Veterinary Perspectives on Raptors Maintained for Various Purposes or A Hawk is a Hawk is a Hawk - NOT!

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The avian veterinarian encounters raptorial birds - falcons, hawks, eagles, and owls - as patients under one of five common circumstances. The raptor may 1) be an injured, wild bird and has been presented for treatment and rehabilitation to the wild, or it may be maintained for 2) the sport of falconry, 3) exhibit in a zoo, 4) educational purposes, or 5) captive breeding.

For whatever reasons and from whatever circumstances they have come under your care, some considerations are common to them all. The infectious and non-infectious diseases to which the raptor maintained for falconry is at risk are qualitatively those to which the other raptors are at risk during their period of captive maintenance. The relative risks imposed by the common spectrum of disease are, however,significantly and quantitatively different among the different groups of birds. The differences exist as a result of 1) the degree of individual attention each individual receives, 2) the specific management practices to which each is exposed, and 3) the degree to which different captive management strategies are employed to encourage or discourage social accommodation to humans.

The Falconry Bird:

The falconer requires that his raptor not only become accustomed to and undisturbed by his presence and activities, but enter into cooperative hunting behaviors which depart greatly from its natural inclinations. The raptor must allow its recovery by the falconer after a successful or unsuccessful flight at game, permit the falconer to take away its hard-won prey , and then carry out another pursuit of game with no apparent "hard feelings" toward its human partner. To these ends every interaction of falconer and hawk is calculated and executed to maximize the likelihood of willing and cooperative behavior on the part of of the bird. First, the bird must be thoroughly convinced that the falconer is its consistently reliable means of satisfying its most basic need - relief of hunger. Once that has been established, other

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behaviors deemed laudable in a hunting hawk are trainable thru positive reinforcement with food.

The foot and talons of the raptor must be intact and functional in order that prey may be grasped and killed. Likewise, the plumage, especially the remiges (primary and secondary flight feathers) and the retrices (tail feathers) must be intact and not weakened by segmental dysplasia ("stress marks"). A bird which has suffered episodes of stress during feather growth and has many feathers weakened by segmental dysplasia must be held thru the next year's molt to grow normal plumage, or have its feathers repaired by the tedious process of "imping" - splicing normal feathers into the quill of the damaged ones.

Thereafter, the *sine qua non* of the falconer's success is that the bird be in peak athletic condition when it is flown at game. A variety of physical conditioning techniques are employed, but all basically rely upon repeated flights during which the bird gains altitude - i.e. does physical work. Level flight provides little muscular and cardio-pulmonary conditioning unless it is directed into a stiff wind. The practice of Arab falconers to make their birds repeatedly fly vertically from the ground to the up-raised hand accomplishes rapid improvement in athletic condition.

Thus, the falconer enters into an intimate association with the individual bird and must be continually aware of its weight, degree of muscling, degree of hunger (which translates as willingness to pursue game or to be taught some other desirable behavior), the relative nutrient values of different foods and how they influence the hawk's condition and behavior, and the bird's tendency to fly during periods of high versus low atmospheric pressure and under different weather conditions. A bird that is well socialized or socially imprinted upon humans can generally be be flown in a "higher condition" (heavier and less hungry) than can a less-well socialized bird.

The Breeding Project Raptor:

Hawks, falcons, eagles, and owls maintained in breeding programs are generally managed by experienced falconers who are well aware of raptor health maintenance in general and particularly of the hazards of overnutrition. It is interesting to this pathologist that the raptors that have most frequently provided the opportunity to observe senescent changes and diseases of old age have been those submitted from breeding projects. Such longevity of birds in breeding projects speaks well of the overall management practiced therein.

The Caged Raptor:

At the opposite end of the spectrum from the falconry bird, is the raptor maintained in a cage. Although most zoos attempt to provide the greatest possibility for flight exercise and the most nutritious of whole-animal or synthetic diets, the caged eagle, hawk, or owl benefits from less exercise in a year than its counterpart regularly flown in falconry does in a week. As a result of feeding *ad libitum*, the zoo raptor is often

moderately to severely obese. Pathological obesity is more common among gang-caged raptors; if several raptors are in one cage or aviary it is impossible to limit one bird's food intake without running the risk of starving others, so all are fed *ad libitum*.

The "Education" Bird:

The raptors usually maintained as "education birds" are previously wild birds whose injuries were of such a nature that rehabilitation and release were not possible. An ankylosed or amputated wing, foot, or leg is the usual excuse for keeping the "education" bird jessed, leashed, and carried about on the gloved fist to show to school children. Unfortunately, many of these birds are kept merely as unusual, attention-getting pets by otherwise well-meaning folk who have little knowledge of the management and nutritional needs of captive raptors.

Diets of unsupplemented meat are, even in this enlightened age, still fed by the ignorant with the expected consequences of hypovitaminosis-A, hypovitaminosis-D, and mineral malnutrition. One-footed and one-legged birds commonly exhibit various degrees of bumblefoot from continued excessive weight-bearing by the remaining foot on inappropriate perch surfaces. They commonly are obese from overfeeding and not uncommonly show evidence of plumage and cere damage from inappropriate caging.

