

# 1

## Handling and Physical Examination

Birds of prey are actually quite easy to work with if you have the proper training and a little experience. On the other hand, they can be incredibly dangerous if handled improperly. As with all wild animals, it is important to work fast and to minimize stress whenever working with birds of prey. Proper handling techniques and being prepared can go a long way to help create a safe and stress-free interaction.

### Learning Objectives

1. Proper handling techniques.
2. Performing a physical exam.
3. Intake protocols for common problems.

### Handling and Restraint

Proper restraint is important for the patient's well-being and for staff safety. Always remember that the talons are in most cases the most dangerous part of the bird and, as such, should be restrained at all times.

Appropriately sized leather gloves should always be worn. They must be thick enough to protect the wearer but not too thick as they can make handling cumbersome.

The legs should be held with the index finger between them. This is more comfortable for the bird (the legs will not rub) and the grip is much more secure (see arrowhead in Fig. 1.1).

The legs should always be grabbed as close to the body as is possible (i.e. above the stifle joints) to avoid iatrogenic fractures. This is especially important in birds with long, thin legs such as

Cooper's hawks. Once the bird is adequately restrained, the grip should be moved closer to the feet for better control of the talons.

When transporting a bird, secure the legs with an underhanded grip, cover the bird's head with a towel and place the bird's back to your chest (Fig. 1.1). With your other hand, gently place the towel across the chest (be careful not to interfere with respiration) and hold the beak up. This protects the bird's face from its talons and also restrains both wings.

The eyes and head should be covered with a light towel whenever possible since this will have a calming effect on birds of prey.

Remember to protect your face with one hand when grabbing a bird from a kennel.



Fig. 1.1. Proper handling for transport.

To decrease stress, consider using isoflurane anesthesia when doing examinations or treatments.

Vultures use their beak for defense so their head must be gently restrained at all times. This can be done by covering the head with a towel and loosely encircling the neck with your fingers just under the mandible.

Young birds should be handled with extreme caution. In most cases these birds should be handled as little as possible, should not be manipulated onto their back unless absolutely necessary and should be transported in a box, rather than hand-carried. *Young birds/hatchlings should never be grabbed by the legs.* Always use a body grab from behind with the wings carefully folded up against the body (see Chapter 12).

Long-handled nets are very useful when capturing birds but they need to be constructed and used properly to avoid injury. The actual net should be made from solid, light-weight cloth and not from fenestrated net material since the strands can cause serious damage to the feathers. The rim of the net should be padded with foam. Plumbing pipe insulation foam works very well.

Different sized nets are needed to safely capture all the common species. Nets should range in size from an 18" (45 cm) net with a 2' (0.6 m) handle to a 36" (90 cm) net with a 5' (1.5 m) handle.

Birds in flight should be netted "cleanly" without allowing their wings to touch the hoop. This can take some practice but is easy once you become accustomed to using the net.

*Never swing a net at a bird to capture as this will almost certainly result in injury.* Instead, place the net in the bird's path and let it fly into the net.

## Physical Examination

Most of the physical exam can be achieved with the bird restrained on its back and a complete exam can be done in less than 10 minutes. Most procedures involving birds of prey, including examinations, require two people. This allows you to be most efficient, keep staff safe and, most importantly, minimize stress to the patient.

Have all supplies and expected treatments ready before beginning the exam or treatment. Be as quiet as possible. This is a general rule that applies whenever working with wildlife, especially for birds of prey. Give butorphanol or midazolam, if needed, at the *beginning of your exam* for analgesia and as a mild sedative (see Appendix B, Formulary, for dosage). Have a physical exam checklist available to refer to (see Table 1.1).

Try to collect a minimum database as quickly as possible but never try to do too much if the bird is stressed or severely compromised. In many cases it is safer to simply stabilize your patient on admission and stage your workup. Your minimum database may include blood work and/or radiographs.

### Raptor Tip

Don't forget to roll the bird over on its sternum to examine the spine and dorsal pelvis.

Although a detailed history is rarely available with wildlife, try to collect as much information regarding where and how the bird was found. If it was transferred from another facility, ask about previous treatments and medications received.

