Chemical and Physical Restraint of Wild Animals

STRESS AND MORTALITY

(gallons!) is needed to neutralize the acids produced by the fermentation of plant material in the rumen. Salivation continues in animals that have been immobilized and saliva may be aspirated if the head is not held with the nose downwards and in a position that places the pharynx higher than the mouth opening. Some of the drugs used to immobilize animals promote regurgitation or cause vomition and aspiration.

Ruminants that go down and are not attended to soon thereafter may aspirate their own saliva or ruminal contents that are regurgitated. Xylazine is reputed to cause a relaxation of the sphincter muscle of the ruminal cardia, and regurgitation and aspiration may result. Free-ranging ruminants that are known to be leaving from a waterhole should not be immobilized. Captive animals should not be fed or given water for 36–48 hours before being immobilized. The imidazole group of drugs stimulate the vomiting centre in the brain and commonly cause emesis. They are often used in clinical cases prior to surgery as this effect is beneficial.

An immediate and consequent response is required to prevent complications in cases where regurgitation or vomition take place. Control the position of the head and establish control over the jaws of the animal. It is important to be able to get your hand deep into the mouth if solid material has collected there. Use something to keep the jaws open to prevent injury to your hand and clear the opening of the pharynx. This may not always be possible, particularly when dealing with the larger and more dangerous species. Immediate antibiotic cover should be administered in all such cases.

5.8 STRESS

The father of the concept of ‘stress,’ Hans Selye, made a distinction between the condition in the body (stress) and the causes of the condition (stressors). This has fallen away over time and the term stress has come to mean both the cause and the effect. It is nevertheless important to have an idea of the differences that Selye attempted to highlight. There are a multitude of different possible stressors that elicit a single pattern of response within the body, referred to as stress.

Stress in its classical sense can be divided into three stages:

- Stage of alarm
- Stage of resistance or adaptation
- Stage of exhaustion.

5.8.1 The stage of alarm

The first response to a stressor reflects the perception of the danger or potential for injury, the degree of injury, pain and fear. This stage follows the fight or flight response by the sympathetic system. A hormone ACTH is secreted by the adenohypophysis, and circulates in the blood to reach the adrenal cortex where it stimulates the secretion of corticosteroids into the blood (primarily a hormone called cortisol) (see Figure 5.1).

Cortisol alters cell function and brings about changes in these circumstances, which results in ‘stress’. It is important to realize that cortisol has a vital role in the maintenance of homeostasis and is constantly present in the blood and tissue fluids. The amount of hormone varies depending on the requirements of the system when in a stable state, and often is part of a regular circadian

Figure 5.1: ACTH and cortisol
rhythm, but it increases dramatically as the animal is stressed. Cortisol levels increase also in circumstances of pleasure. The concentration of cortisol rises approximately 15 minutes after a stimulus. The concentrations of adrenergic hormones (catecholamines) rise more rapidly and their effects are almost immediate because of their release, as neurotransmitters, in the synapse.

Cortisol is a ‘permissive’ hormone in its homeostatic function. It is essential for the function of cells and for the effects mediated by other hormones that affect cell function. It mobilizes amino acids from proteins in tissues for the production of energy and modifies immune or allergic responses that are potentially damaging.

5.8.2 The stage of resistance or adaptation

This stage follows the first in which the animal either fights or flees or is captured. The animal survives but the stressor remains. Cortisol levels are higher than those of an animal that is ‘unstressed’. The utilisation of proteins continues, i.e. the hormone has catabolic effects. The function of the immune system is suppressed, some atrophy of lymphoid tissue takes place and the response of leucocytes to foreign proteins is reduced. The animal is more susceptible to disease. Hypertrophy of the adrenal glands will result from the stimulus of higher concentrations of ACTH.

5.8.3 The stage of exhaustion

Prolonged high levels of cortisol take their toll: catabolism and reduced immunity render the animal vulnerable and likely to develop disease or to die suddenly. Gastric ulcers are often seen. The hypertrophic adrenal glands show signs of exhaustion in the form of cellular degeneration.

