN XII):** The clinical sign most often seen with issues involving CN XII is unilateral atrophy of the tongue.

Nose

Evaluate the nose for symmetry, conformation, and evidence of discharge.

- If discharge is present, it is important to classify it (i.e., serous, purulent, hemorrhagic, mucoid, or mucopurulent), note the amount (mild, moderate, or severe), and whether the discharge is **unilateral** or **bilateral**.
- Note depigmentation of the nares or the nasal planum, as this may indicate an autoimmune disease or fungal infection.
- Next, note whether the airflow from the nose is normal or abnormal. The technician can test for lack of airflow by auscultating over the nose or perform the “glass slide test” by holding a glass slide up to the nose and look for fogging from both nares. Lack of airflow is concerning for a mass or other nasal obstruction. The most common nasal abnormality that can lead to abnormal airflow is *stenotic (narrowed) nares* in brachycephalic breeds such as Pugs and Bulldogs.
- See the *Cranial Nerves* section in relation to testing nasal sensation.

Eyes

- Evaluate lids, conjunctiva, sclera, pupil, cornea, and lens.
- Note discharge, inflammation, redness, uneven/abnormal pupil size, corneal clouding, squinting, or other abnormalities.

- Retropulse (gently push on closed lids) each globe. They should “give” a little. *Lack of retropulsion is concerning for a mass or abscess behind the eye.*
- Assess PLRs – see the *Cranial Nerves* section.
- Note eye movement and position – see the *Cranial Nerves* section.
 - If nystagmus is present, note the direction and in which direction the eye moves fastest.
- Perform a fundic examination by visualizing the back of the eye (retina, blood vessels, and optic nerve) with a lens and a bright light. A fundic examination allows the examiner to visualize both the central nervous system and the cardiovascular system!

Oral Cavity

Evaluate the lips, mucous membranes (see CRT), teeth, hard and soft palate, tongue (see *Cranial Nerves* section), pharynx, and tonsils. Many patients will not permit an extensive oral examination without sedation or general anesthesia, so describe what you are able to see but know that there may be more significant disease “below the surface.”⁶

Ears

Evaluate the carriage and position of both ears, the thickness of the pinnae, and the appearance of the ear canals (this may require an otoscope). Note any debris or discharge.

Neck to Thorax

- Evaluate the cervical region by gently flexing, extending, and rotating the neck, while palpating for pain or masses.
- Identify the parotid salivary glands, located medial and caudal to the mandibular ramus. Use the salivary glands to help localize the mandibular lymph nodes (Figure 1.1), which lie caudal and a bit lateral to the salivary glands.

Do not be “tricked” into thinking the patient has enlarged mandibular lymph nodes when in fact you are feeling normal salivary glands!

- Retropharyngeal masses, such as enlarged retropharyngeal lymph nodes, foreign bodies, or abscesses, may be palpated dorsal to the larynx.
- Palpate the larynx to assess for masses. In dogs with laryngeal paralysis, careful palpation of the larynx may reveal asymmetry if the disease is unilateral.
- In cats, palpate the thyroid region in search of a “thyroid slip,” which feels like a small “blip” or band of tissue moving under your fingers. The presence of a thyroid slip should prompt further investigation to rule out hyperthyroidism. For further information and a video of thyroid palpation, see Chapter 5 Endocrine Disease.
- In dogs, thyroid or parathyroid masses may be palpated just ventral to the larynx.
- Evaluate the larynx and trachea:
 - Auscultate the larynx and trachea to help localize any respiratory noise (stridor).
 - Careful palpation of the trachea should be performed, particularly in dogs where tracheobronchial chondromalacia (aka “tracheal collapse”) is suspected. In many dogs with tracheobronchial chondromalacia, a cough can be elicited on gentle palpation near the thoracic inlet. Use caution in patients that may become unstable with more forceful or invasive palpation of this region.

