

Restraint and Handling of Wild and Domestic Animals

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PART 1

General Concepts

CHAPTER 1

Introduction

Restraint varies from confinement in an unnatural enclosure to complete restriction of muscular activity or immobilization (hypokinesia).⁴ Both physical and chemical restraint are now practiced. Anciently only physical restraint was utilized. Just when man learned of chemical immobilization (poison arrows) is not known, but it antedates recorded history.

The physiological effects of restricted movement have been studied. For centuries, extended bed rest for ill or post-surgical human patients was practiced—to the detriment of the patient. Now it is known that many deleterious effects result from this type of immobility. Solitary confinement is known to be extremely devastating for a human being. Similar confinement of social animals produces severe psychological stress.⁴

Restraint practices evolved with the domestication of animals for food, fiber, labor, sport, and companionship.^{2,4,6,7,13} Domestication necessitated special husbandry practices. As people began to minister to animals' needs, they found it necessary to restrict activity by placing them in enclosures. If animals resisted when wounds were treated or medication administered, it was necessary to further restrain them. Trial and error combined with the shared experiences of fellow human beings ultimately produced satisfactory practices.^{2,3}

A person who undertakes to restrict an animal's activity or restrain the animal is assuming a responsibility that should not be considered lightly.^{4,10} Each restraint incident has some effect on the behavior, life, or other activities of an animal. From a humane and moral standpoint, the minimum amount of restraint consistent with accomplishing the task should be used. This should become a maxim for persons who must restrain animals.

Each time it is proposed to restrain an animal, the following questions should first be asked: Why must this animal be restrained? What procedure will produce the greatest gain with the least hazard? When will it be most desirable to restrain the animal? Who is the most qualified to accomplish the task in the least amount of time and with the least stress to the animal? What location would be best for the planned restraint procedure?

WHY RESTRAINT

Everyone must agree that domestic animals require transporting, medicating, and handling. Some contend that

all wild animals should be free ranging, without human interference. This philosophy seems naive in the present time.

Wild animals kept in captivity require special husbandry practices. They must be transported, housed, and fed. If they become ill, they must be examined and treated.

Free-ranging animals may have to be translocated, as was necessary when the Kariba dam was built in Southern Rhodesia. The translocation of free-ranging wild animals has become a common method of wild animal management for reducing overpopulation or building a population in a new location. The reintroduction of captive-bred wild animals to a former native habitat or a revitalized habitat is now routine. All of these animals must undergo significant screening, which in turn requires restraint, transport, and eventual release. Diseases in wildlife populations must be monitored, since some have far-reaching consequences for the health of domestic livestock and human beings. Many wild populations are managed. As far as wild animals are concerned, any captive situation involves some form of restraint.⁴

GENERAL CONCEPTS

Four basic factors should be considered when selecting a restraint technique: (1) Will it be safe for the person who must handle the animal? (2) Does it provide maximum safety for the animal? (3) Will it be possible to accomplish the intended procedure by utilizing the suggested restraint method? (4) Can constant observation and attention be given the animal following restraint until it has fully recovered from the physical or chemical effects? Once these four factors are evaluated, a suitable technique can be selected.⁴

Many wild animals can inflict serious, if not fatal, injury. The first concern when dealing with wild animals should be the safety of human beings. To think otherwise is foolhardy, and those who grandstand or show off by manipulating dangerous animals without benefit of proper restraint may injure themselves or bystanders. Those who own or have administrative responsibility for wild animals must recognize that the animal, no matter how valuable, cannot be handled in such a way as to jeopardize the safety of those who must work around it. Techniques are known that when properly used can safeguard both animal and operator.

It is desirable to build proper facilities into areas where wild animals must be kept so that these handling procedures

can be safely carried out. It is foolish to pay thousands of dollars for a zoo specimen if facilities are not available in which to handle or restrain the animal for prophylactic measures or treatment of disease or injury.

Certain wildlife populations have become so depleted they are near extinction. We should not practice on these species. It is not economically feasible, nor is there sufficient animal life for each person to gain through personal experience the intimate knowledge of various behavioral patterns and characteristics to enable them to develop expertise in the successful use of restraint procedures. Therefore we must learn from the experiences of others who have dealt extensively with one species or family of animals and utilize their knowledge of the more successful techniques.