5.9 SHOCK

The term shock differs from the general meaning ascribed to it in reporting the state of people after some traumatic event. People who have been frightened are often in a state of ‘shock’. In the context of health, it refers to a condition when the blood pressure has fallen dramatically to a level that is life threatening. Blood pressure may fall as a result of loss of blood volume. This can be due to haemorrhage, severe dehydration or severe parasite loads.

Figure 5.2: Black wildebeest (Connochaetes gnou) capture in linear nets. Without the use of tranquillizers administered immediately at the net site, for example haloperidol, stress might result in death at capture or after capture, possibly during transport and after release.
The result of traumatic nerve damage, a severe depth of anaesthesia or toxicity may result in the following forms of shock:

- **Neurogenic shock** results when muscular tone of blood vessels, generally controlled by the sympathetic system, is lost. The increased vessel volume is followed by a drop in blood pressure.

- **Cardiogenic shock** results from the failure of the heart, which may result from (capture) myopathy of the myocardium or as a result of changes in the electrolyte balance in the blood. The development of acidosis in immobilized animals leads to an increased concentration of potassium ions in the blood and this may have severe effects on cardiac rhythm with sudden death as a result.

- **Anaphylactic shock** is a severe and often uncontrolled allergic response, which results in the release of histamine and other vasoactive substances. This leads to dilation of blood vessels and increased permeability of capillaries, resulting in a fatal drop in blood pressure.

- **Septic shock** (blood poisoning) follows the invasion of the blood and the entire system by bacteria from a focus of infection somewhere in the body. The toxic effects result in vasodilation, high fever, reduced cardiac output and death.

### 5.10 MALADAPTATION

Animals that are translocated to an area of habitat not suitable for them and that succumb as a result of disease or malnutrition may be considered maladapted. Examples of this are legion, as often no evaluation is done of the suitability of the habitat for an animal. Springbok in South Africa are often moved to bushveld areas, succumbing to heartwater in a short while. If they were to survive this challenge, they would most likely die because of a climate or habitat to which they are not adapted. Some species have specific habitat requirements.

![Giraffe](image.jpg)

**Figure 5.3:** Giraffe will run hard after darting and unless the induction time to standing or recumbency is short, they will rapidly exhaust themselves. This is the reason why high doses of opioids are used in this species to achieve a rapid effect, but immediate reversal is necessary once the animal is recumbent.
5.11 THE ELEVEN COMMANDMENTS TO PREVENT AND REDUCE STRESS

1. Never capture when it is too hot, during the hottest times of the day, nor during the hot months of the year. It is ideal to capture at temperatures <25 °C but animals can be captured at higher environmental temperatures based on experience and specific circumstances (>30 °C). Heat will increase the chances of compromising the animal if the capture does not go smoothly, so capture should preferably be carried out in the early morning during those months when temperatures are increasing. Use common sense.

2. Do not chase the animals too far or too fast. Be observant as to the situation, especially when operating from a helicopter, do NOT be afraid to stop or back off.

3. Do not shout or scream during capture, remain calm and collected at all times.

4. Do not manhandle the animals. If physical handling is required, be firm and efficient, use tranquillizers prior to handling where appropriate and/or use blindfolds over the eyes.

5. Do not mix different breeding groups. Become familiar with species behaviour and potentially aggressive behaviour towards each other, even under tranquillization.

6. Load and transport as soon as possible and try to avoid offloading certain species at night. Always consider the use of tranquillization prior to transport.

7. Transport animals in maximum comfort. Give special attention to non-slip flooring, ventilation and draughts, standing and lying room, horn space and piping of horns. Reject slippery floors and unsanitary conditions. Try to avoid travelling during cold winter nights and take special precautions for long trips.

8. Separate or tranquillize aggressive animals to prevent hostility and territorial behaviour.

9. Alleviate stress, fear and panic by using tranquillizers when appropriate. Use of long-acting preparations should be considered in some instances.

10. Do NOT overdose with tranquillizers, especially the long-acting preparations; animals may lie down and be trampled upon.

11. Make sure that animals are introduced into suitable and applicable habitat.

(Adapted from Hymie Ebedes)