The Thorax

We have already obtained a rough assessment of the patient’s cardiovascular system just by observing the breathing rate, pattern, and effort, as well as obtaining a HR, pulse rate/pulse quality, and checking for pulse

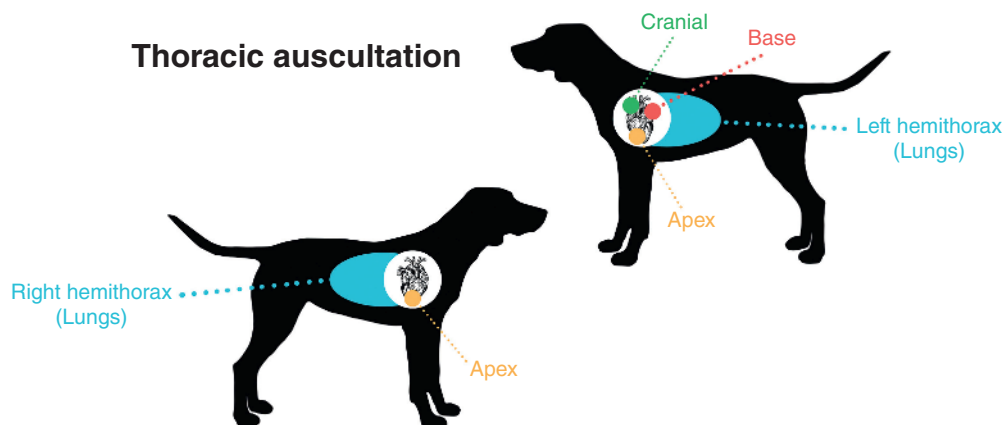


Figure 1.1 Location of optimal auscultation points. *Source: Rose Mattise created in Adobe Photoshop.*

deficits. The thoracic examination includes a more detailed assessment of the heart and lungs.

Every technician should own a good stethoscope and be comfortable using it. This author recommends the Littmann Classic II or III or the Lightweight models as these are affordable and provide good sound quality. Both the bell (low frequency sounds) and the diaphragm (high frequency sounds) should be used. The earpieces should be facing forward and fit comfortably in the ears. Stethoscopes come with multiple sizes of earpieces, so keep trying until you find a fit that is comfortable and allows you to hear clearly.

Ensure you are in a quiet room and gently restrain the animal to avoid artifacts from motion, shivering, or vocalization. Purring cats can pose a challenge—try distracting them with a running faucet or a distracting odor (e.g., food or alcohol). Do not be afraid to move to a quieter location or to restrain the patient differently to get a good examination. Concentrate on listening to one body system (i.e., heart or lungs) at a time. Gently close the mouth if the patient is panting.

Cardiac Auscultation

Auscultation of the heart includes assessments of rate, rhythm, and heart sounds. Having the patient in a standing position is preferred as this will allow you to listen to all heart sounds (see **Figure 1.1**). Palpate the area between the fourth and sixth intercostal spaces on both sides of the thorax for the **point of maximum intensity** (PMI) of the heartbeat and feel for any cardiac thrills, which can be appreciated as a fluttering or vibration under your fingers.

Rate and Rhythm Assessment

- Count beats for 15 s, and then multiply by 4 to determine beats per minute (bpm).
- Rate varies by species, breed, age, and physical fitness (see Table 1.1 for rough guidelines).
- In stressed animals, the HR may be too fast to clearly discern individual heartbeats – be patient and wait a moment with your stethoscope on the chest or try again when the patient is calmer.
- The heart rhythm should be regular and steady. Arrhythmias (aka dysrhythmias) are characterized as **regular** (occurring all the time/with each beat) or **irregular** (occurring sometimes or the “beat” is inconsistent) and should be further evaluated with an electrocardiogram (ECG).
- **Exception:** Dogs can normally have what is known as a **sinus arrhythmia** or respiratory pause, where the HR

increases with inspiration and decreases with expiration. This is *abnormal* in cats.

Heart Sounds

- There are four heart sounds. **In small animals, only the first two sounds (S1 and S2) can be normally auscultated.**
 - The first heart sound (S1) is the “lub” sound. This sound is caused by the closing of the atrioventricular (AV) valves—the mitral and tricuspid valves.
 - The second heart sound (S2) is the “dub” sound. This sound is due to the closing of the semilunar valves—the aortic and pulmonary valves.
 - The third heart sound (S3) and the fourth heart sound (S4): S3 is caused by filling of the ventricles with blood. S4 is due to atrial contraction. S3 and S4 can be heard normally in large animals but are not normally heard in small animals.
- If an S3/S4 sound is heard after the normal “lub–dub” when auscultating a small animal, this is known as a **gallop sound** (because it sounds like a galloping horse). These are best heard using the bell side of the stethoscope. Gallop sounds are usually caused by poor diastolic function (relaxation) of the ventricles. *This can be frequently heard in cats and should be investigated further.*

