The last ten years have seen amazing advances in diagnostic testing capabilities in avian medicine. Tests that were not even considered a decade or two ago are now commonplace. However, the cornerstone of good avian medicine is still the careful evaluation of the patient. Diagnostic tests are an important part of that evaluation, but they are not the whole evaluation. Their use is only a part of a continuum that starts with a careful anamnesis and concludes with a diagnosis. This can be illustrated by the diagnostic pyramid shown (Fig 6.1).

Astute clinicians will move carefully through these levels, refining their differential list through careful history taking, physical examination and selection of diagnostic testing until a final diagnosis (or at least a much shortened list of differentials) is reached.

Understanding the Masking Phenomenon

A common misconception held by many bird owners and veterinarians is that birds are not very resistant to illness. To the novice it often appears that birds show signs of illness one day, are at the bottom of their cage the next, and dead the day after. This misconception has stemmed from two sources.

First, many of the birds seen in practice are only a few generations descended from wild birds. As such, they retain many of the protective instincts inherited from their forebears. Many avian species kept as companions are relatively low on the food chain. These protective instincts have been developed to avoid drawing the
attention of predators. One such instinct is often known as the “masking phenomenon.” Predators are naturally drawn to prey that look or behave differently from others. Unusual coloring, weakness or lameness can single out a bird and make it attractive to a predator. A natural instinct is therefore to avoid appearing “different.” A sick bird will make a determined effort to look healthy, even in the absence of predators. The classical “sick bird look” we usually associate with illness — fluffed feathers, closed eyes, lethargy — only develops when the bird is incapable of masking these signs (Fig 6.2a). Therefore, many of the patients presented to veterinarians are past the initial stages of their illness and are now decompensating rapidly.

Secondly, due to lack of experience, most owners and many veterinarians may miss subtle changes in a bird’s behavior or appearance that are indications of a health problem. Overlooking these early signs, combined with the bird’s efforts to mask obvious clinical signs, invariably leads to the delayed detection of illness and the presentation of the bird in extremis (Figs 6.2b,c). It is important that veterinarians learn to recognize early signs of illness, and educate their clients, so that illnesses can be detected before becoming too advanced. A physical examination form, used routinely by veterinarians and support staff, allows thorough and methodical documentation of the essential parameters of the physical examination (Fig 6.2c). The “masking phenomenon” and the ease with which early clinical signs can be overlooked highlight the importance of regular health examinations for the companion bird. Long-standing conditions such as malnutrition can be detected and corrected before the bird begins to decompensate and shows overt signs of illness.

**History Taking**

The collection of an accurate and thorough history of a patient is as crucial to making a diagnosis as is the physical examination and comprehensive diagnostic testing. A good history can alert the clinician to likely problems and allow him/her to refine the diagnostic approach.

**SIGNALMENT**

The first step in obtaining a history is to gain as much information about the bird itself as possible. A good receptionist or technician can often obtain such information. The clinician should be familiar with avian taxonomy, sexual dimorphism, and species-specific behaviors. Clients are often unaware of some basic facts about their bird (such as species, sex and age). Veterinarians intending to see avian patients regularly need to acquire a working knowledge of commonly kept bird species and their physical characteristics. Such knowledge, while available in some publications, is generally acquired
through experience and through being proactive and inquisitive. This may require visiting other veterinarians, aviaries, avian pet stores and zoologic collections and will take some time to acquire.

The species of the bird is the first key piece of information. Many clients are unaware of the correct identification of their bird, or may refer to it by a local name unfamiliar to others. The cockatiel (*Nymphicus hollandicus*) is known all over the world as the cockatiel or ‘tiel, except in Australia (the bird’s native land), where it is more commonly known as the Quarri or, in Western Australia, as the Weero (Figs 6.3a-f). The clinician needs to be able to recognize common species and have access to illustrated literature that will enable the clinician to confirm the scientific name and to identify unfamiliar species (see Chapter 2, The Companion Bird for selected photos). Knowledge of the species can offer the clinician vital clues to likely differential diagnoses for the sick bird and appropriate preventive medicine and husbandry during wellness examinations. For example, black cockatoos (*Calyptrorhynchus* spp.) and some macaws require more fat in their diet than many other psittacines. The same diet fed to galahs (*Eolophus roseicapillus*) and budgerigars (*Melopsittacus undulatus*) can result in obesity, atherosclerosis or hepatic lipodosis. Species-specific behaviors, such as the alarm “snuffing” typical of *Pionus* spp., is often mistaken by new owners and veterinarians unfamiliar with this behavior as a pathologic respiratory condition.

The age of the bird, while usually difficult to determine once adult plumage has been attained, is another important part of the anamnesis. Juveniles are more susceptible to conditions such as rickets, polyomavirus, circovirus and bacterial infections, while adult birds are more likely to suffer from neoplasia, chronic malnutrition and degenerative conditions. While owners may not be sure of the exact age of their pet, they usually know how long they have owned it, and that may be sufficient for establishing an age-specific list of differential diagnoses.

Many psittacines are sexually monomorphic—or at least appear that way to their owners. Knowing the sex of a bird can be vital. For example, abdominal hernias are almost non-existent in male birds, while being relatively common in females; yolk-related peritonitis and cystic ovarian disease are obviously seen only in hens; cocks do not become egg bound. Do not accept the owner’s assertion of their bird’s sex unless they have proof of sex identification (ie, a history of egg laying or a certificate of sex identification that can be correlated with this bird). If such proof is not available, or the sex cannot be positively diagnosed by physical characteristics, surgical or DNA sexing may be required (Figs 6.4a,b).

**PATIENT HISTORY**

**How long have the clients owned this bird?** (Fig 6.5)

Birds that have been in the owner’s possession for many years, with no recent exposure to other birds, are less likely to have infectious diseases (Fig 6.6) and are more likely to be suffering from underlying chronic conditions such as malnutrition or inadequate exercise. Recently obtained birds are more likely to have been in close contact with other birds and, as such, have possibly been exposed to infectious diseases (Figs 6.7-6.9).

**Where did the owner obtain the bird?**

With experience, the clinician will be able to identify “problem sources” of birds in the local area (ie, a certain breeder with a history of circovirus, bird fairs or a pet shop renowned for chlamydial problems). Developing a working knowledge of the quality of the sources of pet birds in your area can be a key element of patient evaluation in your practice (Fig 6.10) (see Chapter 2, The Companion Bird).

**Is the bird aviary bred or wild-caught?** (Fig. 6.11)

Wild-caught psittacines, although less common in recent times, are still coming into the pet market in certain parts of the world, such as in Europe. In countries such as Australia, Africa and South America, it is reasonably easy to obtain a bird from the wild. The challenge of taming a wild-caught bird can be daunting. Paradoxically, wild-caught (and therefore parent-raised) parrots that survive the rigors of capture and have adapted to interaction with humans, are much less likely to demonstrate the common behavioral problems of our domestically raised parrots. Feather plucking, vent prolapse, inappropriate screaming, and learned biting are all more prevalent in captive-raised African greys, *Cacatua* spp., and macaws (*Ara* spp.). Fortunately, improved techniques for raising these birds are being implemented, and both veterinary and client awareness of the need for continued attention to the emotional well-being of our parrots is increasing. As veterinarians, our responsibility is to inform the owners of the need for attention to and modulation of behaviors in their newly-acquired psittacine pet prior to the onset of problems. Suggesting and providing a contact for a knowledgeable parrot behavioral consultant can make the difference between a decades-long rewarding human-pet bond and years of frustrated and dissatisfied co-existence (see Chapter 2, The Companion Bird and Chapter 3, Concepts in Behavior).

Parasitic infections (both gastrointestinal and hematogenous parasites) are more common in wild-caught birds. However, areas with outdoor aviaries in the USA often have significant and occasionally fatal super infections from various nematode species.
**Fig 6.3a** | Knowing the species, the sex and the name of the color mutation, such as in this cockatiel, makes an owner more comfortable with the avian veterinarian’s knowledge. While most immature cockatiels resemble each other, mature cockatiels are usually sexually dimorphic. A mature gray male is shown here.

**Fig 6.3b** | These birds, if mature (over 9–12 months of age) represent the typical coloration of females of this species and color type. Females are lacking the bright yellow head in the normal gray colored cockatiel. Today’s birds are seldom pure, but rather hybrid mutations. Coloration is not as dependable a factor in determination of gender in these mutation cockatiels. The bird on the left has some yellow on the head and would be said to be a hybrid — demonstrating normal grey female markings like the bird on the right but with the additional yellow of a pied. Females of the normal color have horizontal striping on the tail. When compared to the male in Fig 6.3a the body color is not the usual gray. This is a sign of a split. The coloration illustrated is likely to be “split” to cinnamon as well as lutino in order to demonstrate these colors.

**Fig 6.3c** | This yellow-headed cockatiel was thought to be a male until “he” laid an egg.

**Fig 6.3d** | Young pearl-colored cockatiels (pearlies) have this color pattern. The males revert to being very similar to Fig 6.3a, (normal grey), while the females retain the pearl pattern at maturity.

**Fig 6.3e** | Yellow (in this case) or white wing bars are present on the ventral surface in both cockatiel sexes until maturity. In immature females, these bars are present from the axillary region to the distal wing; in immature males they are present from the elbow joint to the distal wing. The bars are lost in mature males during their first adult molt.

**Fig 6.3f** | Pied-colored cockatiels are not as distinctly sexually dimorphic as normal grey cockatiels. Behavior may aid in gender determination in these mutations. Male cockatiels carry a melody while females usually produce only one or two notes.
Mature budgerigars are sexually dimorphic in the nominate green birds and most color mutations. The male shown here has the characteristic male blue cere.

A mature female budgerigar with normal brown hypertrophy of the cere. Note the lack of hyperkeratosis, despite her being an egg producing hen for several years.

Some bird species, when properly cared for by the avian veterinarian and the owner, can be safely co-mingled, especially in spacious outdoor housing.

Boarding facility at an avian veterinary hospital. Proper testing prior to boarding is critical. Testing for infectious diseases helps prevent disease outbreaks. A complete history and physical examination at the time of admission allows underlying disease, such as chronic malnutrition, to be detected, brought to the owner’s attention and addressed. This protocol minimizes the chance that a bird will expire during boarding, and the subsequent assumption by the owner that the boarding was causative. Trained staff and attention to proper husbandry and monitoring of the birds are essential.

A free-flying Amazon in an English aviculture facility is exposed to untested budgerigars and cockatiels. In this environment, this Amazon may serve as a carrier, intermediate host or mechanical vector between the untested budgerigars and cockatiels and the balance of the aviary. As such, it poses as much or more danger to other aviary birds as exposure to wild birds or infestation with rats or roaches.

Wild birds at feeders outside bird facilities can be a source of infection. Wild lories at Currumbin Bird Park in Australia (see Chapter 21, Preventive Medicine and Screening).

A cap, mask, coveralls or gown, boots, disposable containers and air filtration with HEPA-filters are used at a USDA pet bird quarantine facility. This demonstrates measures that must be taken to impose a true quarantine and limit disease transmission.
Old World species of psittacines are also particularly susceptible to infection and death from sarcocystosis.

In Australia, the probability of a wild-caught cockatoo being affected with psittacine beak and feather disease (PBFD) is much higher than that of an aviary-bred bird. The same is true of African greys imported into the European Union (EU) from the wild. In the USA and the EU, captive African greys, eclectus, lories, sun conures and assorted other species can be infected with proventricular dilatation disease (PDD) (see Chapter 32, Implications of Viruses in Clinical Disorders). Macrorhabdosis is common in captive-raised budgerigars and lovebirds (see Chapter 30, Implications of Macrorhabdus in Clinical Disorders).

**Is the bird hand-reared or parent-reared? If hand-reared, at what age was it pulled from the nest, or was the egg incubator hatched?**

The health of juvenile birds is dependent largely on the health and nutrition of the parents (Fig 6.12). Hand-reared birds are dependent upon the quality of the hand-rearing formula being fed and the skill of the person performing the hand-feeding. Parent-reared birds tend to be more difficult to tame, unless they are handled on a regular basis before fledging. Hand-reared birds on the other hand, while usually more closely bonded to people, often have behavioral disorders associated with poor socialization, especially if reared in isolation. If a large number of chicks from different sources are reared in one facility, there is a higher probability of the spread of diseases such as polyomavirus and chlamydiosis. All of these factors need to be assessed during the history collection, especially when examining juvenile birds. Birds sold prior to weaning, often to inexperienced owners, are predisposed to develop aspiration pneumonia. Behavioral problems are also common in babies hand-fed with the traditional methods (see Chapter 3, Concepts in Behavior).

Although incubator hatched eggs, when harvested by knowledgeable aviculturists, have a far less chance of accidental breakage or parental destruction, several negative consequences arise. Inappropriate incubator temperature or humidity can cause congenital deformities. The lack of antibodies from initial crop feedings by the parents may create an increased susceptibility to many diseases, some of which can prove fatal. Additionally, the consequence of deprivation from parental contact during the first days and weeks of life is not documented in birds, but extrapolation from other species would make it likely that a serious negative impact may arise from this isolation.

**Does the client have other birds? Are they in contact with each other? Are any of these birds affected with similar clinical signs?**

Other birds in the household may have many effects on the environment of the presenting patient. These could be a source of infection or susceptible to infection from a bird presenting to the practitioner with a contagious disease. It would be significant if a blue and gold macaw (Ara ararauna) presenting for dyspnea was being kept in the same room with a powderdown-producing species, such as an umbrella cockatoo (Cacatua alba). With feather destructive or self-mutilation behaviors, the presence or absence of other birds may affect (positively...
or negatively) the emotional state of the affected bird.

**Previous Medical History**

The avian patient’s previous medical history should be determined to the extent possible.
- Has the bird been ill before?
- If so, what were the clinical signs, tests performed, results of those tests, diagnosis and therapy administered?
- What was the bird’s response to this therapy?
- Has the bird recently been treated with remedies purchased at a pet shop or supplied by a breeder? If so, what medication and for what period of time was or is it being administered?
- If the bird is presented for a second opinion or as a referral, may we request copies of the previous medical record?

**HUSBANDRY**

Is the patient an aviary bird, a companion bird, or a zoological specimen?