Always record a keel score with the weight (measured in grams) (Fig. 1.2). The keel score, or body condition score, is a measure of the amount of pectoral muscle mass present and is a good indication of the general health status. Keel scores range from 1 to 5. A healthy bird has a score of 3–4. The determination of a keel score requires palpation and a visual assessment. Using alcohol to clear the feathers from the pectoral muscle helps to determine an accurate score.

With a score of 1 or 2, the muscle mass is clearly concave (or non-existent) and the keel bone is extremely prominent. This is an emaciated bird.

With a score of 3, the muscle mass bulges ventrally and is convex.

With a score of 4, the muscle mass comes out almost horizontally from the keel bone.

With a score of 5, the muscle mass rises above the edge of the keel bone.

**Table 1.1.** Physical examination checklist.

Region/area	Findings	Comments
<b>Weight</b>		
<b>Age</b>	plumage—eye color	
<b>Sex</b>	brood patch—egg—plumage—wing chord	
<b>Behavior</b>	BAR—QAR—lethargic—comatose—neurologic—seizures—habituated—imprinted—unable to stand	
<b>Head</b>	“reading”—tilt—hanging low—wounds—eyes closed	
Mouth (tongue, glottis, choana)	pale—bloody—parasite—cheesy exudate/lesions	
Nares	discharge—bloody—clogged	
Cere	swollen—wound—color	
Beak/jaw	fractured—worn—dirty—cracked—scissor-beak	
Ears	parasites—bloody	
<b>Right eye</b>		
Lids	swollen—wounds—irritated—bruised	
Nicitans	swollen—wounds—irritated—bruised	
Cornea	cloudy—ulcerated—collapsed—perforated	
Anterior chamber	cloudy—fibrinous material—blood clot—synechia	
Lens	cataract—synechia—luxated	
Posterior chamber	blood clot—fibrinous material—chorioretinitis—detachment—craters	
PLR/menace	POS or NEG	
<b>Left eye</b>		
Lids	swollen—wounds—irritated—bruised	
Nicitans	swollen—wounds—irritated—bruised	
Cornea	cloudy—ulcerated—collapsed—perforated	
Anterior chamber	cloudy—fibrinous material—blood clot—synechia	
Lens	cataract—synechia—luxated	
Posterior chamber	blood clot—fibrinous material—chorioretinitis—detachment—craters	
PLR/menace	POS or NEG	
<b>Body</b>		
Crop	full—empty—sour	
Neck	bruised—wounds	
Keel	bruised—wounds	
Keel score	1 2 3 4 5	
Keel fat	yes or no	
Furc fat	yes or no	
Abd fat	yes or no	
Back/spine	bruised—wounds	
Pelvis	bruised—wounds	

*Continued*

Table 1.1. Continued.

Region/area	Findings	Comments
Vent	soiled—bloody—flaccid	
<b>Right wing</b>	drooped	
Coracoid/scapula/ clavicle	fracture (open, closed)—wounds—subcutaneous air—swelling— bruised	
Humerus	fracture (open, closed)—wounds—subcutaneous air—swelling— bruised	
Elbow	swollen—wounds—dislocated—poor ROM	
Ulna/radius	fracture (open, closed)—wounds—swelling—bruised	
Wrist	swollen—wounds—dislocated—poor ROM	
Metacarpals	fracture (open, closed)—wounds—swelling—bruised	
Feathers	soiled—frayed—tipped—broken—in blood	
<b>Left wing</b>	drooped	
Coracoid/scapula/ clavicle	fracture (open, closed)—wounds—subcutaneous air—swelling— bruised	
Humerus	fracture (open, closed)—wounds—subcutaneous air—swelling— bruised	
Elbow	swollen—wounds—dislocated—poor ROM	
Ulna/radius	fracture (open, closed)—wounds—swelling—bruised	
Wrist	swollen—wounds—dislocated—poor ROM	
Metacarpals	fracture (open, closed)—wounds—swelling—bruised	
Feathers	soiled—frayed—tipped—broken—in blood	
<b>Right leg</b>	flaccid—not weight bearing	
Femur	fracture (open, closed)—wounds—subcutaneous air—swelling— bruised	
Stifle	swollen—wounds—dislocated—poor ROM	
Tibiotarsus	fracture (open, closed)—wounds—swelling—bruised	
Hock	swollen—wounds—dislocated—poor ROM	
Tarsometatarsus	fracture (open, closed)—wounds—swelling—bruised	
"Ankle"	swollen—wounds—dislocated	
Digits/talons	fracture (open, closed)—wounds—swelling—bruised—worn/smooth pad—bumblefoot—broken talon	
<b>Left leg</b>	flaccid—not weight bearing	
Femur	fracture (open, closed)—wounds—subcutaneous air—swelling— bruised	
Stifle	swollen—wounds—dislocated—poor ROM	
Tibiotarsus	fracture (open, closed)—wounds—swelling—bruised	
Hock	swollen—wounds—dislocated—poor ROM	
Tarsometatarsus	fracture (open, closed)—wounds—swelling—bruised	