Heart Murmurs

- A murmur is an abnormal sound heard during a normally silent part of the cardiac cycle (i.e., not part of the normal “lub–dub”).
- Murmurs are often low-pitched, soft swooshing sounds (“lub–whoosh–dub” or “lub–dub–whoosh”), generated by turbulent blood flow.
- The diaphragm of the stethoscope should be placed over four locations on each side of the thorax to hear each heart valve: **left apex, left base, right apex, and the right sternal border** (Figure 1.1 and Table 1.2).
- Heart murmurs are characterized by *location, timing, duration, character, and grade* (Table 1.2). A typical example would be a dog with degenerative mitral valve disease described as having a “left apical systolic or holosystolic regurgitant grade II/VI murmur.”
- Murmur **grades** (loudness) are *subjective* and do not necessarily indicate the *degree of cardiac dysfunction*. A patient with significant heart disease may have a quiet murmur.
- Murmurs do not always indicate cardiac disease and can arise due to high or low blood viscosity (anemia or dehydration), especially in cats.

Table 1.2 Evaluating Heart Murmurs

Location	Left base	Aortic or pulmonary valve (aortic or pulmonic stenosis), atrial-septal defects
	Left apex	Mitral valve (mitral regurgitation)
	Right apex	Tricuspid valve (tricuspid regurgitation)
	Right sternal border	Ventricular septal defects
Timing	Systolic	Heard during systole—between S1 and S2 (lub-whoosh-dub)
	Diastolic	Heard during diastole—after S2 (lub-dub-whoosh)
	Continuous	Occurs throughout systole and diastole (lub-whoosh-dub-whoosh)
Duration	Early systole	Occurs early in systole
	Holosystolic	Occurs throughout systole
	Diastolic	Occurs in diastole
Character	Plateau or regurgitant	Static sound throughout the duration of the murmur
	Decrescendo/crescendo	Gets softer (decrescendo) or louder (crescendo) throughout the duration of the murmur
	Machinery/mechanical	Heard throughout systole and diastole, almost a “whirring” sound
Grade	1/6	Can only be heard in a quiet room after several minutes of listening
	2/6	Can be heard immediately or easily in the correct position but is soft
	3/6	Low to moderate intensity (equal to the intensity of the lub/dub)
	4/6	Loud, but without a palpable thrill (louder than the intensity of the lub/dub)
	5/6	Loud, with a palpable thrill
	6/6	Can be heard without a stethoscope or with the stethoscope slightly off the chest wall

Source: Adapted from N. Bari Olivier, DVM (DACVIM, SAIM/Cardiology): Pers. Com. April 30, 2024
See the Chapter 14 Cardiology, physical examination, for more information.

- Cats can have significant underlying heart disease and NO murmur.⁷ Conversely, a recent study found that 56% of cats with a heart murmur had NO structural cardiac abnormalities.⁸ Typically, this author recommends further investigation via echocardiography of any feline heart murmur to determine its clinical significance, given these variables.

Respiratory Evaluation

Observe the patient as it breathes for a few moments to obtain an overall impression of resting RR and effort (see *Vitals* section). Animals that are presented in respiratory distress often have a classic posture: head and neck extended, open mouth, elbows abducted, with an abdominal component (belly moving in and out as they breathe), and shallow, quick breaths. *If this posture is seen, abort the physical examination, reduce stress, and stabilize this patient before proceeding further.*

The next step in the respiratory evaluation is to characterize the respiratory sounds and signs. Are they:

- Continuous or discontinuous?
- Constant or intermittent (may be part of the history obtained from the client)?
- Are signs present only at rest or with activity? To the amusement of her coworkers, this author has run dogs

up and down the hallway to try to elicit respiratory signs that are reported to only occur with exertion.

- Associated with inspiration or expiration? This can be tricky at first. *Watching the animal breathe while you listen or auscultate is helpful in determining this.* Generally, the inspiratory phase of respiration is louder and longer than the expiratory phase.