The husbandry of aviary birds and zoological specimens are discussed elsewhere in this book, and the reader is referred to the appropriate chapters. Assessment of a companion bird’s husbandry must include the cage, the environment around the cage, and the bird’s interaction with its environment.

Is the cage in which the bird was transported the bird’s permanent cage?

If it is not, ask the owner to describe the permanent cage, using the guidelines contained in the following paragraphs.

Where is the cage located in the house?

In the kitchen, living room, individual’s bedroom, or screened porch?

Is the bird able to remove itself from view?

Is it supplied with a hide box or comparable visual screen? Is it kept isolated, away from family activities, or in the middle of constant activity?

Is the bird permitted to get adequate sleep at night?

A common owner misconception is that covering a bird’s cage, while that cage is located in a room with the lights and television on, is providing the bird with an environment conducive to sleep. Whether covered or not, the number of hours that a bird is supplied with sufficient darkness and quiet is critical to health — both emotional and physical.

Does the bird have access to direct, unfiltered sunlight on a regular basis? (Figs 6.13a,b)

Increased calcium absorption and metabolism from ultraviolet (UV) light exposure is beneficial to birds as it is for many other species. Recent research shows that some species may have an absolute requirement for UV light (see Chapter 5, Calcium Metabolism). In the appropriate climates or seasons, regular outdoor exposure to sunlight can have many additional benefits, both physical and psychological. Increased humidity, the sounds and sights of nature, breezes and changes in barometric pressure all promote emotional well-being in birds when these are provided with adequate thought for the bird’s safety and comfort. This leads to the next point:

If the bird is kept outside, is it safe from predators and diseases?

Are there potential disease vectors such as mosquitoes, roaches or rats that can access the bird’s cage? If the bird is brought into the house at night, is the food and water removed and replaced to prevent contamination of the cage contents overnight and subsequent exposure to diseases such as sarcocystosis? (Note: Additional husbandry issues are covered in Figs 6.14-6.17a-c.) Predators such as raccoons are notorious for reaching...
into cages and severing legs and wings from parrots.

**Does the bird come out of its cage? Is it supervised when out of the cage?**

Remember that “supervision” is subjective. Many birds with heavy metal toxicity ingest the inciting material while being supervised. Owners are often adamant prior to the radiographic diagnosis that their bird has no access to metal.

Answers to questions concerning time out of the cage will also help establish the degree of interaction between the bird, its environment and its owners.

**Are the bird’s wings clipped or is it free-flighted? Is the bird exposed to potentially dangerous situations?**

Different injuries and exposures occur in flighted and non-flighted birds. For example, heavy-bodied birds with severe wing clips are prone to beak and keel trauma. While keel and beak tip trauma may be obvious due to the presence of blood, the dislocation or straining of the quadrate bone and associated muscles may present only as depression and lack of appetite.

Conversely, concussive force to the head is most common in fully flighted birds that fly into glass doors or mirrors, as are ceiling fan injuries, burns from stovetops and drowning from accessible water sources.

**Does the bird interact with other animals or birds?**

Dogs and many other pets may carry clostridial bacteria normally, while pet birds often develop digestive disorders from exposure to such bacteria (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders). Also, cat claws and bites may cause penetrating wounds that do not leave obvious external marks but often cause internal damage and/or infection.

**Is the bird subject to potential exposure to toxins?**

Burning plastic, non-stick cooking pans, cigarette smoke, aerosol sprays or household plants are some of the common substances causing toxicity in pet birds. Additionally, the metal wicks of candles may contain lead. Smoke (including cigarette, incense, candles and barbeque grills) and other strong smells are potentially hazardous to pet birds, and exposure to these should be avoided (see Chapter 31, Implications of Toxic Substances in Clinical Disorders [Figs 6.18-6.24]).

**DIET**

Underlying many health problems in pet birds is the common thread of malnutrition. For many generations, bird owners have accepted as fact that seed is a complete diet for birds [Fig 6.25-6.41]. This is reinforced by advertising from many producers and vendors of bird seeds. Historically, there has been a lack of readily available information on the deleterious effect of all-seed diets. Birds, as many other animals, often prefer high fat diets. Given a choice between seed, vegetables, formulated diets and fruits, nearly all birds will consume the seed first. Given this preference, it is not surprising to hear many bird owners state, “All he will eat is the seed, so that is all that I give him.” Chapter 4, Nutritional Considerations, gives more details on nutrition and nutritional disorders. The reader is urged to study this carefully.

**How much food is being consumed?**

An important part of history taking is to ascertain not what the owner offers the bird, but more importantly, what the bird actually consumes. The clinician needs to be aware that there are major species differences in dietary requirements. For example, some species may have a higher requirement for fat than others. There is no single diet that is appropriate for all avian species any more than there is one diet suitable for all mammalian species.

In addition to the type of food offered and consumed, feeding practices need to be reviewed. Some birds, even when provided with an excellent diet, will consume an excessive quantity and become obese.

**Is the food prepared fresh daily? Are dishes cleaned each day? Does the bird dunk food into its water dish?**

This last practice of dunking food creates a nutrient-rich broth ideal for bacterial contamination. Sterilization is not necessary in the healthy home environment, but reasonable cleanliness should be employed.

**Does the bird get any treats?**

Treats can supply sufficient calories to pet birds that any attempt at weight control is sabotaged. Also, certain foods, such as guacamole dip, are not always perceived by the owner as potentially toxic. Other foods, such as snacks containing excessive sodium, may cause or exacerbate feather-destructive or mutilation behaviors (see Chapter 2, Concepts in Behavior Section III p82).

**Are vitamin and mineral supplements being administered?**

If so, what are the contents of the supplement and in what form is it provided (ie, in the water or on the food)? Vitamins administered in the water may decrease a bird’s water consumption, discolor the urates or feces, and either be ineffective due to dilution and lability, or cause hypervitaminosis if administered in conjunction with vitamin-enriched seeds and/or formulated diets.
Fig 6.14 | Cage with natural perches. This bird’s cage is too small to allow for flight. Note that two sources of calcium (mineral blocks) are provided in addition to a formulated diet. This may lead to nutritional imbalance due to excess calcium (see Chapter 4, Nutritional Considerations).

Fig 6.15 | Here sand is used as a cage substrate. Note the accumulation of feces and food indicating poor husbandry and potential microorganism overgrowth. Sand can be used but needs to be raked clean often and replaced when dirty.

Fig 6.16 | Newspaper is a good substrate if changed daily. The number and character of droppings can be determined readily, yielding information reflecting the state of the bird’s health. These “popcorn” droppings are not normal.

Fig 6.17a | Cement and sandpaper perches. Sandpaper perches are generally ineffectual and may cause or add to plantar surface abrasion. Overgrown nails are a sign of metabolic disease and require addressing the underlying problem. Sharp nail points are normal and necessary in the wild. Owners often request trimming of these tips to prevent discomfort to their skin. Some blunting may be necessary to prevent trauma to the owner, but the bird will be less stable when perching and the owners must be forewarned of this. In some cases cement perches can work to keep the tips blunted when the proper type, size, texture and placement in the cage is accomplished.

Fig 6.17b | Plastic perches with ridges to allow a better grip can be wedged into stainless steel cages. They are easy to clean and sterilize.

Fig 6.17c | Natural hard woods like manzanita make long lasting perches. However, these do not offer a rough surface on which the birds can clean their beaks, nor is such a hard slick surface the ideal perch.
Fig 6.18 | Some dog and cat flea products can be a danger to birds.

Fig 6.19a | “Hardware cloth” is galvanized iron. The galvanized coating is usually predominately zinc and may also contain lead. While usually safe for non-chewing birds like this Tragopan sp., it is not safe for members of the psittacine family.

Fig 6.19b | Toys are frequently made of polished galvanized metal. Here a magnet is used as a diagnostic tool — if it attaches, the underlying metal is iron. This is a common metal that is galvanized to prevent rust. Galvanization is primarily zinc. The circular shaped magnet has attached to a chain and anchor screw, indicating galvanization is likely and these objects should be removed.

Fig 6.19c | Toys can have the galvanized hook replaced with brass, the chain replaced with stainless steel, leather or natural fibers (hemp, sisal or cotton), and the link replaced by one of stainless steel.

Fig 6.20 | A decorative palm tree is a safe house plant but items in the soil such as fertilizer beads and other slow release items can be toxic.

Fig 6.21a | Lead weights used to balance car tires and sink fish bait. These are extremely toxic, being rapidly dissolved in the ventriculus and absorbed into the blood stream.

Fig 6.21b | Curtain weight made of lead.

Fig 6.21c | Lead soldered galvanized water dish.
A dangerous toy’s clip has gotten stuck on this African grey’s beak.

While tobacco can be toxic if ingested, smoke from cigarettes is the product’s greatest danger to birds. Contact with nicotine has been considered as a cause of dermatitis.

Shelled nuts often get rancid unless refrigerated or stored in glass or foil bags.

Seeds infested by insect larvae that hatch often become “webby” due to a fungus (usually Aspergillus) and can produce mycotoxins. Do not freeze webby seed and then feed it. The larvae from a grain moth has penetrated this sunflower seed.

Chocolate contains dangerous levels of theobromine and caffeine. Chocolate containing less sugar generally contains a higher level of toxic substances.

Although pothos is considered poisonous in small animals, it has never been a proven cause of systemic toxicity in healthy pet birds.

Mineral blocks, especially when provided to birds on formulated diets, could add toxic levels of calcium (see Chapter 4, Nutritional Considerations).
Fig 6.25 | Palm nuts are eaten by wild hyacinth macaws. Cattle consume and digest the sticky, fleshy outer coating. The seed on the left has been passed out in feces; birds prefer to eat the nut in this form.

Fig 6.26 | Animal protein (meat, egg, cheese) has been removed from pet bird diets for 15 years with excellent results. Whether adding scientifically formulated amounts of animal protein to the diet of breeding birds is warranted is still unknown. Vegetable protein diets have been empirically proven to be sound.

Fig 6.27 | Offering excessive amounts of unbalanced foods allows the bird to choose its diet and nutritional disorders result. The amount of food shown was offered twice a day. The immature corn (sweet corn), baby beans, zucchini, and squash are of little nutritional value. The broccoli, kale and carrots are difficult to digest. While no sunflower seeds are offered, safflower is just as imbalanced, being even higher in fat than sunflower seeds. Peanuts are also high in fat, and when fed without the shell, often become rancid. Peanuts are a common source of mycotoxins. If they are fed at all, a human grade of peanuts certified free of mycotoxins should be used.

Fig 6.28 | An aviculture diet used commonly in the 1980’s. Birds on sunflower seeds, apples, oranges, grapes, pound cake and bread rapidly developed nutritional disorders, especially the breeding females. Nutritionally deprived parent birds were unable to raise their young. Incubation of the eggs and hand-feeding from hatching had to be employed. The associated developmental problems in the young disappeared when a formulated diet was instituted.

Fig 6.29a | Sunflower seed, millet and canary seed are the historic staples of the bird food industry. Only one current manufacturer of formulated diets uses these century-old ingredients and improves their nutritional balance with appropriate additives. This has improved acceptance and avoided potential problems that one may get when attempting to incorporate novel ingredients. New, untested ingredients can create unforeseen problems that may take decades to discover.

Fig 6.29b | Since no standards have been officially declared, diets such as the one pictured above are incorrectly marketed as “complete diets” in many pet stores. Colored seed is the largest part of the pet bird food market in the USA. Newer versions of these colored seed diets have added shaped and colored pellets but empirically are not nutritionally superior to plain seeds.
Fig 6.29c | A scarlet macaw taken from a USA pet store magazine ad for a product that claims to have been developed by their researchers “to make a new all natural... treat (sic) premier supplement for all caged birds — and better than all other brands.” The abnormal color and physical characteristics of the bird’s feathers would indicate the company, their researchers and/or advertisement personnel are uninformed as to the desired physical attributes of a healthy bird.

Fig 6.30 | An aviculturist’s food bowls for macaws and large cockatoos on the left and Amazons and African greys on the right. The organic formulated nuggets are a high potency formula. During the non-breeding season the seeds and nuts are stopped and for some species the nuggets are changed to a maintenance product. After ten years of this diet, the common avicultural problems of infertility, incubation, raising, hand-feeding from day one, congenital and developmental conditions and chronic “infections” are no longer encountered. The parents incubate and raise the babies until a week or so prior to weaning, when hand feeding is initiated to assure tameness. With production increased and problems decreased, profits at this aviary have soared.

Fig 6.29d | Free-ranging scarlet macaws hand-raised on an organic formula in Tambopata, Peru. Notice the tight feather structure and brilliant colors compared to Fig 6.29c.

Fig 6.31 | Twenty-five grams of whole grain (dense) organic nuggets (on the right) compared to an equal weight of traditional extruded brand made from refined flours that expand more readily. The fiber and other ingredients in whole grain flours lack the refined carbohydrates necessary to get the extrusion-induced expansion (fluff) attained with extrusion of these less-nutritious refined flours. These less expensive refined flours are by-products of the oil industry. The end product produces larger, lighter bags of food at a reduced cost. Such products require more additives than whole grains to establish balanced nutrition.
Fig 6.32 | Quantity of pellets consumed in a day by a cockatiel for $0.01 (USA). Many owners waste food as they are not properly educated on proper food volumes.

Fig 6.33 | While many theme parks’ cage labels state that the birds eat a formulated diet, the bowls are often full of a seed mix with colored pellets. Nutritional disorders are commonly observed in such a facility. Incentives such as free foods, cash donations and revenue sharing may be given to the facility for reciprocal endorsements that have little to do with the actual food fed or its nutritional value.

Fig 6.34 | Seeds top-dressed with a powdered mineral/vitamin supplement show the powder on the bottom of the food cup, which is subsequently disposed of with the seed hulls.

Fig 6.35 | Veterinarians in the USA often recommend a pressed seed cake. The waste in this bird’s cage shows that most has been discarded except for the oat hearts. The food coating (egg, minerals, and vitamins) was discarded untouched. This bird had liver, respiratory and orthopedic problems that improved when switched to an organic formulated nugget that could not be selectively consumed.