Continued

Table 1.1. Continued.

Region/area	Findings	Comments
"Ankle"	swollen—wounds—dislocated	
Digits/talons	fracture (open, closed)—wounds—swelling—bruised—worn/smooth pad—bumblefoot—broken talon	
<b>Other</b>		
Ectoparasites	lice—flat flies—maggots	
Mutes	gritty—runny—bloody—odor—color	
Feathers	Soiled—oiled—broken—frayed	

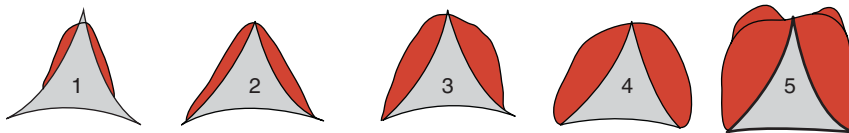


Fig. 1.2. Keel scores.

Note that the keel score measures muscle mass and is relatively independent of the fat that overlies the pectoral muscle. For this reason, it is important to assess the pectoral muscle mass as well as the amount of fat, especially in an overweight bird.

Fat is deposited externally in several places in a bird. Three sites that are easy to check are: over the pectoral muscle/sternum, on the abdomen, and in the furcular hollow formed by the clavicle bones. All three areas should be evaluated.

It is important to realize that the edge of the keel bone will be visible and palpable in all but the most obese birds.

### Raptor Tip

Intranasal midazolam can provide mild sedation for exams and procedures.

Do not forget to examine the eyes carefully. Both anterior and posterior chamber

damage is quite common. In a recent study, 40% of admitted wild raptors had significant damage in at least one posterior chamber (Scott, 2015). It takes practice to become proficient at fundic exams, and recognizing a normal retina is the first step to being able to properly evaluate a traumatized retina. Euthanasia should be considered in any bird that has serious injury to one or both eyes (see Chapter 5).

Blood in the mouth or ears are usually associated with head trauma.

Apply a small amount of alcohol along the ventral side of the wing including the elbows and wrists. This helps clear feathers away and makes visualization of bruises much easier. Make sure there are no open wounds first since the application of alcohol is very painful.

Avian bruises can be quite alarming in both color and extent. As will be discussed later, biliverdin is an important pigment in birds and their bruises will, after a few days, turn green. Do not worry; this is normal (Fig. 1.3).



**Fig. 1.3.** Avian bruises can be very bright green.

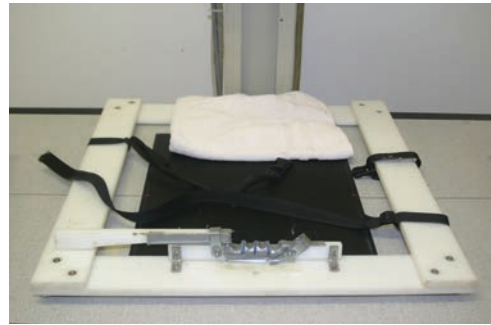
## Physical Exam Checklist

The checklist in [Table 1.1](#) serves as a reminder so that important parts of the examination are not easily forgotten. In addition, always doing your examination in the same order will help insure that important areas are not forgotten. This checklist can be laminated and used with an erasable marker. Findings can be quickly circled or written in while the exam is being completed.