Auscultation

- The thorax should be auscultated in all four quadrants (left cranial/caudal, right cranial/caudal) using a stethoscope.
- Referred upper airway sounds (e.g., noise from the trachea, larynx, nasopharynx, or nasal passages) can make it difficult to hear lower airway sounds. Auscultation of these regions may be helpful in further localizing the noise.
- **Normal** bronchovesicular sounds are continuous, low-pitched noises. They are louder on inspiration versus expiration. They may be difficult to detect or absent entirely, especially in larger dogs. This is normal.
- **Abnormal** lower airway sounds:
 - **Rales/crackles:** Discontinuous, “popping” or “newspaper crunching” sounds
 - Primarily heard during inspiration.

- Moist rales: a wet, gurgling sound which indicates the presence of alveolar fluid.
- Dry rales: usually indicate inflammation or chronic lower airway disease (e.g., bronchial collapse and feline lower airway disease).
- **Wheezes:**
 - Continuous, high-pitched sounds.
 - Usually heard at the end of inspiration or during expiration.
- **Decreased** lower airway sounds
 - Sound “dull” on auscultation, particularly on inspiration.
 - Indicate pleural space diseases, such as fluid/air, a mass, or a collapsed lung, causing dampening of the sounds.

The Abdomen

Begin with a visual assessment: Is the abdomen distended or asymmetrical? Ballottement can be useful in determining whether distention is secondary to gas or fluid; fluid in the abdomen will move, causing a “fluid wave.” After visual assessment, palpation typically proceeds from cranial to caudal and most to least invasive (i.e., superficial to deep palpation). In nervous or tense animals, start slowly and gently to allow the pet to acclimate to having your hands on its abdomen.

Palpation

Smaller patients can be palpated using a one-handed technique (Figure 1.2). In larger patients, use a two-handed approach, running your hands from cranial to caudal along the dog’s body. Obese patients (particularly large obese dogs) or very tense/painful patients are particularly challenging, and full abdominal palpation may not be permitted; simply note this in the medical record.

Most organs cannot be palpated in their entirety. You will begin to feel and remember what is “normal” for various-sized patients with experience. It is helpful to imagine the normal anatomy of the abdominal organs as you palpate. Cranial abdomen: liver, stomach, pancreas, spleen, and cranial intestine. Mid-abdomen: kidneys (dorsal), adrenal glands, spleen, and middle intestine. Caudal abdomen: lower intestine and colon, urinary bladder, and prostate/uterus.

Liver

The liver is in the right cranial abdomen. In some dogs, the margin of the liver can be palpated under the caudal ribs. In most cases, however, the liver will not be palpable. Dogs with hepatomegaly will have palpable liver margins caudal



Figure 1.2 Dominant hand, thumb, and fingers on opposite sides to palpate. Other hand, supporting the patient. *Source:* Kaitlin Lonc, DACVIM (SAIM).

to the last rib. In cats, the liver is not palpable unless it is enlarged or abnormal.

Spleen

In dogs, the margin of the spleen can be palpated in the left cranial to caudal abdomen. Masses can be palpated in the caudal abdomen (tail of the spleen). In cats, the spleen is typically not palpable unless it is enlarged.

Stomach

In large dogs, the stomach is typically not palpable unless distended (e.g., if the patient has recently eaten or there is gas or fluid distention). In small or thin dogs, the stomach (pylorus) may be palpable, particularly in the left cranial abdomen. In cats, the stomach is usually not palpable.

Intestines and Colon

Palpate the small intestines cranially to caudally. In cats and dogs, this should typically feel like homogeneous bands of tissue running under your hands. If a mass is palpated, try to identify its location (e.g., right cranial abdomen). Feces in the colon can feel like a mass but should move or give under firmer palpation. Gas-distended intestines will have a “balloon-like” feeling of gas moving through or under your fingers. Rarely, foreign objects (e.g., string) causing intestinal plications can be palpated.

Kidneys

In dogs, the caudal pole of the left kidney may be palpated, but distinct kidneys are typically not distinguishable unless the patient is very thin or there is enlargement or a mass

effect. In cats, the kidneys should be palpable in the right cranial (“righty-tighty, lefty loosey”) and left mid-abdomen. They should be about 4–6 cm in an average cat. Small, round, golf or ping-pong-ball-sized kidneys are commonly palpated in cats with chronic renal disease. Larger kidneys should be further evaluated, as renal lymphoma or other neoplasia will cause renomegaly. If the patient exhibits signs of pain during kidney palpation, further investigation is warranted. The adrenal glands are not palpable in normal dogs or cats.