Fig 6.36 | Organic formulated nuggets are low in synthetic vitamins and have natural sources of nutrients (alfalfa and spirulina for carotinoids, kelp for iodine and trace minerals, sea salt, natural clay with naturally chelated minerals, high soluble fiber from digestible hulls and psyllium). These nuggets are free of pesticides, food coloring, by-products and preservatives. The absence of preservatives requires cool, dry, dark storage in air-tight containers to prevent rancidity or loss of nutrient value (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders).

Fig 6.37 | Vitamins in this bird’s water color it yellow. Many birds will not drink freely from water with this color and taste, and dehydration can result. Bacterial and fungal growth is also encouraged in this medium. Finally, the dilution of the vitamins and exposure to water, air, heat and light degrade many of the labile vitamins.
Fig 6.38 | Water is often contaminated by improperly designed purifiers. Many allow bacterial proliferation or fail to remove pollutants. In the USA, reverse osmosis (blue and white canisters), bottle and tap water are commonly provided. Only water labeled “USDA drinking water” is regulated and must meet government standards.

Fig 6.39a | Plastic pipe and water hoses have been incriminated in chronic Pseudomonous spp. infections.

Fig 6.39b | Inadequately cleaned plastic bowls are potential sources of bacterial infections. Crock and stainless steel are less porous and thus less likely to be a problem. Water bottles are best constructed of non-porous glass.

Fig 6.40 | Salt/mineral spool, mineral block, powdered calcium, grit and oyster shell are not necessary for birds fed formulated diets, and can be harmful (see Chapter 4, Nutritional Considerations).

Fig 6.41 | Male cockatiel on a seed and table food diet. Note the bent tail, ruffled feathers, and excessive pin feathers over the shoulder and crown. The same bird is shown in Fig 6.3a 6 months after conversion to an organic formulated diet.
Pediatric Patients

Concerns with babies still being hand-fed add additional elements to the anamnesis.

What hand feeding formula is being used? Is the formula being prepared according to the manufacturer’s recommendations? Is anything extra being added to an already balanced diet?

It is common to see a hand-feeding formula designed for macaws used on a baby *Cacatua* spp., with resultant hepatic lipidosis. Likewise, additives such as peanut butter, macadamia oil and sunflower seeds can add additional fat and detract from other necessary nutrients.

Conversely, many prepared formulas for hand-feeding have insufficient calories per unit volume for some species of psittacines, notably macaws.

What is the temperature of the food when fed? What are the quantity, frequency and method (syringe, tube, spoon, cup, weaning pellets) of feeding?

Using a microwave to heat the formula can lead to crop burns. What is not commonly understood is the following: food heated in a microwave oven can have hot spots due to uneven heating. When water is heated in a microwave oven and then poured into another container to be mixed with the formula, the temperature of the resulting formula will be more uniform. The temperature of the formula should still be accurately assessed with a thermometer.

However, if the same container in which the water is heated is used to receive the powered formula, and multiple syringes are extracted over several minutes from this container, disaster often occurs. Many containers hold heat from the microwave, and gradually transfer this heat into the formula, causing the subsequent syringes that are delivered to be much hotter than the initial temperature reading indicated. Severe crops burns can result from this practice.

Conversely, baby birds may refuse formula that is not warm, and cold formula can delay crop emptying.

Various methods of administering the formula are used. Most common still is the use of a syringe, which allows an accurate determination of the quantity of formula being consumed. Spoon and cup feeding are also used successfully by some. Soft plastic or rubber tubing can be used, and this method does decrease the mess produced by bobbing, but carries the inherent risk of accidental ingestion of the tube if it becomes detached from the syringe. It also may not be as psychologically satisfying as having food that can be tasted.

The use of soft, warm, solid foods for feeding and weaning is advocated to more closely approximate the natural feeding patterns of these birds. This technique has been extensively used by Phoebe Linden, of Santa Barbara Bird Farms, with promising results.

Inexperienced hand feeders often cause aspiration or inadvertent starvation of birds while hand feeding. Generally, a baby bird can accept roughly 10% of its body weight per feeding. The frequency of the feedings and the quantity of each feeding will vary with the age, species and individual.

Common problems to look for in the history and physical examination of hand-feeding baby birds include:

1. Insufficient calories being given. Often a new bird owner will adhere to guidelines that state a bird should have a reduced number of feedings per day at a given age. The owner may fail to understand that this is based on the supposition that the bird is starting to eat on its own at this age. Some birds have not yet even been offered food, but the frequency of feedings has been severely reduced, leading to weight loss and debilitation.

2. Over-distention of the crop. This can have many causes, but over-distention may be obvious on physical examination and may be associated with a history of feeding an excessive volume at a given feeding.

BEHAVIOR

A behavioral history is becoming increasingly important as pet birds move out of their cages and into their owners’ lives. Just as countless dogs and cats are euthanized every year because of behavioral problems, many birds suffer a similar fate or are transferred from household to household.

As psittacine behavior is determined largely by the interaction between the bird, its owners and its environment, questioning must focus on these areas. Who is the primary caretaker? Whom does the bird seem to prefer? Does the bird dislike anyone? How many hours per day does the bird spend alone? What does the bird see and hear when it is alone? Does the bird spend time with other birds or other pets?

Many factors that may influence pet psittacine behavior are yet to be determined. For example, recent work has indicated that fluorescent lights are perceived as a constant flickering by the eyes of birds, and both physiologic and behavioral problems may arise from previously unrecognized sources such as these. Also, there is increasing concern that our traditional methods of hand-feeding may be laying the groundwork for the development of behavioral problems later in life (see Chapter 3, Concepts in Behavior).

It is important to clarify the bird’s interaction with its
owners (human flock). How tame is the bird? Does it readily step up onto a proffered hand? Does it always try to move up onto a person’s shoulder? Is this allowed or encouraged? Does the bird talk? Does it like to be petted? Where? How does it react to different family members? How does it react to strangers? For the potential significance of the answers to these questions, see Chapter 3, Concepts in Behavior.

The Presenting Complaint

Once the bird’s background has been established, it is time to assess the reason(s) the bird has been presented. Ask the client to describe the problem. Do not interrupt the client other than to seek clarification of details. You may need to repeat back to the client what they have said to ensure that a mutual understanding and clarification of the owner’s concerns are reached. For example, many birds presented by their owners for “diarrhea” are actually polyuric. An explanation of the difference between diarrhea and polyuria, and a determination of which is actually present, should be made prior to the physical examination and diagnostic testing.

Once the practitioner has identified the problem(s), appropriate questions must be asked of the client to determine duration, severity, progression, previous diagnostics if known, previous therapeutics, and response to prior treatments. When did it start? Is this the first time it has happened? Have other treatments been tried? Who prescribed these treatments? Did they work? Is this condition static, progressive, or resolving? Are other birds affected?

The history taking as described above is not comprehensive. As one gains information, areas of concern will become apparent, and additional questions may be needed for clarification. The clinician must not dominate the conversation — rather, he or she should ask short questions and listen carefully to the client’s reply. However, the clinician must be prepared to guide the discussion, to ensure that the maximum amount of useful information is obtained.

The Distant Examination

During the history taking, the clinician should be observing the bird and noting its behavior prior to restraint.

Most birds, no matter how ill, will make an effort to mask their clinical signs when first brought into the examination room. The clinically ill bird will be unable to maintain this pose for any length of time. Avoid disturbing the bird until it has settled, otherwise valuable clinical signs may be overlooked. The practitioner should be seated in order to remove any predatory threat to the bird. This will expedite its relaxation and therefore accelerate the demonstration of clinical signs.

Observe the bird’s respiration (Fig 6.42a). Once the bird has settled in its cage in the examination room, there should be no open-mouthed breathing, marked tail bobbing, increased respiratory effort or audible respiratory noise. The presence of these signs should alert the clinician to potential respiratory compromise. Respiratory compromise may be due to true respiratory disease, cardiac disease, space-occupying mass or fluid within the coelom, anemia or severe debilitation. Care must obviously be taken with handling patients that are demonstrating respiratory distress.

The bird’s posture should be observed (Figs 6.42b-d). Sick birds that are hypothermic will fluff their feathers in an attempt to conserve body heat. They sit still to conserve energy and, as they weaken, they sleep more (Fig 6.42e). Such signs are the classic “sick bird look,” but not all sick birds will display these signs.

Evidence of a wing droop, lameness or reluctance to bear weight on one leg may indicate a musculoskeletal problem or a central or peripheral neurologic affectation. Spinal deformities can often be detected by an abnormal positioning of the tail. An upright position with a wide-legged stance may indicate egg binding or a similar space-occupying mass in the coelom or cloaca. Birds that hold both wings away from their body and pant are usually heat stressed or severely oxygen deprived.

The bird’s plumage can be cursorily examined prior to restraint. Normally the plumage should be sleek, well groomed and clean. Untidy or dirty plumage may indicate that the bird is not grooming itself, or that there is some type of feather abnormality. Discolored feathers can reflect a variety of problems, including PBFD, chronic liver disease, excessive handling with oily hands or malnutrition. Closer examination of the feathers is warranted when the bird is removed from its cage.

Note the condition of the beak and toenails. Overgrown or flaky beaks or overgrown and twisted nails may be associated with PBFD, poor husbandry, chronic liver disease or malnutrition.

Watch as the bird defecates, looking for signs of straining or discomfort and listening for any accompanying flatulence or vocalization. Birds do not generally pass any gas and should be able to defecate effortlessly.

Observe the bird’s behavior, assessing how tame the bird...
is and whether it is showing any overt sexual display towards the owner, objects in its cage or other people present in the room. Note the owner’s interaction with the bird, as this may reveal valuable clues to relationships at home.

**The Cage**

The cage must be of sufficient size to allow the bird to extend and flap its wings and to turn around without damaging feathers. The bird should ideally be able to express its normal behaviors within its cage, unless the cage is used only as a roosting space while the bird has access to a larger environment. The cage should be constructed of materials that are safe and appropriate for the size and power of the bird’s beak. Small gauge wire, while suitable for smaller psittacines, is readily chewed and eaten by larger birds, often leading to heavy metal toxicity. Similarly, poorly galvanized cheap wire often has tags of zinc on it that are easily picked off and swallowed by psittacines of all sizes. Unsealed wooden cages are inappropriate, not only because many birds will chew the wood, but also because wood is impossible to disinfect, making it difficult to maintain adequate hygiene.
The floor of the cage should not be covered with grit, sand or wood shavings. The substrate of a cage is rarely changed with sufficient frequency, and ingestion of substrate material can lead to blockage of the gastrointestinal tract. Newspaper is a non-toxic and readily available substrate. It is also inexpensive, which encourages frequent changing.

Many cages are sold with plastic or wooden dowel perches. These are rarely suitable, since the smooth, unchanging surface and diameter offer little exercise for the feet and toes, and the symmetry can create constant pressure on selected areas of the feet, leading to pododermatitis. The uninformed owner may be reluctant to discard these perches, assuming that since they were supplied with the bird cage that they are appropriate. Just as variation in diameters and surfaces of perches are important for the individual bird, birds of various sizes and species require different ranges of perch diameters.

The positioning of the perches within the cage is also important. Birds tend to sit on the higher perches, so the diameter and texture of these perches may need to be alternated. Perches should not be placed so that a bird will be defecating into its food or water dish. A bird may be encouraged to sit on a concrete perch if a food dish or treat cup is placed so that access to this cup is achieved by perching on the desired surface.

Dishes should be constructed of a material appropriate to the species using them, and free of contaminants such as lead, which has been used as a solder to repair cheap galvanized dishes. Galvanized dishes should not be used, as the zinc in the galvanized coating may leech into the food or water. Dishes should be cleaned daily and positioned where they are unlikely to be soiled. Food and water dishes should not be placed alongside each other, as many birds will drop their food into the water, producing a broth within a few hours. Birds that tend to dunk their pellets into their water may need to have the water and food dishes placed on opposite sides of the cage.

Toys should be appropriate for the bird, and should not be so numerous as to restrict the bird’s movement within the cage. Cheap toys, especially bells, are a common source of lead or zinc. Metal items that can be attached to a magnet are iron based. Shiny silver-appearing metals are often galvanized and polished and are a potential source of zinc toxicity. Toys should be made of natural materials, such as rope and wood, and should be replaced as soon as they become frayed. Bathing or misting should be available on a regular basis.

**Odors**

Birds that are exposed to significant cigarette smoke will absorb the odor of smoke onto their feathers. Problems ranging from respiratory disease to feather destructive behavior have been linked to excessive exposure to smoke.

The feces of birds with enteritis, especially due to clostridial species overgrowth, have a distinctive, fetid odor. This seems to be most prevalent in cockatoos with fecal retention and cloacal prolapse and in birds with extensive and restrictive cloacal papillomatosis, although it may occur in any bird. The detection of this odor in a bird’s stool should be pursued diagnostically, usually by first performing a Gram’s stain on the feces.

Owners may present their bird, commonly an Amazon, for “bad breath.” This is usually the natural smell of these species, and not related to disease.

**Examination Room Equipment**

Appropriate equipment for use in the examination room includes:
- A supply of freshly laundered towels of different sizes (or paper towels) for restraining birds.
- Scales capable of weighing in grams, preferably with a detachable T-perch (to allow birds to perch on while being weighed), and a container in which to weigh smaller, fully flighted birds.
- A training perch for the bird to perch on while being examined.
- Clinical equipment, such as stethoscope, a focal light source, magnifying loupes, needles and syringes, blood collection tubes and culture swabs.

The use of heavy gloves to catch and restrain birds should be discouraged. With these gloves on, the clinician cannot be sensitive to small movements of the bird, and can easily hurt or even kill the patient. Additionally, these gloves cannot be cleaned or sterilized. Ensure that the room is escape proof, and that clinic staff will not enter the room unexpectedly. Avoid stressful sights and sounds such as dogs, cats and other potential predators.

**Handling and Restraint**

Once a thorough history has been obtained and the bird observed in its cage, the next step is to examine the patient more closely. In order to do so, the bird will
need to be handled and restrained. In the case of avian birds, this should be done with a view of minimizing stress to the bird, while at the same time, avoiding injury to the handler. Many companion birds, on the other hand, have learned to trust humans and regard them affectionately. Destroying this trust through aggressive catching and handling techniques can adversely affect the bond between owner and bird. This relationship must be preserved, and handling techniques for closely bonded birds should emphasize minimal stress and fear (see Chapter 3, Concepts in Behavior).