To be successful in working with animals, one must understand their behavioral characteristics and the aspects of their psychological makeup that will allow for provision of their best interests. Successful restraint operators must understand and have a working acquaintance with the tools of restraint. They must understand the use of voice, manual restraint, and chemical restraint. Special restraint devices and their application should be thoroughly understood. These are explained in the text, with a major emphasis on physical restraint methods. It has been my experience that an operator who really understands what can be done with physical restraint can build upon this information to carry out more successful chemical immobilization—if it is indicated.

The general principles of chemical restraint will be outlined and specific tables presented to give current usage of chemical restraint agents in various classes of animals. There is a marked swing toward the use of chemical restraint when working with wild animals. Pharmaceutical companies are carrying out research on newer and better restraint agents. This has led to the marketing of new products on a continuing basis. This ongoing activity may lead to the false assumption that applying physical restraint techniques is no longer necessary. Nothing could be further from the truth.

Just as the indiscriminate use of antibiotics may cloud test results and cause the inefficient clinician to make an inaccurate diagnosis, indiscriminate chemical restraint can likewise produce clinical aberrations and is often hazardous to the animal.

Chemical restraint is an extremely important adjunct to physical restraint practices, particularly in regard to wildlife. However, it is far from universally ideal and cannot replace special squeeze cages and other specially arranged facilities for wild animals, which allow them to be approached without imposing undue stress or hazard. Those who work extensively with wild animals know that no single chemical or group of chemical restraint agents fulfills all of the safety and efficacy requirements to qualify for universal application.

The decision whether to use chemical or physical restraint is based on the skill of the handlers, facilities available, and the psychological and physical needs of the species to be restrained. No formula can be given. If in doubt, someone who has had experience should be consulted.

WHEN TO RESTRAIN

One does not always have a choice of times when restraint should be carried out. Emergencies must be dealt with immediately. In the majority of instances, however, planning can be done.

Environmental Considerations

Thermoregulation is a critical factor in many restraint procedures. Hyperthermia and, more rarely, hypothermia are common sequelae. Heat is always generated with muscle activity. During hotter months of the year, select a time of day when ambient temperatures are moderate. Special cooling mechanisms such as fans may be required. Place restrained animals in the shade to avoid radiant heat gain. Conversely, use the sun's heat if the weather is cool. Avoid handling when the humidity is 70–90%. Cooling is difficult under such circumstances.

Take advantage of light and dark. Diurnal animals may best be handled at night when they are less able to visually accommodate. Nocturnal species may be more easily handled under bright lights.

Behavioral Aspects

An animal's response to restraint varies with the stage of life.^{4,5,6} A tiger cub grasped by the loose skin at the back of the neck will curl up just as a domestic kitten does. Such a reaction is not forthcoming with adults.

A female in estrus or with offspring at her side reacts differently than at other times. Males near conspecific estrus females may be aggressive.

Male cervids (deer, elk, caribou) go into rut in the fall of the year. By this time the antlers are stripped of velvet and are no longer sensitive. Now the antlers are weapons. Although a handler may safely enter an enclosure of cervids during the spring or summer, it may be hazardous to do so during the rutting season.

Hierarchical Status

Most social animals establish a pecking order. A person trying to catch one animal in an enclosure may be attacked by other members of the group. Dominant male primates are especially prone to guard their band. I have seen similar responses in domestic swine and Malayan otters.

Animals removed from a hierarchical group for too long a time may not be accepted back into the group. At the very least they will have lost a favored position and must win a place in the order.

Infants removed from the dam and kept separated for more than a few hours may be rejected when reunited. Species vary greatly in this behavioral response. An infant Philippine macaque was accepted back by the mother after a 3-month separation. Some species may reject the infant if it has human scent on it. A further hazard of hours-long separation occurs if the dam has engorged mammary glands. The hungry infant may overeat and suffer from indigestion.

Health Status

Recently transported animals are poor restraint risks. Transporting in crates, trucks, and planes is a stressful event. The longer the journey, the more stress. The method of handling and type of accommodations used in transport are also important. If possible, allow the animal time to acclimate to a new environment before carrying out additional restraint.

Sick domestic animals are routinely handled for examination and treatment. It may be more difficult to evaluate the health status of wild animals. Standard techniques of measuring body temperature or evaluating heart and respiratory rate may yield meaningless results because of excitement. Even though a captive wild animal may exhibit some signs of a disease, it may be prudent not to handle it. The following incidents illustrate two such cases.

A nine-year-old child wrote a letter to the president of the United States following a visit to a small zoo. She told him the yak had long hair and long toenails and asked why the zoo didn't give it a haircut and trim its toenails. The letter was answered in an admirable way by a zoo director who explained that the long hair was normal and that it might be more dangerous to catch the yak than to let it be slightly uncomfortable with the long toenails.