Urinary Bladder

In most dogs, the urinary bladder is palpable. This may be difficult in large, obese patients or those who have recently voided. In cats, the bladder is almost always palpable. Bladder pain or enlargement should be further evaluated (e.g., cats with urinary obstruction or dogs with neurogenic bladder secondary to spinal cord disease). Bladder stones may be palpated as hard, “crunchy” material within the bladder.

Prostate

The prostate is not palpable during abdominal palpation unless enlarged in dogs; it is not palpable in cats. The prostate is typically assessed via rectal examination in dogs.

Uterus

If the dog has been spayed, the uterus should not be palpable (hopefully); however, it may be occasionally palpable if it is fluid-distended (e.g., pyometra) in both unaltered dogs and cats.

Integument

The integument consists of the skin, fur, paw pads, and nails/claws. Examine the patient from cranial to caudal, being sure to examine the ears (see the *Head* section), as well as the more difficult-to-visualize areas such as the inguinal region, under the tail, the interdigital spaces (including between the footpads), and under the feet.

Evaluate the haircoat/fur:

- Are lesions localized to one body part or are they generalized (over the whole body)?
 - Are they **symmetrical** or **asymmetrical**? Symmetrical lesions are commonly seen with body-wide diseases, such as endocrine disorders (Cushing’s disease and hypothyroidism) that affect the haircoat
- Is the animal pruritic (itchy)? Can the owner characterize the itchiness on a scale from 1 to 10? Is the animal itching so badly that there are open sores?

- Are there visible parasites, such as fleas or “flea dirt” (fecal material dropped by fleas after they have eaten)?
- Describe any lesions you see as accurately as you can, including:
 - Size
 - Location
 - Raised (**papule**) or flat (**macule**)
 - Fluid (vesicle) or pus (pustule) filled.

Body and Muscle Condition Scoring

Body condition score (BCS) is a rough estimate of the patient’s overall body condition and nutritional status. This is a subjective and breed-dependent measurement. For example, a Labrador Retriever and a Whippet have very different frames and body structures but are scored on the same BCS scale.

There are a few different body condition scoring systems available. The two most common are the World Small Animal Veterinary Association scoring system (which uses a 0–9 scale)⁹ or the lesser-used 0–5 scale. On the 0–9 scale, a score of 4–5 is considered “ideal,” 0–3 is underweight, and 6–9 is overweight to obese. BCS is assessed by evaluating if the animal has visible or palpable ribs, a visible or not visible abdominal tuck, and a visible or not visible waist when viewed from above.

Muscle condition scoring (MCS) can also be utilized.⁹ MCS is scored by visual examination and palpation of musculature over the spine, scapulae, skull, and pelvis.

Lymph Node Evaluation

Normally palpable external lymph nodes are found under the ramus of the mandible (mandibular lymph nodes), at the point of the shoulder (prescapular lymph nodes), in the armpit or axillary region (axillary lymph nodes), in the groin region (inguinal lymph nodes), and behind the knee (popliteal lymph nodes) (Figure 1.3). Lymph nodes should be small, soft, and somewhat moveable. Any lymph

Lymph node palpation

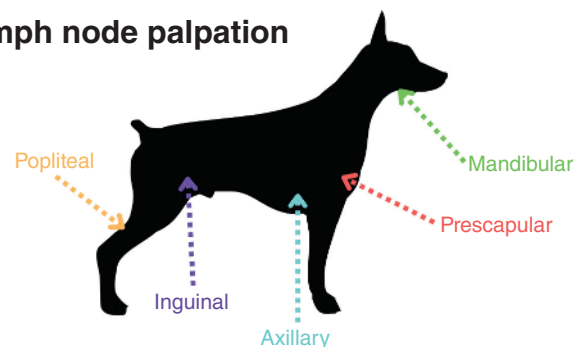


Figure 1.3 Location of the common lymph nodes in the dog. Source: Rose Mattise created in Adobe Photoshop.

node enlargement should be recorded in the medical record and warrants further investigation.