As the oils on human skin can be detrimental to the feathers of many species, a light dusting of unscented talcum powder on the clinician’s hands is appropriate before beginning an examination.

Be aware that the scrubs or other clothing worn by the technicians and practitioner will be exposed to powder down and fecal material during handling and restraint. The potential for disease transmission to subsequent patients should be considered and clothing changed when appropriate.

By the time the clinician is ready to examine the bird, the general temperament of that bird should have been established. If the cage is the bird’s home, its territorial instincts may drive the bird to protect its cage from the intrusion of strangers. In many cases, therefore, it may be appropriate to ask the owner to remove the bird from the cage. If the owner is unwilling (or unable) to do so, the clinician should study the cage to determine the best means of removing the bird. Tame birds may simply step through an open door. At other times, the cage may need to be dismantled rather than trying to catch and remove a bird through a small door. If the bird is friendly, the clinician should gently introduce a hand into the cage, with the back of the hand to the bird. If there is no aggression, the forefinger is extended and placed under the bird’s chest. A tame bird will usually step onto the finger. Restrain the foot or a toe by gently pressing on it with a thumb against the finger, keeping the bird steady, and gently bring it out of the cage. During this procedure, the clinician should be talking to the bird, praising it, and maintaining eye contact. Once the bird has been removed from the cage, continue to praise it and, depending on the species and individual, scratch its head, its axilla, or simply continue talking to it while raising it to a height at which it appears comfortable. If the bird has to be physically caught, it is usually best to use a small hand (or paper) towel to gently envelop and then restrain the bird. Show the bird the towel and let it become accustomed to its appearance. If possible, the clinician should envelop the bird in the towel from below — an approach from above is potentially a very intimidating experience for a pet bird. Keep talking in a friendly voice, and maintain eye contact (see Chapter 3, Concepts in Behavior).

Birds that are not tame can be caught using a towel as described above. These birds will rarely stay still during capture, so a quick capture is the best approach. The most dangerous part of the bird’s body should be immobilized first (i.e., psittacines = the head and beak; raptors = the feet). Once the dangerous areas are immobilized, the bird is wrapped in the towel and removed from the cage.

When the bird has been removed from the cage, the next step will be determined by the bird’s tolerance of handling. Very tame birds can be placed on scales to be weighed, while less tame birds may need to be examined first while still restrained and weighed just before being returned to their cage.

At all times the clinician must be aware of the bird and how it is handling the stress of restraint and examination. Many birds are presented for evaluation of an illness, having been ill for a period prior to the owner’s recognition of disease, and the stress of restraint can exceed their ability to compensate. Collapse and death are, unfortunately, not uncommon with critically ill birds. If there is any doubt as to the bird’s ability to cope with the stress, it should be immediately returned to a perch or the cage and allowed to regain its composure before proceeding. Critically ill birds should not be handled initially (see Chapter 7, Emergency and Critical Care).

**THE “PUT IT DOWN” LIST**

Panting and increased respiratory rate while being examined warrant attention. It may be that these are normal compensation techniques for a stressed or obese bird, but during restraint, it is difficult to determine the extent of the stress without reducing the effectiveness of the restraint.

1. If the bird is panting or breathing rapidly, first alter the grip on the head so the head is free to move. The bird should immediately begin to turn its head in search of something to bite. If it doesn’t, PUT IT DOWN.

2. A paper towel or a corner of the towel being used to restrain the bird can be placed into its mouth. It should immediately begin to bite at this, demonstrating that it has sufficient oxygen reserves to do so. If the bird lets the material lay limply in its mouth, PUT IT DOWN.

3. Have the bird grasp your hand or finger with both of its feet. (This should be part of the physical exam anyway, to determine symmetry and strength of grip). If the bird’s grip is weak or non-existent, PUT IT DOWN.

4. If the bird’s eyes close during the physical exam, PUT
IT DOWN. Conversely, do not be reassured if the bird has its eyes open — many birds have held their eyes open as they drew their last breaths.

5. If in doubt, PUT IT DOWN. Return the bird to the location (cage, owner) where it is most comfortable, and observe it while talking to the owner.

The Physical Examination

“You will miss more by not looking, then you will ever miss by not knowing.”

The old veterinary adage expressed above is as true for avian medicine as it is for any other species. A thorough, systematic physical evaluation of the patient is essential to obtaining information regarding the bird’s problem and diagnosis. Clinicians should develop a thorough examination protocol with which they are comfortable, and use it for every (stable) patient, regardless of the reason for presentation. A physical examination form may be useful in ensuring that nothing is overlooked.

BODY CONDITION

All birds should be weighed during each visit to the veterinarian, and at the same time each day while hospitalized. Monitoring an individual bird’s weight will often detect potential disease prior to the demonstration of clinical signs. The veterinarian will also develop an appreciation for the normal body weight ranges of various species. The weight should be recorded in grams, as this allows accurate monitoring (Figs 6.43, 6.44).

Traditionally a bird’s body condition was determined by palpation of the pectoral muscles and allocating a body score based on the muscle and fat coverage of the sternum. Although useful as a cursory determination of emaciation, this technique fails to take into account that most birds do not store fat in their pectoral region and can be carrying significant fat deposits while still having an apparently normal body score. Wetting the feathers over the abdomen, flanks, thighs and neck with alcohol allows visualization of subcutaneous fat deposits, seen as yellow fat under the skin rather than pinkish-red muscle (Figs 6.45a,b-6.47a,b).

The combination of body-weight recording, pectoral muscle palpation and examination of subcutaneous fat allows an accurate assessment of body condition.

BLEEDING

Bleeding or bruising may be encountered during or produced by the physical examination. Excessive, prolonged or abnormal bleeding or bruising in birds is often related to one or more manifestations of malnutrition. The following is a brief list of the most common presentations and associated etiologies:

- Conjunctival hemorrhage or “red tears” are commonly seen in African greys and Quaker parakeets (see Fig 6.47a2 for information on potential etiologies).
- Denatured blood in the nasal debris of psittacines. This seems particularly prevalent in mutation cockatiels (see Fig 6.47b2). Malnutrition causing squamous metaplasia and secondary bacterial and fungal infections is a likely cause in many birds. In these cockatiels, however, there may also be a decrease in
Fig 6.45a | Body condition scores on simple pectoral profiling are not accurate. This blue and gold macaw is 1300 g and has cleavage in the area of the keel’s corina. When the bird’s feathers are wetted down with alcohol, no fat in the sub-cutaneous tissues is evident. However, on the commonly proposed body score technique, this bird would be called obese because the breast muscle exceeds the keel’s corina in depth. Obese birds are considered high risk birds. This is a large blue and gold, but it is not obese.

Fig 6.45b | Same bird as in Fig 6.45a at a distance. Note the appearance of the feathers. They appear as a unit, not a collection of individual feathers. The colors are clear and crisp. The feather margins are smooth and sharp. The feathers are strong and straight. The skin is reptilian and boldly patterned. The nares, facial skin, eyes and nails are all exemplary. Max has been on a high fat organic formulated nugget for 10 years with limited fruits and vegetables. Natural sunlight and showers are frequently provided. Note the lack of flaking or layering of the beak. No flaking is present on the facial skin and no debris has accumulated in the nares.

Intrinsic clotting factors. Verification and etiology of this coagulopathy have not been determined, but malnutrition and hepatopathy, as well as genetic predisposition, should be considered.

Facial skin bruising is often noted in macaws and African grey parrots (see Fig 6.47c2). This can be the result of restraint that is too aggressive or an inherent bleeding dyscrasia. The same condition likely occurs in other species, but the presence of feathers in the periorbital area prevents observation of the bruising. Malnutrition is likely to be the major underlying cause of overly fragile dermal tissue and decreased coagulation factor production.

- Beak injuries (Fig 6.47d2).
- Broken blood feathers (Fig 6.47e2).
- Blood from the cloaca.
- Blood in the urine.
- Bite wounds (Fig 6.47f2).

**PLUMAGE**

Normal feather development in a baby cockatoo is shown in Figs 6.48a-g. Normal adult feathers are seen in Figs 6.49-6.56a-e and Chapter 2, The Companion Bird.

Attention should be paid to the following areas (Figs 6.57a-z-6.59c):

- **Color of the Feathers.** Abnormal coloration of feathers can be due to a multitude of causes. PBFD can cause green feathers to turn yellow and blue feathers to turn white. It will also lead to a generalized dirtiness of the feathers, especially in cockatoos. Chronic liver disease and/or malnutrition can cause darkening of feathers and a decrease of powderdown production in applicable species. Frequent handling of birds by the owner can leave a deposit of oil on the feathers, which then encourages fungal overgrowth. This causes a black discoloration on these feathers. This is not seen in birds with powderdown, presumably because the powder keeps the feathers clean.

- **Tidiness of the Plumage.** Birds generally keep their plumage well groomed and tidy. If the plumage is untidy, with no immediately obvious cause (eg, recent handling), the clinician should suspect that either the bird is unable to groom itself properly, or a generalized feather dystrophy (eg, PBFD) is present.

- **Evidence of Feather Damage.** Chewed and/or broken
Alcohol can be used to part the feathers to ascertain the absence or presence of body fat. This bird has an accumulation in area three (the abdomen, just anterior to the vent). Other areas should be observed.

This young budgerigar has a bulging fat mass at the furculum (area one).

This euthanized blue-crowned conure has had its feathers removed to show the three fat areas coalescing. 1 is area one. 2 is area two. 3 is area three. Area two, the axilla, is still discrete. Note the fat is deposited subcutaneously to the feather tracts.

Dorsal view of bird in 6.46c. Fat depositions continue in feather tracks over the wing, scapula and pelvis.
**Fig 6.47a** | A very ill conure is barely able to keep its eyes open and maintain its balance. Despite the presence of strangers it remains fluffed during clinical presentation. This implies a grave prognosis.

**Fig 6.47b** | Same conure as in Fig 6.47a. When the feathers are wet with alcohol, there is obviously little remaining breast musculature. This severe emaciation carries a grave prognosis. Handling such a bird without ascertaining its tolerance for restraint via proper distance observation will often precipitate a crisis. If the bird dies, the crisis will be with the owner. The owner will assume the bird died due to inappropriate veterinary care. Proper evaluation can avoid such a crisis. Most birds in this condition will not survive, but a few, when gradually and cautiously approached with treatment and diagnostics, will respond. In either case, the owner must be informed in advance of the severity of their bird’s condition.

**Fig 6.47a2** | Quaker (monk) parakeet with a drop of conjunctival blood post-examination. This phenomena is commonly observed in African greys when restrained. A nutritional disorder is usually involved. Subclinical rhinitis and sinusitis have been incriminated in this production of bloody tears from conjunctival hemorrhage. Squamous metaplasia of the respiratory system is likely underlying the respiratory disease. The degree of blood pressure elevation that restraint creates may also be a factor in more sensitive species (see Chapter 4, Nutritional Considerations).

**Fig 6.47b2** | Cockatiel with black rhinal discharge that is hemoccult positive. Secondary invaders are common and often require therapy. This therapy often includes nutritional correction.

**Fig 6.47c2** | Facial erythema and subsequent scabs like those shown in this African grey are often seen in macaws following restraint. While the immediate cause is the handling, the underlying skin fragility usually responds to nutritional correction.

**Fig 6.47d2** | Budgerigar with beak bleeding after trimming. A nutritional disorder is likely. Budgerigars and other parrots do not normally require beak trimming. The vessels in a nutritionally imbalanced bird’s beak grow closer to the tip and bleed more profusely. Styptics will usually control the bleeding.
feathers should lead the clinician to suspect over-grooming, self-mutilation, cage mate trauma or malnutrition. Saw-toothed edges can indicate a failure to molt normally; hence, old, worn feathers are being retained. It should be noted in cases of feather destructive behavior, whether the feathers have been bitten off level with the skin, plucked out, or if the shaft is being chewed.

- **Evidence of Feather Dystrophies.** Retained feather sheaths, retained pulp, hemorrhage in the shaft of feathers, strictures of the calamus and twisted feathers are indicative of feather dystrophies, often of nutritional, genetic, traumatic or viral origin (ie, polyomavirus, circovirus).

- **Wing Clipping (if present).** The wings should be examined to determine if the bird’s wings have been clipped and, if so, if that clip is appropriate to the species and temperament of the bird. The degree of lift that the bird is achieving with the current clip should be determined by asking the owner and by a “test flight” in a safe area, if needed. The owner’s satisfaction and the effectiveness of the last clip should be determined. The clip should be examined to determine if the cut ends of feathers could be bothering the bird.

- **Absence or Presence of Powder Down.** Powderdown is produced by the powderdown feathers on the thighs of many species of birds, particularly cockatoos and African grey parrots. It is easily recognized by the presence of a fine white powder on the clinician’s hands and clothing after handling the bird. A lack of powderdown leads to staining of the feathers and a shiny appearance to the beak and feet. The most common causes of loss of this powderdown include: malnutrition, hepatic disease, genetic mutations (notably in cockatiels) and circovirus in *Cacatua* spp.

- **Molting Patterns.** Most birds will molt heavily twice yearly, in spring and autumn — the so-called “pre-nuptial” and “post-nuptial” molts. Outside of these annual molts, there is a steady and progressive turnover of old feathers. The end result in psittacines is that each feather is normally replaced once a year. Continual heavy molts or the sudden loss of many feathers is abnormal, as is the failure to molt (seen as the retention of worn and broken feathers).

- **The Presence of Stress Lines or Stress Bars.** Stress or disease at the time a feather is growing will lead to a transverse “break” in the vane of the feather. The presence of many feathers with such stress lines is indicative of a problem in the bird’s recent past.

- **The Condition of the Skin.** The presence of erythema, excessive scale or areas of skin trauma should be noted. This can be done by parting the feathers with a cotton-tipped applicator, or gently blowing on the feathers.

- **Areas of Trauma.** The skin should be thoroughly examined for areas of trauma, especially on the wing tips, sternum, cere, ventral pygostyle and axillae.