In another situation a bison had dermatitis. A decision was made to catch it to check the lesion. The animal died of overexertion during the process.

Deciding when to intervene is difficult. Clinical experience may be the governing factor.

Territoriality

Domestic animals differ in response to handling depending on where they are. A veterinarian attempting to handle a dog in the owner's home will find a more defiant individual than if the same dog is placed in the strange environment of a hospital examining room. Cattle, horses, swine, and sheep likewise respond differently in their own corral or pen than if in a strange place. An animal can sometimes establish its territory rather quickly. A dog placed in a hospital cage may defend it as "home" within a few hours. After removal from the cage the dog may become more docile.

Many wild animals are highly territorial. In order to work on such animals they must be moved to a new enclosure.

HUMANE CONSIDERATIONS

It is incumbent upon a person who takes the responsibility of manipulating an animal's life to be concerned for its feelings, the infliction of pain, and the psychological upsets that may occur from such manipulation.^{1,2,3,10,11} One must, however, be able to be objective about such manipulations and realize that the manipulation is for the best interests of the animal. Some feel that to restrict an animal's activity in any way is immoral and inhumane. At the opposite extreme

is the person who has a total disregard for the life of animals.

Pain is a natural phenomenon that assists an animal to remove itself from danger in response to noxious influences. No animal is exempt from experiencing pain.¹ Pain is relative; individual persons and animals experience pain in varying degrees in response to the same stimulus. Pain can become so intense, however, that an animal may die from shock induced by pain. We should not minimize the effect of pain, nor should we overemphasize it. Some persons cannot cope with pain in themselves, their children, or their pets.

Working as a medical technologist while a student in veterinary school, I frequently saw mothers bring children into the laboratory for a blood count and tell them, "This isn't going to hurt." Nonsense, it does hurt. Why not face the fact and learn to cope with it? We all experience numerous painful stimuli every day. We live through it and so do animals.

Sensitive people do not like to inflict pain. Veterinarians and others who manipulate animals are morally and ethically obligated to minimize pain in the animals they handle. The animal under restraint is incapable of escaping from pain. The handler must perceive the feelings of the animal and take appropriate steps to alleviate pain.^{1,4}

Some of the tools used in restraint practices involve the infliction of mild pain to divert the animal's attention from other manipulative procedures. The equine twitch is an example. The chain is placed over the nose of the horse and twisted down, causing a certain degree of pain. If the horse is preoccupied with the mild pain of the nose, nonpainful manipulative procedures can be carried out elsewhere on the body.

Every restraint procedure should be preceded by an evaluation as to whether or not the procedure will result in the greatest good for that animal. Animals have feelings. People should not look upon animals as machines to be manipulated at will.

It is interesting to peruse a 1912 book on the restraint of domestic animals.¹² One can not read the book without feeling that some of the procedures recommended would cause considerable unpleasantness to the animal and in some cases be inhumane. However, some of the techniques used 96 years ago for physical restraint are similar to those used currently, although modern considerations for behavior and training have diminished the necessity of "brute force."

Albert Schweitzer was one of the foremost proponents of the concept of reverence for life.¹⁰ Human beings may have supreme power over other forms of life on this earth, but unless they recognize a dependence upon other life forms and have an appreciation for their position in the scheme of things, they will fail to develop an attitude that will result in humane care for animals under their charge.¹¹ Persons who seek to work in animal restraint would do well to read some of the literature of the humane movement so they might become more empathetic in their approach to procedures that involve the infliction of pain and understand the emotional trauma associated with restraint.¹⁻⁷

Plan each restraint episode in detail. Anticipate potential problems. Provide equipment and facilities commensurate with the procedure. Time is crucial—get the job done fast. Follow through with observation and care until the animal is back to normal. If you lack experience in handling a given species, ask for help from someone who does have the experience.

Remember: (1) Safety to the handler. (2) Safety to the animal. (3) Will it do the job? (4) Get the animal back to normal.

DOMESTICATION

Approximately 35 of the nearly 50,000 species of vertebrates have adapted to humans' needs for food, fiber, work, sport, and beauty, and are considered to be domesticated (Tables 1.1, 1.2). All but three or four species were living in

harmony with humans before the time of recorded history.^{3,6,13}

Domestication is an evolutionary process that involves a gradual (thousands of years) change in the gene pool of a species to allow adaptation to an artificial environment. Domestic animals must cope with buildings, fences, crowding, confinement, lack of privacy, changed photoperiodicity, altered climatic conditions, and different food.