Orthopedic and Neurologic Examination

A brief orthopedic and neurologic examination should be performed on every patient. This is typically done in a standing position, but the patient may also be gently restrained in lateral recumbency. In lateral recumbency, be sure to only evaluate the nondependent or “up” legs and move the patient to the other side for a complete examination.

Orthopedic Examination

- Evaluate the patient as it walks around the room (this can also be done as part of the Initial Assessment). Note any lamenesses¹⁰:
 - **Forelimb lameness:** Weight is shifted caudally (to the back legs). The back may appear arched. The patient may go “down on the sound” or exhibit a head bob when the sound (non-lame) leg is placed or may take short strides in the hind limbs.
 - **Hindlimb lameness:** Weight is shifted cranially (to the front legs). The head and neck may be extended to offset weight from the hind limbs. A “hip hike” – in which the hip on the lame side has increased vertical motion, making the hip on the unaffected side appear lower when observing the gait from behind – is often noted on the same side as the lameness.¹⁰ Lameness may be graded as follows (adapted from the referenced article):
 - **Grade I:** Sound at the walk, but weight shifting or lameness noted at the trot
 - **Grade II:** Mild weight-bearing lameness noted at the walk
 - **Grade III:** Weight-bearing lameness, typically with distinct “head bob”
 - **Grade IV:** Significant weight-bearing lameness
 - **Grade V:** Toe-touching lameness
 - **Grade VI:** Non-weight-bearing lameness.
- Briefly evaluate for joint pain and/or swelling.
- Run your hands over the trunk and limbs, lift the tail, and gently flex and extend the neck.
- Work from proximal to distal to gently flex and extend the joints. If lameness has been noted on a particular leg, be slow and careful so as not to elicit unnecessary pain. Examine the toes, footpads, and nails.

Neurologic Examination

- The preliminary neurologic assessment and cranial nerve examination are covered earlier in this chapter.

- Gently palpate along the head, spine, and limbs and assess for pain. Start with gentle pressure and escalate to firm palpation in the absence of a pain response.
- This author typically feels down along each limb and then flips the paw over while the patient is standing to test conscious proprioception.
 - More advanced maneuvers such as hopping or wheelbarrowing are typically only performed if the patient demonstrates a lack of conscious proprioception, evidenced by the inability to replace their paw or if the patient has other obvious neurologic abnormalities.
- **Motor = pain sensation:** Animals that can voluntarily move their limbs (i.e., replacing a paw when it is put down in the wrong position) can feel sensation and do not require deep pain testing.
- Spinal reflex testing evaluates both the sensory and motor portions of the reflex arc.
 - Withdrawal reflexes are easy and reliable in all animals. The other reflexes require some skill, a pleximeter (aka reflex hammer), and may not always be reliable. Gently flexing the joint and supporting the limb may help with evaluation. Do not test reflexes on the “down” leg if the patient is in lateral recumbency; you must reposition the patient to the other lateral recumbency.
 - **Forelimbs:** Withdrawal, extensor carpi radialis, biceps, and triceps reflexes.
 - **Hind limbs:** Withdrawal, cranial tibial, patellar, and gastrocnemius.
- **Cutaneous trunci reflex:** gently pinch the skin a few centimeters lateral to the dorsal spinous processes with fingers or a hemostat. This is a helpful test in dogs with spinal cord lesions, as the reflex is typically absent 1–2 vertebral bodies caudal to the lesion. In general, cats do not demonstrate this reflex.
- Perineal and anal reflexes:
 - When a thermometer is inserted into the rectum, you should see the muscles around the anus contract.
- Testing for pain: start with a gentle toe pinch, and then gradually increase pressure as needed, up to pinching the toenails with a hemostat. If the patient responds (e.g., yelps, turns their head, etc.), **they can feel what you are doing.** Remember that pulling the limb away (i.e., withdrawal reflex) is involuntary – when evaluating for pain, you are looking for the patient’s **reaction** to what you are doing! To help tell the difference between a reflex and a reaction, try flexing the limb to avoid confusion.

See Chapter 15 Neurology for an in-depth discussion of the neurologic examination.

External Genitalia and Rectal Examination

Female

- Vulvar/perivulvar region: examine the vulva and perivulvar area for structural abnormalities, urine leakage, or dermatitis. In dogs, a significant amount of excess skin around the vulvar folds is known as a “hooded” vulva and may contribute to recurrent urinary tract infections.
- Palpate along the mammary chain for masses, swelling, or discharge.
- Palpate the groin area for inguinal lymph node enlargement.