- **Flexibility of the Feather (Figs 6.58a-c).** The shaft of the feathers of a healthy bird on a good diet should flex rather than break when the tip is drawn down towards the base; the feather should spring back to a normal position when released.

- **Parasites.** The presence of parasites on the feathers should also be noted; microscopic examination may be necessary for detection (Figs 6.59a-c).
Fig 6.48a | Baby Umbrella cockatoo at day 2.

Fig 6.48b | At 2 weeks of age this bird shows a minor prognathism developing and crooked toes. This was likely a result of the seed-based diet fed to the parents.

Fig 6.48c | At 4 weeks of age. The organic hand-feeding formula has overcome the beak and toe problems.

Fig 6.48d | At 6 weeks of age the slight weakness of the abductor muscles in previous figures has been corrected and the baby is standing.

Fig 6.48e | Eight weeks of age.

Fig 6.48f | Ten weeks of age.

Fig 6.48g | Twelve weeks of age.

Fig 6.49 | A perfectly feathered goffin cockatoo in a defense (attack) posture stimulated by the toy owl.
A Moluccan (salmon-crested) cockatoo displays a greeting feather erection and reaches out with the foot to be picked up. The bird has been fed an organic formulated diet since hatching, 8 years ago. A healthy bird can normally separate its feathers in this manner. Observe the beak, skin around the eye and the feet. Note the strength and vibrance of the feathers. The bird’s attitude is upbeat and active. These are some determinations one needs to master in avian medicine. This requires either seeing normal specimens, such as this bird, or transferring in one’s mind’s eye the characteristics seen in most wild birds. If only seed-eating pet birds are seen in practice, normal is not appreciated.

Two grey-eyed (immature) African grey parrots. Color tones and feather scalloping on these birds are ideal.

This citron-crested cockatoo is normal except for a mild unzipping of the crest feathers.

This severe macaw is showing a defensive posture. The feathers are of poor color and structure. Such feathers often dramatically respond to diet change.

Approximately 1 year later, the bird in Fig 6.53a has been guided by Jan Hooimeijer into the specimen seen here. Owners were instructed in an hour long office consultation on nutrition, husbandry and behavior. The diet was changed to an organic nugget. Periodic evaluations were scheduled to assure secondary problems were not becoming clinically significant. When an avian practitioner has repeatedly seen improvement in these cases with only dietary correction, recommendations for diagnostics in future cases are often altered. A CBC may be warranted to determine if concurrent infection is present. Serum chemistries with bile acids may be performed. However, abnormalities in hepatic enzyme levels, calcium levels and other parameters are often a reflection of the effects of chronic malnutrition. In the absence of clinical disease, the practitioner may elect to institute a wellness program, with the primary emphasis on dietary correction. In this case an organic formulated diet, lactulose and milk thistle were administered. This is a particularly judicious approach if the bird is stable but likely suffering from malnutrition-induced decreased hepatic function. These birds are not ideal candidates for venipuncture due to potential clotting deficiencies. Even more significant, hepatic biopsy, although it may be diagnostic, can be a fatal procedure in the presence of hepatic insufficiency (see Chapter 4, Nutritional Considerations).
Fig 6.54 | A 17-year-old seed-eating cockatiel shows hyperkeratotic follicles, generalized weakness, worn feathers and retained pin feathers.

Fig 6.55 | A wild-caught sulfur-crested cockatoo (Cacatua galerita galerita) which is fed a seed diet, displays poor feathering. Note the fluffed appearance, unzipped crest feathers and its position on the bottom of the cage. The physical examination revealed a retained egg. Malnutrition was addressed over the next few visits.


**Fig 6.56e** | Plumage of right wing. Ventral view. Under wing primary and secondary coverts and the marginal coverts of the propatagium have been removed. 1. Axial secondary pin feather inserting on the dorsal ulna. 2. Upper primary covert 3. Ulna 4. Postpatagium 5. Minor metacarpal III 5a. Major metacarpal II 6. Propatagium. I-X Primary remiges. (I - VI insert on metacarpals; VII the minor digit; VIII-X the major digit) 1-9. Secondary remiges (several additional ones were pulled).
Fig 6.57a | Four-year-old female umbrella cockatoo fed a seed and table food diet. The crest feathers are failing to shed the keratin surrounding the underlying pin feathers. The bald crown area is normal.

Fig 6.57b | Same bird as in Fig 6.57a demonstrating tattered and broken tail feathers compared to a normal umbrella’s wing feather (b).

Fig 6.57c | This close-up demonstrates the difference between stained feathers developed by a bird fed a seed and table food diet compared to a perfect feather being held for comparison.

Fig 6.57d | These wing feathers show a lack of opacity and have a soiled appearance when compared to a perfect feather.

Fig 6.57e | Poor quality rump and tail feathers in a blue and gold macaw fed only seeds and table foods. The feathers lack a sharp vane margin (unzipped appearance). The feather color lacks uniformity and many transverse (stress) lines are present.

Fig 6.57f | Budgerigar on a seed diet with tail feathers unzipped. The lateral recticies are a dull off-brownish-white compared to those they cover, which are pure normal white but still unzipped.
The parents of this palm cockatoo were fed seeds, vegetables and rancid pine nuts soaked in chlorine bleach to remove molds. This baby was raised on a high protein commercial hand rearing product making up 70% of the diet with the other 30% consisting of 20 g of sunflower seed kernels, 40 g apple and 40 g broccoli. In addition to abnormal plumage there was a deficiency of normal flora in the fecal Gram’s stain.

Same bird as in Fig 6.57g 2 months after being removed from described diet. The bird was placed on an organic high fat diet. The head, neck and some wing coverts have molted and regrown in normal texture and color. The bird’s timid and nervous attitude was replaced with a jolly playful one. Fecal bacteria were returning to normal.

Same bird as in Fig 6.57g 6 months post-diet change. The color is uniformly normal. The beak has shed much of its retained keratin. The normal red cheek patch took three more months to appear.

A rectrice with retained sheath and pulp material that is normally shed. This is due to improper nutrient availability to the feathers and a resultant hyperkeratosis. Seed and table food based diets are the major cause (see Chapter 4, Nutritional Considerations).

The two lateral feathers are from a bird with a nutritional disorder. The bird was fed a seed and table food diet. Compare these to the central feather of a bird with normal development on a proper diet. Color, texture, strength, and structure (width of vein) are compared on the feathers’ ventral view.

Dorsal views of three normal and three abnormal feathers from the same dietary situation(s) as described in Fig 6.57k.
6.57m | A sun conure and a gold-capped conure fed the same formulated diet. The sun conure developed yellow primary remiges. The addition of red palm oil, high in carotinoids and vitamin E, allowed the development of new blue feathers. The addition of wheat germ for vitamin B did not produce this coloration, nor did other omega 3-6 oils, including fish, flax, borage, evening primrose, corn and sunflower.

6.57e | Lilac-crowned Amazon fed a seed and table food diet. The overgrown beak and black pigmentation of the feathers has empirically been associated with advancing liver disorders (see Chapter 4, Nutritional Considerations and Chapter 15, Evaluating and Treating the Liver).

Fig 6.57n | Normal lilac-crowned Amazon fed an organic formulated diet.

Fig 6.57p | Sulfur-crested cockatoo picks at its neck feathers and is able to pull its crest feathers with feet to chew them. Diet, behavior and integrative therapies (Chapter 10, Integrative Therapies) are often of benefit. A total cure is rare in such feather disorders unless caught at an early stage.

Fig 6.57q | This yellow-naped Amazon with a history of an all seed, nut, table food diet has keratin accumulating on the feet and beak. While fungus (usually Aspergillus) can be cultured from the black feathers, correcting the diet has treated hundreds of birds under the author’s (GJH) care with no specific therapy instituted for the fungus. Supportive care is often used, such as milk thistle and lactulose, for regeneration of the liver.
Fig 6.57r | Budgerigar fed a vitamin-enriched seed only diet. While liver disorders in budgerigars are common, this blue budgerigar has black in the blue rump feathers, which is rare. Most budgerigars with liver disorders do not show any indications in their feather color.

Fig 6.57t | A lutino cockatiel with staining of the tail from being dipped in vitamin water, oiled seeds top dressed with vitamins and feces, as the perch was too low. A fungus is growing in the black feather coating but the problem cleared when the sources of contamination of the tail feathers were removed.

Fig 6.57u | An 8-year-old lutino pied with advanced gold coloring of the feathers. This bird was fed a seed diet.

Fig 6.57v | Budgerigar with oiled ventral body feathers. Such birds become hypothermic and suffer digestive disorders from preening the oil. Bathing, drying and placing in an incubator at 86° F is minimum therapy.

Fig 6.57s | A pied/lutino cockatiel in the later stages of disease. The dark yellow color is associated with a suspected hereditary liver disease. While too late for this bird, a formulated organic diet and liver support in the form of lactulose and milk thistle may be curative if diagnosed early.

Fig 6.57w | A lutino cockatiel four months after therapy for liver disease showing a return to white feathers.
Fig 6.57x | An 27-year-old yellow-naped Amazon with abnormal yellow coverts developed while being fed a seed, table food and nut diet.

Fig 6.57y | Same bird as in Fig 6.57x with malcolored yellow primary remiges.

Fig 6.57z | Same bird as in Fig 6.57x 6 months after correcting the diet. The abnormal yellow areas are gone.

Fig 6.58a | Healthy feathers are flexible with uniform color and structure.

Fig 6.58b | Holding the feather by the tip, the feather is slowly flexed tip to shaft. It should rebound to a normal position as in (a).

Fig 6.58c | A narrow veined feather that broke (fractured) at the mid-shaft on the flex test. Such easily damaged feathers indicate a nutritional disorder.
Abnormalities of the feathers and skin should be recorded in a detailed manner. Veterinarians should familiarize themselves with the descriptive terminology used for the external anatomy of a bird. Such precise terminology is essential for later comparisons of progression or resolution of lesions and for describing a case to another veterinarian (see the physical exam form at end of chapter).

The uropygial (or preen) gland is located on the dorsal base of the tail. It is bilobed and is not present in all species (it is absent in many Columbiformes and psittacines, notably Amazona spp. and hyacinth macaws but prominent in budgerigars, cockatoos and waterfowl) (Table 6.1).

The uropygial gland should be assessed for evidence of enlargement or inflammation. Impaction, abscessation and neoplasia, all of which may be followed by self-trauma, are potential causes of uropygial gland abnormalities.

### THE HEAD

The head should be first visualized in profile from a number of different angles, looking for asymmetry. Such asymmetry may arise from exophthalmus, enophthalmos, sinus swelling or depression of the skin over the sinuses. Pupillary size, iris color, lens clarity, feathers surrounding the external acoustic meatus (ear) and relative size of the ears, asymmetry of the cere, size of the nares, appearance of the nasal opercula, rhinothecal or gnathothecal deviations or overgrowth all need to be noted (Figs 6.60a,b) (see physical examination form). Loss of feathers on the head can be due to a variety of conditions. Some cockatiel mutations, especially lutinos, have a bald spot behind the crest. Feather loss in other species can be associated with fungal or bacterial dermatitis, infestation with ectoparasites, allergic dermatitis,
PBFD or excessive grooming by a cage mate. Feather loss around the eyes can indicate facial rubbing associated with conjunctivitis or sinusitis. Matting of the feathers over the crown and nape may indicate the bird has been regurgitating or vomiting.

The conformation of the beak should be assessed (Figs 6.60c-6.61e) for the presence of congenital or acquired abnormalities such as scissor (wry) beak, prognathism and bragnathism. Trauma to the beak or localized sinus infections can result in anatomical abnormalities (eg, longitudinal grooves in the keratin). Excessive keratin flaking of the beak can reflect poor nutrition or simply a lack of opportunity to rub the beak on a suitably abrasive surface (ie, a cement perch). Overgrowth of the beak can occur with PBFD, Knemidocoptes spp., congenital or acquired malalignment of the upper and lower beaks, chronic liver disease or malnutrition. It is rarely the result of a lack of objects to chew on. It is important to note that some species, such as the long-billed corella, Cacatua tenuirostris, naturally have elongated beaks. This should not be mistaken for an overgrown beak.

The cere (Figs 6.62a-c), the fleshy skin at the top of the beak, is not present in all species. In the normal green budgerigar (Melopsittacus undulatus) cere color can be used to sex the bird, with cocks having a blue cere and hens a brown cere. However, this will vary with the age of the bird, the color mutation, and the degree of health. Cere hypertrophy — a thickening of the brown cere in the budgerigar hen — may reflect a normal or pathologic hyperestrogenic state.

ORAL EXAM (Figs 6.63a-f)
Examination of the oropharynx can be accomplished by using roll gauze, plastic or metal speculums to open the mouth. In many birds equipment is not needed, as the approach of a light source toward the oral cavity will produce a wide open-mouth reaction and allow visualization. The choana (the slit in the roof of the oropharynx) should be free of excessive mucus or discharge and fringed with well-defined papillae. There should be no abscesses or diphtheritic membranes present. In larger birds, the infundibular cleft can be visualized in the hard palate of the choana. In some cases of severe sinusitis or otitis media, the infundibular cleft will be dilated and contain purulent debris (see Chapter 26, Diagnostic Value of Necropsy).

THE CROP
The crop can be palpated in most birds at the base of the neck, just cranial to the thoracic inlet. It should be carefully and gently palpated to assess if:

- Food is present (ie, Is the bird eating?)
- It feels doughy or fluid-filled, indicating that crop stasis may be present
- Ingluvoliths or other foreign objects are present
- The crop mucosa is thickened
- There is excessive water present
- The crop is overly distended

Care must be taken, especially in debilitated birds, that fluid or ingesta is not propelled retrograde from the crop into the oropharynx and aspirated by the bird.

THE BODY
Palpation of the skin over the trunk occasionally reveals the crackling or air-filled distention caused by subcutaneous emphysema. While this is normal in species such as pelicans, in most species it is the result of trauma or infection in the air sacs that allow the escape of air under the skin.