There are, in my humble opinion, far more "education birds" maintained under that guise than are ever used for that purpose.

The "Rehabilitation" Raptor:

Special considerations apply to the injured, wild raptor being treated for its injuries and undergoing rehabilitative conditioning prior to release. Clearly, during the period of intensive medical and surgical intervention, no meaningful attempt to limit the bird's contact with man can be imposed; daily handling, examination, and treatment are the rule. To some extent, the bird inevitably becomes accustomed to man's presence and come to recognize the caretaker as its source of food. After successful medical or surgical treatment the bird is not in adequate physical or behavioral condition for release.

Its feet, talons, and plumage require the same degree of perfection as do those of the falconer's charge; if damaged irreparably, release is not an ethical or humane option. The rehabilitation bird, like the falconry bird, must undergo intensive athletic conditioning with progressively more strenuous exercise before it can be expected to survive release.

Unfortunately, many raptor rehabilitators are, consciously or unconsciously, frustrated falconers and condition the birds using traditional falconry techniques. Physical condition improves, and the bird is finally deemed physically able once more to compete in its natural habitat. Release of such a bird, however, ignores the significance of its unnatural accommodation to man. Such a bird, once released, is

likely to sit atop a power pole watching calmly while an erstwhile Nimrod walks within rifle or shotgun range and takes aim. The physically healthy, well conditioned, physically rehabilitated raptor has succumbed to the effects of iatrogenic desensitization to man. If that's not a fatal behavioral abnormality, I don't know what is!

An alternative to traditional falconry technique and one that not only promotes rapid improvement in muscular and cardio-pulmonary condition but also counters the effects of accommodation to humans does exist (although most rehabilitators think it's a lot less fun). A large flight cage is constructed that is higher than it is long or wide. The perching poles or shelves are placed high in the cage; the birds are frequently fed small amounts of food on the ground. Every flight from the ground to perch accomplishes far greater physical conditioning than does a daily session of making horizontal flights from a perch to the falconer's glove.

One wall of the conditioning flight cage is solid and has ports thru which the birds may be approached, fed, and observed without detecting human presence. On a daily or more frequent basis the rehabilitator enters the flight cage for the single purpose of frightening the birds; it is the only time the birds view a human. A white umbrella, vigorously and repeatedly opened and closed, quickly elicits avoidance behavior on the part of the birds when a human is in view. Prior to release the birds should be caught and weighed to determine their recovery from the obesity that is an almost inevitable consequence of overfeeding during the medical treatment period. The birds should be made as anxious and upset as possible at the time of weighing and examination.

In the case of falconry birds and those undergoing rehabilitation the major stressors that predispose to decreased resistance to a variety of infectious diseases are asocial stress (early in falconry training, early and late in the course of training and rehabilitating injured birds) and the stress of intermittent periods caloric deprivation imposed to improve response to food during the period of training and physical conditioning. The latter is considered a major predisposing factor in raptors that develop respiratory tract mycotic infections, most often aspergillosis. Conversely, pathological obesity resulting from a combination of inadequate exercise and overnutrition is a common malady of caged raptors and others deprived of exercise and fed excessively.

The falconry bird would seem to run the greatest risk of inadvertent exposure to avian pathogens, and , indeed, is at risk of infection by *Trichomonas* sp., *Mycobacterium avium , Salmonella* sp. and so-called falcon herpesvirus (which is actually a herpesvirus carried asymptomatically by pigeons). However, any raptor under captive management may suffer exposure to a variety of pathogens depending upon the food offered. Commercial poultry are a common source of *Salmonella* sp. and are suspected of being the source of an adenovirus that caused fatal infection in captive American kestrels. The ubiquitous rock dove and its domestic descendant, the pigeon, are easily trapped and are used as food for captive raptors; they are common asymptomatic carriers of *Trichomonas sp.*, *Salmonella typhimurium*, and pigeon herpesvirus.

Bumblefoot ranges in severity from focal hyperkeratosis at weight-bearing sites on the metatarsal and digital pads, to local ulcerative pododermatitis, to severe, septic, fibrino-necrotic pedal panniculo-tendino-arthro-synovitis and osteomyelitis. Two factors may act independently or in concert to incite bumblefoot. Inappropriate perch and substrate surfaces may cause excessive abrasion of the plantar epidermis and permit bacterial contamination of dermis and subcutis. Perch surfaces which are, on the other hand, too smooth can have a polishing effect on the plantar skin and result in focal hyperkeratosis, or "corn" formation at points of weight-bearing. Pressure of the corn can devitalize deeper tissue; cracking of the corn or fissuring of its junction with normal, adjacent skin permits bacterial infection. It should be noted that hypovitaminosis-A predisposes to corn formation and may play either a primary or contributory role in the pathogenesis of bumblefoot. In falconry birds the predominant factor in bumblefoot is inappropriate perch surfaces. In other raptors, increased weight-loading of the foot from obesity, perch surface problems, and hypovitaminosis-A are the frequent offenders.

In summary, it behooves the avian clinician to elicit from the client a detailed history not only of the raptor's illness, but also of the purpose for which the bird is being maintained and details of the circumstances of its environment, nutrition, and general management.