## Radiographic Restraint and Positioning

Both lateral and ventral–dorsal (VD) views are helpful. However, a VD view may be adequate for many cases. General anesthesia is recommended but VD radiographs can oftentimes be done with just simple restraint. The exceptions are very large or powerful birds such as vultures and eagles for which general anesthesia is typically required. The head should be covered with a light towel to decrease stress.

Manual restraint can be achieved with a simple device as shown in [Figs 1.4](#) and [1.5](#). It uses a frame that allows the tarsometatarsi to be restrained under a padded sliding bar and the abdomen and thorax to be secured by nylon strips. The wings can then be secured with masking tape.



**Fig. 1.4.** Radiographic restraint device.



**Fig. 1.5.** Hawk positioned for radiograph.

To get a good VD radiograph ([Fig. 1.6](#)):

- The keel must overlie the spine.
- The legs are pulled down symmetrically.





**Fig. 1.6.** A good ventral–dorsal (VD) radiograph.

- The wings are pulled out symmetrically.
- The elbows and stifles should not overlap.

### Raptor Tip

On the VD radiograph, make sure the keel and spine are overlapped.

Lateral radiographs almost always require anesthesia as the positioning is very uncomfortable for the bird. To get a good lateral radiograph (Fig. 1.7):

- The acetabulae should overlap.
- The coracoids should overlap.
- The wings should be extended dorsally.
- The legs should be pulled back caudally if you are interested in the abdomen. They should be spread if you are interested in the actual femur bones themselves.



**Fig. 1.7.** A good lateral radiograph.



**Fig. 1.8.** Use of a gauze ball to assist in taking radiographs of the foot.

A gauze ball wrapped in elastic bandage material can be useful when taking radiographs of the feet since it helps spread the digits and eliminates superposition problems (Fig. 1.8). Anesthesia is usually required to get good results.

## Intake Protocols

Table 1.2 is a quick-reference guide for treating some commonly seen problems. Refer to the Formulary for dosages.

Table 1.2. Intake protocols.

Problem	Treatment
Blood in oral cavity	Swab oral cavity Start broad-spectrum antibiotic and meloxicam Butorphanol 2 mg/kg BID/TID
Caught in chimney	Rehydrate Flush and stain eyes to check for corneal ulcers Check wrists, beak, and talons for trauma Wipe down feathers with damp cloth Watch for possible respiratory trouble secondary to inhalation of soot Plan to bathe as soon as possible if necessary Treat for emaciation if present
Chorioretinitis	Give one injection of dexamethasone 2 mg/kg IM if less than 24 h Meloxicam
Corneal abrasion	Fluorescein stain to confirm Apply triple antibiotic ointment with sterile applicator Do <b>not</b> use topical corticosteroids
Dehydration	Rehydrate Assume 5 or 10%. Replace deficit over 48 h Maintenance is 50 ml/kg/day Use any appropriate route based on clinical condition. Subcutaneous usually works well in most cases See Chapters 4 and 7 for more details
Emaciation	Rehydrate for 18 h <b>before</b> feeding. Assume 10% dehydration and calculate for 2× maintenance. LRS is usually the best choice Add Vit B complex to fluids. Use enough to tinge the fluids a light yellow color (approximately 0.5 ml per 30 ml) Iron dextran 0.1 ml/kg IM Fenbendazole 25 mg/kg PO Begin antifungals in susceptible species Place in warm incubator After 18 h, begin feeding furless/boneless meat at 20 g per kg BW TID. Tube feeding with formula is also an option. Slowly increase the food amount over the next 2–3 days
External parasites (feather lice and flat flies)	Apply topical insecticidal spray. Products with permethrin, pyrethrins, and piperonyl butoxide (e.g. Bronco Equine Spray®, Farnum, Phoenix, AZ, USA) are safe and seem to work well. <b>Use with caution since many insecticides are toxic to birds</b>
Fracture	Butorphanol 2 mg/kg BID/TID Stabilize (fluids, etc.) Get radiograph if possible. Use general anesthesia via mask Flush wounds Cover/protect exposed bone with hydrogel bandage (e.g. Duoderm® extra thin, ConvaTec, Mulgrave, VIC, Australia). Close wound with sutures if possible Immobilize joint above and below fracture Start enrofloxacin and clindamycin if bone is exposed Start meloxicam Plan surgical repair within 24 h if possible

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Table 1.2. Continued.