The abdomen in the normal bird is concave between the end of the sternum and the pubic bones. If this area is convex, then distention is present. The clinician needs to distinguish between internal and external distension of the abdomen. Internal distension of the abdomen can be due to fat, organ enlargement, ascites or the presence of an egg. External distension can be due to subcutaneous fat, neoplasia (especially lipomas), xanthomas or hernias. Radiology may be required to distinguish between internal and external abdominal distension and between different etiologies of both. The use of GI contrast material (barium) may help determine whether herniation is present and what structures may be incorporated into the hernia (Figs 6.64a,b). Abdominal pain or discomfort can occasionally be elicited by careful palpation. In passerines and juvenile psittacines, wetting the ventral abdomen with alcohol may allow visualization of internal organs. The liver should not extend pass the caudal border of the sternum in adult birds. If it does, liver disease should be suspected (eg, atoxoplasmosis in canaries).

If ascites is suspected, careful abdominocentesis may be indicated. After disinfecting the skin over the abdomen, a 23-27 g needle is gently introduced along the midline. If the needle is inserted lateral to midline, ascitic fluid may then communicate with the abdominal air sacs. In larger psittacines, a suitably sized intravenous catheter can be used. Negative pressure with a syringe is applied, and the fluid obtained is processed for cytology, culture and protein analysis. Care must be taken when abdominocentesis is performed that the loss of protein and/or the sudden change in abdominal pressure do not cause serious or fatal results. See Table 6.2 for a cursory list of fluid characteristics and causes. A more complete discussion is available in other texts.
The back should be carefully palpated for evidence of scoliosis, lordosis or kyphosis. As the thoracic and lumbar vertebrae are predominantly fused, flexibility of the spine cannot be assessed as it is in dogs and cats.

The carina of the sternum should be palpated for evidence of distortion, trauma or congenital defects such as splitting. Distortion of the carina, often indicating a history of rickets or other metabolic bone disease, should lead the clinician to recommend radiographic evaluation of the rest of the patient’s skeletal system.

The ventral area between the cloaca and the tail should be assessed for splitting of the skin (avulsed pygostyle). This condition may be mistaken for a cloacal prolapse on initial examination, until it is noted that the vent is present cranial to the red, protruding tissue that is actually muscle. This condition is commonly seen in pet psittacines and is associated with a poor diet, obesity and/or excessively clipped wings. Obesity and an excessively severe wing clip can cause the bird to land awkwardly, avulsing the tail from the pygostyle. Malnutrition causes the skin to lose its elasticity. The result is that the skin and underlying muscle in this area split. The initial injury may not be noticed by the owner, but the subsequent bleeding and picking at the affected tissue usually alert the owner to a problem.

**THE LEGS AND FEET**

Each leg should be carefully palpated to detect abnormalities, such as fractures, healed bony calluses, or angular deformities of the long bones. Soft tissue swelling may be palpable or be suspected by the bird’s reaction to palpation. Suspicious areas should be examined for bruising. Each joint should be extended and flexed to assess mobility and range of motion. Joints should also be examined for swelling or the presence of subcutaneous and intra-articular deposition of chalky white uric acid crystals (ie, articular gout). This condition is extremely painful and the bird will often be lame and react violently to digital pressure applied to the affected areas. All aspects of the legs should be compared with the contralateral side for symmetry, length, strength of grip and degree of muscling (Figs 6.66a-d).

The toes should be examined for abnormalities including:
- Missing digits or nails
- Annular constrictions
- Swelling of interphalangeal joints, occasionally with the deposition of uric acid crystals
- Avascular necrosis
- Excessive thinness, especially in neonates
- Abnormal position and conformation of the toes
- Excessively long or twisted nails

The skin of the foot is an ideal reflection of the rest of the dermis (Figs 6.67a-k). The plantar surface of each foot should be examined and the condition of the metatarsal pads and digital pads noted (Figs 6.68a-g). Abnormalities seen here include: loss of definition of the epidermis (seen as a shiny, reddened surface), swelling, erosions, ulcers and scabs. Pododermatitis (bumblefoot) is common in captive raptors (bumblefoot is never seen in wild, even one-legged birds - S. Hudelson, personal communication, 2004), but can be seen in any bird. A unilateral lameness causes increased weight-bearing on the unaffected leg. This in turn can lead to pressure necrosis, infection and subsequent pododermatitis. Consequently, in cases of a unilateral lameness, the opposite leg should always be closely examined. Bilateral pododermatitis is frequently encountered in older, obese psittacines with a history of poor diet, inadequate exercise and/or unsuitable perches. Note the discussion under Figs 6.67f-i for evaluating nails.

Occasionally, due to the nature of the injury or the disposition of the bird, a full examination may require general anesthesia. If this is the case, radiographs can be taken at the same time, minimizing handling of the conscious (and therefore stressed) patient.

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**Table 6.2 | Abdominocentesis Abbreviated Results**

<table>
<thead>
<tr>
<th>Nature of Fluid</th>
<th>Diagnostic Possibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow-pink, turbid fluid. Cytology shows fat droplets, proteinaceous material, meso-epithelial cells, macrophages, occasional heterophils.</td>
<td>Yolk-related peritonitis</td>
</tr>
<tr>
<td>Light colored, clear fluid. Cytology shows few cells of any description.</td>
<td>Ovarian cyst Ascites Various neoplasias</td>
</tr>
<tr>
<td>Dark brown fluid. Cytology shows meso-epithelial cells, occasional erythrocytes, heterophils and macrophages.</td>
<td>Renal or hepatic cyst Degenerating ovarian follicles</td>
</tr>
<tr>
<td>Thick, gelatinous fluid.</td>
<td>Salpingitis</td>
</tr>
<tr>
<td>Fluid of variable color and consistency. Cytology shows macrophages, erythrocytes and heterophils, possibly bacteria.</td>
<td>Intestinal perforation Serositis</td>
</tr>
</tbody>
</table>

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*Clinical Avian Medicine - Volume I*
Respiratory/Cardiovascular

AUSCULTATION
When to auscult is the prerogative of the clinician but may be better performed before the bird has been extensively restrained. The heart rate is usually rapid, although that of some pet birds can be surprisingly slow compared to wilder birds. Murmurs, arrhythmias, muffled heart sounds from pericardial effusion, severe tachycardia and bradycardia are occasionally detectable.

Lung and air sac noises can be auscultated, and occasionally friction rubs associated with air sacculitis can be detected. Since the avian lung is basically motionless, the typical mammalian auscultation parameters do not extrapolate well.

CLINICAL PRESENTATIONS
Open-mouthed breathing, abdominal movements and tail bobbing are due to respiratory distress but may also be due to the presence of space-occupying coelemic masses, ascites, anemia, cardiovascular disease, polycythemia, obesity, egg binding and other non-respiratory conditions.

Thyroid disorders in budgerigars can resemble either respiratory or crop/gastric disorders. Dyspnea is not uncommon.

The avian respiratory system is commonly affected by subclinical chronic disease. This is usually due to complications from stress disorders. Malnutrition is the most common cause (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders). A common presentation is mild nasal discharge that stains the feathers over the nares (Figs 6.69a,b). The discharge usually starts out serous in nature and may progress to mucoid in nature. This tendency seems to be species related. For example, budgerigars tend to be more serous, Amazons are more mucoid. African grey parrots and lovebirds seldom have nasal discharge but build up debris and form rhinoliths (Fig 6.69c). This can lead to atrophic rhinitis.

If the nasal condition is not treated, the lower respiratory tract may be affected (see Fig 6.69d). Sinusitis with resulting ocular discharge may occur (Figs 6.69e,f). If it is confined to sinuses of the head a sinus flush is beneficial for diagnosis. Sinus infections may present with swelling over the infraorbital sinus. There is no simple method to evaluate this diverse air sac system.

Generally, tracheal obstruction can be differentiated from lower or generalized respiratory disease by the sound of the respiration (tracheal noise) and the forward-leaning, neck-extended posture that is assumed by these birds. In cockatiels, tracheal obstruction may be due to seed or seed hull aspiration, especially when the illness is truly acute in nature (as judged by the presentation of a well-fleshed bird). In other cases, cockatiels may demonstrate a loss of voice and/or a squeaky sound produced for several days to weeks prior to the onset of more pronounced dyspnea. These cases are more likely to be due to a granuloma (eg, Aspergillus spp.) located at the syrinx, but endoscopy may be necessary to differentiate between these etiologies.

Older and larger birds (African greys, macaws and cockatoos) often suffer from chronic malnutrition with accompanying vitamin A deficiency. This leads to squamous metaplasia and a respiratory environment conducive to Aspergillus spp. propagation and granulomas of the trachea and/or syrinx. The eventual prognosis for these birds is guarded at best due to the long standing pathology and the potential for systemic disease.

Upper respiratory disorders tend to show inspiratory dyspnea. Lower respiratory tract disorders tend to show expiratory dyspnea that rarely have audible sound.

The nares, which are normally covered by feathers in many species, are the openings into the rhinal cavity located at the top of the beak. The nares should be symmetrical, open and dry. The normal opercula should not be mistaken for rhinoliths. Blockage of the nares or an area of communicating cul de sacs of the infraorbital sinus may result in a subtle inflation and deflation of the infraorbital sinus. This causes the up and down motion of the skin over the infraorbital sinuses with respiration (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders).

Neurologic Sensory Assessment

A cursory evaluation of the nervous system should be part of the physical examination. Birds presented for neurologic problems require a thorough neurologic assessment (see Chapter 17, Evaluating and Treating the Nervous System):

• Abnormal conformation or posture
• Paresis or paralysis of any or all limbs
• Fractures of limb bones
• Weakness or inability to grip with one or both feet
• Head tilt, opisthotonos, torticollis
• Altered mentation
• Decreased visual acuity
Fig 6.60c | Close-up view of beak flaking. It may take a year after diet correction for this flaking to abate. This bird is deceased and is demonstrating post-mortem prognathism, a common occurrence, which has no clinical significance after death.

Fig 6.60d | Amazon four weeks post-diet change from seeds and table food to a formulated diet. New yellow head and green neck feathers and the flaking beak are positive signs that the bird is responding to the nutritional therapy. Sneezing and itching often accompany this period. A higher fat and protein diet speeds this recovery.

Fig 6.60e | Cockatiel with overgrown maxilla. Such gross overgrowths may be the result of symphyseal fractures of the mandible and the lack of normal wearing of the maxilla. Nutritional deficiencies and trauma may also result in severe maxillary beak overgrowth.

Fig 6.60f | Overgrowth of the rhamphotheca and interlaminal hemorrhage are common in budgerigars fed seed diets with liver disorders. Grinding or trimming is only a temporary solution. Diet change and liver therapy are needed.
Harrison feels this is a form of rickets and myositis from an unhealthy oral epithelium and facial muscle infections, often emanating from nutritional disorders.

If not detected early, this traumatized bird will likely be further attacked and killed by its clutch mates.

Another passerine (warbler) shows the model beak and nares, but at this magnification demonstrates retained pin feathers over the crown. This presentation is common in wild birds with toxic substance-related debilitation.
Fig 6.62a | The cere of a mature egg-laying budgerigar fed a seed diet. Compare this to the normal cere in Fig 6.4b. The cere is dry, flaky and lacks turgidity. The forehead feathers are predominately immature and have retained sheaths. Malnutrition and other systemic disorders should be on the differential diagnostic list (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders for the Improper Diet Cascade).

Fig 6.62b | Cere of a yellow-fronted Amazon. These swellings in the cere tissue resemble sebaceous cysts of mammals. They may decrease in size with dietary improvement and weight loss if the bird is obese. They can be expressed but they tend to refill, or they can be surgically removed. Often no treatment is necessary since progression of the cysts is usually halted after a diet correction.

Fig 6.62c | Scaly face (Knemidocoptes spp.) mites cause a powdered look to the beak and a raised honeycomb mass, either on the cere, eyelids, beak, feet or other body locations. Magnification shows pinpoint tunnels in these powdery masses. This is where the mites live. The tunnels are pathognomonic and help differentiate this from other causes of similar lesions. Scrapings may be negative even when mites are present.

Fig 6.61c | Long beaks are normal for a species like the little (slender-billed) correla.

Fig 6.61e | Delaminating beak in this Toco toucan is a reflection of a metabolic disorder as it is in other species.

Fig 6.61d | This 20-year-old toucan was fed a toucan pellet for a decade and then an organic low iron nugget for the second half of his life. He had free flight and ate 1/4 of a raw organic papaya daily. Two years after this he died of a pancreatic carcinoma.
Fig 6.63a | The “gape” in a nighthawk. Note the lack of a choanal slit. There are leukoid plaques in the oropharynx. Candidiasis or trichomoniasis is suspected.

Fig 6.63b | Female eclectus with palatine and sublingual hyperkeratotic salivary “abscess.” While usually sterile, the condition is reported to be due to hypovitaminosis A. Therapy with vitamin A and dietary correction containing sufficient vitamin A precursors is appropriate treatment. (Some cases of “foot stomping” in eclectus parrots eating spirulina in the diet improve on dilution of the diet, while others find a correlation with PDD. If not PDD then the “stomping” may decrease over time with no therapy.)

Fig 6.63c | The intermandibular space found in all parrots.

Fig 6.63d | A swelling of the sublingual salivary gland on the left side of the intermandibular space. This lesion is usually a collection of amorphous cellular debris. Surgical resection may be necessary if these sterile abscesses interfere with tongue movement.

Fig 6.63e | An oral speculum in an Amazon with a fungal infection.

Fig 6.63f | The same Amazon as in Fig 6.63e after therapy and dietary correction. While the choanal papillae are reduced in stature and depigmented, they have regrown their pointed characteristic tips.
Fig 6.64a | Anesthetized female budgerigar with an early abdominal hernia. Hernias are correlated with fat accumulating in the hernia area, xanthoma of the hernia sac’s skin, ovarian cystic accumulation of estrogen laden fluids and nutritional disorders. Nutritional and hormone therapy should be instituted prior to considering surgery (see Chapter 18, Evaluating and Treating the Reproductive System).

Fig 6.64b | Budgerigar hernia — see Fig 6.64a. A simple skin removal several weeks post-diet change aids in correction. However, if the tissue is xanthomatous, it will not hold sutures well.