Genetic alteration during the evolutionary process took place by selection for specific characteristics that were economically or esthetically pleasing to humans. Docile animals were selected over aggressive individuals. This may require only a single gene mutation. Other economically important characteristics include higher fertility, rapid growth, efficient food conversion, higher milk production, and disease resistance. Farmers have often selected polled cattle over horned breeds to minimize injury.

There was definite selection to reduce or eliminate undesirable wild characteristics such as territoriality, intra-specific dominance, elaborate food identification and gathering mechanisms, intricate courtship behavior, and fear of humans. This constant selection yielded animals that are much easier to handle. They tolerate the presence of humans without a flight response. If physically restrained they rarely fight to the death, as do some wild species.

Mankind has been able to change the morphology and behavior of some domestic animals to the degree that it is difficult to determine what their wild counterpart might be like. Many breeds of livestock and companion animals have been produced. An overview, with excellent illustrations of breeds of livestock, is found in Sambraus.⁸ He lists 55 breeds of cattle, 41 of sheep, 17 of goats, 62 of horses, 4 of donkeys and 15 of swine. There are more than 100 breeds of dogs and cats.

Asian elephants *Elephas maximus* were considered to be a domestic animal in years past. Surely the elephant has been in the service of humans for millennia, but it nevertheless lacks some of the criteria for domestication. Currently the elephant is classified as being in domesticity.

Two insect species are considered domestic animals, those being the European honeybee *Apis mellifera* and the silkworm *Bombyx mori*.

TABLE 1.1. Domestic mammals

Common Name	Scientific Name	Family	Order
Mouse	<i>Mus musculus</i>	Muridae	Rodentia
Rat	<i>Rattus norvegicus</i>		
Guinea pig	<i>Cavia porcellus</i>	Caviidae	
Golden hamster	<i>Mesocricetus auratus</i>	Cricetidae	
Rabbit	<i>Oryctolagus cuniculus</i>	Leporidae	Lagomorpha
Dog	<i>Canis familiaris</i>	Canidae	Carnivora
Fox	<i>Vulpes fulva</i>		
Cat	<i>Felis catus</i>	Felidae	
Mink	<i>Mustela vison</i>	Mustelidae	
Ferret	<i>Mustela putorius</i>		
Horse	<i>Equus caballus</i>	Equidae	Perissodactyla
Ass (donkey)	<i>Equus asinus</i>		
Swine	<i>Sus scrofa</i>	Suidae	Artiodactyla
Bactrian camel	<i>Camelus bactrianus</i>	Camelidae	
Dromedary camel	<i>Camelus dromedarius</i>		
Llama	<i>Llama glama</i>		
Alpaca	<i>Llama pacos</i>		
Reindeer	<i>Rangifer tarandus</i>	Cervidae	
Cattle, European	<i>Bos taurus</i>	Bovidae	
Cattle, zebu	<i>Bos taurus</i>		
Yak	<i>Bos grunniens</i>		
Banteng	<i>Bibos banteng</i>		
Gayal	<i>Bibos frontalis</i>		
Water buffalo	<i>Bubalus bubalis</i>		
Musk-ox	<i>Ovibos moschatus</i>		
Sheep	<i>Ovis aries</i>		
Goat	<i>Capra hircus</i>		

TABLE 1.2. Domestic birds

Common Name	Scientific Name	Family	Order
Pekin duck	<i>Anas platyrhynchos</i>	Anatidae	Anseriformes
Muscovy duck	<i>Cairina moschata</i>		
Goose	<i>Anser anser</i>		
Canada goose	<i>Branta canadensis</i>		
Mute swan	<i>Cygnus olor</i>		
Chicken	<i>Gallus gallus</i>	Phasianidae	Galliformes
Ring-necked pheasant	<i>Phasianus colchicus</i>		
Coturnix quail	<i>Coturnix coturnix</i>		
Peafowl	<i>Pavo cristatus</i>		
Guinea fowl	<i>Numida meleagris</i>	Numidae	
Turkey	<i>Meleagris gallopavo</i>	Meleagrididae	
Pigeon	<i>Columba livia</i>	Columbidae	Columbiformes
Budgerigar	<i>Melopsittacus undulatus</i>	Psittacidae	Psittaciformes
Canary	<i>Serinus canarius</i>	Fringillidae	Passeriformes

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