Male

- Examine the prepuce for discharge, swelling, or dermatitis.
- Examine the penis by gently using your fingers to move the prepuce back and extrude the penis. Evaluate for masses, swelling, fur (which can lead to entrapment of the penis or **paraphimosis**), or dermatitis. A small amount of yellow to green mucoid discharge (smegma) is common in intact male dogs, but copious amounts of discharge or foul-smelling discharge should be further evaluated. Neutered males should not have any penile discharge. In male cats, evaluate for grit in the urethra or swelling, which may cause concern for urethral obstruction.
 - In intact males, examine the testicles within the scrotum. Both testicles should be palpable, and no pain, masses, or swelling should be noted.

Rectal Examination

- Rectal examination should be performed in all dogs and, if possible, in cats with concern for rectal strictures, masses, or constipation. Proceed gently with a small finger and lots of lubricant in small patients.
- Ensure the patient is safely restrained by an assistant. Ideally, the patient should be in a standing position.
- A “clock face” can be used to imagine the important structures that are palpated during rectal examination:
 - Insert your finger with the pad facing ventrally (6 o'clock). Gently rotate your finger dorsally. Feel the pubic bone and the urethra (a tubular structure) on the ventral midline. Stones or masses, if present, may be palpated in the urethra.
 - Feel along the rectal wall for abnormalities such as hernias as you rotate your finger dorsally (from 6 o'clock toward 12 o'clock).
 - At 12 o'clock, palpate the sacral spine for pain or spondylosis. Apply gentle pressure on the bony structures and gently flex and extend the tail.

- The sublumbar lymph nodes are located just below the spine. They are typically not felt or are very small in normal animals.
- Gently rotate to the 4 o'clock and 8 o'clock positions to palpate the anal glands. If full and large, gently sweep your finger upward to express them, and then reevaluate for masses or nodules.
 - This is especially important in patients with hypercalcemia, which can be caused by an apocrine gland anal sac adenocarcinoma, a particularly aggressive form of cancer.
- In male dogs, rotate your finger back to the 6 o'clock position, then feel the prostate gland.
 - In intact males, the prostate should have two distinct hemispheres and be smooth and firm (“Barbie dolls behind”).
 - In large dogs, gently pressing upward in the caudal abdomen with your other hand while you palpate may help those with small hands reach the prostate. This author has also enlisted a colleague with longer fingers in cases where she cannot palpate the prostate in an intact male, as it is an important part of the physical examination.
 - In neutered male dogs, the region of the prostate should be palpated, but the prostate itself may not be felt if it is small.
- In female dogs, the uterus can be palpated if enlarged (pyometra) at the 6 o'clock position. It is typically not palpable in normal, intact females.
- A small sample of feces may be obtained on your gloved finger to evaluate for color, consistency, or blood.

Conclusion

Upon concluding the physical examination, or even while you are performing it, record your findings. Go back over anything that is abnormal and add it to your problem list. It is important to decide which problems warrant further evaluation – for example, a small skin lesion may need to be added to the problem list and then “inactivated” in a patient with a more serious concern such as difficulty breathing. A complete, thorough, and accurate physical examination is the basis on which all treatment decisions will be made. Therefore, its importance cannot be overstated. Veterinary technicians can become invaluable members of the veterinary healthcare team by mastering this important skill.

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For Online Appendix/Textbook Companion

Sample referral form <https://drive.google.com/file/d/1ypHPahdFJTJQEu9QdjaadH4MF-sL0a65/view?usp=sharing>

Sample history form (https://drive.google.com/file/d/1yixFIRf9ocgKiQOoCMx6TxX2_A-638vJ/view?usp=sharing)

Sample PE form (<https://drive.google.com/file/d/1pOefPmFaTK04jw68zt5hUQB57hi2bFtp/view?usp=sharing>)

AVMA: Twenty-five components of a baseline, best-practice companion animal physical exam established by a panel of experts (<https://avmajournals.avma.org/view/journals/javma/260/8/javma.21.10.0468.xml>) <https://www.dvm360.com/view/the-complete-physical-exam-empowering-your-team-to-do-more-than-just-a-tpr>