Fig 6.65a | Dermatophytosis in a finch. Skin and feather fungal infections that cause lesions are very rare in birds. Most finches are fed a primarily seed diet. Combine that with crowding, poor air quality, lack of sun and inability to bathe, and the bird’s defenses may succumb. Topical and systemic medications are needed, and the primary husbandry issues need to be addressed.

Fig 6.65b | Patagial dermatitis is not uncommon in birds. In birds with nutritional disorders, the skin (and all tissues) lose elasticity. As a result small tears can occur. While viruses have been suspected in lovebirds with similar lesions, none have been reported in most other parrots. Treating for fungal and bacterial infections, topical dressing and splinting to stop motion while changing the diet and husbandry may be curative.

Fig 6.65c | Sternal ulcers are seen in large bodied birds that have had their wing(s) clipped too short and are housed over hard surfaces. The resultant falls cause pressure necrosis (see Chapter 13, Integument and Figs 1.25a-e).
Fig 6.65d | Xanthomas may be seen in birds with nutritional disorders. If treated early, they may respond to dietary correction. Hormonal therapy may be of value in reproductively active hens with xanthoma. In advanced cases, surgical resection is often required.

Fig 6.65e | Lovebird with polyfolliculitis. Multiple feathers form in a single follicle. A necrotizing dermatitis is also present (see Chapter 13, Integument).

Fig 6.66a | Peafowl chick with a dislocated Achilles tendon. Providing an improved diet, surgical repair and providing the enclosure with a substrate that is not slick may be curative. However, the prognosis is progressively guarded as the species size increases.

Fig 6.66b | Peafowl chick hock shows bruising from post-traumatic repair. Subcutaneous blood in birds is often green (biliverdin).

Fig 6.66c | A wild passerine in rehabilitation shows the normal nail length, with the nail tapered and needle sharp. This bird has a toxic neuropathy.
Fig 6.67a | Normal Amazon dorsal foot skin patterns.

Fig 6.67b | Dorsal surface of the foot of a free-ranging slender-billed corrella. A severe drought led to water holes drying up and very low natural food sources. The feet are dry but the patterns remain bold. This is believed to be a temporary phenomenon as a result of environmental stress.

Fig 6.67c | Acute phase of Amazon foot necrosis can occur in a matter of minutes. The condition usually affects just Amazons (see Chapter 13, Integument).

Fig 6.67d | Peracute phase of Amazon foot necrosis. The skin will slough over several weeks. No therapy is effective at this stage, but prevention of self trauma and secondary infection may be necessary (see Chapter 13, Integument).

Fig 6.67e | Permanent pigmental scars 3 months after the initial lesions of Amazon foot necrosis.

Fig 6.67f | A free-ranging slender-billed corrella shows the natural nail length and tapering needle points of the nail. Note that while the foot has dry skin, the plantar patterns are still bold. One would expect the dry skin to be replaced in a few weeks if the drought is broken.
This Amazon’s nails are thickened and overgrown (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders).

Nails of a captive canary on a seed-based diet. In addition to being long and twisted with no tapering, or sharp point, the feet scales are hypertrophic and dry. This could indicate metabolic, parasitic or bacterial disease and/or malnutrition (e.g., Knemidocoptes spp., staphylococcal or fungal infection).

Finch supplied with synthetic nest material (nylon) has a strangulated digit that needs to be amputated. Natural fibers or nest pads avoid this unnecessary calamity.

Papillomatosis of both feet of a finch.

Gout tophi is a painful collection of uric acid crystals in the joints and subcutaneous areas of the feet.

Normal Amazon plantar foot skin patterns.
Fig 6.68b | This warbler shows the normal bold but delicate pattern of a small passerine’s plantar foot surface.

Fig 6.68c | Plantar surface of a slender billed corrella. As previously mentioned, the skin is dry but the bold pattern is undisturbed.

Fig 6.68d | Tarsal pad loss of epithelial pattern is common in parrots with nutritional disorders. As they become physically inactive, their tendons seem to weaken and they perch on their hocks. Dietary correction and supportive care, correction of husbandry issues, and alteration of perches may improve this condition.

Fig 6.68e | The degree of development of bold patterns on the plantar surface can be an indication of nutritional disorders. Abrasive perches can exacerbate the problem, but these surfaces do not generally cause plantar excoriation, ulceration or pododermatitis in healthy birds. Large bodied birds may be an exception.

Fig 6.68f | Advanced bumblefoot in a female lutino cockatiel. Anecdotally females develop bumblefoot more often than males in several species (cockatiels, swans, flamingoes and chickens). Nutritional and hormonal disorders need to be addressed.

Fig 6.68g | Mynah bird with bumblefoot and massive tarsal scale proliferation indicative of a metabolic disorder. Nutritional and husbandry issues must be addressed and any secondary infection treated.
Fig 6.69a | A 20-year-old male cockatiel fed a seed based diet shows accumulation of discharge over the left naris and around the eyes, which is typical of sinusitis.

Fig 6.69c | Lovebird rhinolith. Nutritional correction and nasal flushes, systemic antibiotics and antifungals are often required. The addition of hyaluronidase to the flush can expedite the breakdown of caseated debris (see Chapter 9, Therapeutic Agents).

Fig 6.69d | Latex injection mold of the cervicocephalic air sac and the infraorbital sinus (red latex under eye, around naris and the cranial aspect of the beak). A section of a wooden applicator is being used to prop open the oral cavity. (Some latex has run down the rhamphotheca from the nares and more has run into the oral cavity at the commissure of the mouth and on the leading edge of the beak).

Fig 6.69e | Budgerigar with an extensive accumulation of infraorbital sinus serous fluid. This is a very difficult problem to correct. Mycoplasma has been incriminated in some cases.

Fig 6.69f | Canary with infraorbital sinusitis. Mycoplasma was isolated.
**EYES**

The eyes should be bright and clear. Ocular discharge and loss or matting of the feathers around the eye indicates either conjunctivitis or sinusitis. Conjunctival hypertrophy is common in chronic conjunctivitis, especially in cockatiels. Mycoplasma has been implicated in this syndrome in cockatiels. Focal light, magnification and fluorescein stain is needed for a detailed ocular examination. Severe or non-responsive ocular disease should be referred to an ophthalmologist familiar with the avian eye when possible.

Determination of the integrity of the globe and neurologic pathways necessary for vision can be difficult. Consultation with or referral to an ophthalmologist familiar with the avian eye may be necessary.

Iris color can indicate sex and/or age. Young birds tend to have a dark iris that lightens as the bird matures. This is true for blue and gold macaws and African grey parrots among others. In many white cockatoos the dark iris lightens to brownish red or even reddish orange in the mature female, while in the male it remains dark. This is not as prevalent in the umbrella and Moluccan cockatoos as it tends to be in the yellow or citron crested members of this genus. Additionally, it is not a guarantee of gender, and a DNA determination of sex should be made if the gender is questionable (Figs 6.70a-e).

Both nuclear sclerosis and true cataracts occur in birds. In larger psittacines, cataract removal can be accomplished by selected veterinary ophthalmologists. As in dogs and cats, the degree to which the bird is affected by the decreased or lost vision will often dictate whether attempting surgery for cataract removal is warranted.

Various congenital and acquired diseases of the eyelids, cornea, iris, and fundus exist in birds as in other species. Again, there are increasing numbers of veterinary ophthalmologists who are knowledgeable regarding avian ocular anatomy and disease, and a referral may be indicated.

**EARS**

The ears can be examined by parting the ear coverts with the wooden end of a cotton-tipped applicator or similar
appliance. The ears should be open and free of discharge or erythema. Visualization of the tympanic membrane is difficult in most species without the use of an endoscope (see Chapter 24, Diagnostic Value of Endoscopy and Biopsy). Note that the tympanum of birds is normally convex, as opposed to the normal concavity that is found in mammals.

**DIGESTIVE AND URINARY SYSTEM**

The cloaca can be assessed externally for enlargement and dilation (often indicative of reproductive behavior in a hen), prolapse, ulceration or inflammation around the mucocutaneous junction, and the presence or loss of sphincter tone. Moistened cotton-tipped applicators can be introduced into the cloaca and used to isolate and evert the cloacal mucosa. The mucosa is normally thin, pink and smooth (Figs 6.71a,b). Gently everting the cloaca allows a cursory examination of the mucosa, possibly revealing papillomas in susceptible species. These may be obvious pedunculated protrusions or more subtle thickenings with a cobblestone appearance to the tissues. Suspicious areas can be painted with dilute acetic acid; blanching indicates the presence of a papilloma. A more thorough evaluation of the cloaca requires endoscopy.

**REPRODUCTIVE SYSTEM**

Refer to the physical examination form, Chapter 4, Nutritional Considerations, Section II Nutritional Disorders and Chapter 18, Evaluating and Treating the Reproductive System for in-depth discussions of reproductive anatomy, physiology and disease (Figs 6.72a,b,g).

**Fecal Examination**

Birds’ droppings are made up of three components: feces, urates and urine (Figs 6.72a2,b2). In a healthy bird, the fecal portion should be formed and homogeneous, with little odor (except for poultry, waterfowl and carnivorous birds). The color should be various shades of brown when the bird is fed a pelleted diet. Seed diets will cause the stool to be a more greenish color. Various fruits, especially those with strong pigments such as cranberries and blueberries, and artificially colored foods including colored pellets, may affect the stool color (Fig 6.72c).

The urates should be a crisp white and slightly moist. If the bile pigments are not adequately resorbed from the GI tract and reused by the liver, the excess of bile pigments, mainly biliverdin, will leach out of the feces and into the urates, causing the urates to develop a greenish tinge. Diet, species, and state of excitation may alter the ratio of urine to feces present in a dropping. Do not confuse true polyuria with “excitement polyuria,” the excess urine produced by an excited or nervous bird. See Chapter 16, Evaluating and Treating the Kidneys, for information on polyuria and further diagnostics.

Lorikeets, due to their liquid diet, will normally produce large amounts of urine. A close examination of the droppings is a valuable and non-stressful starting point for the clinical examination. Examination of the droppings in the bird’s cage that have been collected from the past 24 hours will yield more information than limiting the examination to stress droppings produced enroute to or in the hospital.

Some abnormalities commonly encountered in the avian dropping include:

- **Diarrhea** — unformed fecal portion (Figs 6.72c,f2)
- **Undigested food in feces** (Fig 6.72f)
- **Very bulky droppings** — malabsorption; reproductively active hen; abdominal growth; pelleted diet (Figs 6.72a2,d,e)

• Melena
**Fig 6.72a** | Prolapsed uterus in a finch.

**Fig 6.72b** | Prolapsed uterus in a budgerigar.

**Fig 6.72c** | Passerine droppings with artificially colored food items and mild enteritis.

**Fig 6.72d** | An elderly malnourished female budgie with an obstructive cloacal condition from a uterine tumor. When the obstruction was manipulated, 8 cc of feces were expressed. The owner elected euthanasia.

**Fig 6.72e** | The normal stress changes observed in the droppings of a parrot that traveled a long distance prior to examination. Droppings at home (bottom); droppings at the clinic (top). The dark color at home (a sign of melena) is not normal.
Fig 6.72f  |  Passing whole seeds in feces. Various causes of proventriculitis, ventriculitis, and pancreatitis must be considered.

Fig 6.72g  |  Egg-bound pearly cockatiel passes a loose liquid dropping after having the egg removed. Biliverdinuria reflects the liver stress of the situation.

Fig 6.72h  |  A parrot’s droppings show excess urates with the beginning of biliverdinuria.

Fig 6.72i  |  Loose feces from polydipsia in a large parrot.

Fig 6.72j  |  Polyurates with biliverdinuria and feces typical of enteritis.
Hyperglycemia is a common cause of PU/PD, especially in obese adult cockatiels on poor diets.

Polyurates with fat. Fat in the urine is rare. Severe kidney damage has occurred, and this bird did not survive.

Passing whole blood in the urine after the bird ate the back of an old mirror (mercury). Similar presentations have been seen in lead toxicosis.
• Malodorous droppings — bacterial (clostridial or other) or fungal overgrowth
• Aerated droppings — also called “popcorn stool” seen most commonly in cockatiels with giardiasis (see Fig 6.16)
• Green urates — often indicative of liver disease and biliverdinuria (Figs 6.72e,f,j,k)
• Yellow urates — associated with anorexia and liver bilirubin excess (Fig 6.72h)
• Pink/red urates — blood, hemoglobin or denatured hemoglobin that may be associated with renal disease. Some species, such as Amazons, eclectus and galahs will demonstrate pink to brown urates with lead poisoning
• Orange urates — may be due to vitamin B injection in the last few hours or artificial colors in the diet
• Thick, pasty urates — dehydration
• Polyuria — multiple etiologies, including: heavy metal toxicity, renal disease, sarcocystosis, diabetes mellitus, and pituitary adenoma (Figs 6.72i-l)
• Polyurates (Figs 6.72m-o)
• Anuria — etiologies include:
  Obstruction: Fecoliths or uroliths, egg-binding, cloacal prolapse, papillomatosis
  Functional: Renal disease, severe dehydration
• Fresh blood — cloacal pathology (Fig 6.72p)

A fresh fecal sample should be collected for a fecal Gram’s stain (see Chapter 4, Nutritional Considerations: Section II, Nutritional Disorders), flotation and wet smear evaluation. If there is polyuria, a urine sample can be collected for urinalysis.

Urine evaluation and the urinary system in general is covered in depth in Chapter 16, Evaluating and Treating the Kidneys.

**Diagnostic Testing**

Veterinarians treating birds (and other exotic species) are faced with challenges often not encountered by their colleagues treating dogs and cats. Many birds are presented to veterinarians only when near-terminally ill, and a rapid tentative diagnosis is often the difference between life and death. Birds are often limited in their range of expression of clinical signs and many clinicians, through no fault of their own, lack the experience to conduct a thorough physical examination. The combination of these factors has led to an increasing tendency in avian medicine to conduct exhaustive diagnostic tests on patients, often with scant attention paid to a complete history and a careful physical examination and with little attempt to refine or focus the diagnostic efforts. The selection of diagnostic tests should be based on a solid understanding of the species in question and the results of a thorough history taking and physical examination that enable the practitioner to develop an abbreviated list of differential diagnoses.