Problem	Treatment
Head trauma	Give one injection of dexamethasone 2 mg/kg IM. Note that this treatment is controversial but definitely seems to be beneficial for acute retinal injury If trauma occurred within 24 h, give mannitol at 500 mg/kg IV/IO slowly TID × 3 followed by crystalloids for diuresis Butorphanol 2 mg/kg BID/TID Use midazolam as necessary Place in oxygen cage Do <b>not</b> apply heat (i.e. in a warm incubator)
Maggots and fly eggs	Physically remove eggs and maggots Apply nitenpyram (Capstar®, Novartis, Greensboro, NC, USA) topically on wounds (mix with water and spray on wounds). See Formulary for recipe Wait a few minutes and remove dead maggots Flush and clean wounds Give nitenpyram ½ tablet orally Check BID for recurrence Manage wounds as necessary with antibiotics and debridement
Oiled	Give activated charcoal 10–30 ml/kg PO if risk of aspiration is low Stabilize (fluids, etc.) Once stabilized, bathe the bird under general anesthesia with warm water and Dawn dish soap® (Proctor & Gamble, Cincinnati, OH, USA) (see Chapter 7)
Open-mouthed breathing	Administer oxygen via mask (intubate if necessary) Place air sac tube if no improvement (see Chapter 4 for more details)
Poisoning (suspected)	If organophosphorus toxicity: Atropine 0.4 ml/kg IM. Repeat q4h as needed If lead toxicity: run blood lead test as soon as possible. Begin chelation therapy Give activated charcoal 10–30 ml/kg PO if risk of aspiration is low Give Vitamin-B complex 0.1 ml/kg IM Supportive care (fluids, etc.) Keep NPO
Seizures	Midazolam 1 mg/kg IM, repeat as needed Keep NPO Provide supportive care (oxygen, fluids, etc.) Run blood lead test as soon as possible
Shock	Administer oxygen via mask (intubate if necessary) Place 20 or 22 gauge IO catheter Begin fluid therapy immediately (see Chapter 4 for more details)
Soft tissue wounds / tendon or bone exposure	Butorphanol 2 mg/kg BID/TID Stabilize (fluids, etc.) Start broad-spectrum antibiotic and meloxicam Flush wounds Cover/protect exposed tissue with silver sulfadiazene cream and hydrogel bandage (e.g. Duoderm® extra thin). Close wound with temporary sutures if possible Immobilize wound Plan surgical debridement and closure as soon as possible if tendon or bone is exposed

Continued

Table 1.2. Continued.

Problem	Treatment
Subcutaneous air	Aspirate with 18 gauge needle. Make small nick with needle as you are withdrawing to make a larger hole Repeat as necessary Do not give subcutaneous fluids Determine cause as soon as possible
Unable to stand/spinal trauma	Give one injection of dexamethasone 2 mg/kg IM. Note that this treatment may or may not be beneficial and is controversial Supportive care (fluids, etc.) Clean and evacuate vent/cloaca BID Keep on thick padding Provide nutritional support Run blood lead test if no evidence of trauma Meloxicam Trimethoprim-sulfamethoxazole: aids in controlling intestinal bacterial overgrowth but be certain to maintain adequate hydration Place a tail wrap
Uveitis	Rule out corneal ulcer with fluorescein stain Use prednisone drops if stain negative Can also use topical NSAID drops Meloxicam
Wing droop	Radiograph to check for fractures. Many of these cases can have a coracoid fracture Apply figure-8 bandage ± body wrap as needed Meloxicam

## Bibliography

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- Redig, P. (1993) *Medical Management of Birds of Prey*, 3rd edn. The Raptor Center, St. Paul, MN, USA.
- Scott, D. (2015) RaptorMed™ clinical database at Carolina Raptor Center, Charlotte, NC, USA.