Before proceeding with diagnostic tests, the clinician should first ask:
• Is the patient sufficiently stable to undergo diagnostic testing, or does it require supportive care prior to sampling?
• Are the physical risks to the patient justified by the likely clinical value of the results?
• Are the test(s) appropriate to the patient (ie, species, age, sex) and its clinical signs?
• Has the test been validated to ensure that the result obtained is likely to be both accurate and meaningful?

If the answer to these questions is ‘yes,’ then diagnostic testing should proceed.

Diagnostic testing should be done in steps, with the results of each test allowing interpretation and reevaluation of the subsequent diagnostic procedure. Where appropriate, the clinician should endeavor to start with minimally invasive tests (ie, fecal wet smears, fecal flotations and Gram’s staining) before moving on to more invasive tests. As each tier is passed, the information gained should allow the clinician to narrow the differentials and perform tests leading to a definitive diagnosis.

The practitioner should be aware that the “normal” values provided by laboratories for serum chemistries, hematology and other parameters are generalizations and are not species-specific. Some of these values are inaccurate and are extrapolated from canine or feline values. The practitioner should be familiar with normals for the species in question, or have a reputable reference text available (see also Appendix).

Clinicians also need to be familiar with the advantages, disadvantages and accuracy of the diagnostic test(s) they employ. There is controversy and healthy debate within avian medicine concerning many of the tests that are currently in use. Examples include:
• Are fecal Gram stains an appropriate diagnostic test to use on healthy patients (see Chapter 4, Nutritional Considerations, Section II Nutritional Disorders)?
• What is the significance of yeast in a Gram’s stain?
• How should one interpret cloacal and choanal cultures? Should these cultures be routinely performed?
• Should zinc levels be assessed in patients not showing clinical signs consistent with zinc toxicosis?
• Can a diagnosis of zinc toxicosis be made from a single blood level evaluation?
• Can aspergillosis be diagnosed or ruled out in a patient based solely on serologic tests or culture?
• How accurate is the differentiation between species of *Mycobacterium* via serology? What is the true zoonotic potential of *Mycobacterium avium*? Should birds diagnosed with this disease be treated?
• Can disease be diagnosed from a positive DNA or PCR test on an asymptomatic patient?
• What is the appropriate interpretation of plasma electrophoresis?
• In what cases are biopsies (eg, renal, hepatic, and pancreatic) warranted? What is the risk/benefit ratio?
• Should crop biopsies be obtained for potential diagnosis of PDD?
• Is skin testing for birds sufficiently advanced to yield clinically useful information?

As we move into the 21st century, it may no longer be sufficient to just have a textbook as a reference on these issues and others. Access to discussion lists on the Internet is an invaluable tool for keeping abreast of current issues. Topics are often discussed on the Internet several years before they appear in even the most recent textbook. As with all non-peer reviewed information, accuracy may be in question. It is important to trace information to the original source to adequately evaluate the material. Journals, educational CDs, wet labs, annual conferences and regular discussions with colleagues also contribute to the maintenance of current knowledge. Conversely, a solid knowledge of the basics of avian anatomy, physiology and disease generally requires more in-depth study than can be obtained through the above sources. A combination of core textbook study, experience, and Internet and journal-based current information will yield the optimal breadth and scope of knowledge necessary for avian practice.

Once again, “you will miss more by not looking than you ever will by not knowing.” It is only by a careful evaluation of the patient’s history, a thorough physical examination, and the judicious use of appropriate diagnostic tests that the clinician can arrive at the correct diagnosis and implement successful treatment.
BODY CONDITION

Body weight _______ g

Hydration: □ Normal

   □ <5%  □ 5-10%  □ >10%

Emaciation: __________________________________________ □ yes □ no

Underweight: __________________________________________ □ yes □ no

(Percent or by how many grams? ______% _______ g)

Amount of body fat: □ None □ Trace □ Light □ Obese

Lipoma(s): □ None □ Trace □ Light □ Obese

Where located? _________________________________________ □ yes □ no

BLEEDING

IF BLEEDING IS OR HAS BEEN PRESENT

Bleeding/bruising of

Sternum: _____________________________________________ □ yes □ no

Distal wing: __________________________________________ □ yes □ no

(Note: bleeding from wing tips may be from skin tears, bruising or damaged blood feathers and these must be differentiated)

Skin: _______________________________________________ □ yes □ no

Location: _____________________________________________

Beak: _______________________________________________ □ yes □ no

If yes from beak tip, trauma? ____________________________ □ yes □ no

Bite wound: __________________________________________ □ yes □ no

Skin at commissure: ________________________________ □ yes □ no

Blood feathers: ______________________________________ □ yes □ no

Cloacal blood

Frank red blood in feces ______________________________ □ yes □ no

Occult blood in feces ________________________________ □ yes □ no

Black feces ________________________________________ □ yes □ no

Frank blood from cloaca independent of droppings ________ □ yes □ no

Hemolyzed blood in urine ______________________________ □ yes □ no

Occult blood in urine ________________________________ □ yes □ no

“Chocolate milk” methemoglobin in urine ______________ □ yes □ no

FEATHERS

Clipping of Wings

Is bird currently full-flighted? __________________________ □ yes □ no

Owner declines clipping: ______________________________ □ yes □ no

Wing clipped: Now ________________________________ □ yes □ no

Previously _____________________________________ □ yes □ no

Wing clipped: Right ________________________________ □ yes □ no

Left ___________________________________________ □ yes □ no

Both __________________________________________ □ yes □ no

Feather Structure/Color

Abnormal molt: _____________________________________ □ yes □ no

Describe __________________________________________

Chronic pinfeathers that fail to open: ___________________ □ yes □ no

Is there retained keratin in the feathers of head? ________ □ yes □ no

Feathers of body ___________________________________ □ yes □ no

Saw-toothed edges to feathers (failure to zip) __________ □ yes □ no

Broken, malformed or bent feathers: ___________________ □ yes □ no

Lack of powder down when applicable: ________________ □ yes □ no

Dull appearance to feathers __________________________ □ yes □ no

Stained or dirty: ____________________________________ □ yes □ no

Stress lines/bars: __________________________________ □ yes □ no

   □ Generalized □ Localized

Flexibility of feather at 180° tip to base: (test of feather integrity)

   □ Breaks when bent ______________________________□ yes □ no

   □ Bends and remains bent _________________________ □ yes □ no

   □ Indents when flexed ____________________________ □ yes □ no

   □ Straightens back to normal when released ________ □ yes □ no
Are there malcolored feathers (abnormal for species, i.e., black on normally green or blue feathers, pink or red feathers; yellow coloration to normally blue, green or white feathers; white discoloration of hyacinth feathers; red pigment in grey feathers). □ yes □ no
If yes, describe (color, location, onset):

Over-preening, picking, or other feather destructive behavior □ yes □ no
Feather dystrophy □ yes □ no
Multiple feathers in follicles □ yes □ no

**BEAK**
Is beak symmetrical. □ yes □ no
If no, describe abnormality (scissors beak, prognathism, beak trauma, groove in beak from naris (previous rhinitis, other))

Overgrown □ yes □ no
Friable □ yes □ no
Hyperkeratinization □ yes □ no
Small scratch abrasions from concrete perch evident on beak □ yes □ no

**NAILS**
Missing nails □ yes □ no
List:
Abnormally curled □ yes □ no
Otherwise deformed □ yes □ no
If so, describe:

**SKIN**
Flaking □ yes □ no
Pruritic □ yes □ no
Other lesions (erythema, excoriation, scabs, lacerations, necrotic areas, etc.) List and see diagram:

Cutaneous or subcutaneous masses □ yes □ no
Loss of normal foot patterns (thin shiny skin) □ yes □ no
Where located:
Pododermatitis □ yes □ no
Where located and degree
Self-cannibalized (mutilation) □ yes □ no
Where located:
Burn □ yes □ no
Where located:
Bite wounds □ yes □ no
Where located:
(Note: with a history of an encounter with a dog or cat, one should assume that a bite wound has occurred whether or not a wound is detected)

**UROPYGIAL GLAND**
Is a uropygial gland normally present or absent in this species? □ yes □ no
If present, is the uropygial gland normal in size and symmetry □ yes □ no
Able to express small amount of sebum from papilla □ yes □ no

**AXIAL SKELETON**
Is the spine completely immobile □ yes □ no
If mobile, identify areas of bruising:

**ABAXIAL SKELETON**

**Wings**
Symmetrical at rest (i.e., no wing droop) □ yes □ no
Bilaterally symmetrical on extension □ yes □ no
Symmetrical range of motion □ yes □ no
Pain on palpation, extension or flexion □ yes □ no
Swelling or thickening of any joints □ yes □ no
Skin of patagium healthy and elastic □ yes □ no

**Legs**
Tibiotarsal length □ yes □ no
Symmetry of legs when extended □ yes □ no
Range of motion of leg joints - bilaterally symmetrical □ yes □ no
Pain on extension or flexion □ yes □ no
Weakness of grip when perched □ yes □ no
Symmetrical grip strength □ yes □ no
Favoring one leg when perched or ambulating □ yes □ no
Feet abnormally warm □ yes □ no
Posture (erect, drooped, unstable) □ yes □ no
If yes, describe:

**Toes**
Toes missing □ yes □ no
Which one(s):
Toes deformed/luxated □ yes □ no
Which one(s):

**Sternum**
Carina of keel - smooth, straight □ yes □ no
Breast muscle bilaterally symmetrical □ yes □ no

**ABDOMINAL PALPATION**
Normal or increased sterno-pubic distance □ yes □ no
Palpable fluid in sterno-pubic area □ yes □ no
Severity/extent of fluid?
Masses palpable in sterno-pubic area □ yes □ no

**RESPIRATORY/CARDIOVASCULAR**

**Nares**
Dirty feathers over nares □ yes □ no
Nasal discharge □ yes □ no
Character:
Nares asymmetrical □ yes □ no
Describe:
Dry (lith), hard mass in nares □ yes □ no
Infraorbital sinus swollen □ yes □ no
Describe:
Excessive sneezing □ yes □ no

**Dyspnea** □ yes □ no
If yes, characterize the dyspnea:

Is neck extended and does the bird vocalize with inspiratory dyspnea □ yes □ no
Is there increased abdominal movement □ yes □ no
Open mouth breathing □ yes □ no
Tail-bobbing □ yes □ no
Panting with exercise □ yes □ no
Cessation of panting within 2-3 minutes □ yes □ no
ORAL EXAMINATION

Eyes
- Symmetrical size when viewed head-on: yes/no
- Redness or hyperplasia of conjunctiva: yes/no
- Corneal opacity: yes/no
- Iris color consistent with age, species and sex: yes/no
- Pupillary light response: yes/no
- Iris color consistent with age, species and sex: yes/no
- Normal numbers of digestive bacteria
- Underdigested food in feces: yes/no
- Change in feces color: yes/no
- Increased liquid in urine: yes/no
- Increased powder in urates: yes/no
- White, fluffy droppings: yes/no

Ears
- Presence of symmetrical openings: yes/no
- Discharge or matting of feathers: yes/no
- Pruritus, excessive scratching at ears: yes/no
- Fluid or material visible beneath tympanic membrane: yes/no
- Head tilt: yes/no
- Nasal or tracheal noise/fluid/wheeze: yes/no

Auscultation
- Respiratory Rate ______ Heart Rate ______
- Cardiac murmur: yes/no
- Arrhythmia: yes/no
- Description:
- Air sacs audible: yes/no
- Description:
- Lung sounds audible: yes/no
- Description:
- Nasal or tracheal noise/fluid/wheeze: yes/no
- Description:

NEUROLOGIC - SENSORY

Eyes
- Presence of symmetrical openings: yes/no
- Redness or hyperplasia of conjunctiva: yes/no
- Corneal opacity: yes/no
- Iris color consistent with age, species and sex: yes/no
- Pupillary light response: yes/no
- Iris color consistent with age, species and sex: yes/no
- (Note: consensual response is not present in birds, and voluntary constriction can occur, so interpret carefully. Also see Chapter 17, Evaluating and Treating the Nervous System for comments on bone porosity and consensual reflex)

Ears
- Presence of symmetrical openings: yes/no
- Discharge or matting of feathers: yes/no
- Pruritus, excessive scratching at ears: yes/no
- Fluid or material visible beneath tympanic membrane: yes/no
- Head tilt: yes/no
- Nasal or tracheal noise/fluid/wheeze: yes/no

Digestive System

ORAL EXAMINATION

Choana
- Choanal papilla normal: yes/no
- Papillomas in oral cavity: yes/no
- Presence of plaques: yes/no
- Abscesses near glottis at base of tongue: yes/no
- Infundibular cleft visible: yes/no
- Infundibular cleft swollen or discharge present: yes/no
- Mucous membrane color appropriate for species: yes/no
- Sublingual area abscess/masses: yes/no

Tongue symmetrical and mobile: yes/no
- Submandibular space abscess: yes/no
- Wounds: yes/no
- Lesions/burns/fistulas on crop skin: yes/no

Regurgitation
- Passive or active regurgitation noted: yes/no
- Passively regurgitates water when handled: yes/no
- Delayed crop emptying: yes/no
- Food retained in crop/crop distention: yes/no
- Odor to crop contents: yes/no
- Fungal or yeast hyphae in Gram's stain: yes/no

Droppings
- Odor to feces: yes/no
- Decreased/increased amount: yes/no
- Decreased number of bacteria: yes/no
- Delayed crop emptying: yes/no
- Undigested fiber: yes/no
- Diarrhea: yes/no
- Pasting of vent: yes/no

Gram’s Stain of Droppings
- Normal numbers of digestive bacteria
- (100-150/high power field): yes/no
- More than 5-10 yeast per field: yes/no
- More than 1% Clostridium spp. present: yes/no
- Undigested fiber: yes/no
- RBCs in Gram’s stain: yes/no
- WBCs in Gram’s stain: yes/no
- Megabacteria (macrophagobiosis) in Gram’s stain: yes/no
- Fungal or yeast hyphae in Gram’s stain: yes/no

Cloaca
- Vent lips normal: yes/no
- Diameter of vent and tone normal: yes/no
- Mucosa of cloaca normal thin, clear tissue: yes/no
- Irritation, ulceration, cobblestone appearance or papillomas noted: yes/no

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